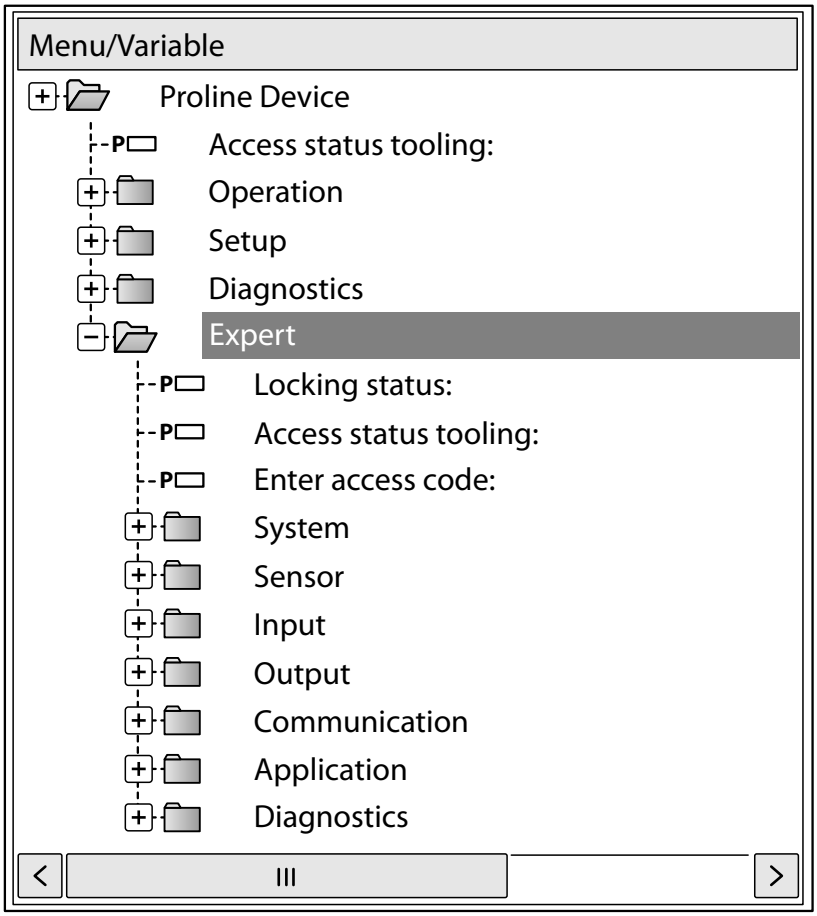
GP01023D/06/EN/01.15
71280338

Valid as of version
01.01.zz (Device firmware)

Description of Device Parameters
Proline Prowirl 200
PROFIBUS PA

Vortex flowmeter



Endress+Hauser
People for Process Automation

Table of contents

1 Document information

1.1 Document function

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

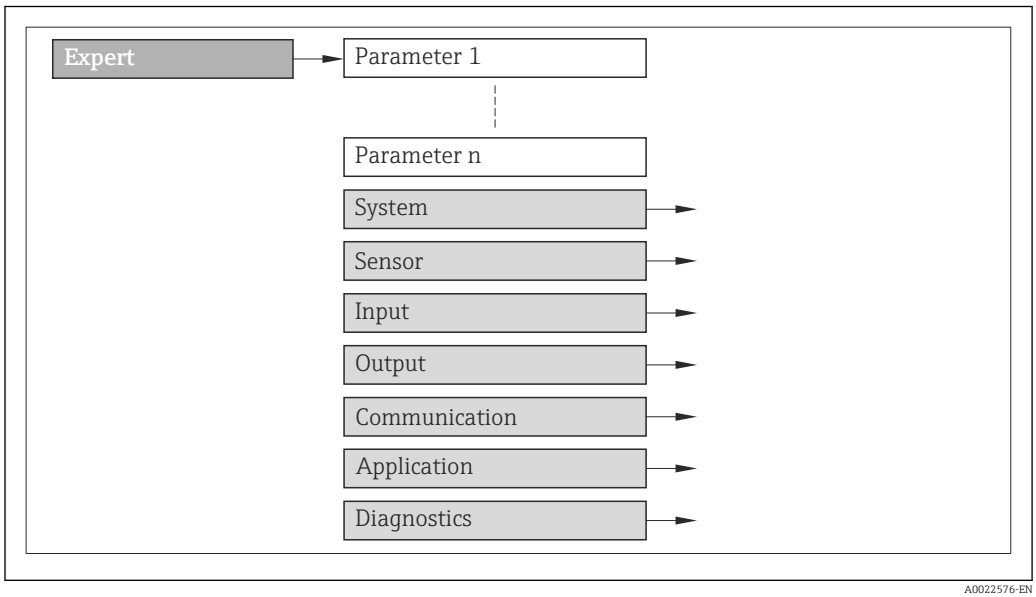
1.2 Target group

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

1.3 Using this document

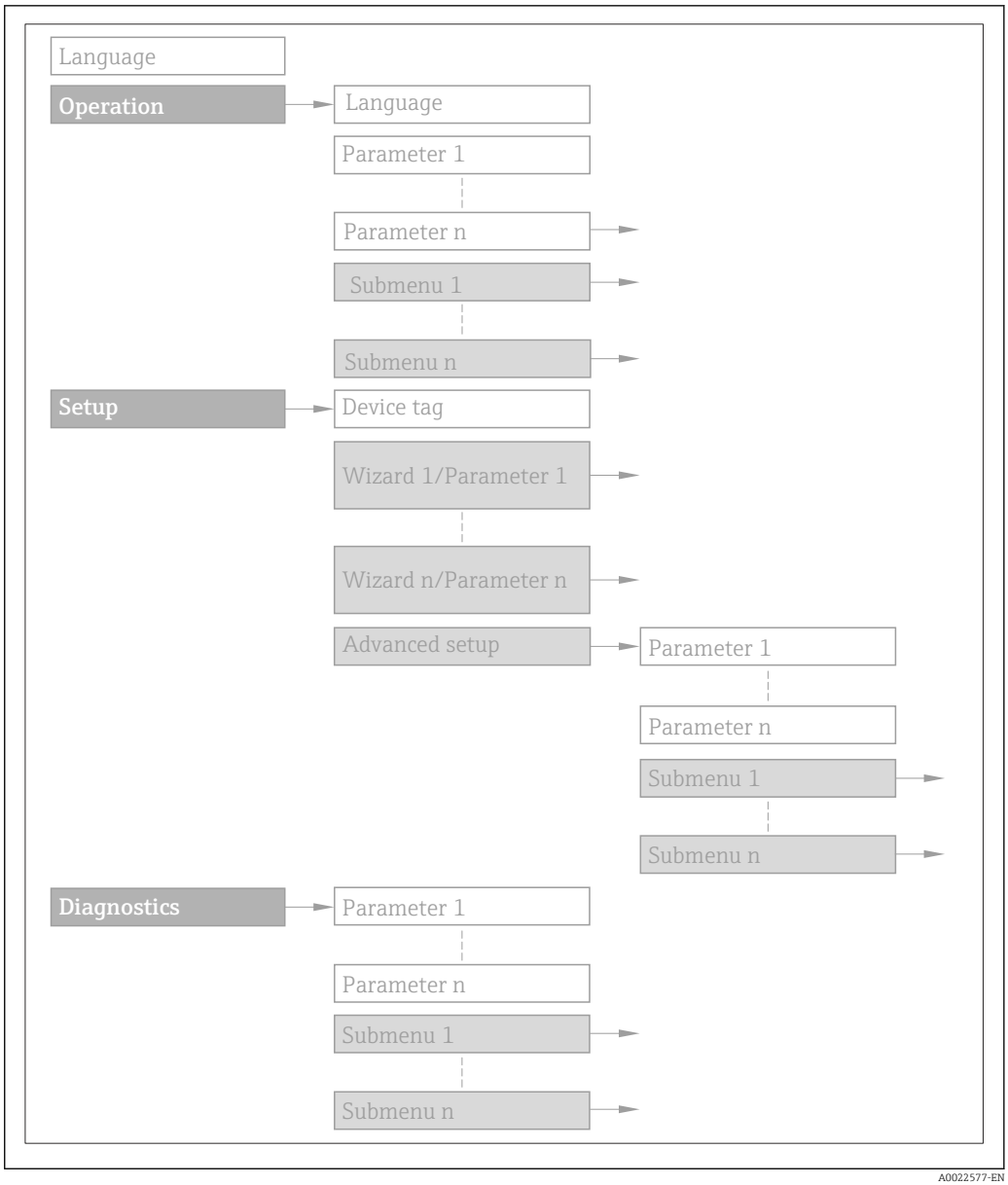
1.3.1 Information on the document structure

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



1 Sample graphic

For information on the arrangement of the parameters according to the structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu (→ 202), along with a brief description, see the Operating Instructions for the device.



2 Sample graphic

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

1.3.2 Structure of a parameter description

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

Complete parameter name	Write-protected parameter =

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

Prerequisite
The parameter is only available under these specific conditions

Description
Description of the parameter function

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

User entry
Input range for the parameter

User interface
User interface value/data for parameter

Factory setting
Default setting ex works

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

1.4 Symbols used

1.4.1 Symbols for certain types of information

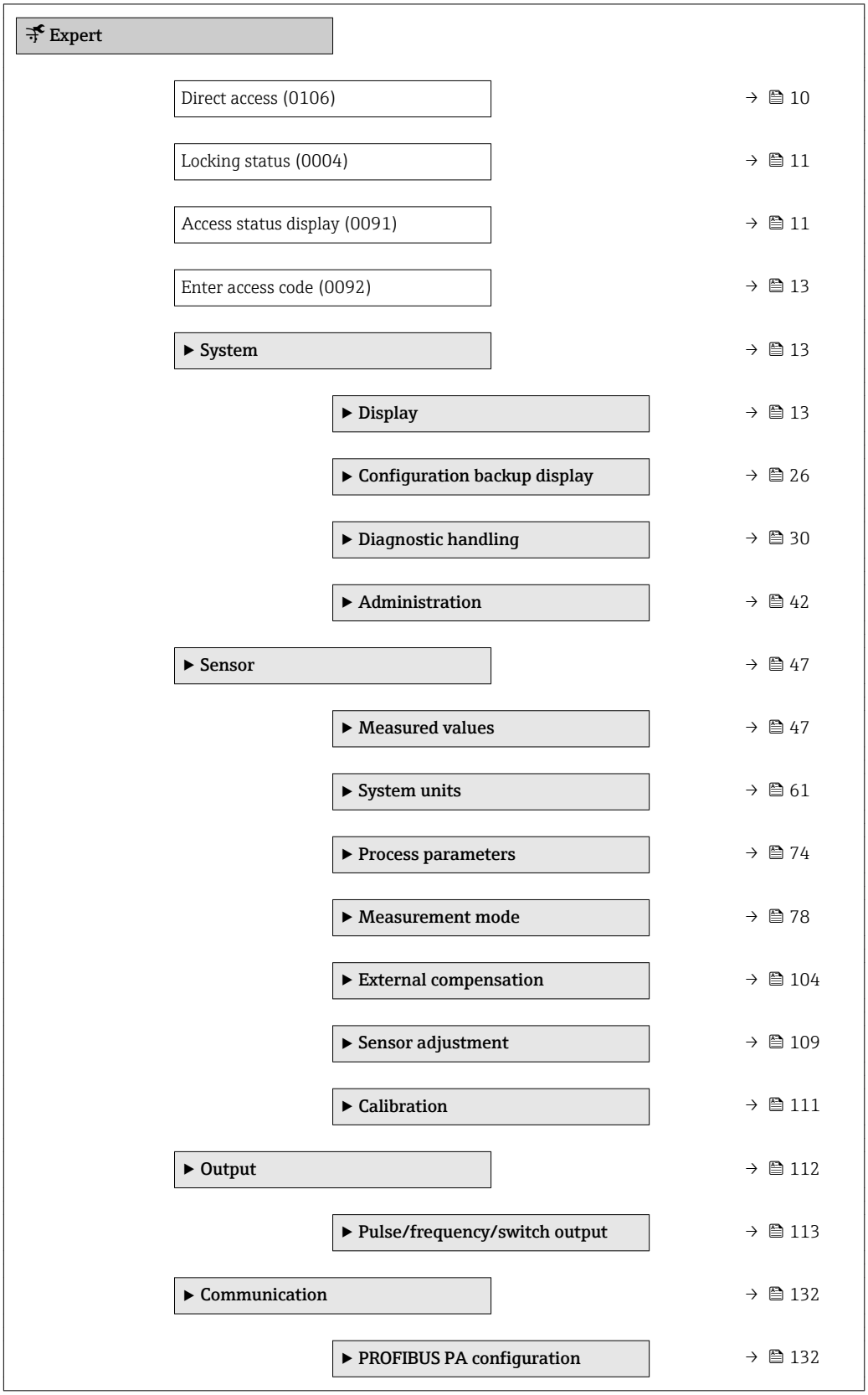
Symbol	Meaning
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Operation via local display
	Operation via operating tool
	Write-protected parameter

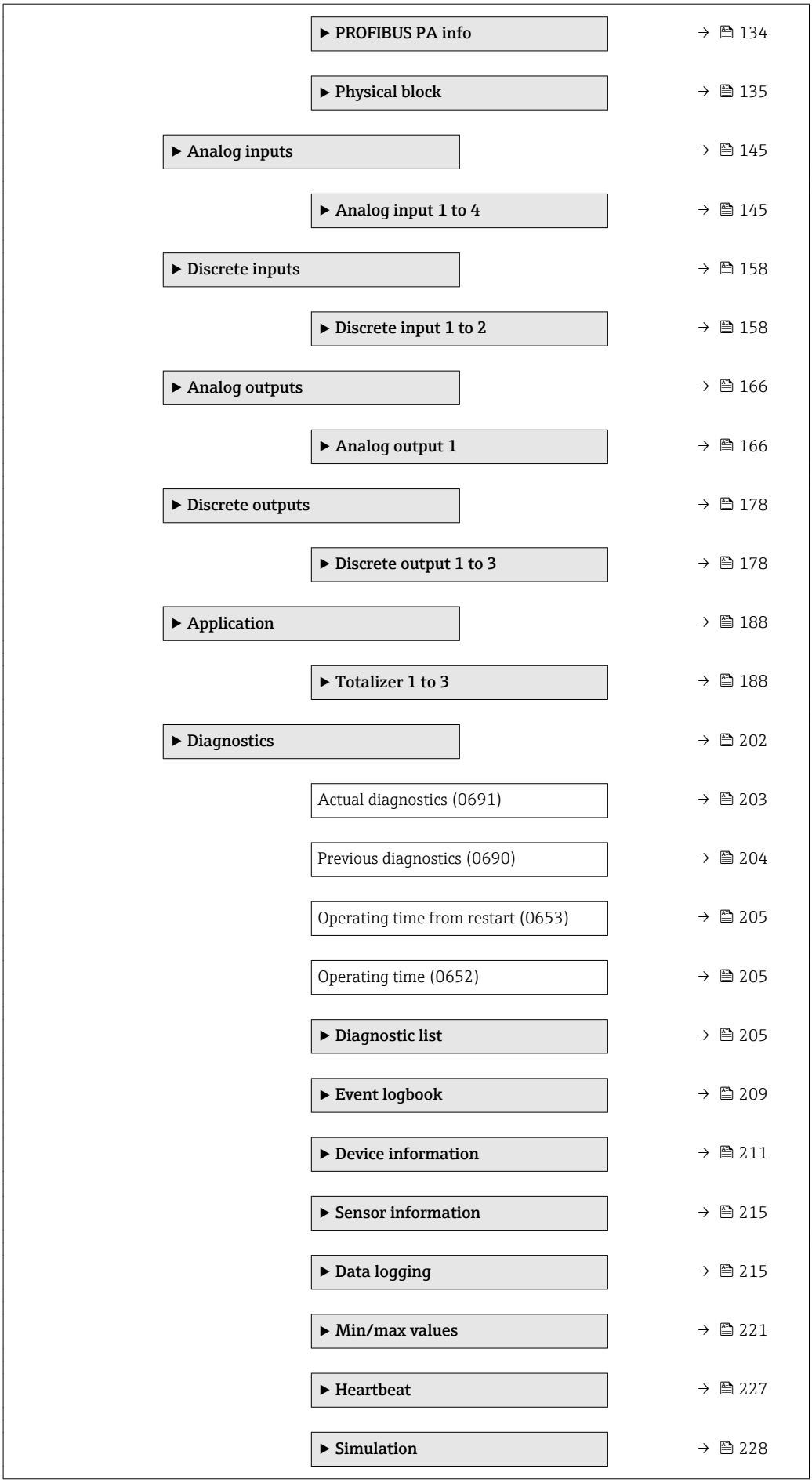
1.4.2 Symbols in graphics

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

2 Overview of the Expert operating menu

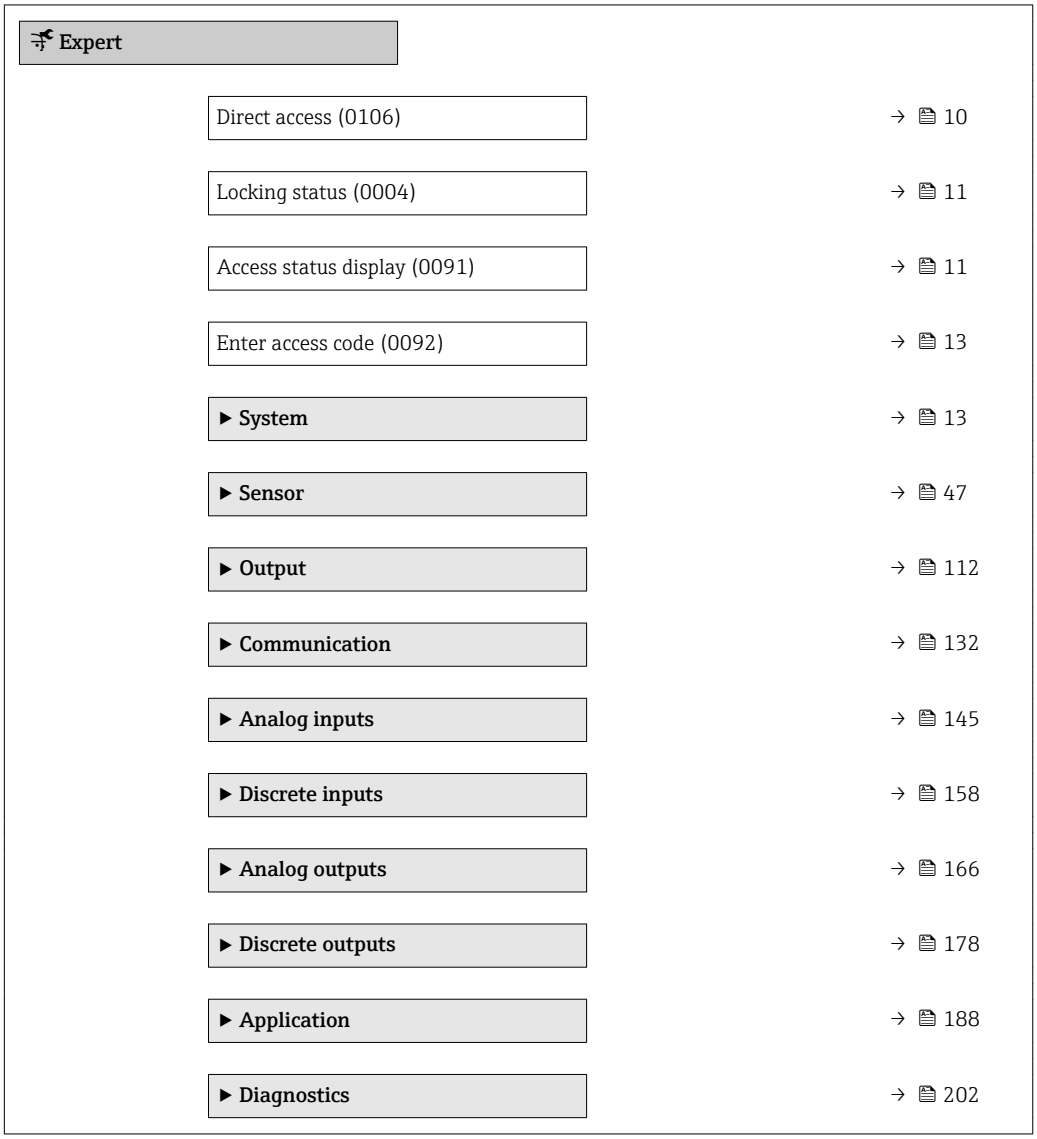
The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.




▶ PROFIBUS PA info → 134
▶ Physical block → 135
▶ Analog inputs → 145
▶ Analog input 1 to 4 → 145
▶ Discrete inputs → 158
▶ Discrete input 1 to 2 → 158
▶ Analog outputs → 166
▶ Analog output 1 → 166
▶ Discrete outputs → 178
▶ Discrete output 1 to 3 → 178
▶ Application → 188
▶ Totalizer 1 to 3 → 188
▶ Diagnostics → 202
Actual diagnostics (0691) → 203
Previous diagnostics (0690) → 204
Operating time from restart (0653) → 205
Operating time (0652) → 205
▶ Diagnostic list → 205
▶ Event logbook → 209
▶ Device information → 211
▶ Sensor information → 215
▶ Data logging → 215
▶ Min/max values → 221
▶ Heartbeat → 227
▶ Simulation → 228

3 Description of device parameters

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



Direct access

Navigation Expert → Direct access (0106)

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

User entry 0 to 65 535

Additional information *User entry*

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

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

Locking status

Navigation Expert → Locking status (0004)

Description Use this function to view the active write protection.

User interface
- Hardware locked
- Temporarily locked

Additional information *User interface*

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

In the operating tool all active types of write protection are selected.

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

"Hardware locked" option (priority 1)

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

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

"Temporarily locked" option (priority 2)

Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.

Access status display

Navigation Expert → Access stat.disp (0091)

Prerequisite A local display is provided.

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

User interface
- Operator
- Maintenance

Factory setting
Operator

Additional information

Description

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

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

For information on the **Enter access code** parameter (→ 13), see the "Disabling write protection via access code" section of the Operating Instructions for the device

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

User interface

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

Access status tooling

Navigation
Expert → Access stat.tool (0005)

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

User interface
- Operator
- Maintenance

Factory setting
Maintenance

Additional information

Description

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

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

Display

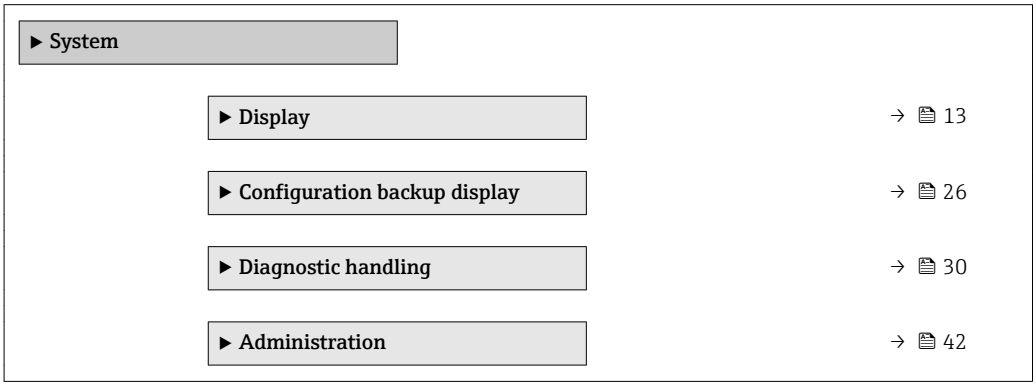
Information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device.

Enter access code	
Navigation	Expert → Ent. access code (0092)
Description	Use this function to enter the user-specific release code to remove parameter write protection on the local display.
User entry	0 to 9 999

Enter access code	
Navigation	Expert → Ent. access code (0003)
Description	Use this function to enter the user-specific release code to remove parameter write protection in the operating tool.
User entry	0 to 9 999

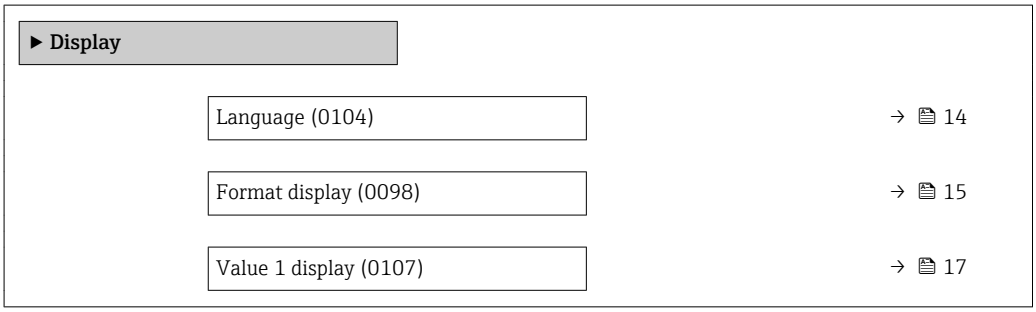
3.1 "System" submenu

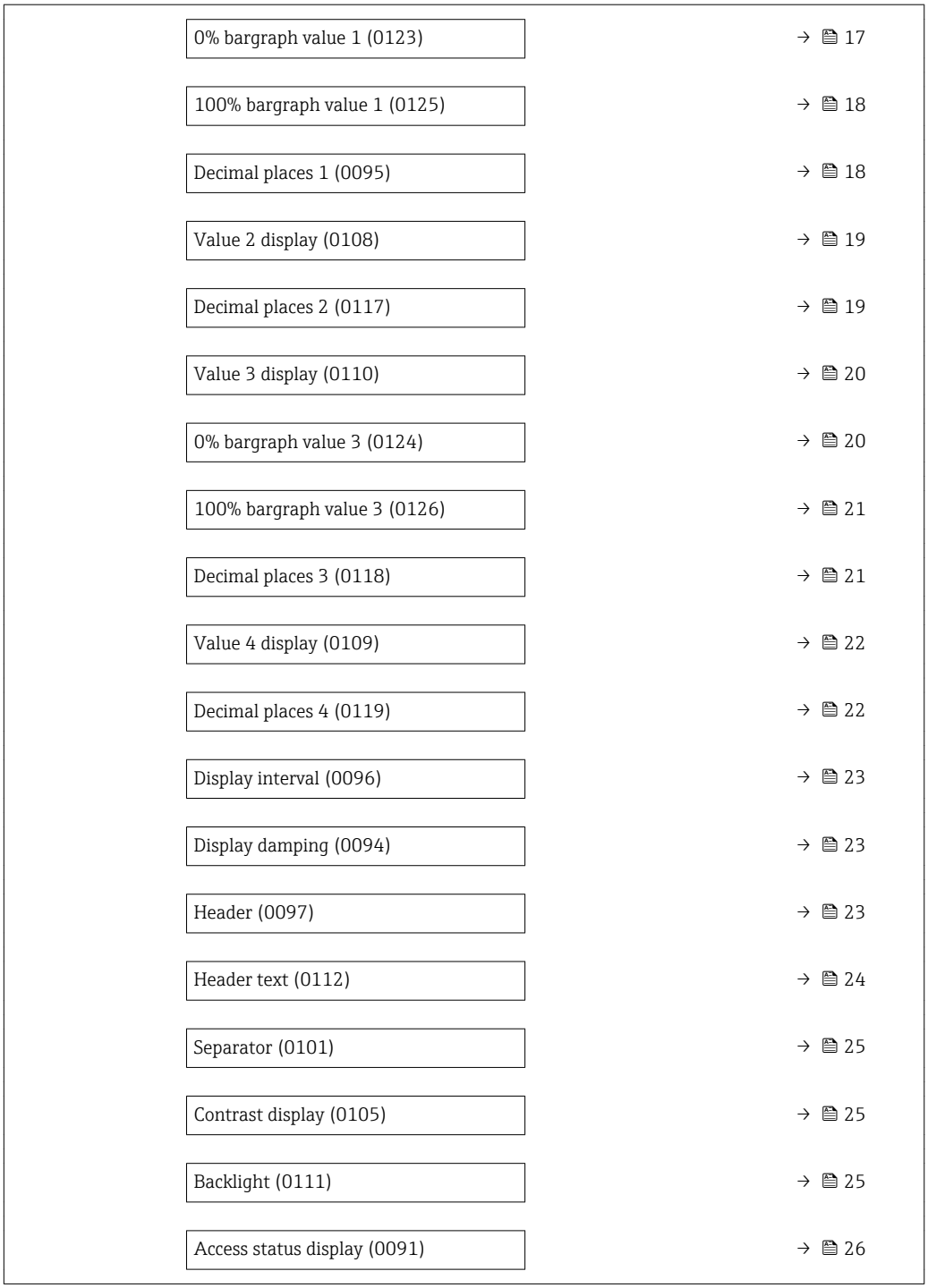
Navigation Expert → System



3.1.1 "Display" submenu

Navigation Expert → System → Display





Language

Navigation Expert → System → Display → Language (0104)

Prerequisite A local display is provided.

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

Selection
- English
- Deutsch *
- Français *
- Español *
- Italiano *
- Nederlands *
- Portuguesa *
- Polski *
- русский язык (Russian) *
- Svenska *
- Türkçe *
- 中文 (Chinese) *
- 日本語 (Japanese) *
- 한국어 (Korean) *
- Bahasa Indonesia *
- tiếng Việt (Vietnamese) *
- 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. size
- 1 bargraph + 1 value
- 2 values
- 1 value large + 2 values
- 4 values

Factory setting 1 value, max. size

Additional information *Description*

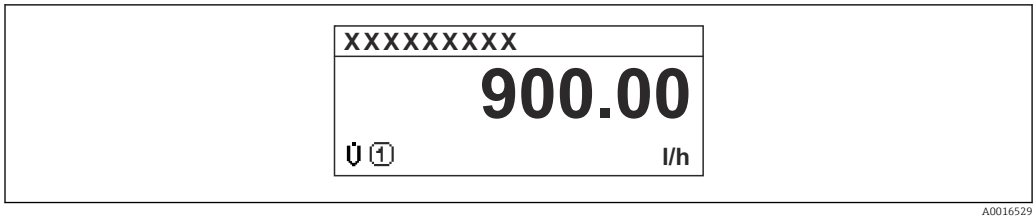
The display format (size, bar graph etc.) and number of measured values displayed simultaneously (1 to 4) can be configured. This setting only applies to normal operation.

- The **Value 1 display** parameter (→ 17)...**Value 4 display** parameter (→ 22) parameters are used to specify which measured values are shown on the display and in which order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured using the **Display interval** parameter (→ 23) parameter.

