GP01132D/06/EN/01.19
71439311
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