Possible measured values shown on the local display:

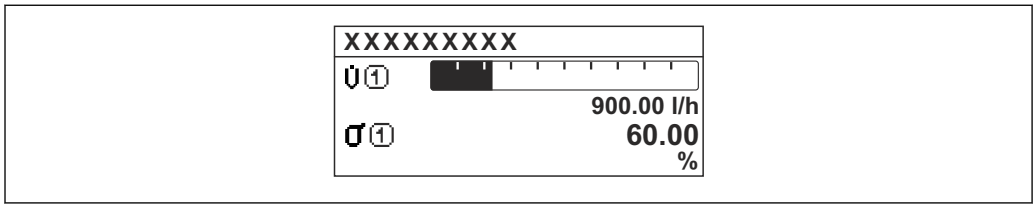
* Visibility depends on order options or device settings

"1 value, max. size" option



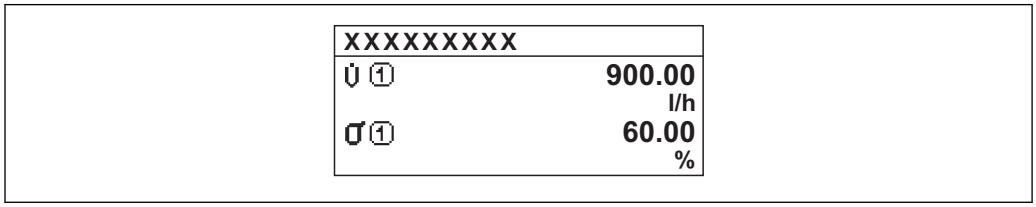
A0016529

"1 bargraph + 1 value" option



A0016530

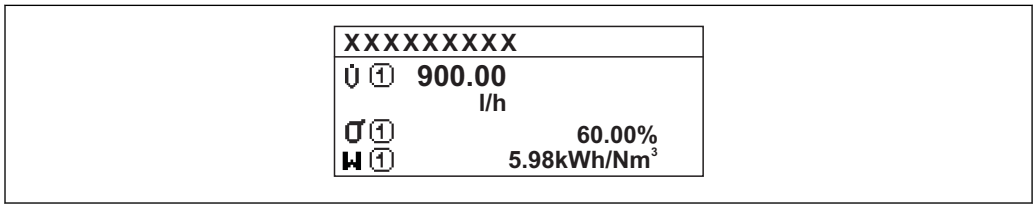
"2 values" option



A0016531

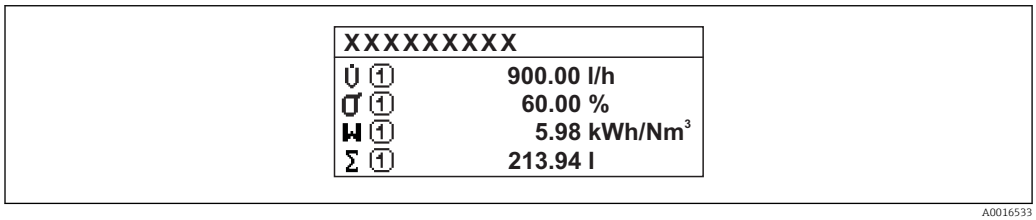
3

"1 value large + 2 values" option



A0016532

"4 values" option



A0016533

Value 1 display

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

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
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *
- Density *
- Pressure *
- Specific volume *
- Degrees of superheat *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Volume flow

Additional information

Description

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 61).

0% bargraph value 1

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

Prerequisite A local display is provided.

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

* Visibility depends on order options or device settings

User entry Signed floating-point number

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

Additional information *Description*

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 61).

100% bargraph value 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter → 234

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 (→ 61).

Decimal places 1

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

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

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

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

Factory setting x.xx

Additional information *Description*

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

Value 2 display

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

Prerequisite A local display is provided.

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

Selection Picklist, see **Value 1 display** parameter (→ 17)

Factory setting None

Additional information *Description*

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 61).

Decimal places 2

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

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

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

Selection

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

Factory setting x.xx

Additional information *Description*

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

Value 3 display

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

Prerequisite A local display is provided.

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

Selection Picklist, see **Value 1 display** parameter (→ 17)

Factory setting None

Additional information *Description*

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 61).

0% bargraph value 3

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

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

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

User entry Signed floating-point number

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

Additional information *Description*

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 61).

100% bargraph value 3

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

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

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

User entry Signed floating-point number

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 (→ 61).

Decimal places 3

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

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

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

Selection

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

Factory setting x.xx

Additional information

Description

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

Value 4 display

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

Prerequisite A local display is provided.

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

Selection Picklist, see **Value 1 display** parameter (→ 17)

Factory setting None

Additional information

Description

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 61).

Decimal places 4

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

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

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

Selection

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

Factory setting x.xx

Additional information

Description

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

Display interval

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

Prerequisite A local display is provided.

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

User entry 1 to 10 s

Factory setting 5 s

Additional information *Description*

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

- The **Value 1 display** parameter (→ 17)...**Value 4 display** parameter (→ 22) are used to specify which measured values are shown on the display.
- The display format of the displayed measured values is specified using the **Format display** parameter (→ 15).

Display damping

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

Prerequisite A local display is provided.

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

User entry 0.0 to 999.9 s

Factory setting 5.0 s

Additional information *User entry*

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

Header

Navigation Expert → System → Display → Header (0097)

Prerequisite A local display is provided.

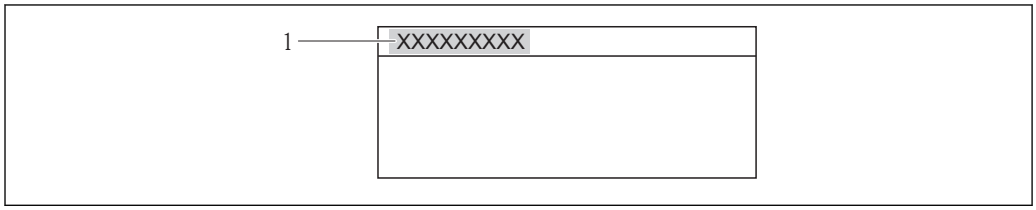
Description Use this function to select the contents of the header of the local display.

Selection
- Device tag
- Free text

Factory setting Device tag

Additional information *Description*

The header text only appears during normal operation.



1 Position of the header text on the display

Selection
- Device tag
  Is defined in the **Device tag** parameter (→ 212).
- Free text
  Is defined in the **Header text** parameter (→ 24).

Header text

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

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

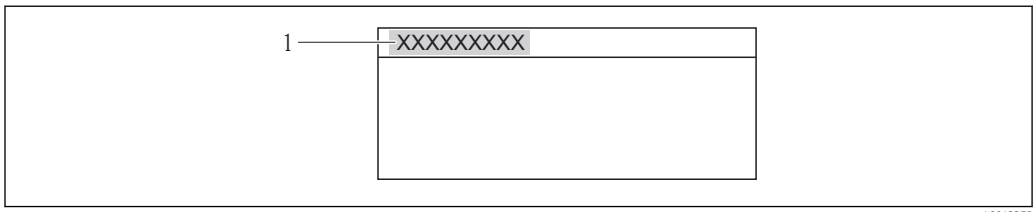
Description Use this function to enter a customer-specific text for the header of the local display.

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

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

Additional information *Description*

The header text only appears during normal operation.



1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator

Navigation Expert → System → Display → Separator (0101)

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

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

Backlight

Navigation Expert → System → Display → Backlight (0111)

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

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

Selection
- Disable
- Enable

Factory setting Disable

Access status display

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

Prerequisite A local display is provided.

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

User interface
- Operator
- Maintenance

Factory setting Operator

Additional information

Description

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

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

For information on the **Enter access code** parameter (→ 13), see the "Disabling write protection via access code" section of the Operating Instructions for the device

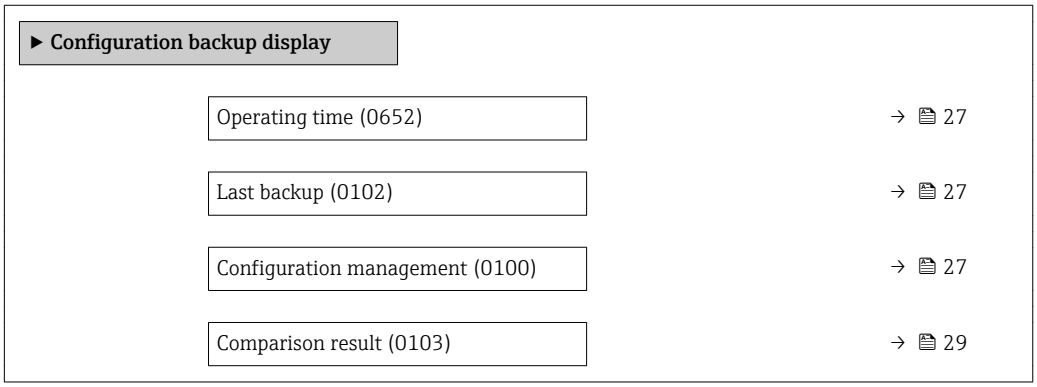
If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 11).

User interface

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

3.1.2 "Configuration backup display" submenu

Navigation Expert → System → Conf.backup disp



Operating time

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

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

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

Additional information *User interface*

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

Last backup

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

Prerequisite A local display is provided.

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

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

Configuration management

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

Prerequisite A local display is provided.

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

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

Factory setting Cancel

Additional information *Description*

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

For information about the status message in the operating tool: **Backup state** parameter (→ 28)

Selection

- Cancel
  No action is executed and the user exits the parameter.
- Execute backup
  - A backup copy of the current device configuration in the HistoROM is saved to the display module of the device. The backup copy includes the transmitter data of the device.
  - The following message appears on local display: Backup active, please wait!
- Restore
  - The last backup copy of the device configuration is copied from the display module to the HistoROM of the device. The backup copy comprises the transmitter data of the device.
  - The following message appears on local display: Restore active! Do not interrupt power supply!
- Duplicate
  - The transmitter configuration from another device is duplicated to the device using the display module.
  - The following message appears on local display: Copy active! Do not interrupt power supply!
- Compare
  - The device configuration saved in the display module is compared to the current device configuration of the HistoROM.
  - The following message appears on local display: Comparing files
  - The result can be viewed in the **Comparison result** parameter (→ 29).
- Clear backup data
  - The backup copy of the device configuration is deleted from the display module of the device.
  - The following message appears on local display: Deleting file

HistoROM

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

Backup state

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

Prerequisite A local display is provided.

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

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

Factory setting None

Comparison result

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

Prerequisite A local display is provided.

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

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

Factory setting Check not done

Additional information

Description

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

Selection

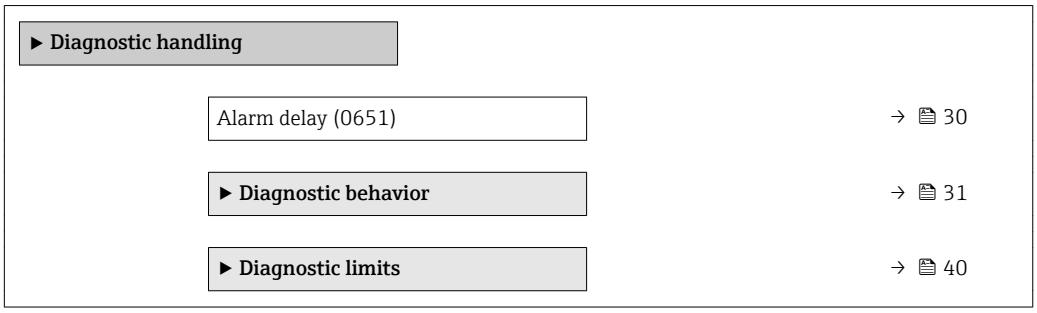
- Settings identical
  - The current device configuration of the HistoROM is identical to the backup copy in the display module.
  - If the transmitter configuration of another device has been copied to the device via the display module and the **Duplicate** option in the **Configuration management** parameter (→ 27), the current device configuration of the HistoROM only partly matches the backup copy in the display module: The settings for the transmitter are not identical.
- Settings not identical
  The current device configuration of the HistoROM is not identical to the backup copy in the display module.
- No backup available
  There is no backup copy of the device configuration of the HistoROM in the display module.
- Backup settings corrupt
  The current device configuration of the HistoROM is corrupt or not compatible with the backup copy in the display module.
- Check not done
  The device configuration of the HistoROM has not yet been compared to the backup copy in the display module.
- Dataset incompatible
  The backup copy in the display module is not compatible with the device.

HistoROM

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

3.1.3 "Diagnostic handling" submenu

Navigation Expert → System → Diagn. handling



Alarm delay

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

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

The diagnostic message is reset without a time delay.

User entry 0 to 60 s

Factory setting 0 s

Additional information *Description*

This setting affects the following diagnostic messages:
- 046 Sensor limit exceeded
- 828 Ambient temperature too low
- 829 Ambient temperature too high
- 832 Electronic temperature too high
- 833 Electronic temperature too low
- 834 Process temperature too high
- 835 Process temperature too low
- 841 Flow velocity too high
- 841 Sensor range
- 844 Sensor range exceeded
- 870 Measuring inaccuracy increased
- 871 Near steam saturation limit
- 872 Wet steam detected
- 873 Water detected
- 874 X% spec invalid
- 945 Sensor range exceeded
- 946 Vibration detected
- 947 Vibration exceeded
- 972 Degrees of superheat limit excceeded

"Diagnostic behavior" submenu

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

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

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

- **Off** option
  The diagnostic event is ignored; it is neither entered into the Event logbook, nor is a diagnostic message generated.
- **Alarm** option
  The device continues to measure. The signal outputs assume the defined alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues to measure. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues to measure. The diagnostic message is entered in the **Event logbook** submenu (→ 209) (**Event list** submenu (→ 210)) only and is not displayed in alternation with the measured value display.

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

▶ Diagnostic behavior	
Assign behavior of diagnostic no. 022 (0751)	→ 32
Assign behavior of diagnostic no. 122 (0752)	→ 33
Assign behavior of diagnostic no. 350 (0756)	→ 33
Assign behavior of diagnostic no. 371 (0757)	→ 33
Assign behavior of diagnostic no. 442 (0658)	→ 34
Assign behavior of diagnostic no. 443 (0659)	→ 34
Assign behavior of diagnostic no. 828 (0755)	→ 35
Assign behavior of diagnostic no. 829 (0754)	→ 35
Assign behavior of diagnostic no. 832 (0675)	→ 35
Assign behavior of diagnostic no. 833 (0676)	→ 36

Assign behavior of diagnostic no. 022 (Temperature sensor defective)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 022 (0751)

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

Description Use this function to change the diagnostic behavior of the diagnostic message **022 Temperature sensor defective**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Alarm

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 122 (Temperature sensor defective)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 122 (0752)

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

Description Use this function to change the diagnostic behavior of the diagnostic message **122 Temperature sensor defective**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 350 (Pre-amplifier defective)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 350 (0756)

Description Use this function to change the diagnostic behavior of the diagnostic message **350 Pre-amplifier defective**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Alarm

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 371 (Temperature sensor defective)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 371 (0757)

Description Use this function to change the diagnostic behavior of the diagnostic message **371 Temperature sensor defective**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 442 (Frequency output)

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 443 (Pulse output)

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 828 (Ambient temperature too low)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 828 (0755)

Description Use this function to change the diagnostic behavior of the diagnostic message **828 Ambient temperature too low**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 829 (Ambient temperature too high)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 829 (0754)

Description Use this function to change the diagnostic behavior of the diagnostic message **829 Ambient temperature too high**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 841 (Flow velocity too high)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 841 (0729)

Description Use this function to change the diagnostic behavior of the diagnostic message **841 Flow velocity too high**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 844 (Sensor range exceeded)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 844 (0747)

Description Use this function to change the diagnostic behavior of the diagnostic message **844 Sensor range exceeded**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 870 (Measuring inaccuracy increased)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 870 (0726)

Description Use this function to change the diagnostic behavior of the diagnostic message **870 Measuring inaccuracy increased**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 871 (Near steam saturation limit)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 871 (0748)

Prerequisite In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Use this function to change the diagnostic behavior of the diagnostic message **871 Near steam saturation limit**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Off

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 872 (Wet steam detected)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 872 (0746)

Prerequisite The **Wet steam detection** application package has been enabled.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

Description Use this function to change the diagnostic behavior of the diagnostic message **872 Wet steam detected**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 873 (Water detected)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 873 (0749)

Prerequisite In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Use this function to change the diagnostic behavior of the diagnostic message **873 Water detected**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Off

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 874 (X% spec invalid)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 874 (0772)

Prerequisite In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Use this function to change the diagnostic behavior of the diagnostic message **874 X% spec invalid**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Off

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 945 (Sensor range exceeded)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 945 (0750)

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

Description Use this function to change the diagnostic behavior of the diagnostic message **945 Sensor range exceeded**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 947 (Vibration exceeded)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 947 (0753)

Description Use this function to change the diagnostic behavior of the diagnostic message **947 Vibration exceeded**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Alarm

Additional information For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 972 (Degrees of superheat limit excceeded)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 972 (0758)

Prerequisite If the **Steam** option is selected in the **Select medium** parameter (→ 78).

Description Use this function to change the diagnostic behavior of the diagnostic message **972 Degrees of superheat limit excceeded**.

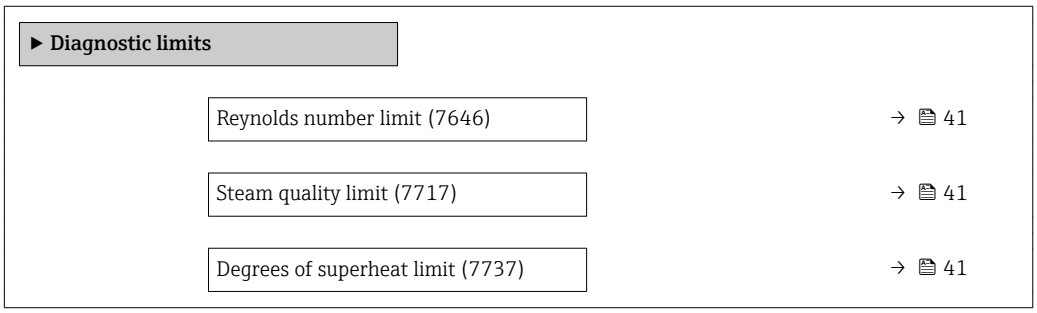
Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Off

Additional information For a detailed description of the options available for selection: → 31

"Diagnostic limits" submenu

Navigation Expert → System → Diagn. handling → Diagn. limits



Reynolds number limit

Navigation Expert → System → Diagn. handling → Diagn. limits → Re number limit (7646)

Prerequisite For the following order code:
"Sensor version", option "Mass flow (integrated temperature measurement)"

Description Use this function to enter the lower limit value for the Reynolds number. If the Reynolds number falls short of this limit value, the diagnostic message **870 Measuring inaccuracy increased** is triggered.

User entry 4 000 to 100 000

Factory setting 5 000

Additional information *Limit value*

If the Reynolds number falls short of the limit value configured here, the diagnostic behavior selected in the **Assign behavior of diagnostic no. 870** parameter (→ 37) is triggered.

Steam quality limit

Navigation Expert → System → Diagn. handling → Diagn. limits → SteamQualLimit (7717)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Steam** option is selected.
- In the **Steam quality** parameter (→ 108), the **Calculated value** option is selected.

Description Use this function to enter the threshold value for the steam quality which, if undershot, triggers the diagnostic message ⚠**S872 Wet steam detected**.

User entry 80 to 100 %

Factory setting 80 %

Additional information *Limit value*

This limit value has a hysteresis of 5 %, i.e. the diagnostic message is reset at a threshold value of +5 % or if 100 % is reached (for factory setting of 80 % at 85 %).

If the steam quality has dropped below the limit value configured here, the diagnostic behavior selected in the **Assign behavior of diagnostic no. 872** parameter (0746) (→ 38) is triggered.

Degrees of superheat limit

Navigation Expert → System → Diagn. handling → Diagn. limits → Degr.superh.lim. (7737)

Prerequisite In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Use this function to enter the threshold value for the degree of superheat which, if exceeded, triggers the diagnostic message **972 Degrees of superheat limit excceeded**.

User entry 0 to 500 K

Factory setting 5 K

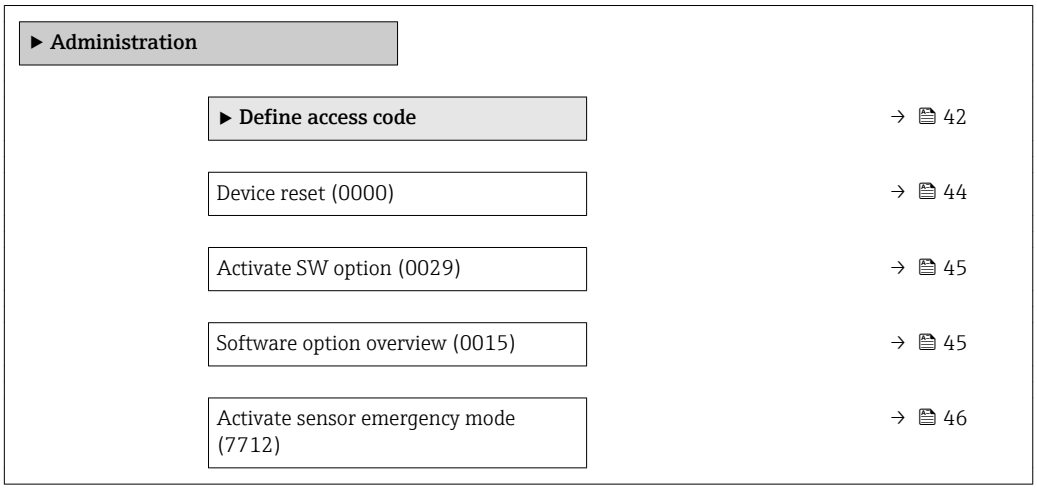
Additional information *Limit value*

This limit value has a hysteresis of 1 K, i.e. the diagnostic message is triggered if the threshold value +1 K is reached and is reset again when the value drops below the threshold value.

If the degree of superheat has exceeded the limit value configured here, the diagnostic behavior selected in the **Assign behavior of diagnostic no. 972** parameter (→ 40) is triggered.

3.1.4 "Administration" submenu

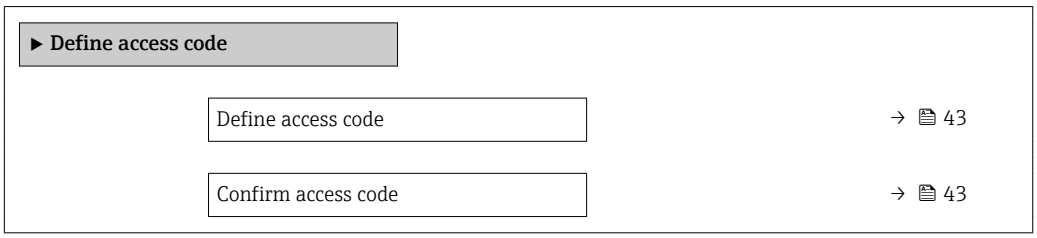
Navigation Expert → System → Administration



"Define access code" wizard

The **Define access code** wizard is only available if operating using the local display. If you are operating using the operating tool, the **Define access code** parameter (→ 44) is directly in the **Administration** submenu. The **Confirm access code** parameter is not available if you are operating using the operating tool.

Navigation Expert → System → Administration → Def. access code



Define access code

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

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

User entry 0 to 9 999

Factory setting 0

Additional information

Description

The write protection affects all parameters in the document marked with the symbol. On the local display, the symbol in front of a parameter indicates that the parameter is write-protected.

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

If you lose the access code, please contact your Endress+Hauser Sales Center.

User entry

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

Factory setting

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

Confirm access code

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

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

User entry 0 to 9 999

Factory setting 0

Additional parameters in the "Administration" submenu

Define access code

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

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

User entry 0 to 9 999

Factory setting 0

Additional information

Description

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

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

If you lose the access code, please contact your Endress+Hauser Sales Center.

User entry

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

Factory setting

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

Device reset

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

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

Selection
- Cancel
- To fieldbus defaults **
- To factory defaults
- To delivery settings
- Restart device

Factory setting Cancel

Additional information

"Cancel" option

No action is executed and the user exits the parameter.

** Visibility depends on communication

"To fieldbus defaults" option

Every parameter is reset to fieldbus default values.

"To factory defaults" option

Every parameter is reset to its factory setting.

"To delivery settings" option

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

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

"Restart device" option

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

Activate SW option

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

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

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

Factory setting 0

Additional information

User entry

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

NOTICE! This activation code varies depending on the measuring device and the software option. If an incorrect or invalid code is entered, this can result in the loss of software options that are already been activated. After commissioning the measuring device: in this parameter only enter activation codes which Endress+Hauser has provided (e.g. when a new software option was ordered). If an incorrect or invalid activation code is entered, enter the activation code from the parameter protocol again and contact your Endress+Hauser sales organization, quoting the serial number of your device.

Example for a software option

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

Software option overview

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

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

User interface

- Extended HistoROM
- Mass flow
- Natural gas
- Air + industrial gas
- Wet steam detection
- Wet steam measurement
- Heartbeat Verification

Additional information

Description

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

"Extended HistoROM" option

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

"Mass flow" option

Order code for "Sensor version"
- For Prowirl D, F, R: option 3 "Mass flow (integrated temperature measurement)"
- For Prowirl C, O: option 6 "Mass flow Alloy 718"

"Natural gas" option

Order code for "Application package", option EN "Natural gas"

"Air + industrial gas" option

Order code for "Application package", option ET "Air+industrial gases (single gas+gas mixtures)"

"Wet steam detection" option

Only available for Prowirl F.

Order code for "Application package", option ES "Wet steam detection"

"Wet steam measurement" option

Only available for Prowirl F.

Order code for "Application package", option EU "Wet steam measurement"

"Heartbeat Verification" option

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

Activate sensor emergency mode

Navigation

Expert → System → Administration → Sens. emerg.mode (7712)

Prerequisite

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

Description

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

Selection

- Cancel
- Ok

Factory setting Cancel

Additional information *Description*

This parameter becomes visible if the data in the S-DAT or on-board memory cannot be read on account of a defect or error. There is a copy of the data on the HistoROM (FT10). If the emergency mode is activated, this copy is used and the device measure correctly again at least up until the next device switch-off/switch-on. After switch-on/switch-off, the emergency mode would have to be reactivated again. This ensures that the client can operate the device until a new spare part arrives.

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

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

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

3.2 "Sensor" submenu

Navigation Expert → Sensor

▶ Sensor	
▶ Measured values	→ 47
▶ System units	→ 61
▶ Process parameters	→ 74
▶ Measurement mode	→ 78
▶ External compensation	→ 104
▶ Sensor adjustment	→ 109
▶ Calibration	→ 111

3.2.1 "Measured values" submenu

Navigation Expert → Sensor → Measured val.

▶ Measured values	
▶ Process variables	→ 48

▶ **Totalizer**	→ 58
▶ **Output values**	→ 59

"Process variables" submenu

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

▶ **Process variables**	
Volume flow (1838)	→ 49
Corrected volume flow (1850)	→ 49
Mass flow (1847)	→ 50
Flow velocity (1865)	→ 50
Temperature (1851)	→ 51
Calculated saturated steam pressure (1852)	→ 51
Steam quality (1853)	→ 52
Total mass flow (1854)	→ 52
Condensate mass flow (1857)	→ 52
Energy flow (1872)	→ 53
Heat flow difference (1863)	→ 53
Reynolds number (1864)	→ 53
Density (7607)	→ 54
Specific volume (7739)	→ 54
Pressure (7696)	→ 55
Saturation temperature (7709)	→ 55
Degrees of superheat (7738)	→ 56
Compressibility factor (7729)	→ 56
Vortex frequency (7722)	→ 56

Volume flow

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

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

User interface Signed floating-point number

Additional information *Dependency*

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

Corrected volume flow

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

Description Displays the corrected volume flow currently calculated.

User interface Signed floating-point number

Additional information *Description*

To calculate the corrected volume flow, the measured volume flow is multiplied by the ratio of the density (**Density** parameter (→ 54)) to the reference density. The density and reference density here depend on the sensor version and the selected medium (see table). Outputting the corrected volume flow cannot be used for gases that condense (e.g. steam).

Sensor version	Medium	Medium type	Density	Reference density
Volume flow	All [1]	–	ρ	ρ_{Ref}
Mass flow	Steam	–	f(p, T)	–
	Gas	All except [2]	f(p, T)	f(p_{Ref}, T_{Ref})
	Liquid	All except [2]	f(T)	f(T_{Ref})
	Gas	[2]	f(p, T, z, p_{Ref}, T_{Ref}, z_{Ref}, ρ_{Ref})	ρ_{Ref}
	Liquid	[2]	f(T, a_{lin}, T_{Ref}, ρ_{Ref})	ρ_{Ref}

ρ	Fixed density (→ 106)
ρ_{Ref}	Reference density (→ 86)
p	Pressure (→ 55)
p_{Ref}	Reference pressure (→ 87)
T	Temperature (→ 51)
T_{Ref}	Reference temperature (→ 88)
z	Z-factor (→ 86)
z_{Ref}	Reference Z-factor (→ 88)
a_{lin}	Linear expansion coefficient (→ 82)
f(...)	Calculation method as function of ...

1) Outputting the corrected volume flow cannot be used for gases that condense.
2) User-specific gas or liquid

Dependency

The unit is taken from the **Corrected volume flow unit** parameter (→ 65)

Mass flow

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

Description Displays the mass flow currently calculated.

User interface Signed floating-point number

Additional information *Description*

To calculate the mass flow, the measured volume flow is multiplied by the density (**Density** parameter (→ 54)). The density depends on the sensor version and the selected medium (see table).

Sensor version	Medium	Medium type	Density
Volume flow	All	–	ρ
Mass flow	Steam	–	f(p, T)
	Gas	All except [1]	f(p, T)
	Liquid	All except [1]	f(T)
	Gas	[1]	f(p, T, z, p_{Ref}, T_{Ref}, z_{Ref}, ρ_{Ref})
	Liquid	[1]	f(T, a_{lin}, T_{Ref}, ρ_{Ref})

ρ	Fixed density (→ 106)
ρ_{Ref}	Reference density (→ 86)
p	Pressure (→ 55)
p_{Ref}	Reference pressure (→ 87)
T	Temperature (→ 51)
T_{Ref}	Reference temperature (→ 88)
z	Z-factor (→ 86)
z_{Ref}	Reference Z-factor (→ 88)
a_{lin}	Linear expansion coefficient (→ 82)
f(...)	Calculation method as function of ...

1) User-specific gas or liquid

Dependency

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

Flow velocity

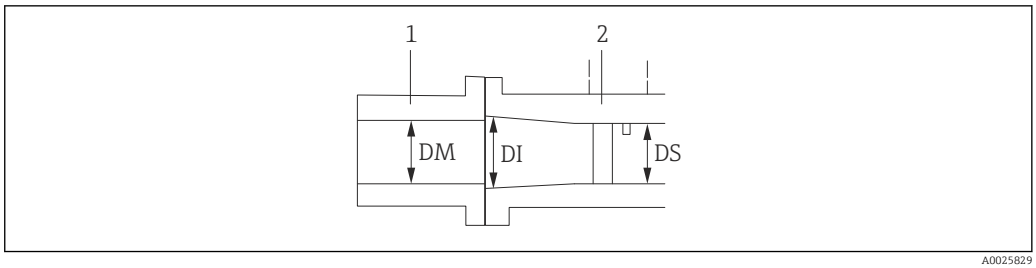
Navigation Expert → Sensor → Measured val. → Process variab. → Flow velocity (1865)

Description Displays the flow velocity currently calculated.

User interface Signed floating-point number

Additional information *Description*

The flow velocity is calculated based on the aspect ratio of the vortex measuring tube (DS) to the process connection of the sensor (DI), or to the **Mating pipe diameter** parameter (→ 110) (DM) if this has been entered by the customer; the DS and DI are production data that are defined by the shape and size of the meter body.



1 Process connection
2 Vortex measuring tube
DM Mating pipe diameter (→ 110)
DI Process connection of the sensor
DS Vortex measuring tube

Dependency

The unit is taken from the **Velocity unit** parameter (→ 71)

Temperature

Navigation Expert → Sensor → Measured val. → Process variab. → Temperature (1851)

Description Displays the temperature currently measured.

User interface Signed floating-point number

Additional information *Dependency*

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

Calculated saturated steam pressure

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

Prerequisite The following conditions are met:
- Order code for "Sensor version", option "Mass flow"
- In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Displays the saturated steam pressure currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

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

Steam quality

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

Prerequisite
The following conditions are met:
- Order code for "Sensor version", option "Mass flow"
- In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Displays the current steam quality. Depends on the compensation mode of the steam quality (**Steam quality** parameter (→ 108)).

User interface Signed floating-point number

Total mass flow

Navigation Expert → Sensor → Measured val. → Process variab. → Total mass flow (1854)

Prerequisite
The following conditions are met:
- Order code for "Application package", option EU "Wet steam measurement"
- In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Displays the total mass flow (steam and condensate) currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

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

Condensate mass flow

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

Prerequisite
The following conditions are met:
- Order code for "Application package", option EU "Wet steam measurement"
- In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Displays the condensate mass flow currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

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

Energy flow

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

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

Description Displays the energy flow currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Energy flow unit** parameter (→ 68)

Heat flow difference

Navigation Expert → Sensor → Measured val. → Process variab. → Heat flow diff. (1863)

Prerequisite The following conditions are met:
Order code for "Sensor version", option "Mass flow"

One of the following options is selected in the **Select gas type** parameter (→ 78):
- Single gas
- Gas mixture
- Natural gas
- User-specific gas

Description Displays the heat flow difference currently calculated.

User interface Signed floating-point number

Additional information *Description*

The measuring device requires the following to calculate the heat flow difference correctly:

1. Select the type of calculation in the **Delta heat calculation** parameter (→ 106).
2. Enter the value in the **2nd temperature delta heat** parameter (→ 107).

Dependency

The unit is taken from the **Energy flow unit** parameter (→ 68)

Reynolds number

Navigation Expert → Sensor → Measured val. → Process variab. → Reynolds number (1864)

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

Description Displays the Reynolds number currently calculated.

User interface Signed floating-point number

Additional information *Description*

$$Re = \frac{\rho \cdot v \cdot d}{\eta}$$

Where:
- ρ is the density of the medium (**Density** parameter (→ 54))
- v is the flow velocity of the fluid in relation to the body (**Flow velocity** parameter (→ 50))
- d is the characteristic length of the body
- η is the viscosity of the medium
  - For gases: **Dynamic viscosity** parameter (→ 85)
  - For liquids: **Dynamic viscosity** parameter (→ 84)
- The mating pipe diameter is taken as the characteristic length (**Mating pipe diameter** parameter (→ 110))

Density

Navigation Expert → Sensor → Measured val. → Process variab. → Density (7607)

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

Description Displays the density currently calculated.

User interface Positive floating-point number

Additional information *Description*

Depending on the selected medium the density is calculated with pressure and temperature and the corresponding method (e.g. IAPWS, NEL40...).

User interface

The unit is taken from the **Density unit** parameter (→ 71)

Specific volume

Navigation Expert → Sensor → Measured val. → Process variab. → Specific volume (7739)

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

Description Displays the current value for the specific volume.

User interface Positive floating-point number

Additional information

Description

The specific volume is a process variable that is common in steam applications.

For the calculation: reciprocal value of the density (**Density** parameter (→ 54))

Dependency

The unit is taken from the **Specific volume unit** parameter (→ 72)

Pressure

Navigation Expert → Sensor → Measured val. → Process variab. → Pressure (7696)

Prerequisite

For the following order code:
- "Sensor version", option "Mass flow"
- In the **External value** parameter (→ 105), the **Pressure** option is selected.

Description

Displays the current process pressure.

User interface

0 to 250 bar

Additional information

Description

The value of the pressure which is read in (e.g. via the current input module) is displayed..

If the **Pressure** option is not selected as the external value in the **External value** parameter (→ 105), the input value for the fixed process pressure (**Fixed process pressure** parameter (→ 108)) is displayed.

Dependency

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

Saturation temperature

Navigation Expert → Sensor → Measured val. → Process variab. → Saturation temp. (7709)

Prerequisite

In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description

Displays the saturation temperature currently calculated.

User interface

Country-specific:
- °C
- °F

Additional information

The saturation temperature describes the temperature limit at which steam begins to condense. This value is calculated using the current process pressure (**Pressure** parameter (→ 55)) according to IAPWS-IF97.

Dependency

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

Degrees of superheat

Navigation Expert → Sensor → Measured val. → Process variab. → Degree superheat (7738)

Prerequisite In the **Select medium** parameter (→ 78), the **Steam** option is selected.

Description Displays the degree of superheating currently calculated.

User interface 0 to 500 K

Additional information *Description*

The degree of superheating describes the difference between the temperature (**Temperature** parameter (→ 51)) and the saturation temperature (**Saturation temperature** parameter (→ 55)). If the temperature is below the current saturation temperature, the degree of superheating has the value **0**.

Compressibility factor

Navigation Expert → Sensor → Measured val. → Process variab. → CompressFactor (7729)

Prerequisite The following conditions are met:
Order code for "Sensor version", option "Mass flow"

In the **Select medium** parameter (→ 78), the **Gas** option or **Steam** option is selected.

Description Displays the compressibility factor currently calculated.

User interface 0 to 2

Additional information *Description*

The compressibility factor describes the deviation of the medium from the ideal behavior under the current process conditions. If the medium is a user-specific gas/liquid, the compressibility factor is entered as the Z-factor (**Z-factor** parameter (→ 86)).

Vortex frequency

Navigation Expert → Sensor → Measured val. → Process variab. → Vortex frequency (7722)

Description Displays the measured variable for the flow in the measuring tube which is recorded directly with the DSC sensor.

User interface

Measuring range depending on the nominal diameter:
0.1 to 3 100 Hz

Additional information

Description

The filter settings specify the measuring range of the vortex frequency depending on the nominal diameter.

Filter settings for liquids

Nominal diameter	Minimum vortex frequency	Maximum vortex frequency
	f_{vmin} [Hz]	f_{vmax} [Hz]
DN 15 (½") DN 25 (1") > DN 15 (½") DN 40 (1½") >> DN 15 (½")	11.5	666.5
DN 25 (1") DN 40 (1½") > DN 25 (1") DN 50 (2") >> DN 25 (1")	6.7	388.8
DN 40 (1½") DN 50 (2") > DN 40 (1½") DN 80 (3") >> DN 40 (1½")	3.9	224.3
DN 50 (2") DN 80 (3") > DN 50 (2") DN 100 (4") >> DN 50 (2")	3.0	172.8
DN 80 (3") DN 100 (4") > DN 80 (3") DN150 (6") >> DN 80 (3")	2.1	122.8
DN 100 (4") DN150 (6") > DN 100 (4") DN 200 (8") >> DN 100 (4")	1.7	101.4
DN150 (6") DN 200 (8") > DN150 (6") DN 250 (10") >> DN150 (6")	1.1	66.6
DN 200 (8")	0.7	41.7
DN 250 (10")	0.6	34.3
DN 300 (12")	0.5	28.9

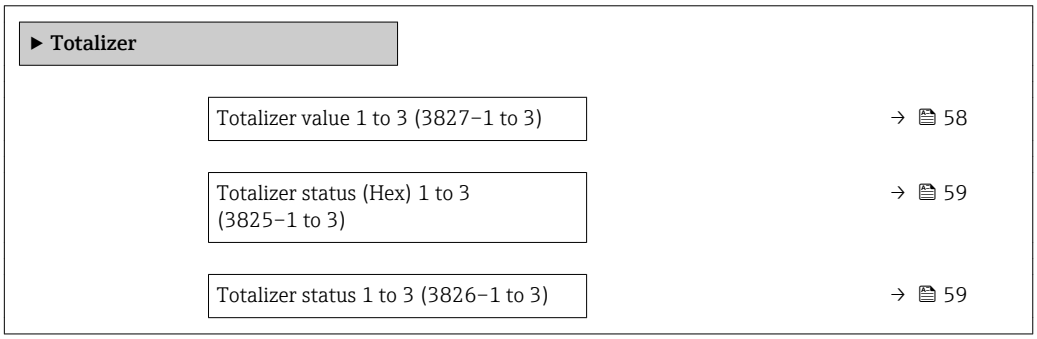
Filter settings for gases/steam

DN [mm (in)]	Minimum vortex frequency	Maximum vortex frequency
	f_{vmin} [Hz]	f_{vmax} [Hz]
DN 15 (½") DN 25 (1") > DN 15 (½") DN 40 (1½") >> DN 15 (½")	209.9	3 100
DN 25 (1") DN 40 (1½") > DN 25 (1") DN 50 (2") >> DN 25 (1")	67.1	3 100
DN 40 (1½") DN 50 (2") > DN 40 (1½") DN 80 (3") >> DN 40 (1½")	13.7	1 869.1
DN 50 (2") DN 80 (3") > DN 50 (2") DN 100 (4") >> DN 50 (2")	10.5	2 303.8

DN [mm (in)]	Minimum vortex frequency	Maximum vortex frequency
	f_{vmin} [Hz]	f_{vmax} [Hz]
DN 80 (3") DN 100 (4") > DN 80 (3") DN150 (6") >> DN 80 (3")	7.5	1 636.9
DN 100 (4") DN150 (6") > DN 100 (4") DN 200 (8") >> DN 100 (4")	6.2	1 352.3
DN150 (6") DN 200 (8") > DN150 (6") DN 250 (10") >> DN150 (6")	4.1	888.6
DN 200 (8")	2.5	555.4
DN 250 (10")	2.1	457.3
DN 300 (12")	1.8	385.3

Totalizer

Navigation Expert → Sensor → Measured val. → Totalizer



Totalizer value 1 to 3

Navigation Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to 3 (3827–1 to 3)

Prerequisite In **Target mode** parameter (→ 195), the **Auto** option is selected.

Description Displays the current reading for totalizer 1-3.

User interface Signed floating-point number

Additional information *Description*

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

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

User interface

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

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

Totalizer status (Hex) 1 to 3

Navigation Expert → Sensor → Measured val. → Totalizer → Status (Hex) 1 to 3 (3825–1 to 3)

Prerequisite In **Target mode** parameter (→ 195), the **Auto** option is selected.

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

User interface 0 to 0xFF

Totalizer status 1 to 3

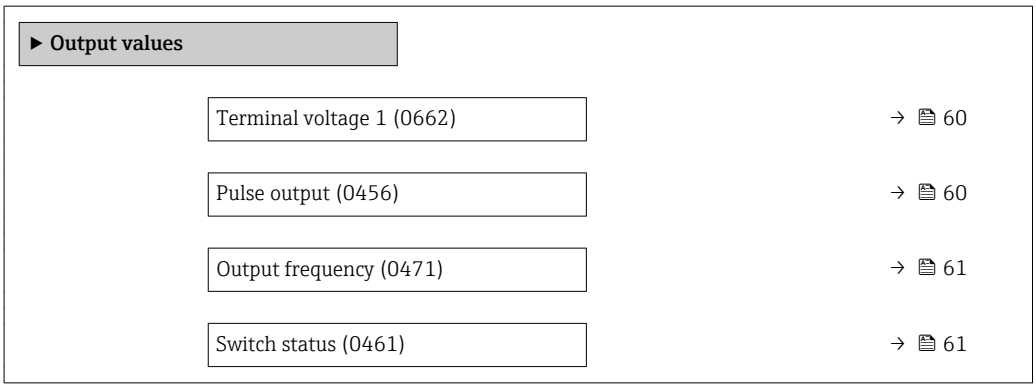
Navigation Expert → Sensor → Measured val. → Totalizer → Tot. status 1 to 3 (3826–1 to 3)

Description Displays the status of the particular totalizer.

User interface
- Good
- Uncertain
- Bad

"Output values" submenu

Navigation Expert → Sensor → Measured val. → Output values



Terminal voltage 1

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

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

User interface 0.0 to 50.0 V

Pulse output

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

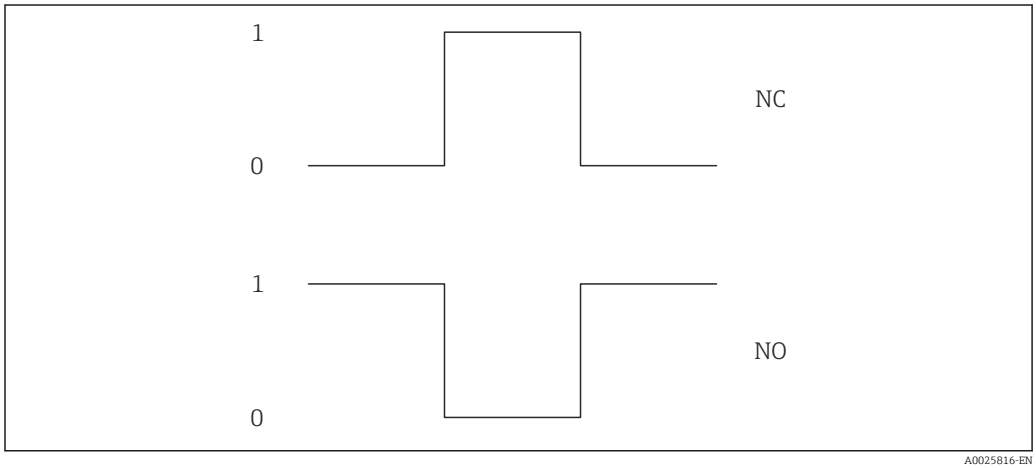
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 114).

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

- The pulse output is an open collector output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.
- The **Value per pulse** parameter (→ 116) and the **Pulse width** parameter (→ 116) can be used to define the value (i.e. the amount of the measured value that corresponds to a pulse) and the duration of the pulse.



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

The output behavior can be reversed via the **Invert output signal** parameter (→ 131), i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of an error (**Failure mode** parameter (→ 117)) can be configured.

Output frequency

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

Prerequisite In the **Operating mode** parameter (→ 114), the **Frequency** option is selected.

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

User interface 0 to 1 250 Hz

Switch status

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 114).

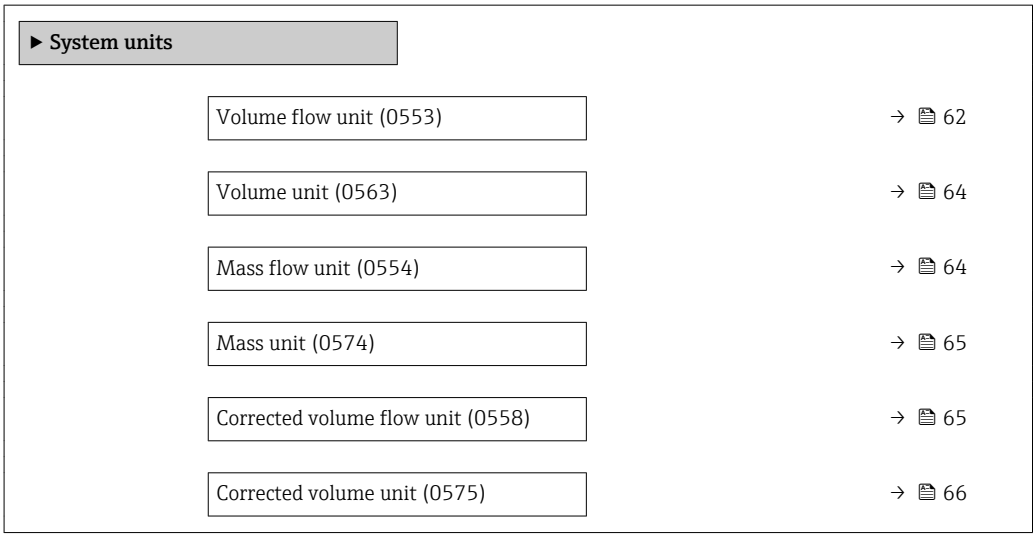
Description Displays the current switch status of the status output.

User interface
- Open
- Closed

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

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units



Volume flow unit

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

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

Selection

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

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

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

Factory setting

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

Additional information

Result

The selected unit applies for:
Volume flow parameter (→ 49)

Selection

For an explanation of the abbreviated units: → 238

Volume unit

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

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

Selection

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

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

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

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

Additional information *Selection*

For an explanation of the abbreviated units: → 238

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:
- **Mass flow** parameter (→ 50)
- **Total mass flow** parameter (→ 52)
- **Condensate mass flow** parameter (→ 52)

Selection

For an explanation of the abbreviated units: → 238

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: → 238

Corrected volume flow unit

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

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

Selection

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

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

Factory setting

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

Additional information

Result

The selected unit applies for:
Corrected volume flow parameter (→ 49)

Selection

For an explanation of the abbreviated units: → 238

Corrected volume unit

Navigation

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

Description

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

Selection

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

US units
- Sft^3

Factory setting

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

Additional information

Selection

For an explanation of the abbreviated units: → 238

Pressure unit

Navigation

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

Prerequisite

For the following order code:
"Sensor version", option "Mass flow"

Description

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

Selection

SI units
- GPa
- MPa
- kPa
- Pa
- mPa
- µPa
- bar
- mbar a
- torr
- atm
- kgf/cm²
- gf/cm²

US units
psi

Other units
- inH2O (4°C)
- inH2O (68°F)
- mmH2O (4°C)
- mmH2O (68°F)
- ftH2O (68°F)
- inHg (0°C)
- mmHg (0°C)

Factory setting

Country-specific:
- bar
- psi

Additional information

Result

The unit is taken from:
- **Calculated saturated steam pressure** parameter (→ 51)
- **Atmospheric pressure** parameter (→ 106)
- **Maximum value** parameter (→ 227)
- **Fixed process pressure** parameter (→ 108)
- **Pressure** parameter (→ 55)
- **Reference pressure** parameter (→ 87)

Selection

For an explanation of the abbreviated units: → 238

Temperature unit

Navigation

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

Description

Use this function to select the unit for the temperature.

Selection

SI units
- °C
- K

US units
- °F
- °R

Factory setting

Country-specific:
- °C
- °F

Additional information

Result

The selected unit applies for:
- **Temperature** parameter (→ 51)
- **Maximum value** parameter (→ 224)
- **Minimum value** parameter (→ 224)
- **Average value** parameter (→ 224)
- **Maximum value** parameter (→ 225)

- **Minimum value** parameter (→ 225)
- **Maximum value** parameter (→ 226)
- **Minimum value** parameter (→ 226)
- **2nd temperature delta heat** parameter (→ 107)
- **Fixed temperature** parameter (→ 107)
- **Reference combustion temperature** parameter (→ 86)
- **Reference temperature** parameter (→ 88)
- **Saturation temperature** parameter (→ 55)

Selection

For an explanation of the abbreviated units: → 238

Energy flow unit

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

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

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

Selection

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

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

Factory setting Country-specific:
- kW
- Btu/h

Additional information

Result

The selected unit applies for:
- **Heat flow difference** parameter (→ 53)
- **Energy flow** parameter (→ 53)

Selection

For an explanation of the abbreviated units: → 238

Energy unit

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

Prerequisite

For the following order code:
"Sensor version", option "Mass flow"

Description

Use this function to select the unit for energy.

Selection

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

Imperial units
- Btu
- MBtu
- MMBtu

Factory setting

Country-specific:
- kWh
- Btu

Additional information

Selection

For an explanation of the abbreviated units: → 238

Calorific value unit

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

Prerequisite

The following conditions are met:
- Order code for "Sensor version", option "Mass flow"
- The **Gross calorific value volume** option or the **Net calorific value volume** option is selected in the **Calorific value type** parameter (→ 82).

Description

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

Selection

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

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

Factory setting

Country-specific:
- kJ/Nm³
- Btu/Sft³

Additional information

Result

The selected unit applies for:
Reference gross calorific value parameter (→ 87)

Selection

For an explanation of the abbreviated units: → 238

Calorific value unit (Mass)

Navigation

Expert → Sensor → System units → Cal. value unit (0606)

Prerequisite

The following conditions are met:
- Order code for "Sensor version", option "Mass flow"
- The **Gross calorific value mass** option or the **Net calorific value mass** option is selected in the **Calorific value type** parameter (→ 82).

Description

Use this function to select the unit for the calorific value (mass).

Selection

SI units
- kJ/kg
- MJ/kg
- kWh/kg
- MWh/kg

US units
- kJ/lb
- MJ/lb
- kWh/lb
- MWh/lb

Imperial units
- Btu/lb
- MBtu/lb

Factory setting

Country-specific:
- kJ/kg
- Btu/lb

Additional information

Selection

For an explanation of the abbreviated units: → 238

Velocity unit

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

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

Selection

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

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

Additional information *Result*

The selected unit applies for:
- **Flow velocity** parameter (→ 50)
- **Maximum value** parameter (→ 227)

Selection

For an explanation of the abbreviated units: → 238

Density unit

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

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

Selection

SI units	*US units*	*Imperial units*
▪ g/cm³	▪ lb/ft³	▪ lb/gal (imp)
▪ kg/dm³	▪ lb/gal (us)	▪ lb/bbl (imp;beer)
▪ kg/l	▪ lb/bbl (us;liq.)	▪ lb/bbl (imp;oil)
▪ kg/m³	▪ lb/bbl (us;beer)	
▪ SD4°C	▪ lb/bbl (us;oil)	
▪ SD15°C	▪ lb/bbl (us;tank)	
▪ SD20°C		
▪ SG4°C		
▪ SG15°C		
▪ SG20°C		

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

Additional information *Result*

The selected unit applies for:
- **Density** parameter (→ 54)
- **Fixed density** parameter (→ 106)
- **Reference density** parameter (→ 86)

Selection

- SD = specific density
  The specific density is the ratio of the fluid 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 fluid 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: → 238

Specific volume unit

Navigation Expert → Sensor → System units → Spec. vol. unit (0610)

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

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

Selection

Other units
- m^3/kg
- ft3/lb

Factory setting Country-specific:
- m^3/kg
- ft^3/lb

Additional information *Result*

The selected unit applies for:
Specific volume parameter (→ 54)

Additional information *Selection*

For an explanation of the abbreviated units: → 238

Dynamic viscosity unit

Navigation Expert → Sensor → System units → Dyn. visc. unit (0577)

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

Selection

SI units
- Pa s
- cP
- P

Factory setting Pa s

Additional information *Result*

The selected unit applies for:
- **Dynamic viscosity** parameter (→ 85) (gases)
- **Dynamic viscosity** parameter (→ 84) (liquids)

Additional information *Selection*

For an explanation of the abbreviated units: → 238

Specific heat capacity unit

Navigation Expert → Sensor → System units → SpecHeatCapaUnit (0604)

Prerequisite The following conditions are met:
- Selected medium:
  - The **User-specific gas** option is selected in the **Select gas type** parameter (→ 78).
    Or
  - The **User-specific liquid** option is selected in the **Select liquid type** parameter (→ 79).
- The **Heat** option is selected in the **Enthalpy type** parameter (→ 82).

Description Use this function to select the unit for the specific heat capacity.

Selection

SI units	*Imperial units*
▪ kJ/(kgK)	Btu/(lb°R)
▪ MJ/(kgK)	
▪ kWh/(kgK)	
▪ kcal/(kgK)	

Factory setting kJ/(kgK)

Additional information *Result*

The selected unit applies for:
Specific heat capacity parameter (→ 89)

Additional information *Selection*

For an explanation of the abbreviated units: → 238

Length unit

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

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

Selection

SI units
- mm
- m

US units
- in
- ft

Factory setting

Country-specific:
- mm
- in

Additional information

Result

The selected unit applies for:
- **Inlet run** parameter (→ 110)
- **Mating pipe diameter** parameter (→ 110)

Selection

For an explanation of the abbreviated units: → 238

Date/time format

Navigation

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

Description

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

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

Factory setting

dd.mm.yy hh:mm

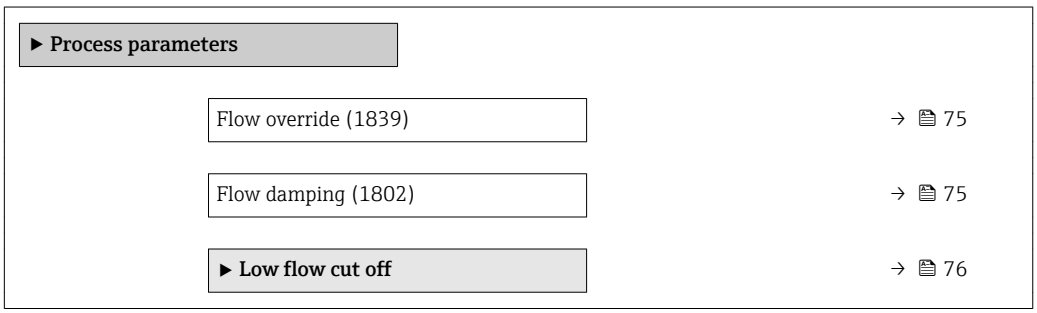
Additional information

Selection

For an explanation of the abbreviated units: → 238

3.2.3 "Process parameters" submenu

Navigation Expert → Sensor → Process param.



Flow override

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

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

Selection
- Off
- On

Factory setting Off

Additional information

Result

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

Description

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

Flow damping

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

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

User entry 0 to 999.9 s

Factory setting 5 s

Additional information

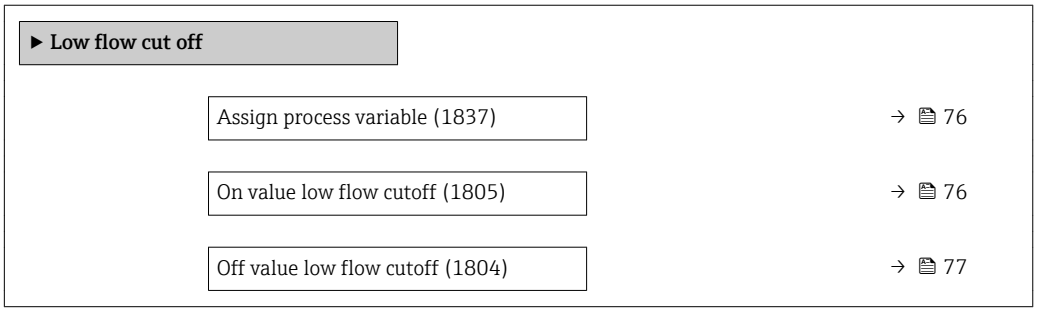
Result

The damping has an effect on the following variables of the device:
- Outputs
- Low flow cut off → 76
- Totalizer

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

"Low flow cut off" submenu

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



Assign process variable

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

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

Selection
- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Reynolds number *

Factory setting Off

On value low flow cutoff

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

Prerequisite One of the following options is selected in the **Assign process variable** parameter (→ 76):
- Volume flow
- Corrected volume flow
- Mass flow
- Reynolds number *

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 → 77.

User entry Positive floating-point number

Factory setting 0

* Visibility depends on order options or device settings

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign process variable** parameter (→ 76).

Off value low flow cutoff

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

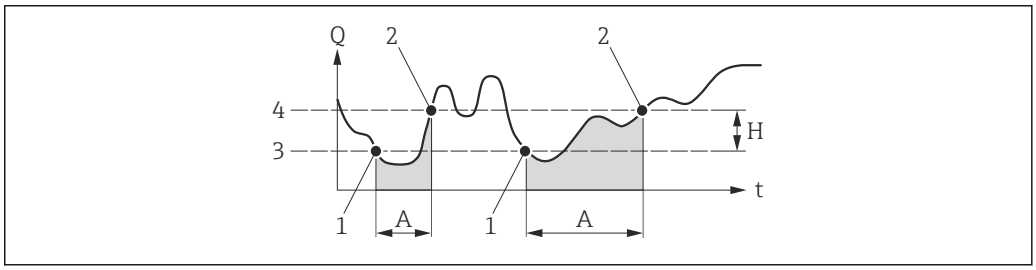
Prerequisite One of the following options is selected in the **Assign process variable** parameter (→ 76):
- Volume flow
- Corrected volume flow
- Mass flow
- Reynolds number *

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 → 76.

User entry 0 to 100.0 %

Factory setting 50 %

Additional information *Example*



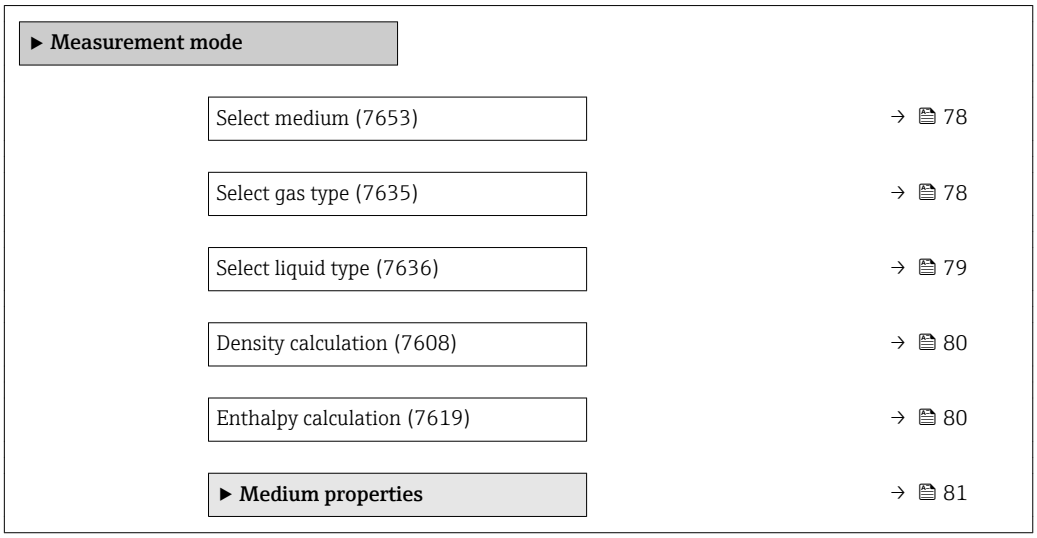
A0012887

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*

* Visibility depends on order options or device settings

3.2.4 "Measurement mode" submenu

Navigation Expert → Sensor → Measurement mode



Select medium

Navigation Expert → Sensor → Measurement mode → Select medium (7653)

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

Selection
- Gas
- Liquid
- Steam

Factory setting Steam

Select gas type

Navigation Expert → Sensor → Measurement mode → Select gas type (7635)

Prerequisite The following conditions are met:
- Order code
  - "Sensor version", option "Mass flow"
  - "Application package", option "Air + Industrial gases" or option "Natural gas"
- The **Gas** option is selected in the **Select medium** parameter (→ 78).

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

Selection
- Single gas
- Gas mixture
- Air
- Natural gas
- User-specific gas

Factory setting User-specific gas

Additional information *"User-specific gas" option*

Applications: calculation of the mass flow of a user-specific gas

Calculated variables: the mass flow, the density, the corrected volume flow and the heat quantity are calculated from the measured volume flow and the measured temperature. Either the specific thermal capacity or the calorific value must be entered for calculating the heat quantity.

Formulae for calculation:
- Mass flow: $m = q \cdot \rho\ (T)$
- Density: $\rho = \rho_1\ (T_1) / (1 + \beta_p \cdot [T - T_1])$
- Corrected volume flow: $v_n = q \cdot (\rho\ (T) / \rho_{ref})$
- Heat quantity in the case of delta heat: $E = q \cdot \rho\ (T) \cdot c_p \cdot \Delta T$
- Heat quantity in the case of combustion: $E = q \cdot \rho\ (T) \cdot h$

m = Mass flow

q = Volume flow (measured)

v_n = Corrected volume flow

T = Process temperature (measured)

T_1 = Temperature (→ 51) at which the value for ρ_1 applies.

ρ = Density

ρ_{ref} = Reference density

= Density (→ 54) at which the value for T_1 applies.

β_p = Linear expansion coefficient (→ 82) of the liquid at T_1

Possible combinations of these values: **Linear expansion coefficient** parameter (→ 82)

Select liquid type

Navigation Expert → Sensor → Measurement mode → Sel. liquid type (7636)

Prerequisite The following conditions are met:
- Order code for "Sensor version", option "Mass flow"
- The **Liquid** option is selected in the **Select medium** parameter (→ 78) parameter.

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

Selection
- Water
- LPG (Liquefied Petroleum Gas)
- User-specific liquid

Factory setting Water

Additional information *"User-specific liquid" option*

Applications: calculation of the mass flow of a user-specific liquid, such as thermal oil.

Calculated variables: the mass flow, the density, the corrected volume flow and the heat quantity are calculated from the measured volume flow and the measured temperature. Either the specific thermal capacity or the calorific value must be entered for calculating the heat quantity.

Formulae for calculation:
- Mass flow: $m = q \cdot \rho (T)$
- Density: $\rho = \rho_1 (T_1) / (1 + \beta_p \cdot [T - T_1])$
- Corrected volume flow: $v_n = q \cdot (\rho (T) / \rho_{ref})$
- Heat quantity in the case of delta heat: $E = q \cdot \rho (T) \cdot c_p \cdot \Delta T$
- Heat quantity in the case of combustion: $E = q \cdot \rho (T) \cdot h$

m = Mass flow

q = Volume flow (measured)

v_n = Corrected volume flow

T = Process temperature (measured)

T_1 = Temperature (→ 51) at which the value for ρ_1 applies.

ρ = Density

ρ_{ref} = Reference density

= Density (→ 54) at which the value for T_1 applies.

β_p = Linear expansion coefficient (→ 82) of the liquid at T_1

Possible combinations of these values: **Linear expansion coefficient** parameter (→ 82)

Density calculation

Navigation Expert → Sensor → Measurement mode → Density calc. (7608)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.

Description Use this function to select the standard on the basis of which the density is calculated.

Selection
- AGA Nx19
- ISO 12213- 2
- ISO 12213- 3

Factory setting AGA Nx19

Enthalpy calculation

Navigation Expert → Sensor → Measurement mode → Enthalpy calc. (7619)

Prerequisite The following conditions are met:
- Order code
  - "Sensor version", option "Mass flow (integrated temperature measurement)"
  - "Application package", option "Natural gas"
- In the **Select medium** parameter (→ 78), the **Gas** option is selected and in the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.

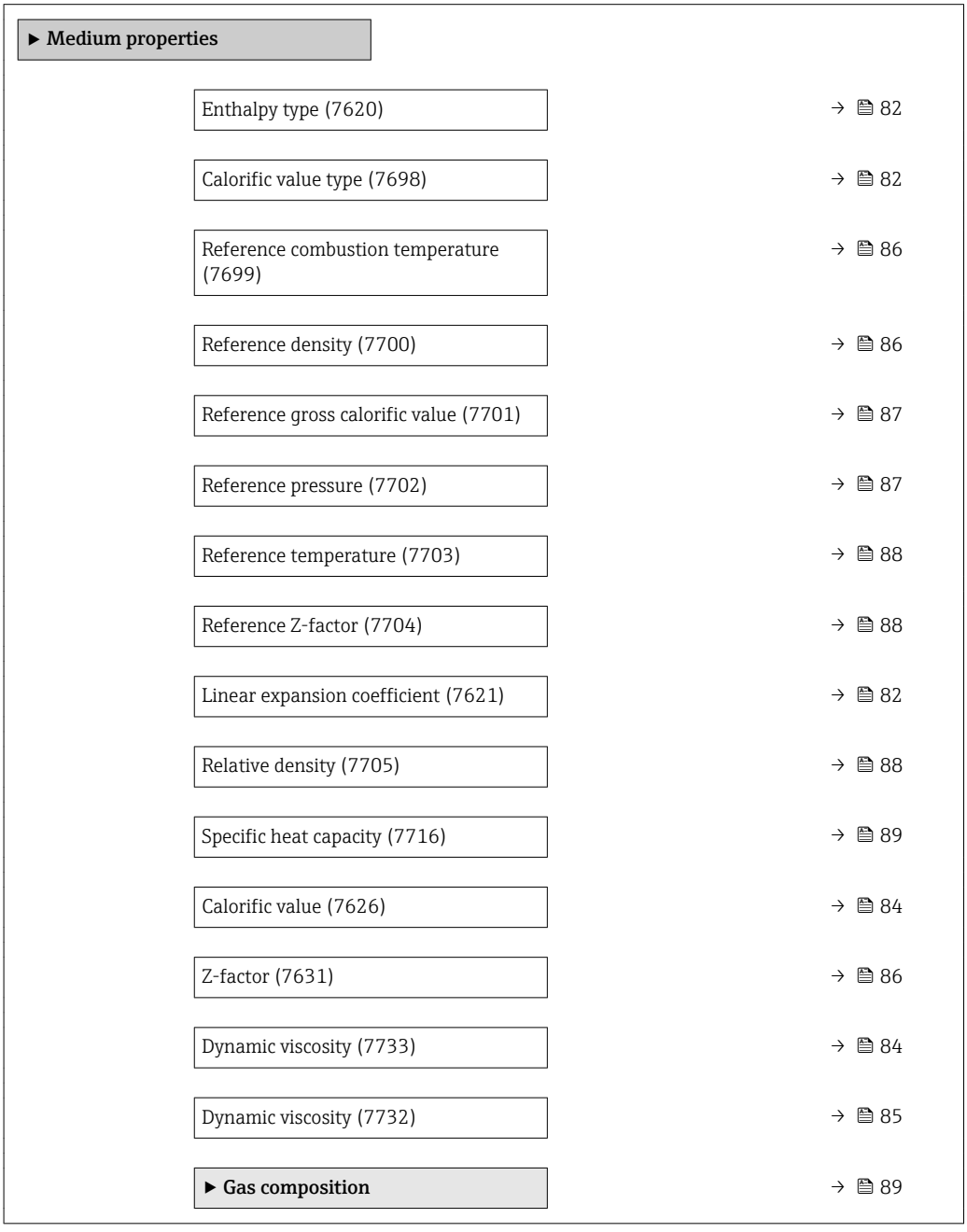
Description Use this function to select the standard on the basis of which the enthalpy is calculated.

Selection
- AGA5
- ISO 6976

Factory setting AGA5

"Medium properties" submenu

Navigation Expert → Sensor → Measurement mode → Medium property



Calorific value type

Navigation Expert → Sensor → Measurement mode → Medium property → Cal. value type (7698)

Prerequisite The **Calorific value type** parameter (→ 82) is visible.

Description Use this function to select whether the net calorific value or the gross calorific value is used as the basis for calculation.

Selection
- Gross calorific value volume
- Net calorific value volume
- Gross calorific value mass
- Net calorific value mass

Factory setting Gross calorific value mass

Enthalpy type

Navigation Expert → Sensor → Measurement mode → Medium property → Enthalpy type (7620)

Prerequisite The following conditions are met:
- In the **Select gas type** parameter (→ 78), the **User-specific gas** option is selected. Or
- In the **Select liquid type** parameter (→ 79), the **User-specific liquid** option is selected.

Description Use this function to select the type of enthalpy.

Selection
- Heat
- Calorific value

Factory setting Heat

Linear expansion coefficient

Navigation Expert → Sensor → Measurement mode → Medium property → Linear exp coeff (7621)

Prerequisite The following conditions are met:
- The **Liquid** option is selected in the **Select medium** parameter (→ 78).
- The **User-specific liquid** option is selected in the **Select liquid type** parameter (→ 79).

Description Use this function to enter the linear, medium-specific expansion coefficient for calculating the reference density for user-specific liquids.

User entry 1.0^{-6} to 2.0^{-3}

Factory setting 2.06^{-4}

Additional information *User entry*

- If the value in this parameter is changed, it is advisable to reset the totalizer.
- The expansion coefficient can be determined using the Applicator.
- If two density and temperature value pairs are known (density ρ_1 at temperature T_1 and density ρ_2 at temperature T_2), the expansion coefficient can be calculated according to the following formula:
  $\beta_p = ((\rho_1/\rho_2) - 1)/(T_1 - +T_2)$

Sample values

The closer the process temperature is to the specific temperature value, the better the calculation of the density for application-specific liquids. If the process temperature deviates greatly from the value indicated, the expansion coefficient should be calculated according to the formula (see above).

Medium (liquid)	Temperature value [K]	Density value [kg/m³]	Expansion coefficient [10^{-4} 1/K]
Air	123.15	594	18.76
Ammonia	298.15	602	25
Argon	133.15	1028	111.3
n-butane	298.15	573	20.7
Carbon dioxide	298.15	713	106.6
Chlorine	298.15	1398	21.9
Cyclohexane	298.15	773	11.6
n-decane	298.15	728	10.2
Ethane	298.15	315	175.3
Ethylene	298.15	386	87.7
n-heptane	298.15	351	12.4
n-hexane	298.15	656	13.8
Hydrogen chloride	298.15	796	70.9
i-butane	298.15	552	22.5
Methane	163.15	331	73.5
Nitrogen	93.15	729	75.3
n-octane	298.15	699	11.1
Oxygen	133.15	876	95.4
n-pentane	298.15	621	16.2
Propane	298.15	493	32.1
Vinyl chloride	298.15	903	19.3
Table values according to Carl L. Yaws (2001): Matheson Gas Data Book, 7th edition			

Calorific value

Navigation Expert → Sensor → Measurement mode → Medium property → Calorific value (7626)

Prerequisite
The following conditions are met:
- Selected medium:
  - In the **Select gas type** parameter (→ 78), the **User-specific gas** option is selected. Or
  - In the **Select liquid type** parameter (→ 79), the **User-specific liquid** option is selected.
- In the **Enthalpy type** parameter (→ 82), the **Calorific value** option is selected.
- In the **Calorific value type** parameter (→ 82), the **Gross calorific value volume** option or **Gross calorific value mass** option is selected.

Description Use this function to enter the calorific value for calculating the energy flow.

User entry Positive floating-point number

Factory setting 50 000 kJ/kg

Dynamic viscosity (Liquids)

Navigation Expert → Sensor → Measurement mode → Medium property → Dynam. viscosity (7733)

Prerequisite
The following conditions are met:
- Order code for "Sensor version", option "Volume flow"
- The **Liquid** option is selected in the **Select medium** parameter (→ 78) parameter. Or
- The **User-specific liquid** option is selected in the **Select liquid type** parameter (→ 79).

Description Use this function to enter a fixed value for the dynamic viscosity for a liquid.

User entry Positive floating-point number

Factory setting 1 cP

Additional information *Description*

The viscosity entered is used to linearize the measured error in the lower Reynolds number range if the calculated viscosity is not available e.g. "Volume flow" sensor version or the fluid is a user-specific liquid (see table).

Dependencies

Sensor version	Medium	Dyn. viscosity
Volume flow	All	x
Mass flow	All except [1]	–

Sensor version	Medium	Dyn. viscosity
	1)	x
x	Dynamic viscosity as the input value	

1) User-specific liquid

Dependency

The unit is taken from the **Dynamic viscosity unit** parameter (→ 72)

Dynamic viscosity (Gases)

Navigation Expert → Sensor → Measurement mode → Medium property → Dynam. viscosity (7732)

Prerequisite

The following conditions are met:
- Order code for "Sensor version", option "Volume flow"
- The **Gas** option or the **Steam** option is selected in the **Select medium** parameter (→ 78).
  Or
- The **User-specific gas** option is selected in the **Select gas type** parameter (→ 78).

Description Use this function to enter a fixed value for the dynamic viscosity for a gas or steam.

User entry Positive floating-point number

Factory setting 0.015 cP

Additional information

Description

The viscosity entered is used to linearize the measured error in the lower Reynolds number range if the calculated viscosity is not available e.g. "Volume flow" sensor version or the fluid is a user-specific gas (see table).

Dependencies

Sensor version	Medium	Dyn. viscosity
Volume flow	All	x
Mass flow	All except 1)	–
	1)	x
x	Dynamic viscosity as the input value	

1) User-specific gas

Dependency

The unit is taken from the **Dynamic viscosity unit** parameter (→ 72)

Z-factor

Navigation Expert → Sensor → Measurement mode → Medium property → Z-factor (7631)

Prerequisite In the **Select gas type** parameter (→ 78), the **User-specific gas** option is selected.

Description Use this function to enter the real gas constant Z for gas under operating conditions.

User entry 0.1 to 2.0

Factory setting 1

Reference combustion temperature

Navigation Expert → Sensor → Measurement mode → Medium property → Ref. comb. temp. (7699)

Prerequisite The **Reference combustion temperature** parameter (→ 86) is visible.

Description Use this function to enter the reference combustion temperature for calculating the natural gas energy value.

User entry −200 to 450 °C

Factory setting 20 °C

Additional information *Dependency*

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

Reference density

Navigation Expert → Sensor → Measurement mode → Medium property → Ref.density (7700)

Prerequisite The following conditions are met:
- In the **Select gas type** parameter (→ 78), the **User-specific gas** option is selected.
  Or
- In the **Select liquid type** parameter (→ 79), the **Water** option or **User-specific liquid** option is selected.

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

User entry 0.01 to 15 000 kg/m³

Factory setting 1 000 kg/m³

Additional information *Dependency*

The unit is taken from the **Density unit** parameter (→ 71)

Reference gross calorific value

Navigation Expert → Sensor → Measurement mode → Medium property → Ref. GrossCalVal (7701)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 3** option is selected.

Description Use this function to enter the reference gross calorific value of the natural gas.

User entry Positive floating-point number

Factory setting 50 000 kJ/Nm³

Additional information *Dependency*

The unit is taken from the **Calorific value unit** parameter (→ 69)

Reference pressure

Navigation Expert → Sensor → Measurement mode → Medium property → Ref. pressure (7702)

Prerequisite The following conditions are met:
- Order code for "Sensor version", option "Mass flow (integrated temperature measurement)"
- The **Gas** option is selected in the **Select medium** parameter (→ 78).

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

User entry 0 to 250 bar

Factory setting 1.01325 bar

Additional information *Dependency*

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

Reference temperature

Navigation Expert → Sensor → Measurement mode → Medium property → Ref. temperature (7703)

Prerequisite
The following conditions are met:
- The **Gas** option is selected in the **Select medium** parameter (→ 78).
  Or
- The **Liquid** option is selected in the **Select medium** parameter (→ 78).

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

User entry −200 to 450 °C

Factory setting 20 °C

Additional information *Dependency*

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

Reference Z-factor

Navigation Expert → Sensor → Measurement mode → Medium property → Ref. Z-factor (7704)

Prerequisite In the **Select gas type** parameter (→ 78), the **User-specific gas** option is selected.

Description Use this function to enter the real gas constant Z for gas under reference conditions.

User entry 0.1 to 2

Factory setting 1

Relative density

Navigation Expert → Sensor → Measurement mode → Medium property → Relative density (7705)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 3** option is selected.

Description Use this function to enter the relative density of the natural gas.

User entry 0.55 to 0.9

Factory setting 0.664

Specific heat capacity

Navigation Expert → Sensor → Measurement mode → Medium property → Spec. heat cap. (7716)

Prerequisite
The following conditions are met:
- Selected medium:
  - In the **Select gas type** parameter (→ 78), the **User-specific gas** option is selected.
  Or
  - In the **Select liquid type** parameter (→ 79), the **User-specific liquid** option is selected.
- In the **Enthalpy type** parameter (→ 82), the **Heat** option is selected.

Description Use this function to enter the specific heat capacity of the medium.

User entry 0 to 50 kJ/(kgK)

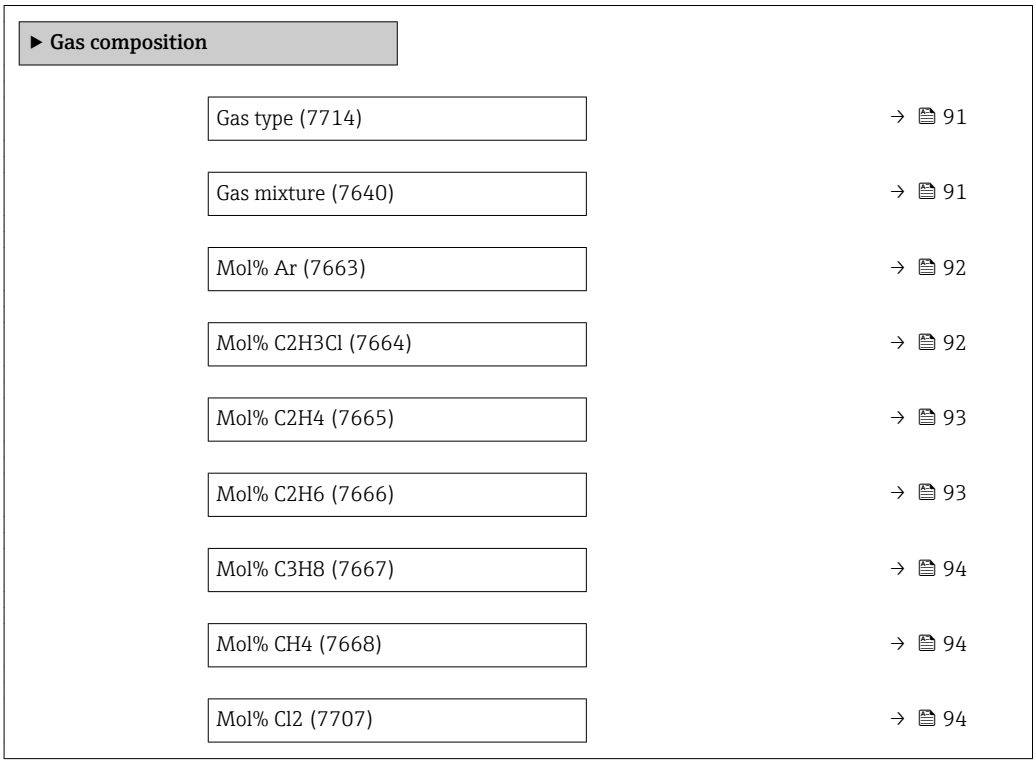
Factory setting 4.187 kJ/(kgK)

Additional information *Dependency*

The unit is taken from the **Specific heat capacity unit** parameter (→ 73)

"Gas composition" submenu

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition



Mol% CO (7669)	→ 95
Mol% CO2 (7670)	→ 95
Mol% H2 (7671)	→ 96
Mol% H2O (7672)	→ 96
Mol% H2S (7673)	→ 96
Mol% HCl (7674)	→ 97
Mol% He (7675)	→ 97
Mol% i-C4H10 (7676)	→ 98
Mol% i-C5H12 (7677)	→ 98
Mol% Kr (7678)	→ 98
Mol% N2 (7679)	→ 99
Mol% n-C10H22 (7680)	→ 99
Mol% n-C4H10 (7681)	→ 100
Mol% n-C5H12 (7682)	→ 100
Mol% n-C6H14 (7683)	→ 100
Mol% n-C7H16 (7684)	→ 101
Mol% n-C8H18 (7685)	→ 101
Mol% n-C9H20 (7686)	→ 101
Mol% Ne (7687)	→ 102
Mol% NH3 (7688)	→ 102
Mol% O2 (7689)	→ 103
Mol% SO2 (7691)	→ 103
Mol% Xe (7692)	→ 103
Mol% other gas (7690)	→ 104
Relative humidity (7731)	→ 104

Gas type

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Gas type (7714)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Single gas** option is selected.

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

Selection
- Hydrogen H2
- Helium He
- Neon Ne
- Argon Ar
- Krypton Kr
- Xenon Xe
- Nitrogen N2
- Oxygen O2
- Chlorine Cl2
- Ammonia NH3
- Carbon monoxide CO
- Carbon dioxide CO2
- Sulfur dioxide SO2
- Hydrogen sulfide H2S
- Hydrogen chloride HCl
- Methane CH4
- Ethane C2H6
- Propane C3H8
- Butane C4H10
- Ethylene C2H4
- Vinyl Chloride C2H3Cl

Factory setting Methane CH4

Gas mixture

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Gas mixture (7640)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.

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

Selection
- Hydrogen H2
- Helium He
- Neon Ne
- Argon Ar
- Krypton Kr
- Xenon Xe
- Nitrogen N2

- Oxygen O2
- Chlorine Cl2
- Ammonia NH3
- Carbon monoxide CO
- Carbon dioxide CO2
- Sulfur dioxide SO2
- Hydrogen sulfide H2S
- Hydrogen chloride HCl
- Methane CH4
- Ethane C2H6
- Propane C3H8
- Butane C4H10
- Ethylene C2H4
- Vinyl Chloride C2H3Cl
- Others

Factory setting Methane CH4

Mol% Ar

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Ar (7663)

Prerequisite The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
– In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Argon Ar** option is selected.
Or
– In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% C2H3Cl

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% C2H3Cl (7664)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Vinyl Chloride C2H3Cl** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% C2H4

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% C2H4 (7665)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Ethylene C2H4** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% C2H6

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% C2H6 (7666)

Prerequisite The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Ethane C2H6** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% C3H8

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% C3H8 (7667)

Prerequisite The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Propane C3H8** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% CH4

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% CH4 (7668)

Prerequisite The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Methane CH4** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 100 %

Mol% Cl2

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Cl2 (7707)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Chlorine Cl2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% CO

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% CO (7669)

Prerequisite The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Carbon monoxide CO** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% CO2

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% CO2 (7670)

Prerequisite The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Carbon dioxide CO2** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% H2

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% H2 (7671)

Prerequisite
The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Hydrogen H2** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **AGA Nx19** option is **not** selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% H2O

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% H2O (7672)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% H2S

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% H2S (7673)

Prerequisite
The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Hydrogen sulfide H2S** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% HCl

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% HCl (7674)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Hydrogen chloride HCl** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% He

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% He (7675)

Prerequisite The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Helium He** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% i-C4H10

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% i-C4H10 (7676)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% i-C5H12

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% i-C5H12 (7677)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% Kr

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Kr (7678)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Krypton Kr** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% N2

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% N2 (7679)

Prerequisite
The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Nitrogen N2** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **AGA Nx19** option or the **ISO 12213-2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% n-C10H22

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C10H22 (7680)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% n-C4H10

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C4H10 (7681)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
  - In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Butane C4H10** option is selected.
    Or
  - In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.
- Or
  In the **Select medium** parameter (→ 78), the **Liquid** option is selected and in the **Select liquid type** parameter (→ 79), the **LPG** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% n-C5H12

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C5H12 (7682)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% n-C6H14

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C6H14 (7683)

Prerequisite
The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% n-C7H16

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C7H16 (7684)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% n-C8H18

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C8H18 (7685)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% n-C9H20

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C9H20 (7686)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.
- In the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% Ne

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Ne (7687)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Neon Ne** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% NH3

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% NH3 (7688)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Ammonia NH3** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% O2

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% O2 (7689)

Prerequisite The following conditions are met:
In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Oxygen O2** option is selected.
  Or
- In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213- 2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% SO2

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% SO2 (7691)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Sulfur dioxide SO2** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% Xe

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Xe (7692)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Xenon Xe** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Mol% other gas

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% other gas (7690)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Others** option is selected.

Description Use this function to enter the amount of the gas constituent in the gas mixture.

User entry 0 to 100 %

Factory setting 0 %

Relative humidity

Navigation Expert → Sensor → Measurement mode → Medium property → Gas composition → Rel. humidity (7731)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Air** option is selected.

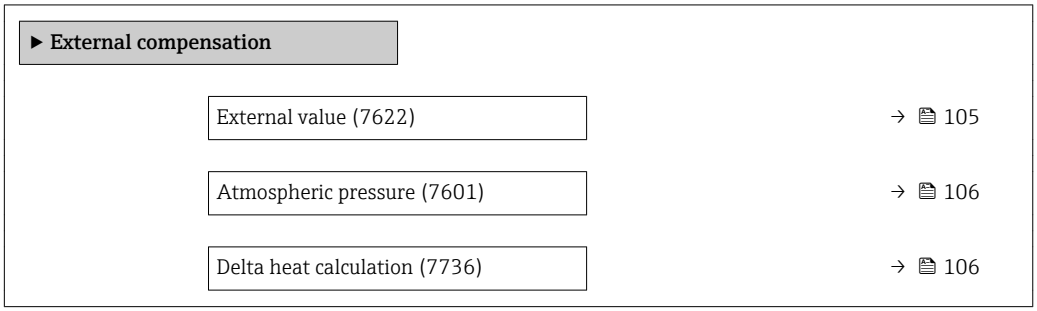
Description Use this function to enter the humidity content of the air in %.

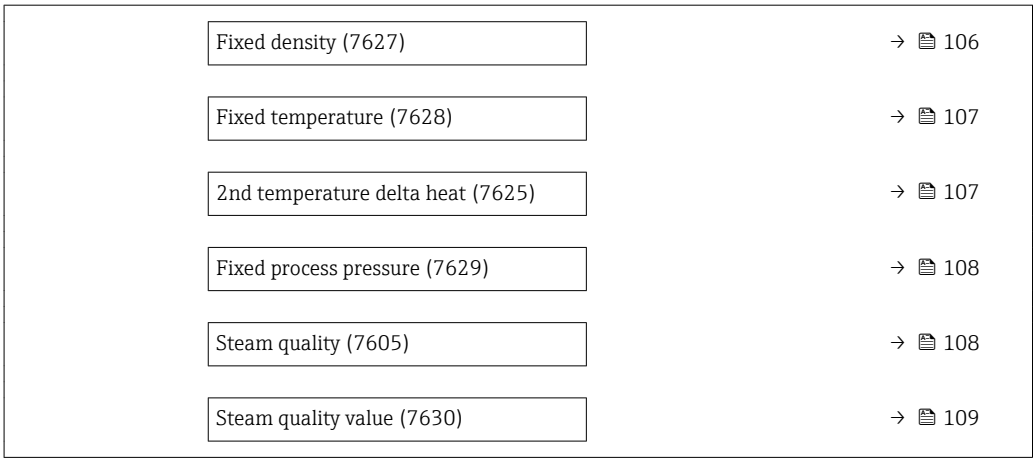
User entry 0 to 100 %

Factory setting 0 %

3.2.5 "External compensation" submenu

Navigation Expert → Sensor → External comp.





External value

Navigation Expert → Sensor → External comp. → External value (7622)

Prerequisite For the following order code:
"Sensor version", option "Mass flow"

Description Use this function to select the process variable which is taken from an external device.

For detailed information on setting the parameter in steam applications, see the Special Documentation for the **Wet Steam Detection** and **Wet Steam Measurement** application package.

Selection
- Off
- Pressure
- Relative pressure
- Density
- Temperature
- 2nd temperature delta heat

Factory setting Off

Additional information *Selection*

The **Fixed process pressure** parameter (→ 108) is set to the value **0 bar abs.** (ex works). In this case, the measuring device ignores the pressure read in via PROFIBUS PA. For the measuring device to use the external (read-in) pressure, a value > 0 bar abs. must be entered in the **Fixed process pressure** parameter (→ 108).

NOTE!

If pressure is the selected option, the pressure is read in externally by means of a pressure transmitter.

The pressure must be read in the unit Pascal so that pressure compensation can be read in correctly.

▸ Select the **Pa** option in the **Pressure unit** parameter (→ 66).

Atmospheric pressure

Navigation Expert → Sensor → External comp. → Atmosph. press. (7601)

Prerequisite In the **External value** parameter (→ 105), the **Relative pressure** option is selected.

Description Use this function to enter the value for the ambient pressure to be used for pressure correction.

User entry 0 to 250 bar

Factory setting 1.01325 bar

Additional information *Dependency*

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

Delta heat calculation

Navigation Expert → Sensor → External comp. → Delta heat calc. (7736)

Prerequisite The **Delta heat calculation** parameter (→ 106) is visible.

Description Use this function to select the option for calculating the heat transferred via a heat exchanger (=delta heat).

Selection
- Off
- Device on cold side
- Device on warm side

Factory setting Device on warm side

Fixed density

Navigation Expert → Sensor → External comp. → Fixed density (7627)

Prerequisite For the following order code:
"Sensor version", option "Volume flow"

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

User entry 0.01 to 15 000 kg/m³

Factory setting 1 000 kg/m³

Additional information *Description*

The density entered is used to linearize the measured error in the lower Reynolds number range if the calculated density is not available e.g. "Volume flow" sensor version or the fluid is a user-specific gas (see table).

Dependency

The unit is taken from the **Density unit** parameter (→ 71)

Fixed temperature

Navigation Expert → Sensor → External comp. → Fixed temp. (7628)

Description Use this function to enter a fixed value for the process temperature.

User entry −200 to 450 °C

Factory setting 20 °C

Additional information *Dependency*

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

2nd temperature delta heat

Navigation Expert → Sensor → External comp. → 2ndTempDeltaHeat (7625)

Prerequisite The **2nd temperature delta heat** parameter (→ 107) is visible.

Description Use this function to enter the second temperature value for calculating the delta heat.

User entry −200 to 450 °C

Factory setting 20 °C

Additional information *Dependency*

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

Fixed process pressure

Navigation Expert → Sensor → External comp. → Fix. proc.press. (7629)

Prerequisite
The following conditions are met:
- Order code for "Sensor version", option "Mass flow (integrated temperature measurement)"
- In the **External value** parameter (→ 105) the **Pressure** option is not selected.

Description Use this function to enter a fixed value for the process pressure.

User entry 0 to 250 bar abs.

Factory setting 0 bar abs.

Additional information

User entry

For detailed information on setting the parameter in steam applications, see the Special Documentation for the **Wet Steam Detection** and **Wet Steam Measurement** application package.

Dependency

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

Steam quality

Navigation Expert → Sensor → External comp. → Steam quality (7605)

Prerequisite
The following conditions are met:
- Order code for "Application package":
  - Option ES "Wet steam detection"
  - Option EU "Wet steam measurement"
- In the **Select medium** parameter (→ 78) the **Steam** option is selected.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

Description Use this function to select the compensation mode for the steam quality.

Selection
- Fixed value
- Calculated value

Factory setting Fixed value

Additional information

Selection

For detailed information on setting the parameter in steam applications, see the Special Documentation for the **Wet Steam Detection** and **Wet Steam Measurement** application package.

Steam quality value

Navigation Expert → Sensor → External comp. → Steam qual. val. (7630)

Prerequisite The following conditions are met:
- In the **Select medium** parameter (→ 78) the **Steam** option is selected.
- In the **Steam quality** parameter (→ 108) the **Fixed value** option is selected.

Description Use this function to enter a fixed value for the steam quality.

User entry 0 to 100 %

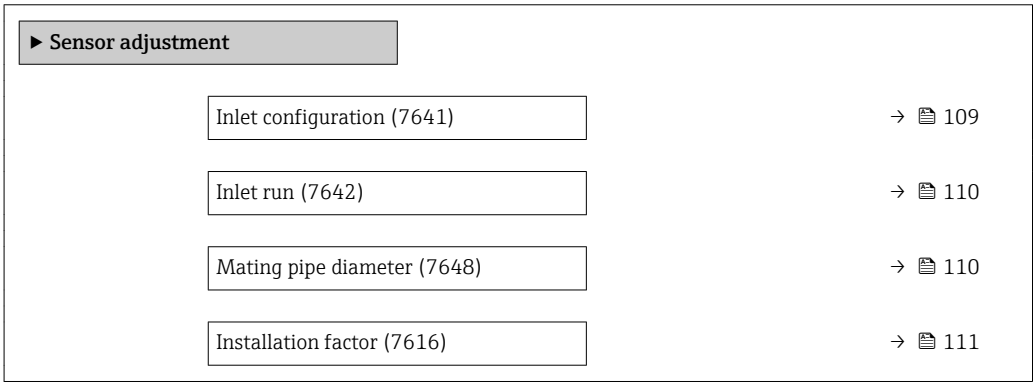
Factory setting 100 %

Additional information *User entry*

For detailed information on setting the parameter in steam applications, see the Special Documentation for the **Wet Steam Detection** and **Wet Steam Measurement** application package.

3.2.6 "Sensor adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm.



Inlet configuration

Navigation Expert → Sensor → Sensor adjustm. → Inlet config. (7641)

Prerequisite The **inlet run correction** feature:
- Is a standard feature and can only be used in Prowirl F 200.
- Can be used for the following pressure ratings and nominal diameters:
  DN 15 to 150 (1 to 6")
  – EN (DIN)
  – ASME B16.5, Sch. 40/80

Description Use this function to select the inlet configuration.

Selection
- Off
- Single elbow
- Double elbow
- Double elbow 3D
- Reduction

Factory setting Off

Inlet run

Navigation Expert → Sensor → Sensor adjustm. → Inlet run (7642)

Prerequisite The **inlet run correction** feature:
- Is a standard feature and can only be used in Prowirl F 200.
- Can be used for the following pressure ratings and nominal diameters:
  DN 15 to 150 (1 to 6")
  – EN (DIN)
  – ASME B16.5, Sch. 40/80

Description Use this function to enter the length of the straight inlet run.

User entry 0 to 20 m

Factory setting 0 m

Additional information *Dependency*

The unit is taken from the **Length unit** parameter (→ 73)

Mating pipe diameter

Navigation Expert → Sensor → Sensor adjustm. → D mating pipe (7648)

Description Use this function to enter the diameter of the mating pipe to enable diameter mismatch correction.

User entry 0 to 1 m (0 to 3 ft)

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

Additional information *Description*

The device has diameter mismatch correction. This can be enabled by entering the actual internal diameter of the mating pipe in the **Mating pipe diameter** parameter.

User entry

If the value entered is **0**, diameter mismatch correction is disabled. If the standard internal diameter of the ordered process connection differs from the internal diameter of the

mating pipe, an additional measuring uncertainty of up to 2 % must be expected if diameter mismatch correction is disabled.

Limit values

Diameter mismatch correction should be enabled only within the following limit values:

Flange connection:
- DN 15 (½"): ±20 % of the internal diameter
- DN 25 (1"): ±15 % of the internal diameter
- DN 40 (1½"): ±12 % of the internal diameter
- DN ≥ 50 (2"): ±10 % of the internal diameter

Disc (wafer version):
- DN 15 (½"): ±15 % of the internal diameter
- DN 25 (1"): ±12 % of the internal diameter
- DN 40 (1½"): ±9 % of the internal diameter
- DN ≥ 50 (2"): ±8 % of the internal diameter

Dependency

The unit is taken from the **Length unit** parameter (→ 73)

Installation factor

Navigation Expert → Sensor → Sensor adjustm. → Install. factor (7616)

Description Use this function to enter the factor to adjust installation conditions.

User entry Positive floating-point number

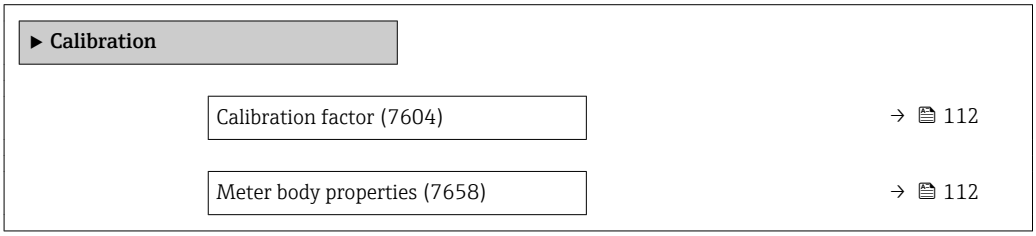
Factory setting 1.0

Additional information *Description*

The calculated volume flow and all measured variables derived from this are multiplied by the installation factor.

3.2.7 "Calibration" submenu

Navigation Expert → Sensor → Calibration



Calibration factor

Navigation Expert → Sensor → Calibration → Cal. factor (7604)

Description Displays the calibration factor. The calibration factor is determined during device calibration.

User interface Positive floating-point number

Factory setting This value is always > **0** when the device is delivered from the factory.

Additional information *Description*

Factor by which the measured vortex frequency must be divided in order to calculate the volume flow.

Unit

In $1/m^3$, or vortex pulses per cubic meter

Meter body properties

Navigation Expert → Sensor → Calibration → Meter body prop. (7658)

Description Displays informative text about the measuring tube.

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

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

Additional information *Description*

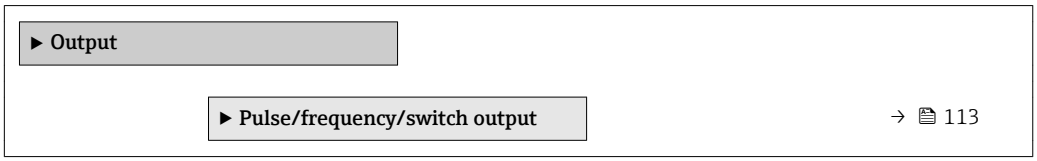
Summarized information about the meter body.

Example

DN25F-PN40: nominal diameter DN25, flange type, pressure rating 40 bar

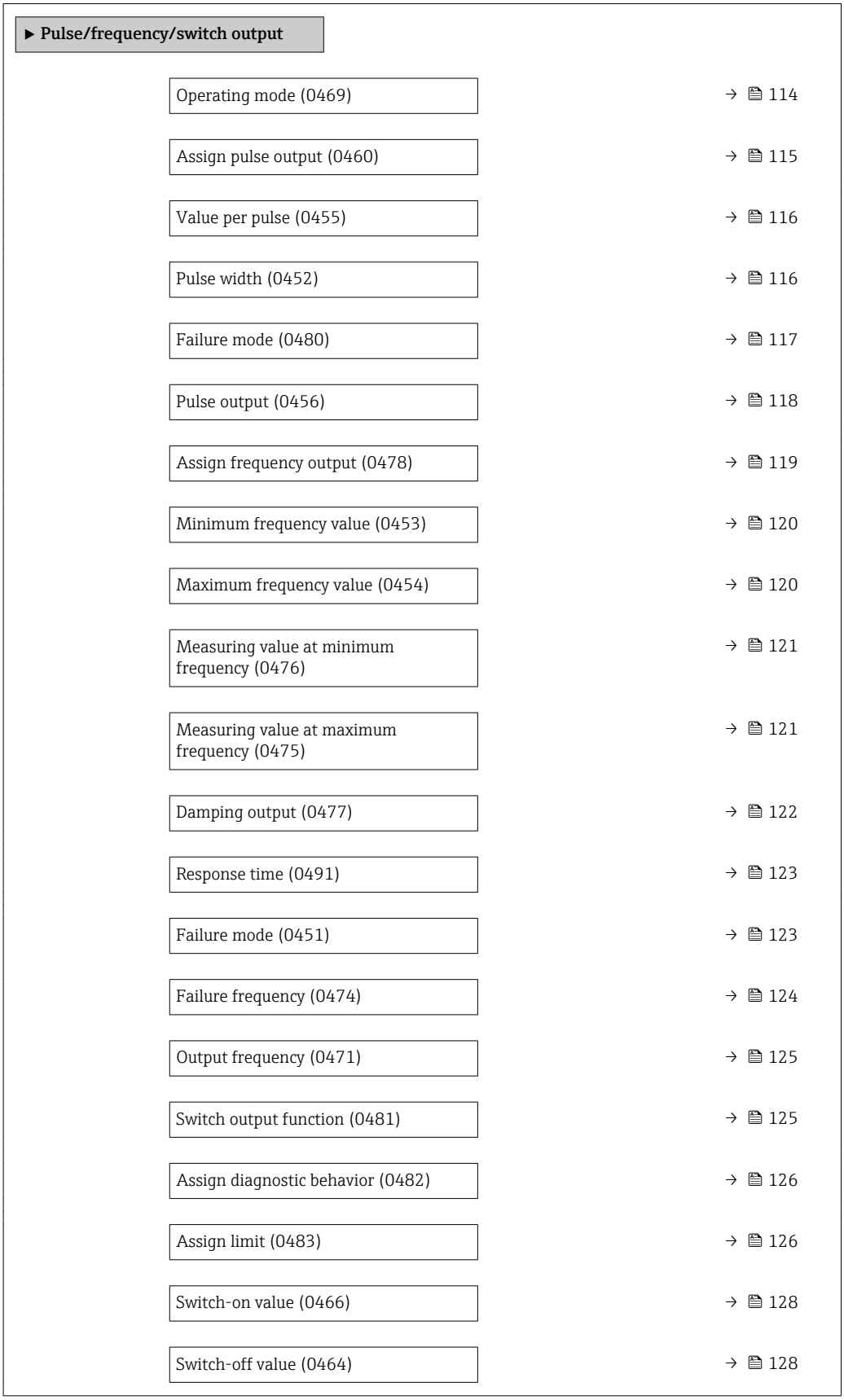
3.3 "Output" submenu

Navigation Expert → Output



3.3.1 "Pulse/frequency/switch output" submenu

Navigation Expert → Output → PFS output



Assign flow direction check (0484)	→ 129
Assign status (0485)	→ 129
Switch-on delay (0467)	→ 130
Switch-off delay (0465)	→ 130
Failure mode (0486)	→ 130
Switch status (0461)	→ 131
Invert output signal (0470)	→ 131

Operating mode

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

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

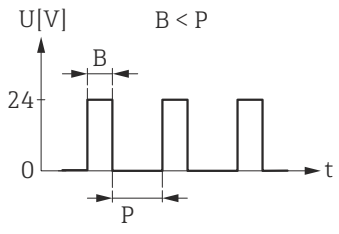
Selection
- Pulse
- Frequency
- Switch

Factory setting Pulse

Additional information *"Pulse" option*

Quantity-dependent pulse with configurable pulse width
- Whenever a specific volume, corrected volume, mass, total mass, energy or heat 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
- Total flow approx. 100 g/s
- Pulse value 0.1 g
- Pulse width 0.05 ms
- Pulse rate 1 000 Impuls/s



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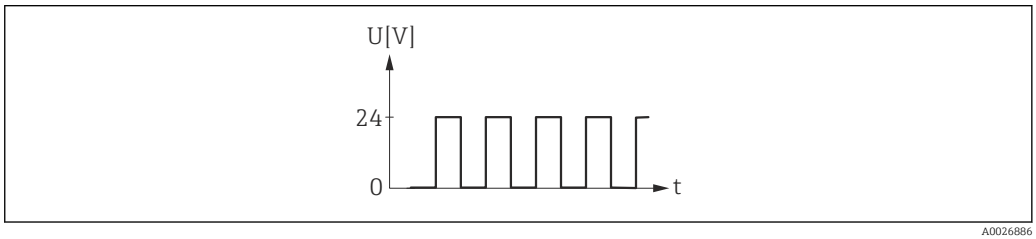
4 *Quantity-proportional pulse (pulse value) with pulse width to be configured*

B Pulse width entered
P Pauses between the individual pulses

"Frequency" option

Flow-proportional frequency output with 1:1 on/off ratio
An output frequency is output that is proportional to the value of a process variable, such as volume flow, corrected volume flow, mass flow, flow velocity, temperature, calculated saturated steam pressure, steam quality, total mass flow, energy flow or heat flow difference.

Example
- Total flow approx. 100 g/s
- Max. frequency 10 kHz
- Flow rate at max. frequency1 000 g/s
- Output frequency approx. 1 000 Hz

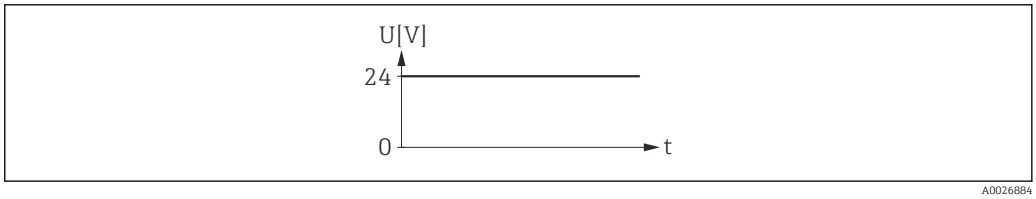


5 *Flow-proportional frequency output*

"Switch" option

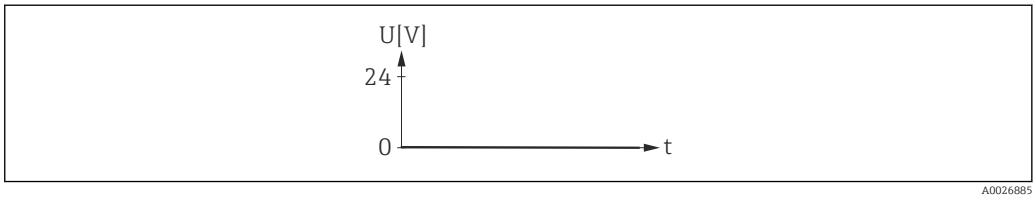
Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

Example
Alarm response without alarm



6 *No alarm, high level*

Example
Alarm response in case of alarm



7 *Alarm, low level*

Assign pulse output

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 114).

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

Selection
- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Total mass flow *
- Energy flow *
- Heat flow difference *

Factory setting Volume flow

Value per pulse

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign pulse output** parameter (→ 115):
- Volume flow
- Corrected volume flow
- Mass flow
- Total mass flow *
- Energy flow *
- Heat flow difference *

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

User entry Positive floating-point number

Factory setting Depends on country and nominal diameter → 235

Additional information *User entry*

Weighting of the pulse output with a quantity.

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

Pulse width

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

Prerequisite In the **Operating mode** parameter (→ 114), the **Pulse** option is selected and one of the following options is selected in the **Assign pulse output** parameter (→ 115):
- Volume flow
- Corrected volume flow
- Mass flow

* Visibility depends on order options or device settings

- Total mass flow *
- Energy flow *
- Heat flow difference *

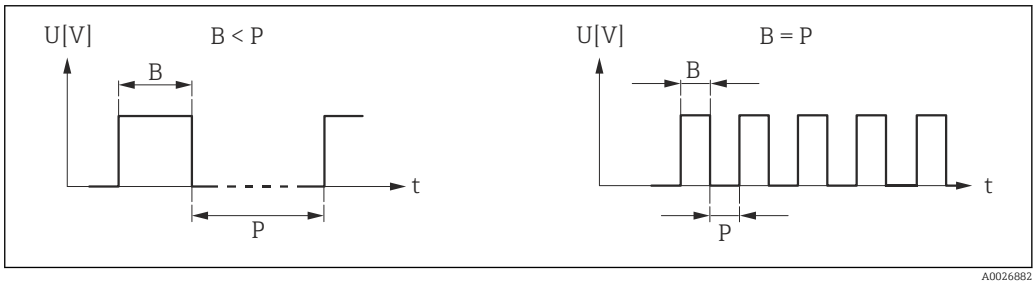
Description Use this function to enter the duration of the output pulse.

User entry 5 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 2**.



B Pulse width entered
P Intervals 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

The pulse width is not relevant for **Automatic pulse** option.

Failure mode

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

Prerequisite In the **Operating mode** parameter (→ 114), the **Pulse** option is selected and one of the following options is selected in the **Assign pulse output** parameter (→ 115):

- Volume flow
- Corrected volume flow
- Mass flow
- Total mass flow *
- Energy flow *
- Heat flow difference *

* Visibility depends on order options or device settings

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 fault.

Options

- 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

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

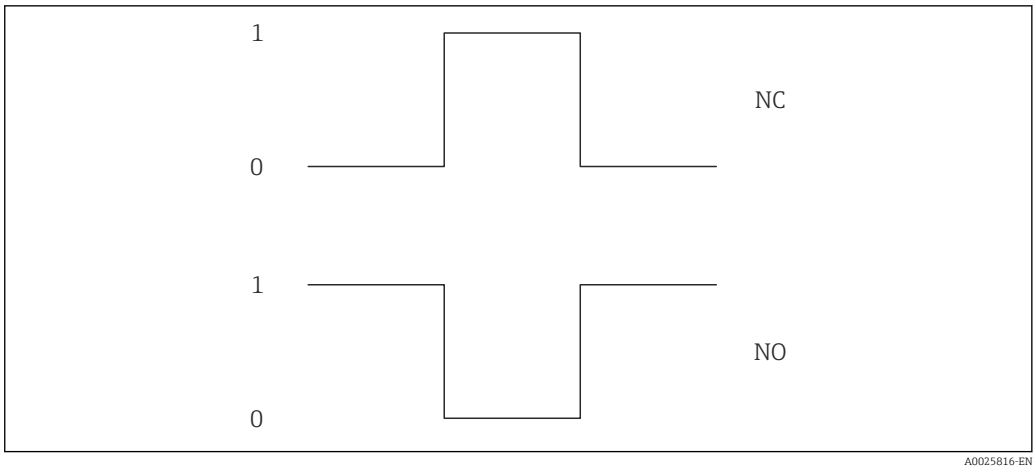
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 114).

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

- The pulse output is an open collector output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.
- The **Value per pulse** parameter (→ 116) and the **Pulse width** parameter (→ 116) can be used to define the value (i.e. the amount of the measured value that corresponds to a pulse) and the duration of the pulse.



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

The output behavior can be reversed via the **Invert output signal** parameter (→ 131), i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of an error (**Failure mode** parameter (→ 117)) can be configured.

Assign frequency output

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114).

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

Selection
- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

Factory setting Off

* Visibility depends on order options or device settings

Minimum frequency value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

Description Use this function to enter the start value frequency.

User entry 0 to 1 000 Hz

Factory setting 0 Hz

Maximum frequency value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

Description Use this function to enter the end value frequency.

User entry 0 to 1 000 Hz

Factory setting 1 000 Hz

* Visibility depends on order options or device settings

Measuring value at minimum frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Dependency*

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 119).

Measuring value at maximum frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

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

User entry Signed floating-point number

* Visibility depends on order options or device settings

Factory setting Depends on country and nominal diameter

Additional information *Description*

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

Dependency

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 119).

Damping output

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

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

User entry 0 to 999.9 s

Factory setting 5.0 s

Additional information *Description*

Use this function to enter a time constant (PT1 element) for frequency output damping. The frequency output is subject to separate damping that is independent of all preceding time constants.

* Visibility depends on order options or device settings

Response time

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

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
  and
- Depending on the measured variable assigned to the output.
  Flow damping

Failure mode

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

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

* Visibility depends on order options or device settings

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 fault is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. This Failure frequency (→ 124) replaces the current measured value and the alarm can be bypassed in this way. The actual measurement is switched off for the duration of the alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

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

Failure frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

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 1250.0 Hz

Factory setting 0.0 Hz

* Visibility depends on order options or device settings

Output frequency

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

Prerequisite In the **Operating mode** parameter (→ 114), the **Frequency** option is selected.

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

User interface 0 to 1 250 Hz

Switch output function

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 114).

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

Selection
- Off
- On
- Diagnostic behavior
- Limit
- Status

Factory setting Off

Additional information *Options*
- Off
  The switch output is permanently switched off (open, non-conductive).
- On
  The switch output is permanently switched on (closed, conductive).
- Diagnostic behavior
  Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level.
- Limit
  Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level.
- Flow direction 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 diagnostic behavior

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 114).
- The **Diagnostic behavior** option is selected in the **Switch output function** parameter (→ 125).

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.

Options
- 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 → Assign limit (0483)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 114).
- The **Limit** option is selected in the **Switch output function** parameter (→ 125).

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

Selection
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *

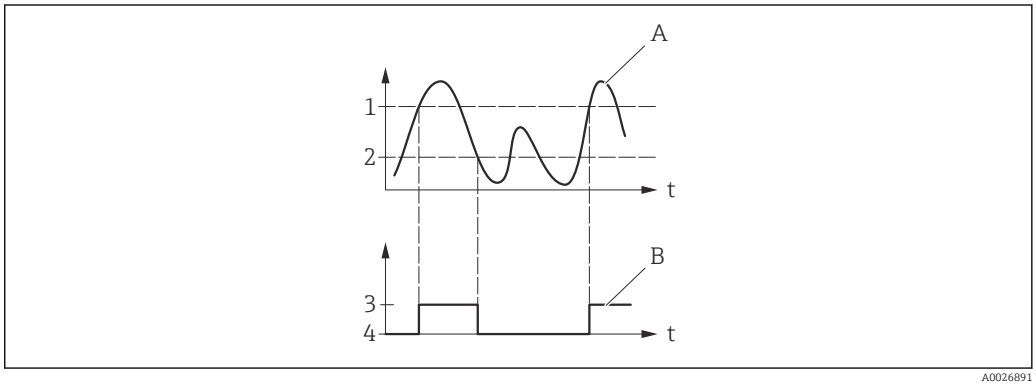
* Visibility depends on order options or device settings

- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Volume flow

Additional information *Description*

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



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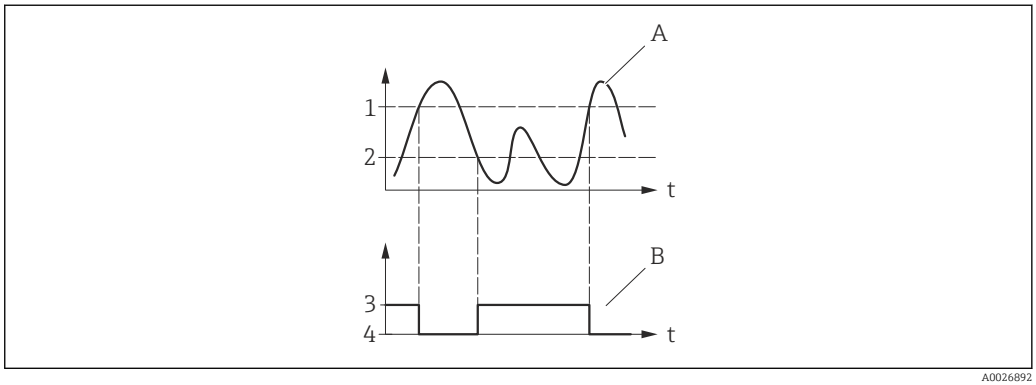
1 Switch-on value
2 Switch-off value
3 Conductive
4 Non-conductive
A Process variable
B Status output

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



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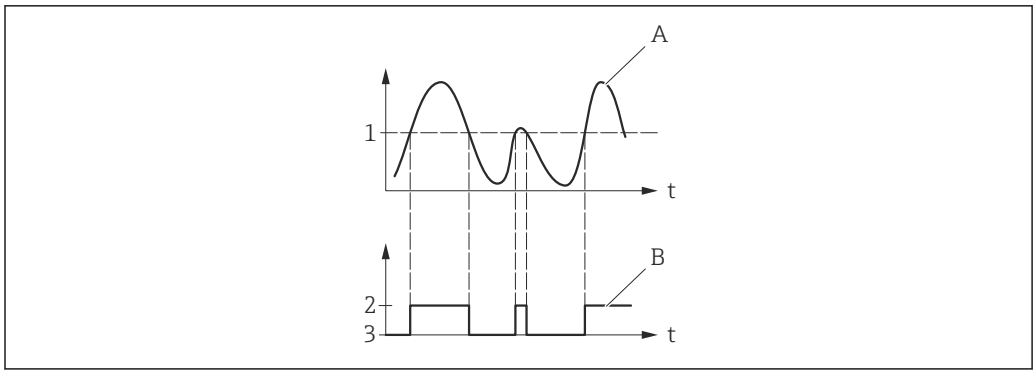
1 Switch-off value
2 Switch-on value
3 Conductive
4 Non-conductive
A Process variable
B Status output

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



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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 → Switch-on value (0466)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 114).
- The **Limit** option is selected in the **Switch output function** parameter (→ 125).

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

User entry Signed floating-point number

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

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 126).

Switch-off value

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 114).
- The **Limit** option is selected in the **Switch output function** parameter (→ 125).

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

User entry Signed floating-point number

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

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 126).

Assign flow direction check

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 114).
- The **Flow direction check** option is selected in the **Switch output function** parameter (→ 125).

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

Selection
- Off
- Volume flow
- Mass flow
- Corrected volume flow

Factory setting Volume flow

Assign status

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 114).
- The **Status** option is selected in the **Switch output function** parameter (→ 125).

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

Selection
- Low flow cut off
- Digital output 2

Factory setting Low flow cut off

Additional information *Options*

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

Switch-on delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 114).
- The **Limit** option is selected in the **Switch output function** parameter (→ 125).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-off delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 114).
- The **Limit** option is selected in the **Switch output function** parameter (→ 125).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Failure mode

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

Description Use this function to select 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

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 114).

Description Displays the current switch status of the status output.

User interface

- Open
- Closed

Additional information *User interface*

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

Invert output signal

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

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

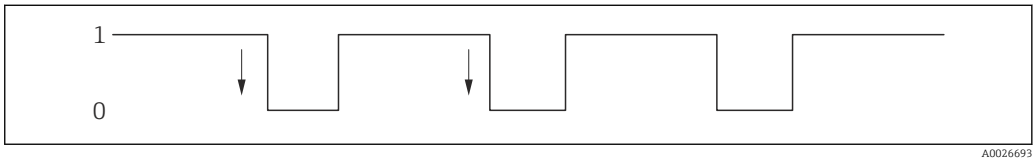
Selection

- No
- Yes

Factory setting No

Additional information *Selection*

No option (passive - negative)



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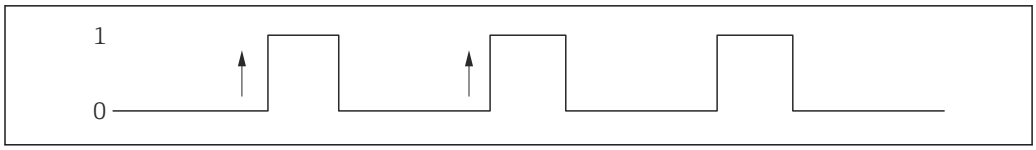
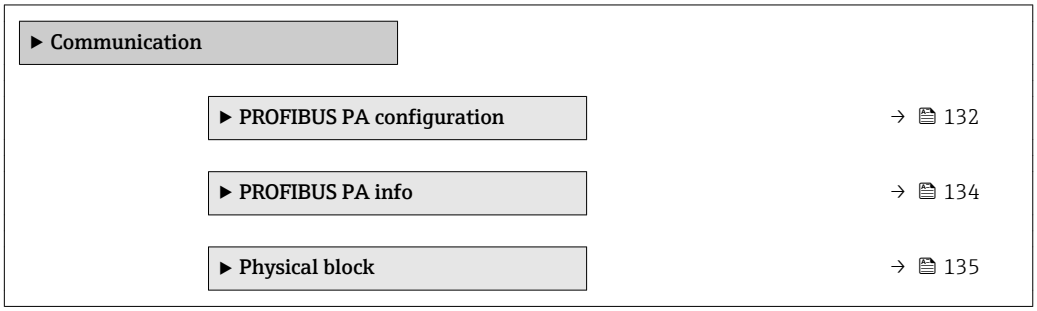
Yes option (passive - positive)



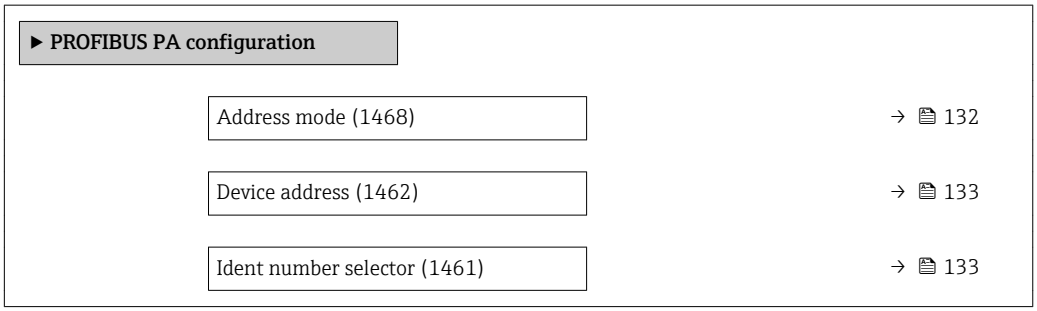
3.4 "Communication" submenu

Navigation Expert → Communication



3.4.1 "PROFIBUS PA configuration" submenu

Navigation Expert → Communication → PROFIBUS PA conf



Address mode

Navigation Expert → Communication → PROFIBUS PA 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 PA 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 (→ 132)

Ident number selector

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

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

Selection
- Automatic mode
- Prowirl 200 (0x1564)
- Prowirl 73 (0x153C)
- Prowirl 72 (0x153B)
- 3 AI, 1 Totalizer (0x9742)
- 2 AI, 1 Totalizer (0x9741)
- 1 AI, 1 Totalizer (0x9740)

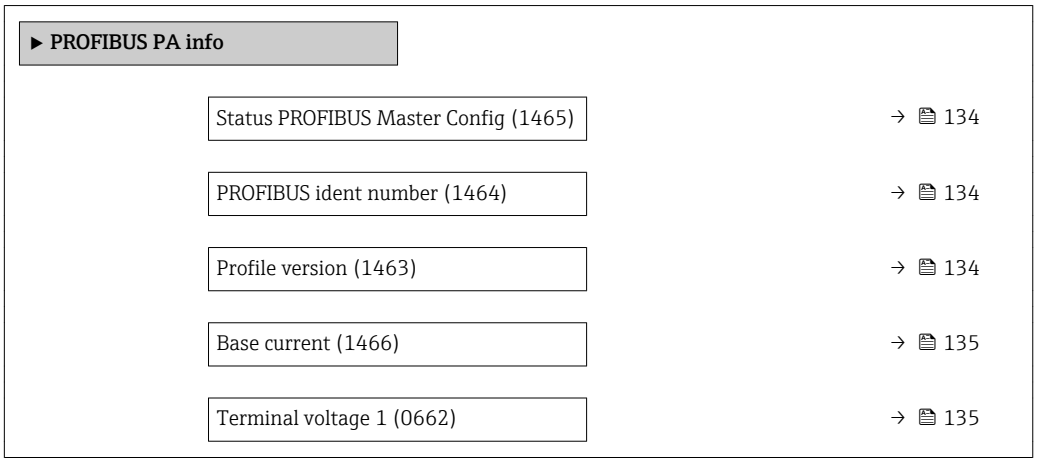
Factory setting Automatic mode

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.

3.4.2 "PROFIBUS PA info" submenu

Navigation Expert → Communication → PROFIBUS PA info



Status PROFIBUS Master Config

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

Description For displaying the status of the PROFIBUS Master configuration.

User interface
- Active
- Not active

Factory setting Not active

PROFIBUS ident number

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

Description For displaying the PROFIBUS identification number.

User interface 0 to FFFF

Factory setting 0x1564

Profile version

Navigation Expert → Communication → PROFIBUS PA 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

Base current

Navigation Expert → Communication → PROFIBUS PA info → Base current (1466)

Description Displays the basic current: Every PA measuring device taps a constant basic current from the MBP cable. This base current must be at least 10 mA. The base current enables power to be supplied to the measuring device.

User interface 15 mA

Terminal voltage 1

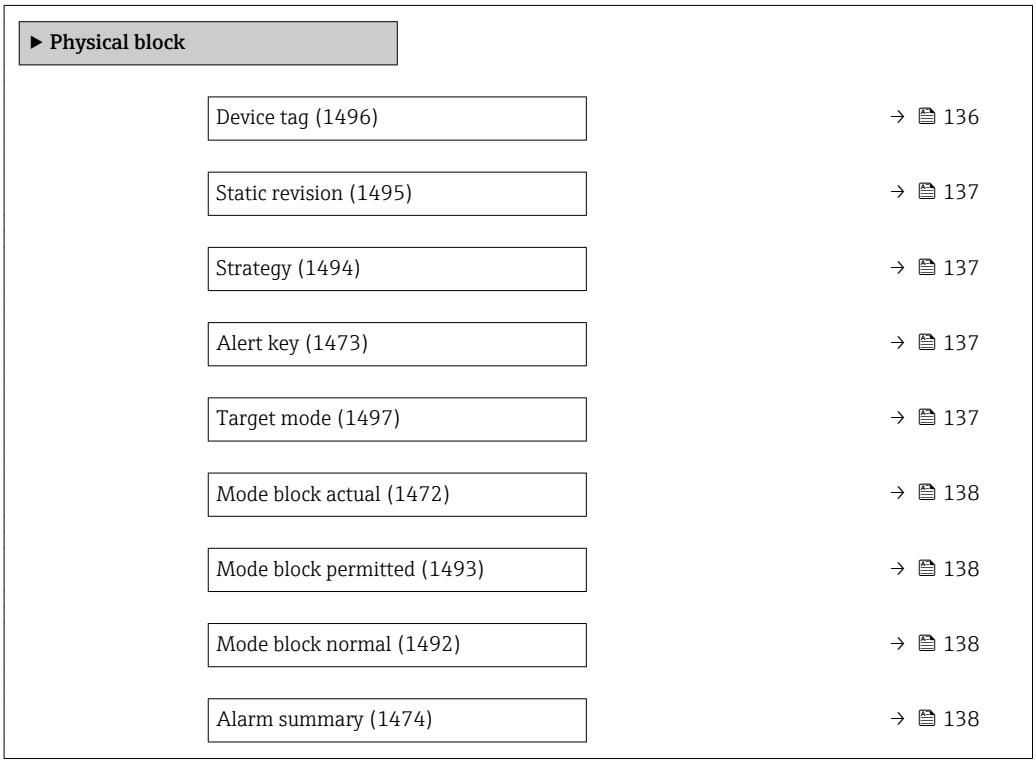
Navigation Expert → Communication → PROFIBUS PA info → Terminal volt. 1 (0662)

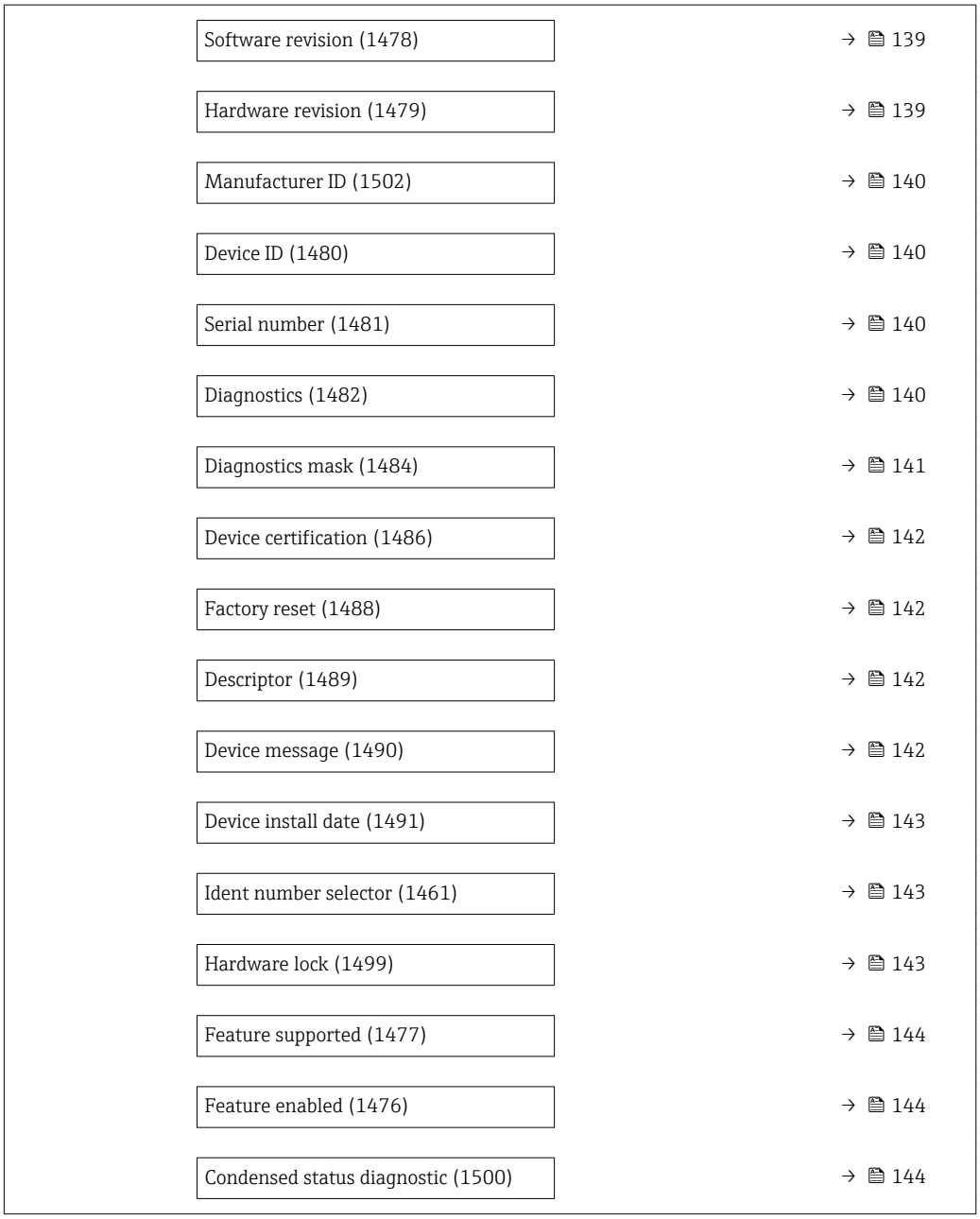
Description Use this function to view the actual terminal voltage that is present at the current output.

User interface 0.0 to 50.0 V

3.4.3 "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 Prowirl 200 PA

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 actual

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

Description Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 137).

User interface
- Auto
- Out of service

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 137)) indicates whether it was possible to reach the target mode.

Mode block permitted

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

Description Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 137) 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 block normal

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

Description Displays the Mode block normal: This is available to allow the operator to select the Mode block normal 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
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- 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.
- Alarm state HiHi limit
  Upper alarm limit
- Alarm state Hi limit
  Upper warning limit
- Alarm state LoLo limit
  Lower alarm limit
- Alarm state Lo limit
  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 (→ 138), 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 (→ 138) is deleted again).

Software revision

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 revision

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 Prowirl 200 PA

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
- Hardware failure electronics
- Hardware failure mechanics
- Temperature motor

- Electronic temperature
- Memory checksum error
- Measurement error
- Device not initialized
- Initialization error
- Zero point error
- Power supply
- Configuration invalid
- On warmstart
- On coldstart
- Maintenance required
- Characterization invalid
- Ident number violation
- More information available
- Maintenance alarm
- Maintenance demanded
- Function check or simulation
- Invalid process condition

Diagnostics mask

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

Description Displays the diagnostic messages supported by the measuring device.

User interface

- Hardware failure electronics
- Hardware failure mechanics
- Temperature motor
- Electronic temperature
- Memory checksum error
- Measurement error
- Device not initialized
- Initialization error
- Zero point error
- Power supply
- Configuration invalid
- On warmstart
- On coldstart
- Maintenance required
- Characterization invalid
- Ident number violation
- More information available
- Maintenance alarm
- Maintenance demanded
- Function check or simulation
- Invalid process condition

Device certification

Navigation Expert → Communication → Physical block → Dev certificate (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 address
- 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 install 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 number selector

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

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

Selection
- Automatic mode
- Prowirl 200 (0x1564)
- Prowirl 73 (0x153C)
- Prowirl 72 (0x153B)
- 3 AI, 1 Totalizer (0x9742)
- 2 AI, 1 Totalizer (0x9741)
- 1 AI, 1 Totalizer (0x9740)

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 supported

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 status diagnosis
- Data exchange broadcast
- MS1 application relationship
- PROFIsafe communication

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 status diagnosis
- Data exchange broadcast
- MS1 application relationship
- PROFIsafe communication

Condensed status diagnostic

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

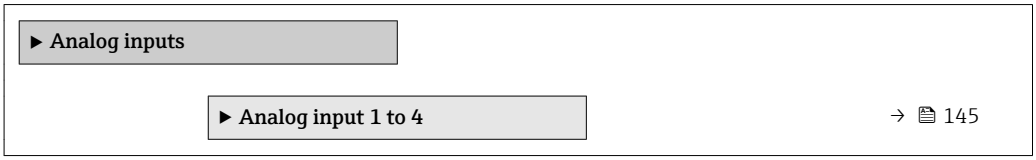
Description Use this function to switch the condensed status diagnostic on and off.

Selection
- Off
- On

Factory setting On

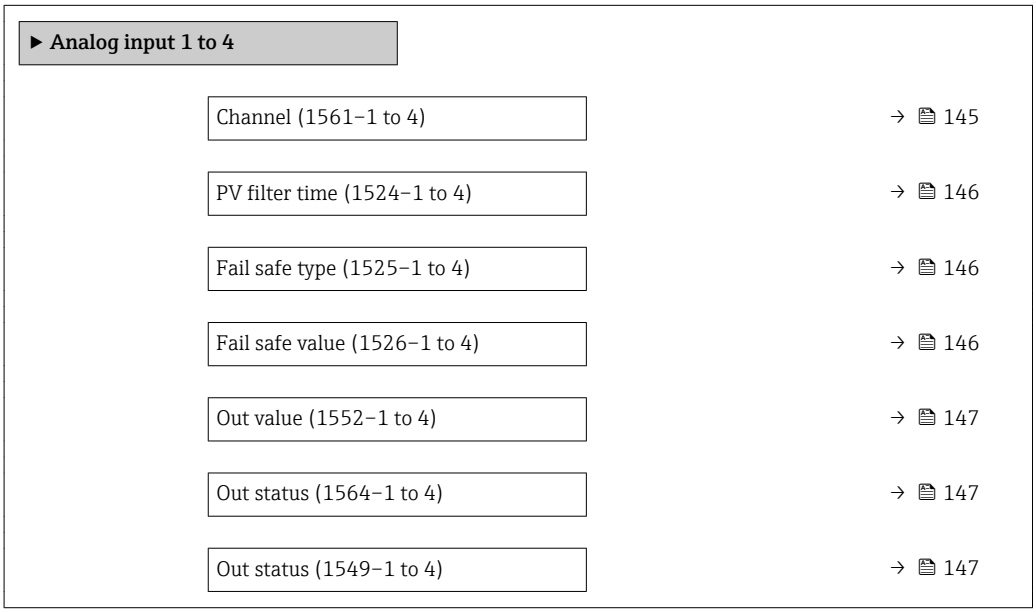
3.5 "Analog inputs" submenu

Navigation Expert → Analog inputs



3.5.1 "Analog input 1 to 4" submenu

Navigation Expert → Analog inputs → Analog input 1 to 4



Channel

Navigation Expert → Analog inputs → Analog input 1 to 4 → Channel (1561–1 to 4)

Description For selecting the process variable.

Selection
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *
- Density *

* Visibility depends on order options or device settings

- Pressure *
- Specific volume *
- Degrees of superheat *

Factory setting Volume flow

PV filter time

Navigation Expert → Analog inputs → Analog input 1 to 4 → PV filter time (1524–1 to 4)

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 4 → Fail safe type (1525–1 to 4)

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 (→ 146).
- 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 4 → Fail safe value (1526–1 to 4)

Prerequisite In **Fail safe type** parameter (→ 146), the **Fail safe value** option is selected.

* Visibility depends on order options or device settings

Description Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 147)) 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 4 → Out value (1552–1 to 4)

Prerequisite In **Target mode** parameter (→ 148), 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 4 → Out status (1564–1 to 4)

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

User interface
- Good
- Uncertain
- Bad

Out status

Navigation Expert → Analog inputs → Analog input 1 to 4 → Out status (1549–1 to 4)

Prerequisite In **Target mode** parameter (→ 148), 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 4 → Tag description (1562–1 to 4)

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 4 → Static revision (1560–1 to 4)

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 4 → Strategy (1559–1 to 4)

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 4 → Alert key (1522–1 to 4)

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 4 → Target mode (1563–1 to 4)

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 actual

Navigation Expert → Analog inputs → Analog input 1 to 4 → Mode block act (1521–1 to 4)

Description Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 148).

User interface
- Auto
- Man
- Out of service

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 148)) indicates whether it was possible to reach the target mode.

Mode block permitted

Navigation Expert → Analog inputs → Analog input 1 to 4 → Mode block perm (1553–1 to 4)

Description Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 148) 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 block normal

Navigation Expert → Analog inputs → Analog input 1 to 4 → Mode blk norm (1546–1 to 4)

Description Displays the Mode block normal: This is available to allow the operator to select the Mode block normal 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 4 → Alarm summary (1537–1 to 4)

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
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- 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 4 → Batch ID (1533–1 to 4)

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 4 → Batch operation (1534–1 to 4)

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 4 → Batch phase (1535–1 to 4)

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 Unit Procedure

Navigation Expert → Analog inputs → Analog input 1 to 4 → Batch Recipe (1536–1 to 4)

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.

PV scale lower range

Navigation Expert → Analog inputs → Analog input 1 to 4 → PVscale lo range (1554–1 to 4)

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

PV scale upper range

Navigation Expert → Analog inputs → Analog input 1 to 4 → PVscale up range (1555–1 to 4)

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 lower range

Navigation Expert → Analog inputs → Analog input 1 to 4 → Out scale low (1548–1 to 4)

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 upper range

Navigation Expert → Analog inputs → Analog input 1 to 4 → Out scale up (1551–1 to 4)

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 4 → Lin type (1523–1 to 4)

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 4 → Out unit (1550–1 to 4)

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 decimal point

Navigation Expert → Analog inputs → Analog input 1 to 4 → Out dec_ point (1547–1 to 4)

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 4 → Alarm hysteresis (1527–1 to 4)

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 4 → Hi Hi Lim (1528–1 to 4)

Description Use this function to enter the value for the upper alarm limit (**Hi Hi alarm value** parameter (→ 155)).

User entry Signed floating-point number

Factory setting Positive floating-point number

Additional information *Description*

If the output value Out value (→ 147) exceeds this limit value, the **Hi Hi alarm state** parameter (→ 155) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 152)) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).

Hi Lim

Navigation Expert → Analog inputs → Analog input 1 to 4 → Hi Lim (1529–1 to 4)

Description Use this function to enter the value for the upper warning limit (**Hi alarm value** parameter (→ 155)).

User entry Signed floating-point number

Factory setting Positive floating-point number

Additional information

Description

If the output value Out value (→ 147) exceeds this limit value, the **Hi alarm state** parameter (→ 156) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 152)) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).

Lo Lim

Navigation Expert → Analog inputs → Analog input 1 to 4 → Lo Lim (1530–1 to 4)

Description Use this function to enter the value for the lower warning limit (**Lo alarm value** parameter (→ 156)).

User entry Signed floating-point number

Factory setting Negative floating-point number

Additional information

Description

If the output value Out value (→ 147) exceeds this limit value, the **Lo alarm state** parameter (→ 156) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 152)) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).

Lo Lo Lim

Navigation Expert → Analog inputs → Analog input 1 to 4 → Lo Lo Lim (1531–1 to 4)

Description Use this function to enter the value for the lower alarm limit (**Lo Lo alarm value** parameter (→ 156)).

User entry Signed floating-point number

Factory setting Negative floating-point number

Additional information *Description*

If the output value Out value (→ 147) exceeds this limit value, the **Lo Lo alarm state** parameter (→ 157) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 152)) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).

Hi Hi alarm value

Navigation Expert → Analog inputs → Analog input 1 to 4 → HiHi alarm value (1541–1 to 4)

Description Displays the alarm value for the upper alarm limit value (**Hi Hi Lim** parameter (→ 153)).

User interface Signed floating-point number

Hi Hi alarm state

Navigation Expert → Analog inputs → Analog input 1 to 4 → HiHi alarm state (1540–1 to 4)

Description Displays the status for the upper alarm limit value (**Hi Hi Lim** parameter (→ 153)).

User interface
- No alarm
- Alarm state HiHi limit

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 4 → Hi alarm value (1539–1 to 4)

Description Displays the alarm value for the upper warning limit value (**Hi Lim** parameter (→ 154)).

User interface Signed floating-point number

Hi alarm state

Navigation Expert → Analog inputs → Analog input 1 to 4 → Hi alarm state (1538–1 to 4)

Description Displays the status for the upper warning limit value (**Hi Lim** parameter (→ 154)).

User interface
- No warning
- Alarm state Hi limit

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 4 → Lo alarm value (1543–1 to 4)

Description Displays the alarm value for the lower warning limit value (**Lo Lim** parameter (→ 154)).

User interface Signed floating-point number

Lo alarm state

Navigation Expert → Analog inputs → Analog input 1 to 4 → Lo alarm state (1542–1 to 4)

Description Displays the status for the lower warning limit value (**Lo Lim** parameter (→ 154)).

User interface
- No warning
- Alarm state Lo limit

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 Lo alarm value

Navigation Expert → Analog inputs → Analog input 1 to 4 → LoLo alarm value (1545–1 to 4)

Description Displays the alarm value for the lower alarm limit value (**Lo Lo Lim** parameter (→ 154)).

User interface Signed floating-point number

Lo Lo alarm state

Navigation Expert → Analog inputs → Analog input 1 to 4 → LoLo alarm state (1544–1 to 4)

Description Displays the status for the lower alarm limit value (**Lo Lo Lim** parameter (→ 154)).

User interface
- No alarm
- Alarm state LoLo limit

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 4 → Simulate enabled (1556–1 to 4)

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 4 → Simulate value (1558–1 to 4)

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 4 → Simulate status (1557–1 to 4)

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 4 → Out unit text (1532–1 to 4)

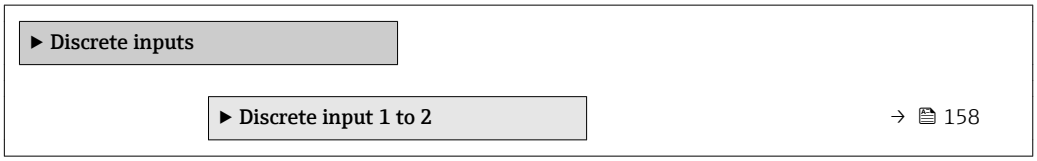
Description Use this function to enter the out unit text: if a specific out unit does not appear in the code list, the user can enter the specific text. The unit code is then equivalent to the definition provided here.

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

Factory setting NoUnit

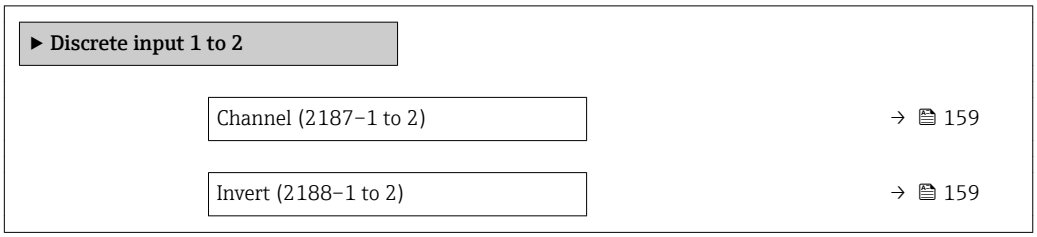
3.6 "Discrete inputs" submenu

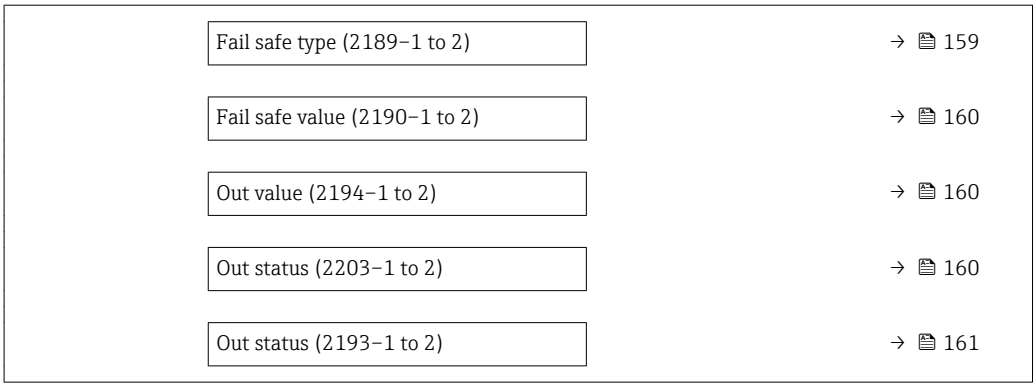
Navigation Expert → Discrete inputs



3.6.1 "Discrete input 1 to 2" submenu

Navigation Expert → Discrete inputs → Discrete input 1 to 2





Channel

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Channel (2187–1 to 2)

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

Selection
- Low flow cut off
- Switch output status
- Verification status *

Factory setting Switch output status

Invert

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Invert (2188–1 to 2)

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 2 → Fail safe type (2189–1 to 2)

Description Use this function to select the failure mode.

Selection
- Fail safe value
- Fallback value
- Off

* Visibility depends on order options or device settings

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 (→ 160).
- 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 inputs → Discrete input 1 to 2 → Fail safe value (2190–1 to 2)

Prerequisite In **Fail safe type** parameter (→ 159), 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 (→ 160)) in the event of an error.

User entry 0 to 255

Factory setting 0

Out value

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Out value (2194–1 to 2)

Prerequisite In **Target mode** parameter (→ 162), 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 2 → Out status (2203–1 to 2)

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

User interface
- Good
- Uncertain
- Bad

Out status

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Out status (2193–1 to 2)

Prerequisite In **Target mode** parameter (→ 162), 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 2 → Tag description (2201–1 to 2)

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 2 → Static revision (2200–1 to 2)

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 2 → Strategy (2199–1 to 2)

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 2 → Alert key (2182–1 to 2)

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 2 → Target mode (2202–1 to 2)

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 actual

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Mode block act (2181–1 to 2)

Description Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 162).

User interface
- Auto
- Man
- Out of service

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 162)) indicates whether it was possible to reach the target mode.

Mode block permitted

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Mode block perm (2195–1 to 2)

Description Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 162) 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 block normal

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Mode blk norm (2192–1 to 2)

Description Displays the Mode block normal: This is available to allow the operator to select the Mode block normal 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 2 → Alarm summary (2191–1 to 2)

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
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- 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 2 → Batch ID (2183–1 to 2)

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 2 → Batch operation (2184–1 to 2)

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 2 → Batch phase (2185–1 to 2)

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 Unit Procedure

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Batch Recipe (2186–1 to 2)

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 2 → Simulate enabled (2196–1 to 2)

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 status

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Simulate status (2197–1 to 2)

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.

Simulate value

Navigation Expert → Discrete inputs → Discrete input 1 to 2 → Simulate value (2198–1 to 2)

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

User entry 0 to 255

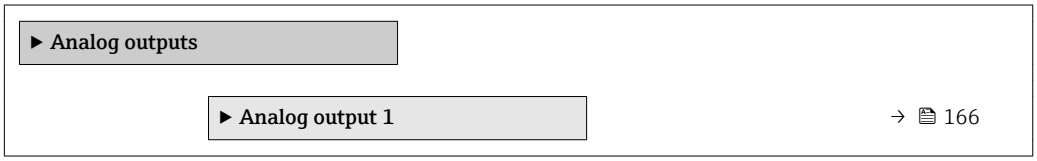
Factory setting 0

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.

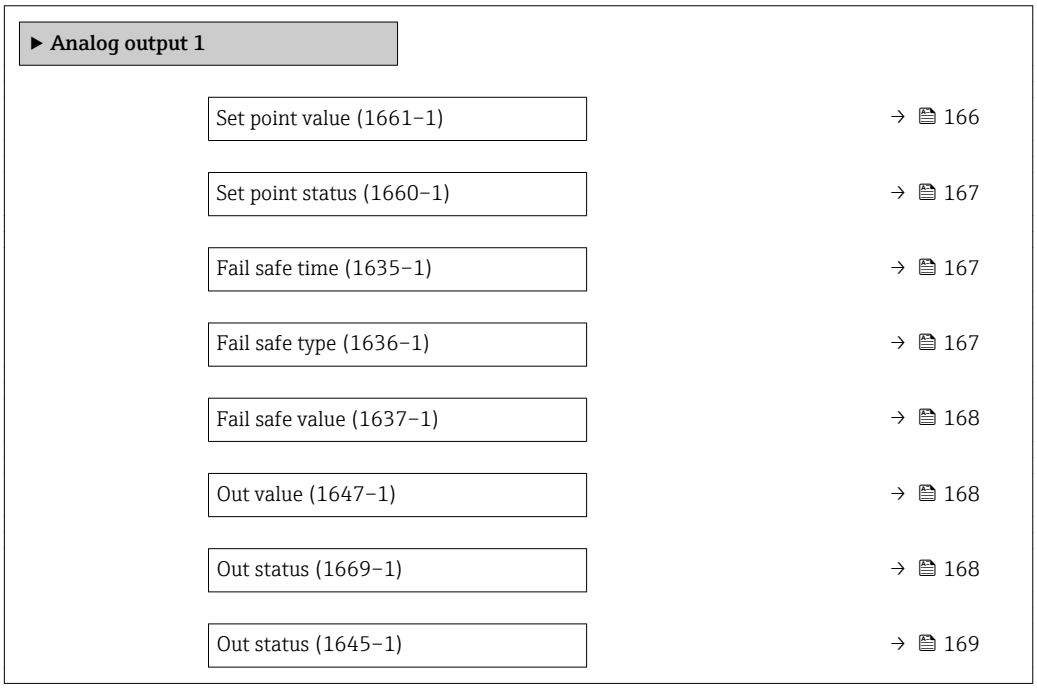
3.7 "Analog outputs" submenu

Navigation Expert → Analog outputs



3.7.1 "Analog output 1" submenu

Navigation Expert → Analog outputs → Analog output 1



Set point value

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

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 → Set point status (1660–1)

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 → Fail safe time (1635–1)

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 → Fail safe type (1636–1)

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 (→ 168).
- 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 → Fail safe value (1637–1)

Prerequisite In **Fail safe type** parameter (→ 167), 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 (→ 168)) in the event of an error.

User entry Signed floating-point number

Factory setting 0

Out value

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

Prerequisite In **Target mode** parameter (→ 170), 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 → Out status (1669–1)

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

User interface
- Good
- Uncertain
- Bad

Out status

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

Prerequisite In **Target mode** parameter (→ 170), 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 → Tag description (1667–1)

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 → Static revision (1666–1)

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 → Strategy (1665–1)

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 → Alert key (1632–1)

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 → Target mode (1668–1)

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 actual

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

Description Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 170).

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 (→ 170)) indicates whether it was possible to reach the target mode.

Mode block permitted

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

Description Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 170) 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 block normal

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

Description Displays the Mode block normal: This is available to allow the operator to select the Mode block normal 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 → Alarm summary (1642–1)

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
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- 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 → Batch ID (1633–1)

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 → Batch operation (1639–1)

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 → Batch phase (1640–1)

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 Unit Procedure

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

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.

PV scale lower range

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

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

PV scale upper range

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

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 → Readback value (1659–1)

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 → Readback status (1658–1)

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 → RCAS in value (1655–1)

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 (→ 174). 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 → RCAS in status (1654–1)

Description Use this function to enter the RCAS (Remote Cascade) in status. Defines the status for the RCAS in value (→ 174).

User entry 0 to 255

Factory setting 0

Input channel

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

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 → Output channel (1671–1)

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 compensation

Factory setting External compensation

RCAS out value

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

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 → RCAS out status (1656–1)

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

User interface 0 to 0xFF

Position value

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

Description Displays the current value of the positioner.

User interface 0 to 255

Position status

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

Description Displays the current status of the positioner.

User interface 0 to 255

Setpoint deviation

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

Description Displays the deviation between the set point (**Set point value** parameter (→ 166)) and the actual value (**Readback value** parameter (→ 173)).

User interface Signed floating-point number

Simulate enabled

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

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 → Simulate value (1664–1)

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 → Simulate status (1663–1)

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 → Increase close (1638–1)

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 upper range

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

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 lower range

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

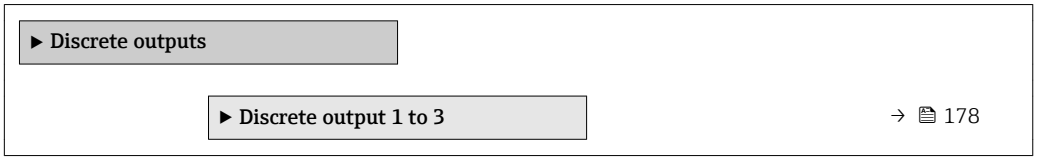
Description Use this function to enter the lower value range for the output value in system units.

User entry Signed floating-point number

Factory setting 0

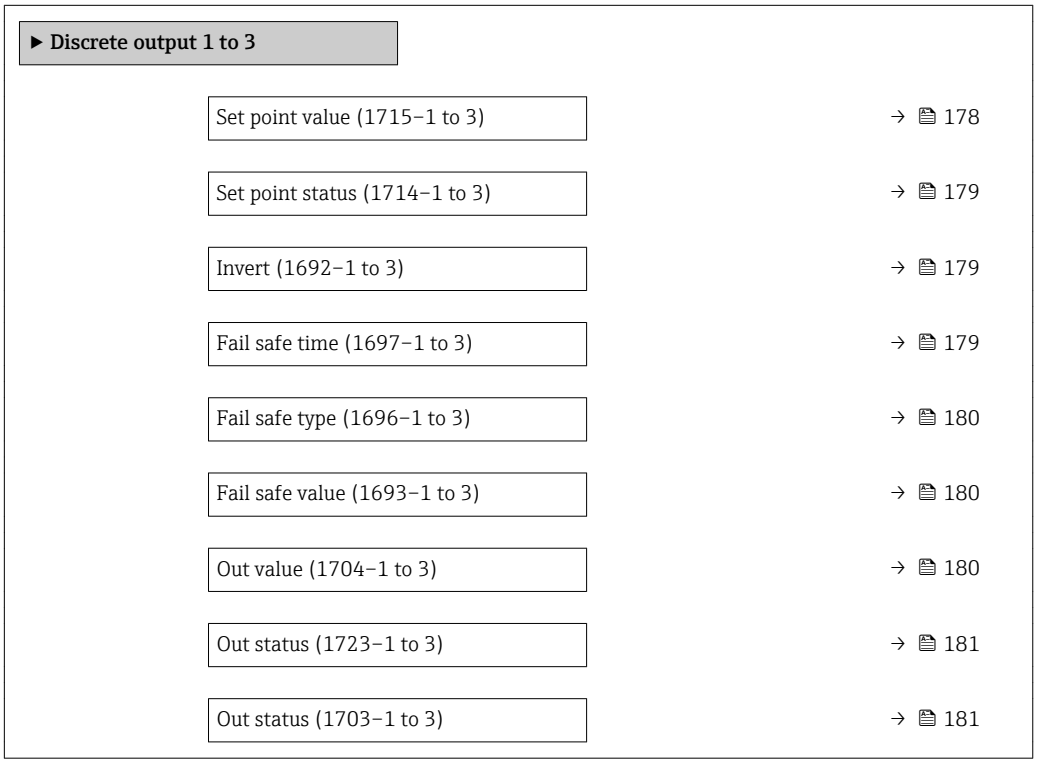
3.8 "Discrete outputs" submenu

Navigation Expert → Discrete outputs



3.8.1 "Discrete output 1 to 3" submenu

Navigation Expert → Discrete outputs → Discr. out. 1 to 3



Set point value

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → Set point val (1715–1 to 3)

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 3 → Set point status (1714–1 to 3)

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 3 → Invert (1692–1 to 3)

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 3 → Fail safe time (1697–1 to 3)

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 3 → Fail safe type (1696–1 to 3)

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 (→ 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.

Fail safe value

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → Fail safe value (1693–1 to 3)

Prerequisite In **Fail safe type** parameter (→ 180), 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 outputs → Discr. out. 1 to 3 → Out value (1704–1 to 3)

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 outputs → Discr. out. 1 to 3 → Out status (1723–1 to 3)

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

User interface
- Good
- Uncertain
- Bad

Out status

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → Out status (1703–1 to 3)

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 outputs → Discr. out. 1 to 3 → Tag description (1721–1 to 3)

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 3 → Static revision (1720–1 to 3)

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 3 → Strategy (1719–1 to 3)

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 3 → Alert key (1694–1 to 3)

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 3 → Target mode (1722–1 to 3)

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 actual

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → Mode block act (1691–1 to 3)

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

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 (→ 182)) indicates whether it was possible to reach the target mode.

Mode block permitted

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → Mode block perm (1705–1 to 3)

Description Displays the Mode block permitted: 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 block normal

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → Mode blk norm (1702–1 to 3)

Description Displays the Mode block normal: This is available to allow the operator to select the Mode block normal 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 3 → Alarm summary (1701–1 to 3)

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
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- 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 3 → Batch ID (1695–1 to 3)

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 3 → Batch operation (1698–1 to 3)

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 3 → Batch phase (1699–1 to 3)

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 Unit Procedure

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → Batch Recipe (1700–1 to 3)

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 3 → Readback value (1713–1 to 3)

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 3 → Readback status (1712–1 to 3)

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 3 → RCAS in value (1707–1 to 3)

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 (→ 185). 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 3 → RCAS in status (1706–1 to 3)

Description Use this function to enter the RCAS (Remote Cascade) in status. Defines the status for the RCAS in value (→ 185).

User entry 0 to 255

Factory setting 0

Input channel

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → Input channel (1724–1 to 3)

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 3 → Output channel (1725–1 to 3)

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
- Pulse/frequency/switch output *
- Flow override
- Start verification *

Factory setting Flow override

RCAS out value

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → RCAS out value (1711–1 to 3)

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.

* Visibility depends on order options or device settings

User interface 0 to 255

RCAS out status

Navigation Expert → Discrete outputs → Discr. out. 1 to 3 → RCAS out status (1708–1 to 3)

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 3 → Simulate enabled (1716–1 to 3)

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 outputs → Discr. out. 1 to 3 → Simulate value (1718–1 to 3)

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 3 → Simulate status (1717–1 to 3)

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

User entry 0 to 255

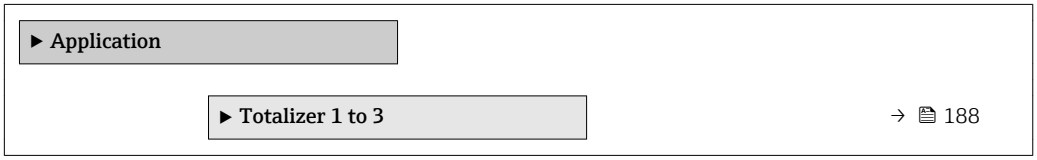
Factory setting 0

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.

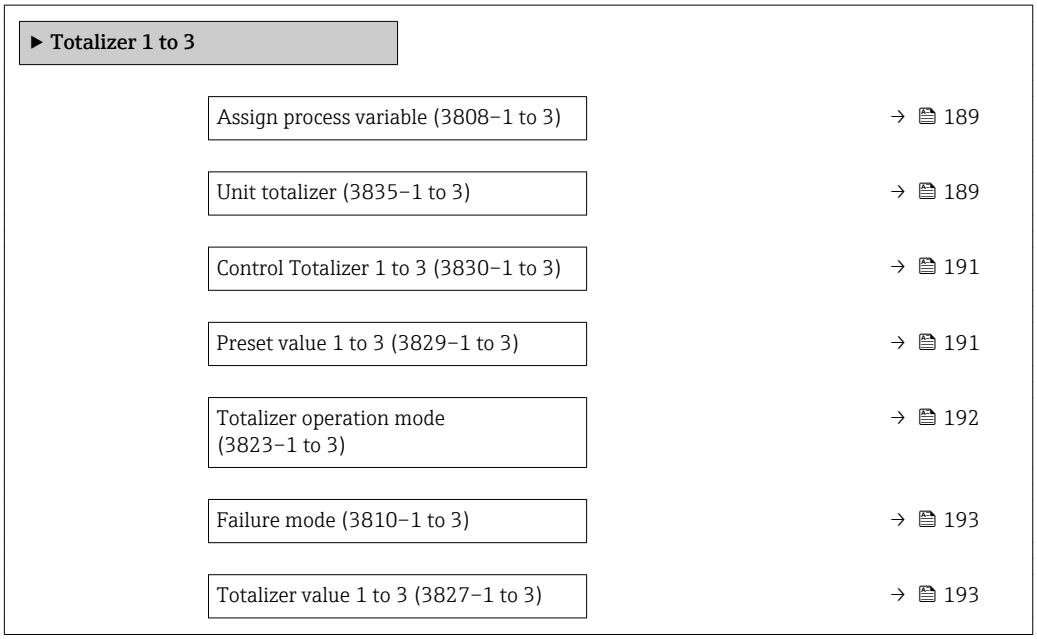
3.9 "Application" submenu

Navigation Expert → Application



3.9.1 "Totalizer 1 to 3" submenu

Navigation Expert → Application → Totalizer 1 to 3



Totalizer status 1 to 3 (3826–1 to 3)	→ 194
Totalizer status (Hex) 1 to 3 (3825–1 to 3)	→ 194

Assign process variable

Navigation Expert → Application → Totalizer 1 to 3 → Assign variable (3808–1 to 3)

Description Use this function to select a process variable for the Totalizer 1 to 3.

Selection
- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

Factory setting
- Totalizer 1: Volume flow
- Totalizer 2: Mass flow
- Totalizer 3: Corrected volume 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 3 → Unit totalizer (3835–1 to 3)

Prerequisite One of the following options is selected in the **Assign process variable** parameter (→ 189):
- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

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 (→ 61).

* Visibility depends on order options or device settings

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

or

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

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

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

or

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

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

Imperial units
Sgal (imp)

or

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

Imperial units
- Btu
- MBtu
- MMBtu

Factory setting

m^3

Additional information

Selection

The selection is independent of the process variable selected in the **Assign process variable** parameter (→ 189).

Dependency

The following parameters depend on the option selected:
- **Alarm hysteresis** parameter (→ 198)
- **Hi Hi Lim** parameter (→ 198)
- **Hi Lim** parameter (→ 199)
- **Lo Lim** parameter (→ 199)

- **Lo Lo Lim** parameter (→ 200)
- **Totalizer value** parameter (→ 58)
- **Preset value** parameter (→ 191)

Control Totalizer 1 to 3

Navigation Expert → Application → Totalizer 1 to 3 → Control Tot. 1 to 3 (3830–1 to 3)

Prerequisite In the **Assign process variable** parameter (→ 189), one of the following options is selected:
- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

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 3

Navigation Expert → Application → Totalizer 1 to 3 → Preset value 1 to 3 (3829–1 to 3)

Prerequisite One of the following options is selected in the **Assign process variable** parameter (→ 189):
- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

* Visibility depends on order options or device settings

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

User entry Signed floating-point number

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

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

Example

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

Totalizer operation mode

Navigation Expert → Application → Totalizer 1 to 3 → Operation mode (3823–1 to 3)

Prerequisite In the **Assign process variable** parameter (→ 189), one of the following options is selected:
- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

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

Selection
- Net flow total
- Forward flow total
- Reverse flow 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 flow total
  Only the flow in the forward flow direction is totalized.
- Reverse flow total
  Only the flow against the forward flow direction is totalized (= reverse flow total).
- Last valid value
  The value is frozen. Totaling is stopped.

* Visibility depends on order options or device settings

Failure mode

Navigation Expert → Application → Totalizer 1 to 3 → Failure mode (3810–1 to 3)

Prerequisite In the **Assign process variable** parameter (→ 189), one of the following options is selected:
- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

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

Selection
- Stop
- Actual value
- Last valid value

Factory setting Actual value

Additional information *Description*

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

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

Totalizer value 1 to 3

Navigation Expert → Application → Totalizer 1 to 3 → Totalizer val. 1 to 3 (3827–1 to 3)

Prerequisite In **Target mode** parameter (→ 195), the **Auto** option is selected.

Description Displays the current reading for totalizer 1-3.

User interface Signed floating-point number

* Visibility depends on order options or device settings

Additional information

Description

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

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

User interface

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

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

Totalizer status 1 to 3

Navigation Expert → Application → Totalizer 1 to 3 → Tot. status 1 to 3 (3826–1 to 3)

Description Displays the status of the particular totalizer.

User interface

- Good
- Uncertain
- Bad

Totalizer status (Hex) 1 to 3

Navigation Expert → Application → Totalizer 1 to 3 → Status (Hex) 1 to 3 (3825–1 to 3)

Prerequisite In **Target mode** parameter (→ 195), 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 3 → Tag description (3833–1 to 3)

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 3 → Static revision (3832–1 to 3)

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 3 → Strategy (3831–1 to 3)

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 3 → Alert key (3803–1 to 3)

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 3 → Target mode (3834–1 to 3)

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 actual

Navigation Expert → Application → Totalizer 1 to 3 → Mode block act (3801–1 to 3)

Description Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 195).

User interface
- Auto
- Man
- Out of service

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 195)) indicates whether it was possible to reach the target mode.

Mode block permitted

Navigation Expert → Application → Totalizer 1 to 3 → Mode block perm (3828–1 to 3)

Description Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 195) 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 block normal

Navigation Expert → Application → Totalizer 1 to 3 → Mode blk norm (3824–1 to 3)

Description Displays the Mode block normal: This is available to allow the operator to select the Mode block normal 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 3 → Alarm summary (3809–1 to 3)

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
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- 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 3 → Batch ID (3804–1 to 3)

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 3 → Batch operation (3805–1 to 3)

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 3 → Batch phase (3806–1 to 3)

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 Unit Procedure

Navigation Expert → Application → Totalizer 1 to 3 → Batch Recipe (3807–1 to 3)

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 3 → Alarm hysteresis (3802–1 to 3)

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 m^3

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

Hi Hi Lim

Navigation Expert → Application → Totalizer 1 to 3 → Hi Hi Lim (3815–1 to 3)

Description Use this function to enter the value for the upper alarm limit of the totalizer (**Hi Hi alarm value** parameter (→ 200)).

User entry Signed floating-point number

Factory setting Positive floating-point number

Additional information *Description*

If the output value Out value (→ 147) exceeds this limit value, the **Hi Hi alarm state** parameter (→ 200) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 152)) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

Hi Lim

Navigation Expert → Application → Totalizer 1 to 3 → Hi Lim (3816–1 to 3)

Description Use this function to enter the value for the upper warning limit of the totalizer (**Hi alarm value** parameter (→ 201)).

User entry Signed floating-point number

Factory setting Positive floating-point number

Additional information

Description

If the output value Out value (→ 147) exceeds this limit value, the **Hi alarm state** parameter (→ 201) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 152)) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

Lo Lim

Navigation Expert → Application → Totalizer 1 to 3 → Lo Lim (3819–1 to 3)

Description Use this function to enter the value for the lower warning limit of the totalizer (**Lo alarm value** parameter (→ 201)).

User entry Signed floating-point number

Factory setting Negative floating-point number

Additional information

Description

If the output value Out value (→ 147) exceeds this limit value, the **Lo alarm state** parameter (→ 201) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 152)) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

Lo Lo Lim

Navigation Expert → Application → Totalizer 1 to 3 → Lo Lo Lim (3822–1 to 3)

Description Use this function to enter the value for the lower alarm limit of the totalizer (**Lo Lo alarm value** parameter (→ 202)).

User entry Signed floating-point number

Factory setting Negative floating-point number

Additional information

Description

If the output value Out value (→ 147) exceeds this limit value, the **Lo Lo alarm state** parameter (→ 202) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 152)) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

Hi Hi alarm value

Navigation Expert → Application → Totalizer 1 to 3 → HiHi alarm value (3814–1 to 3)

Description Displays the alarm value for the upper alarm limit value (**Hi Hi Lim** parameter (→ 198)).

User interface Signed floating-point number

Hi Hi alarm state

Navigation Expert → Application → Totalizer 1 to 3 → HiHi alarm state (3813–1 to 3)

Description Displays the status for the upper alarm limit value (**Hi Hi Lim** parameter (→ 198)).

User interface
- No alarm
- Alarm state HiHi limit

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 3 → Hi alarm value (3812–1 to 3)

Description Displays the warning value for the upper warning limit value (**Hi Lim** parameter (→ 199)).

User interface Signed floating-point number

Hi alarm state

Navigation Expert → Application → Totalizer 1 to 3 → Hi alarm state (3811–1 to 3)

Description Displays the status for the upper warning limit value (**Hi Lim** parameter (→ 199)).

User interface
- No warning
- Alarm state Hi limit

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 3 → Lo alarm value (3818–1 to 3)

Description Displays the warning value for the lower warning limit value (**Lo Lim** parameter (→ 199)).

User interface Signed floating-point number

Lo alarm state

Navigation Expert → Application → Totalizer 1 to 3 → Lo alarm state (3817–1 to 3)

Description Displays the status for the lower warning limit value (**Lo Lim** parameter (→ 199)).

User interface
- No warning
- Alarm state Lo limit

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 Lo alarm value

Navigation Expert → Application → Totalizer 1 to 3 → LoLo alarm value (3821–1 to 3)

Description Displays the alarm value for the lower alarm limit value (**Lo Lo Lim** parameter (→ 200)).

User interface Signed floating-point number

Lo Lo alarm state

Navigation Expert → Application → Totalizer 1 to 3 → LoLo alarm state (3820–1 to 3)

Description Displays the status for the lower alarm limit value (**Lo Lo Lim** parameter (→ 200)).

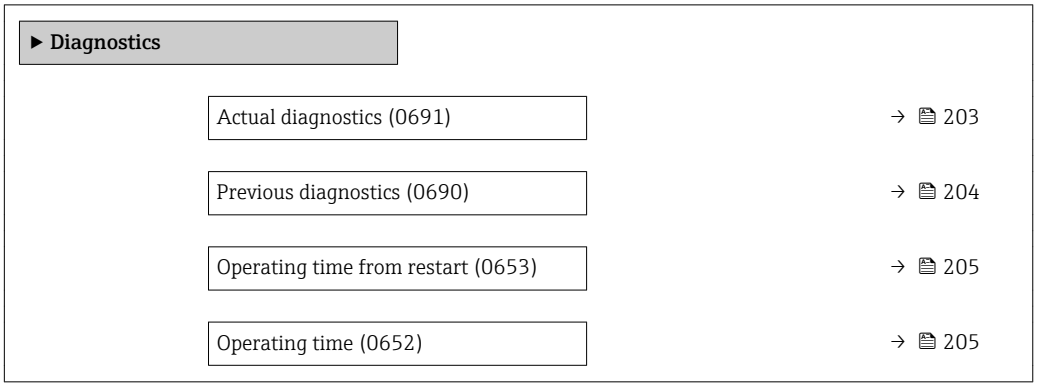
User interface
- No alarm
- Alarm state LoLo limit

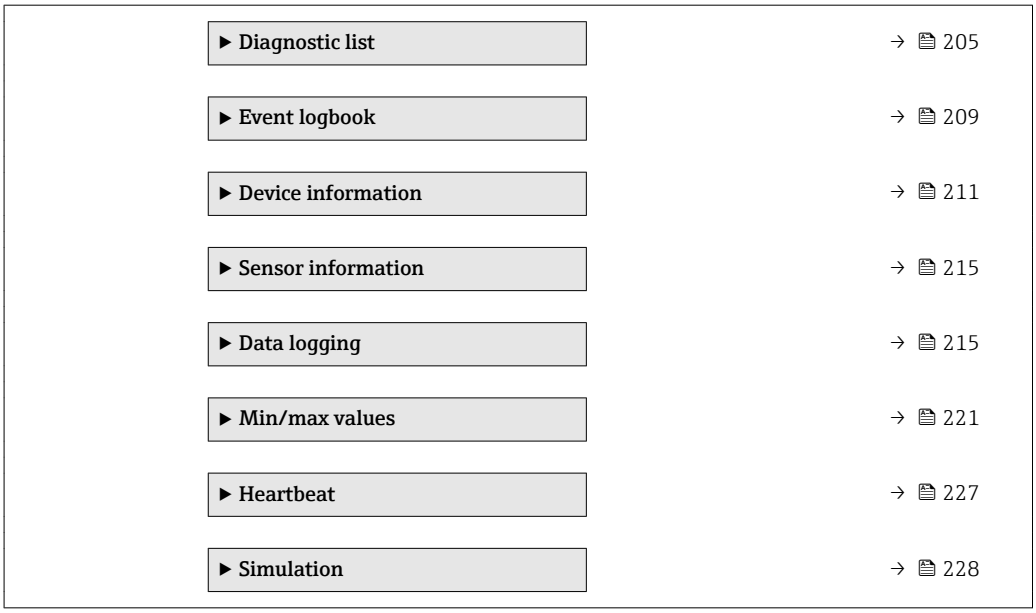
Additional information *User interface*

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

3.10 "Diagnostics" submenu

Navigation Expert → Diagnostics





Actual diagnostics

Navigation Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite A diagnostic event has occurred.

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

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

Additional information *User interface*

Additional pending diagnostic messages can be displayed in the **Diagnostic list** submenu (→ 205).

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

Example

For the display format:
⊗F271 Main electronic failure

Timestamp

Navigation Expert → Diagnostics → Timestamp (0667)

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

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

Additional information *User interface*

The diagnostic message can be displayed via the **Actual diagnostics** parameter (→ 203).

Example

For the display format:
24d12h13m00s

Previous diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics (0690)

Prerequisite Two diagnostic events have already occurred.

Description Displays the diagnostic message that occurred before the current message.

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

Additional information *User interface*

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

Example

For the display format:
⊗F271 Main electronic failure

Timestamp

Navigation Expert → Diagnostics → Timestamp (0672)

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 *User interface*

The diagnostic message can be displayed via the **Previous diagnostics** parameter (→ 204).

Example

For the display format:
24d12h13m00s

Operating time from restart

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

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

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

Operating time

Navigation Expert → Diagnostics → Operating time (0652)

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

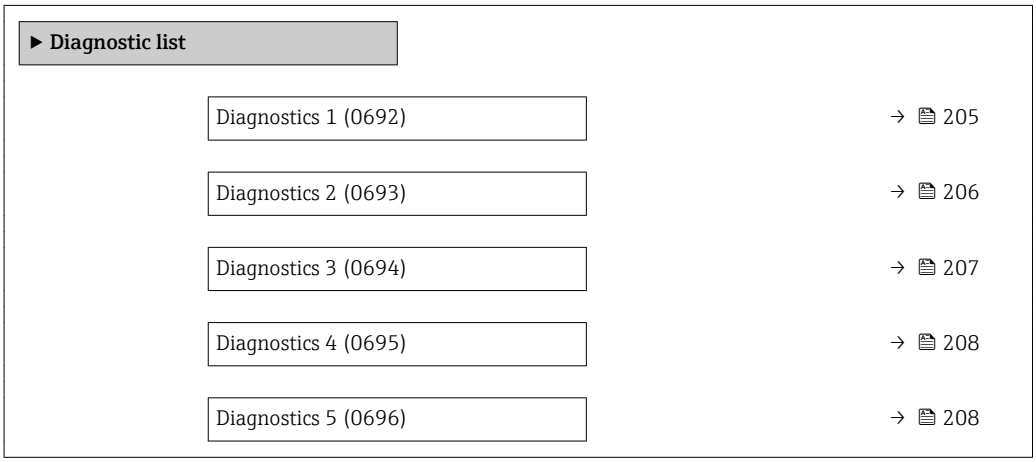
User interface Days (d), hours (h), minutes (m) and seconds (s)

Additional information *User interface*

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

3.10.1 "Diagnostic list" submenu

Navigation Expert → Diagnostics → Diagnostic list



Diagnostics 1

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 1 (0692)

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

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

Additional information *Examples*

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

Timestamp

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

Description Displays the operating time when the diagnostic message with the highest priority occurred.

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

Additional information *User interface*

The diagnostic message can be displayed via the **Diagnostics 1** parameter (→ 205).

Example

For the display format:
24d12h13m00s

Diagnostics 2

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

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

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

Additional information *Examples*

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

Timestamp

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

Description Displays the operating time when the diagnostic message with the second-highest priority occurred.

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

Additional information *User interface*

The diagnostic message can be displayed via the **Diagnostics 2** parameter (→ 206).

Example

For the display format:
24d12h13m00s

Diagnostics 3

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

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

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

Additional information *Examples*

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

Timestamp

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

Description Displays the operating time when the diagnostic message with the third-highest priority occurred.

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

Additional information *User interface*

The diagnostic message can be displayed via the **Diagnostics 3** parameter (→ 207).

Example

For the display format:
24d12h13m00s

Diagnostics 4

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

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

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

Additional information *Examples*

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

Timestamp

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

Description Displays the operating time when the diagnostic message with the fourth-highest priority occurred.

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

Additional information *User interface*

The diagnostic message can be displayed via the **Diagnostics 4** parameter (→ 208).

Example

For the display format:
24d12h13m00s

Diagnostics 5

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

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

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

Additional information *Examples*

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

Timestamp

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

Description Displays the operating time when the diagnostic message with the fifth-highest priority occurred.

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

Additional information *User interface*

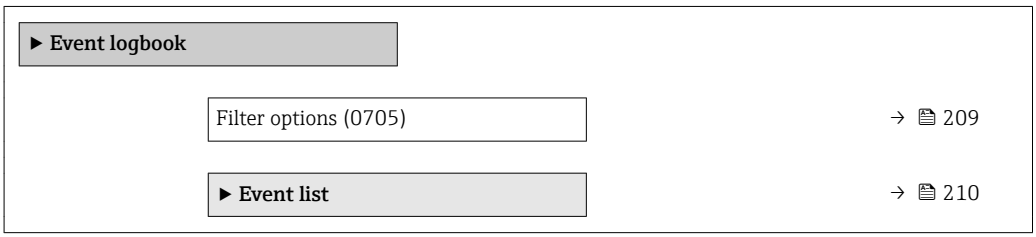
The diagnostic message can be displayed via the **Diagnostics 5** parameter (→ 208).

Example

For the display format:
24d12h13m00s

3.10.2 "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)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- Information (I)

Factory setting All

Additional information *Description*

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

Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options (0656)

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

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

Factory setting All

Additional information *Description*

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

"Event list" submenu

Navigation Expert → Diagnostics → Event logbook → Event list

Event list

Navigation Expert → Diagnostics → Event logbook → Event list

Description Use this function to display the history of event messages of the category selected in the **Filter options** parameter (→ 209).

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

Additional information

Description

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

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

Examples

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

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

HistoROM

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

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

3.10.3 "Device information" submenu

Navigation Expert → Diagnostics → Device info

▶ **Device information**

Device tag (0011)	→ 212
Serial number (0009)	→ 212
Firmware version (0010)	→ 213
Device name (0013)	→ 213

Order code (0008)	→ 213
Extended order code 1 (0023)	→ 214
Extended order code 2 (0021)	→ 214
Extended order code 3 (0022)	→ 214
ENP version (0012)	→ 214

Device tag

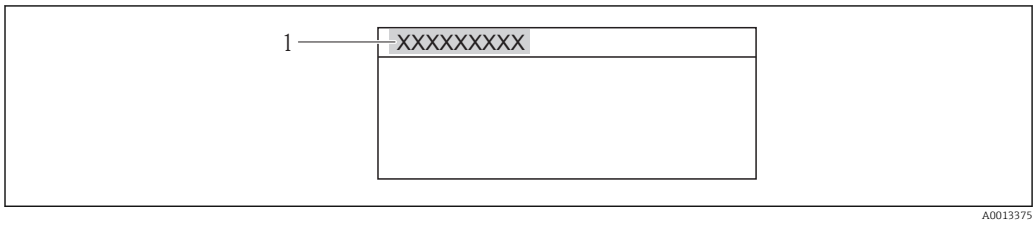
Navigation Expert → Diagnostics → Device info → Device tag (0011)

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 Prowirl 200 PA

Additional information *User interface*



8 Header text

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 A maximum of 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

Factory setting 01.01

Device name

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

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

User interface Prowirl

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.

Extended order code 1

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

Description Displays the first part of the extended order code.

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

User interface Character string

Additional information *Description*

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

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

Extended order code 2

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

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

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 214)

Extended order code 3

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

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

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 214)

ENP version

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

Description Displays the version of the electronic nameplate.

User interface Character string

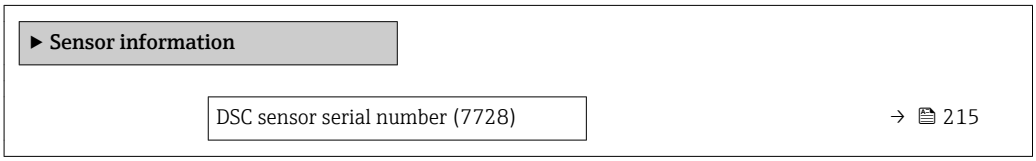
Factory setting 2.02.00

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.

3.10.4 "Sensor information" submenu

Navigation Expert → Diagnostics → Sensor info



DSC sensor serial number

Navigation Expert → Diagnostics → Sensor info → DSC serial no. (7728)

Description Displays the serial number of the DSC sensor that is used in the measuring tube.

User interface Character string

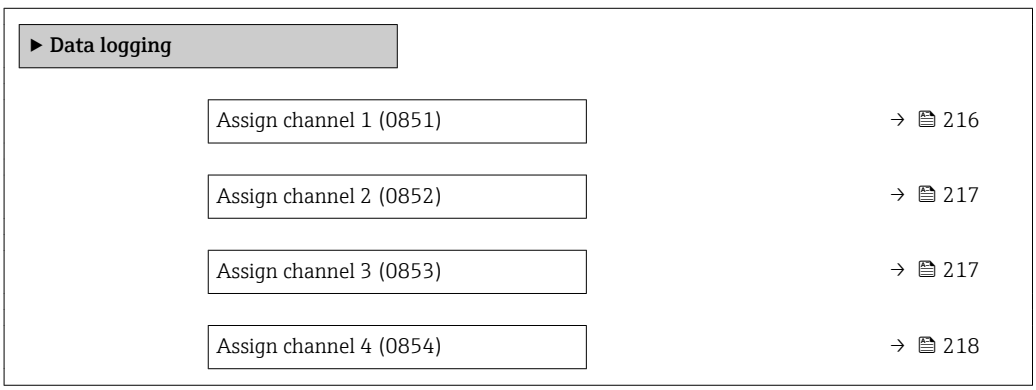
Additional information *Description*

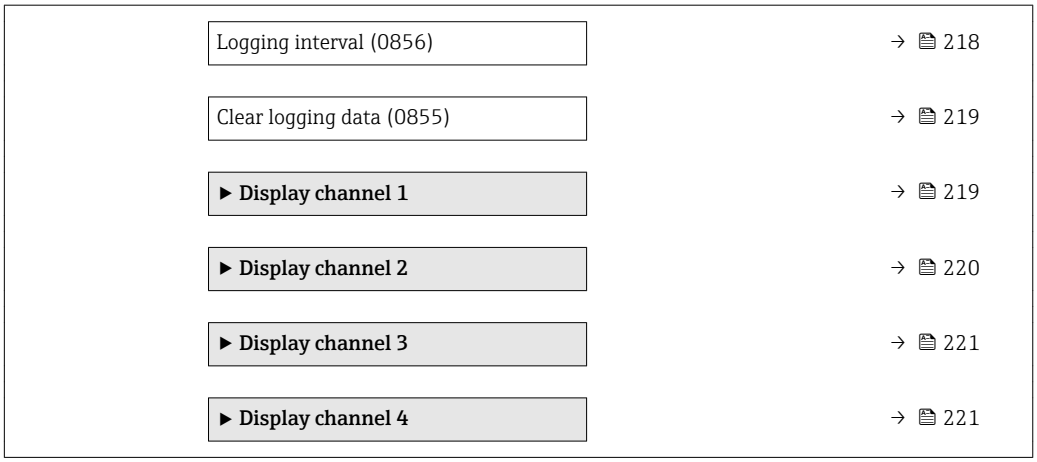
The serial number and other individual values of the DSC sensor, such as temperature range and reference values, are stored on the S-DAT.

If the DSC sensor is replaced, the S-DAT must also always be replaced.

3.10.5 "Data logging" submenu

Navigation Expert → Diagnostics → Data logging





Assign channel 1

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

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

Description Use this function to select a process variable for the data logging channel.

Selection
- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *
- Density *
- Pressure *
- Specific volume *
- Degrees of superheat *
- Vortex frequency
- Electronic temperature

Factory setting Off

* Visibility depends on order options or device settings

Additional information *Description*

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

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

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

Assign channel 2

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

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

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

Selection Picklist, see **Assign channel 1** parameter (→ 216)

Factory setting Off

Assign channel 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 **Software option overview** parameter (→ 45).

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

Selection Picklist, see **Assign channel 1** parameter (→ 216)

Factory setting Off

Assign channel 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 **Software option overview** parameter (→ 45).

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

Selection Picklist, see **Assign channel 1** parameter (→ 216)

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 **Software option overview** parameter (→ 45).

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

User entry 1.0 to 3 600.0 s

Factory setting 10.0 s

Additional information

Description

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

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

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

Example

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

Clear logging data

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

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

Description Option to clear the entire logging data.

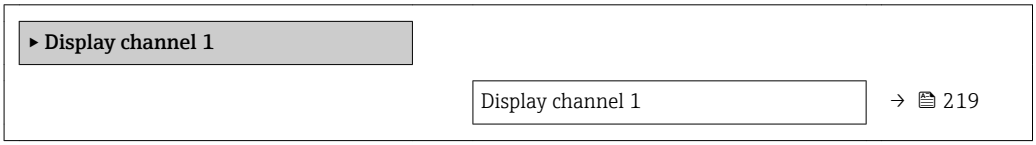
Selection
- Cancel
- Clear data

Factory setting Cancel

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

"Display channel 1" submenu

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



Display channel 1

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

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

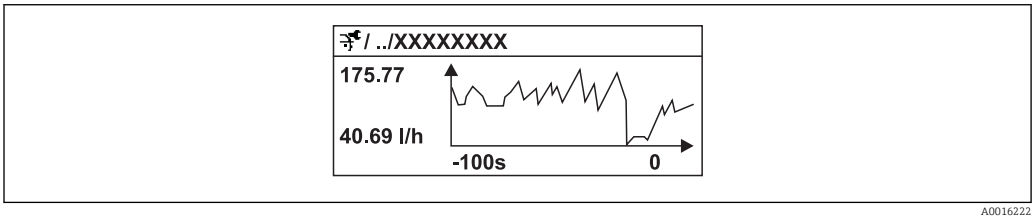
One of the following options is selected in the **Assign channel 1** parameter (→ 216):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *

* Visibility depends on order options or device settings

- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *
- Density *
- Pressure *
- Specific volume *
- Degrees of superheat *
- Vortex frequency
- Electronic temperature

Description Displays the measured value trend for the logging channel in the form of a chart.

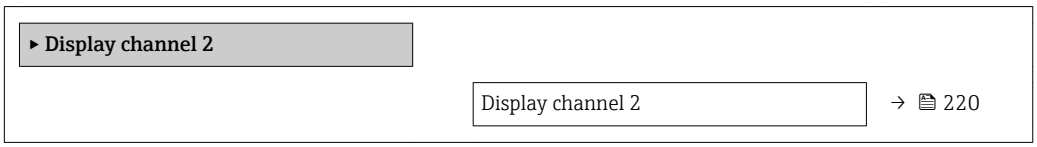
Additional information *Description*



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

"Display channel 2" submenu

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



Display channel 2

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

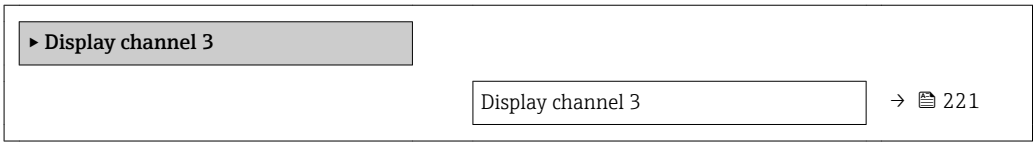
Prerequisite A process variable is defined in the **Assign channel 2** parameter.

Description See the **Display channel 1** parameter → 219

* Visibility depends on order options or device settings

"Display channel 3" submenu

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



Display channel 3

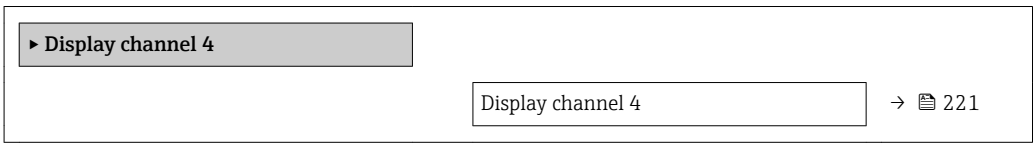
Navigation Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite A process variable is defined in the **Assign channel 3** parameter.

Description See the **Display channel 1** parameter → 219

"Display channel 4" submenu

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



Display channel 4

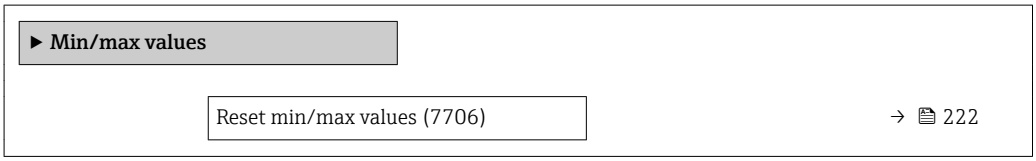
Navigation Expert → Diagnostics → Data logging → Displ.channel 4

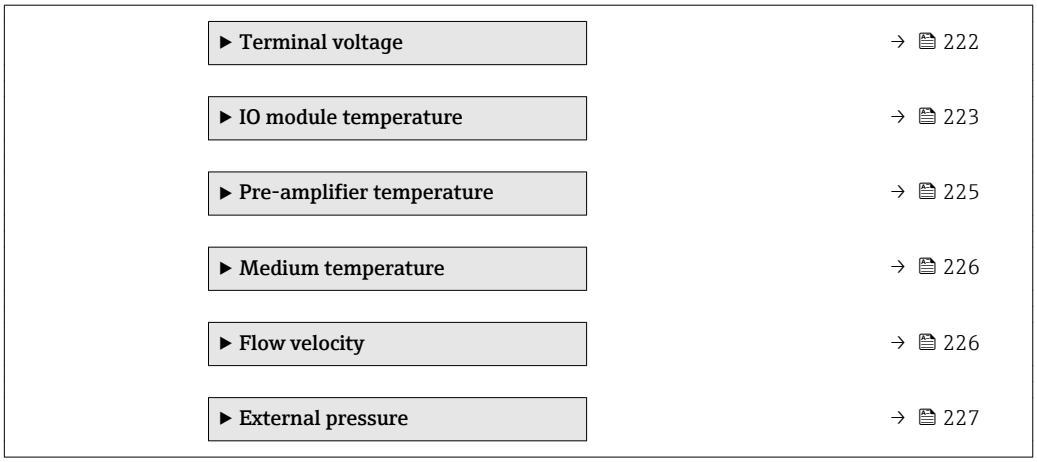
Prerequisite A process variable is defined in the **Assign channel 4** parameter.

Description See the **Display channel 1** parameter → 219

3.10.6 "Min/max values" submenu

Navigation Expert → Diagnostics → Min/max val.





Reset min/max values

Navigation Expert → Diagnostics → Min/max val. → Reset min/max (7706)

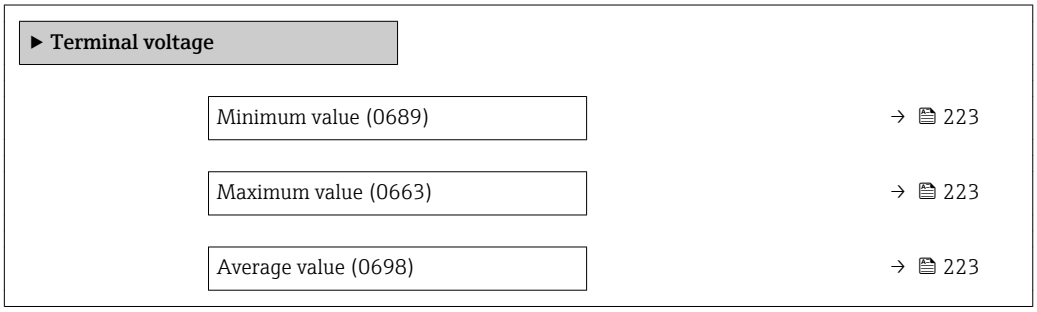
Description Use this function to select measured variables whose minimum, maximum and average measured values are to be reset.

Selection
- Cancel
- Terminal voltage 1
- Temperature
- Flow velocity
- Pressure

Factory setting Cancel

"Terminal voltage" submenu

Navigation Expert → Diagnostics → Min/max val. → Terminal volt.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Terminal volt. → Minimum value (0689)

Description Use this function to display the smallest previously measured terminal voltage value in Volts.

User interface 0.0 to 50.0 V

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Terminal volt. → Maximum value (0663)

Description Use this function to view the largest previously measured terminal voltage value in Volts.

User interface 0.0 to 50.0 V

Average value

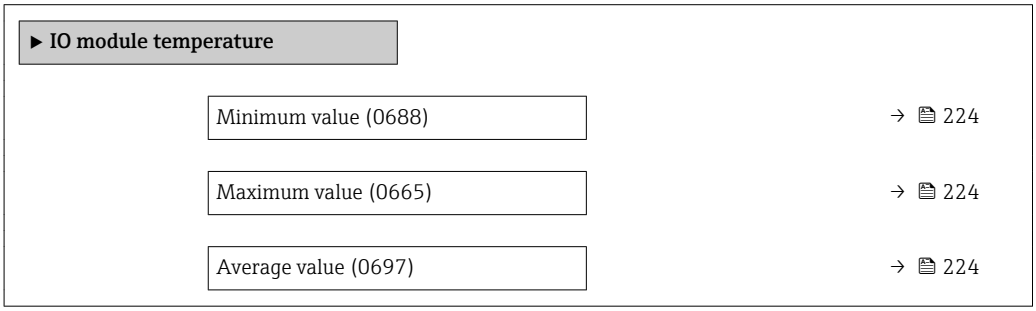
Navigation Expert → Diagnostics → Min/max val. → Terminal volt. → Average value (0698)

Description Use this function to view the average of all previously measured terminal voltage values in Volts.

User interface Signed floating-point number

"IO module temperature" submenu

Navigation Expert → Diagnostics → Min/max val. → IO module temp.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → IO module temp. → Minimum value (0688)

Description Displays the lowest previously measured temperature value of the I/O electronics module.

User interface Signed floating-point number

Additional information *Dependency*

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

Maximum value

Navigation Expert → Diagnostics → Min/max val. → IO module temp. → Maximum value (0665)

Description Displays the highest previously measured temperature value of the I/O electronics module.

User interface Signed floating-point number

Additional information *Dependency*

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

Average value

Navigation Expert → Diagnostics → Min/max val. → IO module temp. → Average value (0697)

Description Displays the average value of all previously measured temperature values of the I/O electronics module.

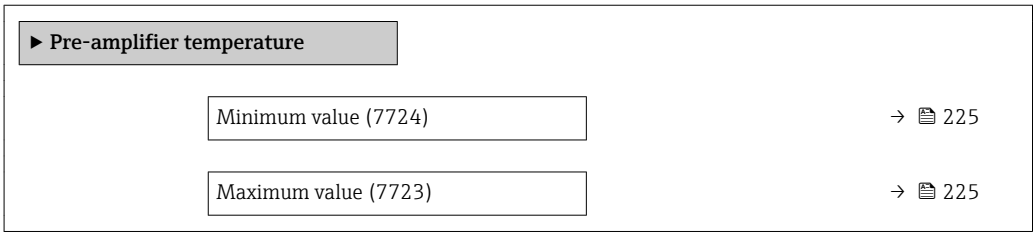
User interface −1 273.15 to 726.85 °C

Additional information *Dependency*

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

"Pre-amplifier temperature" submenu

Navigation Expert → Diagnostics → Min/max val. → Pre-amplif. temp



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Pre-amplif. temp → Minimum value (7724)

Description Displays the lowest previously measured temperature value of the pre-amplifier module.

User interface 0 to 1 000 °C

Additional information *Dependency*

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

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Pre-amplif. temp → Maximum value (7723)

Description Displays the highest previously measured temperature value of the pre-amplifier module.

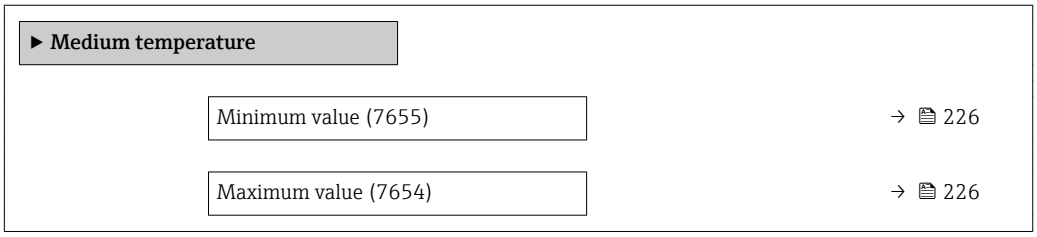
User interface 0 to 1 000 °C

Additional information *Dependency*

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

"Medium temperature" submenu

Navigation Expert → Diagnostics → Min/max val. → Medium temp.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Medium temp. → Minimum value (7655)

Description Displays the lowest previously medium temperature.

User interface 0 to 1 000 °C

Additional information *Dependency*

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

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (7654)

Description Displays the highest previously medium temperature.

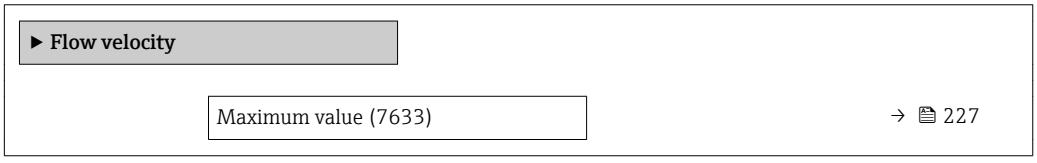
User interface 0 to 1 000 °C

Additional information *Dependency*

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

"Flow velocity" submenu

Navigation Expert → Diagnostics → Min/max val. → Flow velocity



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Flow velocity → Maximum value (7633)

Description Displays the highest previously measured flow velocity.

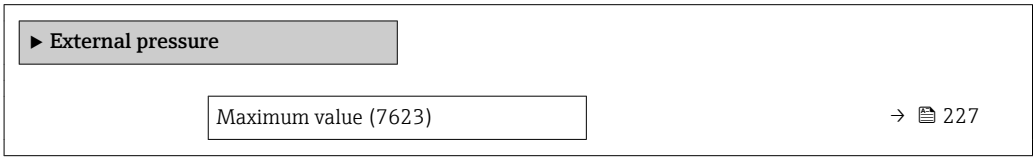
User interface Positive floating-point number

Additional information *Dependency*

The unit is taken from the **Velocity unit** parameter (→ 71)

"External pressure" submenu

Navigation Expert → Diagnostics → Min/max val. → External press.



Maximum value

Navigation Expert → Diagnostics → Min/max val. → External press. → Maximum value (7623)

Description Displays the highest previously measured external pressure.

User interface Positive floating-point number

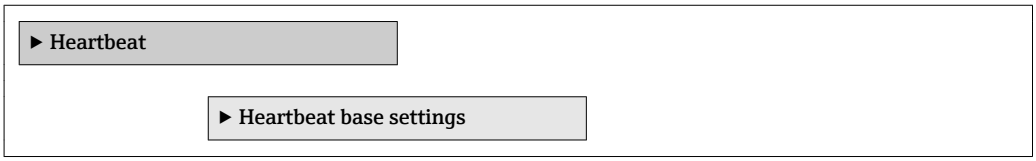
Additional information *Dependency*

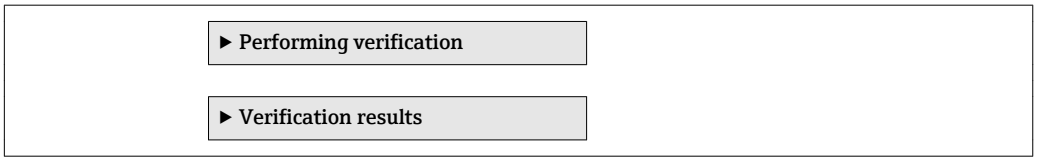
The unit is taken from the **Pressure unit** parameter (→ 66)

3.10.7 "Heartbeat" submenu

For detailed information on the parameter descriptions of the **Heartbeat Verification** application package, see the Special Documentation for the device

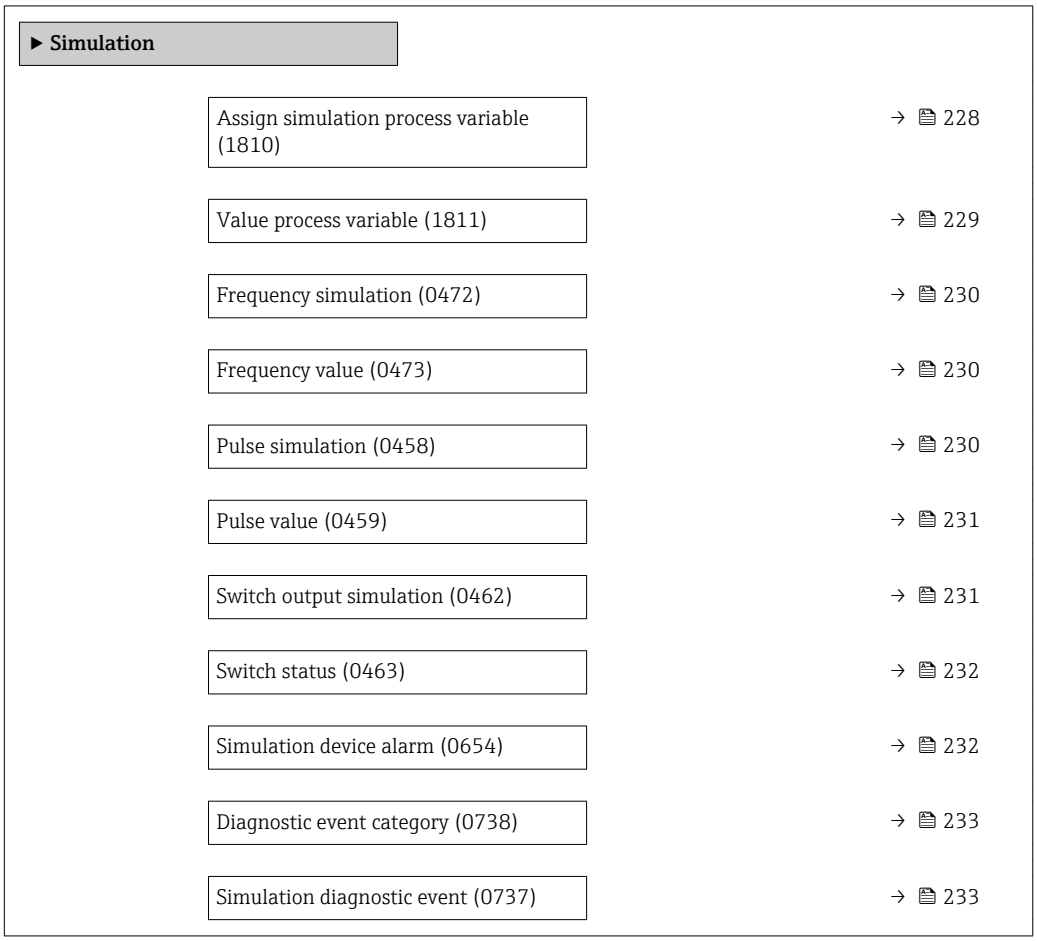
Navigation Expert → Diagnostics → Heartbeat





3.10.8 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation



Assign simulation process variable

Navigation Expert → Diagnostics → Simulation → Assign proc.var. (1810)

Description Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature

- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Condensate mass flow *
- Energy flow
- Heat flow difference *
- Reynolds number

Factory setting Off

Additional information *Description*

The simulation value of the selected process variable is specified in the **Value process variable** parameter (→ 229).

Value process variable

Navigation Expert → Diagnostics → Simulation → Value proc. var. (1811)

Prerequisite One of the following options is selected in the **Assign simulation process variable** parameter (→ 228):
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature *
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *

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 (→ 61).

* Visibility depends on order options or device settings

Frequency simulation

Navigation Expert → Diagnostics → Simulation → Frequency sim. (0472)

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 114).

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

Selection
- Off
- On

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Frequency value** parameter (→ 230).

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

Frequency value

Navigation Expert → Diagnostics → Simulation → Freq. value (0473)

Prerequisite The **On** option is selected in the **Frequency simulation** parameter (→ 230).

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

User entry 0.0 to 1250.0 Hz

Factory setting 0.0 Hz

Pulse simulation

Navigation Expert → Diagnostics → Simulation → Pulse sim. (0458)

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 114).

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

Selection
- Off
- Fixed value
- Down-counting value

Factory setting Off

Additional information

Description

The desired simulation value is specified in the **Pulse value** parameter (→ 231).

Selection
- Off
  Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
  Pulses with the pulse width specified in the **Pulse width** parameter (→ 116) are output continuously.
- Down-counting value
  The pulses specified in the **Pulse value** parameter (→ 231) are output.

Pulse value

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

Prerequisite In the **Pulse simulation** parameter (→ 230), the **Down-counting value** option is selected.

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

User entry 0 to 65 535

Switch output simulation

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 114).

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 specified in the **Switch status** parameter (→ 232).

Selection

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

Switch status

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

Prerequisite The **On** option is selected in the **Switch output simulation** parameter (→ 231).

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

Selection

- Open
- Closed

Factory setting Open

Additional information *Options*

- Open
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Switch simulation is active.

Simulation device alarm

Navigation Expert → Diagnostics → Simulation → Sim. alarm (0654)

Description Use this function to switch the device alarm on and off.

Selection

- Off
- On

Factory setting Off

Additional information *Description*

In this way, users can verify the correct function of downstream switching units.

The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Diagnostic event category

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

Description Use this function to select the category of the diagnostic events that are displayed for the simulation in the **Simulation diagnostic event** parameter (→ 233).

Selection
- Sensor
- Electronics
- Configuration
- Process

Factory setting Process

Simulation diagnostic event

Navigation Expert → Diagnostics → Simulation → Sim. diag. event (0737)

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

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

Factory setting Off

Additional information *Description*

For the simulation, you can choose from the diagnostic events of the category selected in the **Diagnostic event category** parameter (→ 233).

4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

Volume flow	m^3/h
Volume	m^3
Mass flow	kg/h
Mass	kg
Corrected volume flow	Nm^3/h
Corrected volume	Nm^3
Pressure	bar
Temperature	°C
Energy flow	kW
Energy	kWh
Calorific value (volume)	kJ/Nm^3
Calorific value (mass)	kJ/kg
Velocity	m/s
Density	kg/m^3
Specific volume	m^3/kg
Dynamic viscosity	Pa s
Specific heat capacity	kJ/(kgK)
Length	mm

4.1.2 Full scale values

The factory settings applie to the following parameters:
100% bar graph value 1

Nominal diameter [mm]	**[m^3/h]**
15 25 > 15 40 >> 15	25
25 40 > 25 50 >> 25	125
40 50 > 40 80 >> 40	308
50 80 > 50 100 >> 50	513
80 100 > 80 150 >> 80	1 152

Nominal diameter [mm]	[m³/h]
100 150 > 100 200 >> 100	1995
150 200 > 150 250 >> 150	4539
200 250 > 200 300 >> 200	8713
250 300 > 250 350 >> 250	13735
300 350 > 300 400 >> 300	19701

4.1.3 Pulse value

Nominal diameter	Volume flow	Mass flow
[mm]	(~ 2 pulse/s) [m³/pulse]	(~ 2 pulse/s) [kg/pulse]
15 25 > 15 40 >> 15	0.00067	0.0034
25 40 > 25 50 >> 25	0.0035	0.018
40 50 > 40 80 >> 40	0.0085	0.044
50 80 > 50 100 >> 50	0.023	0.12
80 100 > 80 150 >> 80	0.051	0.26
100 150 > 100 200 >> 100	0.089	0.46
150 200 > 150 250 >> 150	0.20	1.04
200 250 > 200 300 >> 200	0.39	1.99
250 300 > 250 350 >> 250	0.61	3.14
300 350 > 300 400 >> 300	0.88	4.51

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

Volume flow	ft^3/min
Volume	ft^3
Mass flow	lb/min
Mass	lb
Corrected volume flow	Sft^3/min
Corrected volume	Sft^3
Pressure	psi
Temperature	°F
Energy flow	Btu/h
Energy	Btu
Calorific value (volume)	Btu/Sft^3
Calorific value (mass)	Btu/lb
Velocity	ft/s
Density	lb/ft^3
Specific volume	ft^3/lb
Length	in

4.2.2 Full scale values

The factory settings applie to the following parameters:
100% bar graph value 1

Nominal diameter [in]	**[ft^3/h]**
½ 1 > ½ 1½ >> ½	882
1 1½ > 1 2 >> 1	4414
1½ 2 > 1½ 3 >> 1½	10876
2 3 > 2 4 >> 2	18116
3 4 > 3 6 >> 3	40682
4 6 > 4 8 >> 4	70452
6 8 > 6 10 >> 6	160293

Nominal diameter [in]	[ft³/h]
8 10 > 8 12 >> 8	307 696
10 12 > 10 14 >> 10	485 046
12 14 > 12 16 >> 12	695 734

4.2.3 Pulse value

Nominal diameter	Volume flow	Volume flow
[in]	~ 2 pulse/s [gal/pulse]	~ 2 pulse/s [lb/pulse]
½ 1 > ½ 1½ >> ½	0.18	0.0076
1 1½ > 1 2 >> 1	0.92	0.039
1½ 2 > 1½ 3 >> 1½	2.25	0.097
2 3 > 2 4 >> 2	6.02	0.26
3 4 > 3 6 >> 3	13.50	0.58
4 6 > 4 8 >> 4	23.42	1.01
6 8 > 6 10 >> 6	53.29	2.29
8 10 > 8 12 >> 8	102.29	4.40
10 12 > 10 14 >> 10	161.26	6.93
12 14 > 12 16 >> 12	231.30	9.94

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Calorific value (volume)	kWh/Nm³, MWh/Nm³, kJ/Nm³, MJ/Nm³	Kilowatt hour, megawatt hour, kilojoule, megajoule/ standard cubic meter
	kWh/Sm³, MWh/Sm³, kJ/Sm³, MJ/Sm³	Kilowatt hour, megawatt hour, kilojoule, megajoule/ standard cubic meter
Calorific value (mass)	kWh/kg, MWh/kg, kJ/kg, MJ/kg	Kilowatt hour, megawatt hour, kilojoule, megajoule/ kilogram
Density	g/cm³	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 fluid density to the water density 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 fluid density to the water density at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
Pressure	Pa, kPa, MPa	Pascal, kilopascal, megapascal
	mbar a	Millibar (absolute)
	bar, torr, atm	Bar, torr, physical atmosphere
	gf/cm², kgf/cm²	Gram force, kilogram force/square centimeter
Dynamic viscosity	Pa s	Pascal second
	cP, P	Centipoise, poise
Energy	kWh, MWh, GWh	Kilowatt hour, megawatt hour, gigawatt hour
	kJ, MJ, GJ	Kilojoule, megajoule, gigajoule
	kcal, Mcal, Gcal	Kilocalories, megacalories, gigacalories
Energy flow	kW, MW, GW	Kilowatt, megawatt
	kJ/s, kJ/min, kJ/h, kJ/d	Kilojoule/time unit
	MJ/s, MJ/min, MJ/h, MJ/d	Megajoule/time unit
	GJ/s, GJ/min, GJ/h, GJ/d	Gigajoule/time unit
	kcal/s, kcal/min, kcal/h, kcal/d	Kilocalories/time unit
	Mcal/s, Mcal/min, Mcal/h, Mcal/d	Megacalories/time unit
	Gcal/s, Gcal/min, Gcal/h, Gcal/d	Gigacalories/time unit
Velocity	m/s	Meter/time unit
Length	mm, m	Millimeter, meter
Mass	g, kg, t	Gram, kilogram, metric ton
Mass flow	g/s, g/min, g/h, g/d	Gram/time unit
	kg/s, kg/min, kg/h, kg/d	Kilogram/time unit
	t/s, t/min, t/h, t/d	Metric ton/time unit
Corrected volume	Nl, Nm³, Sm³	Normal liter, normal cubic meter, standard cubic meter
Corrected volume flow	Nl/s, Nl/min, Nl/h, Nl/d	Normal liter/time unit
	Nm³/s, Nm³/min, Nm³/h, Nm³/d	Normal cubic meter/time unit
	Sm³/s, Sm³/min, Sm³/h, Sm³/d	Standard cubic meter/time unit

Process variable	Units	Explanation
Specific heat capacity	kJ/(kgK), MJ/(kgK)	Kilojoule, megajoule/kilogram Kelvin
	kWh/(kgK)	Kilowatt hour/kilogram Kelvin
	kcal/(kgK)	Kilocalories/kilogram Kelvin
Temperature	°C , K	Celsius, Kelvin
Volume	cm^3, dm^3, m^3	Cubic centimeter, cubic decimeter, cubic meter
	ml, l	Milliliter, liter
Volume flow	cm^3/s , cm^3/min, cm^3/h, cm^3/d	Cubic centimeter/time unit
	dm^3/s, dm^3/min, dm^3/h, dm^3/d	Cubic decimeter/time unit
	m^3/s, m^3/min, m^3/h, m^3/d	Cubic meter/time unit
	ml/s, ml/min, ml/h, ml/d	Milliliter/time unit
	l/s, l/min, l/h, l/d	Liter/time unit
Time	m, h, d, y	Minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Calorific value (mass)	kWh/lb, MWh/lb, kJ/lb, MJ/lb	Kilowatt hour, kilojoule, British thermal unit, thousand British thermal units/pound
Density	lb/ft^3, 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
Pressure	psi a	Psi absolute
Velocity	ft/s	Foot/time unit
Length	in, ft	Inch, foot
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
Corrected volume	Sft^3	Standard cubic foot
Corrected volume flow	Sft^3/s, Sft^3/min, Sft^3/h, Sft^3/d	Standard cubic foot/time unit
Temperature	°F, °R	Fahrenheit, Rankine
Volume	af	Acre foot
	ft^3	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
	ft^3/s, ft^3/min, ft^3/h, ft^3/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

Process variable	Units	Explanation
	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	m, h, d, y	Minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

5.3 Imperial units

Process variable	Units	Explanation
Calorific value (volume)	Btu/Sm^3, MBtu/Sm^3	British thermal unit, thousand British thermal units/ standard cubic meter
	Btu/Sft^3, MBtu/Sft^3	British thermal unit, thousand British thermal units/ standard cubic foot
Calorific value (mass)	Btu/lb, MBtu/lb	British thermal unit, thousand British thermal units/ pound
Density	lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)	Pound/volume unit
Energy	Btu, MBtu, MMBtu	British thermal unit, thousand British thermal units, million British thermal units
Energy flow	Btu/s, Btu/min, Btu/h, Btu/day	British thermal unit/time unit
	MBtu/s, MBtu/min, MBtu/h, MBtu/d	Thousand British thermal units/time unit
	MMBtu/s, MMBtu/min, MMBtu/h, MMBtu/d	Million British thermal units/time unit
Specific heat capacity	Btu/(lb °R)	British thermal unit/pound degree Rankine
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	m, h, d, y	Minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

5.4 Other units

Process variable	Units	Explanation
Pressure	mmH2O (4°C)	Millimeter of water column (4 °C)
	mmH2O (68°F)	Millimeter of water column (68 °F)
	mmHg (0°C)	Millimeter of mercury column (0 °C)
	inH2O (4°C)	Inch of water column (4 °C)
	inH2O (68°F)	Inch of water column (68 °F)
	ftH2O (68°F)	Foot of water column (68 °F)
	inHg (0°C)	Inch of mercury (0 °C)
Specific volume	m^3/kg	Cubic meter/kilogram
	ft^3/lb	Cubic foot/pound

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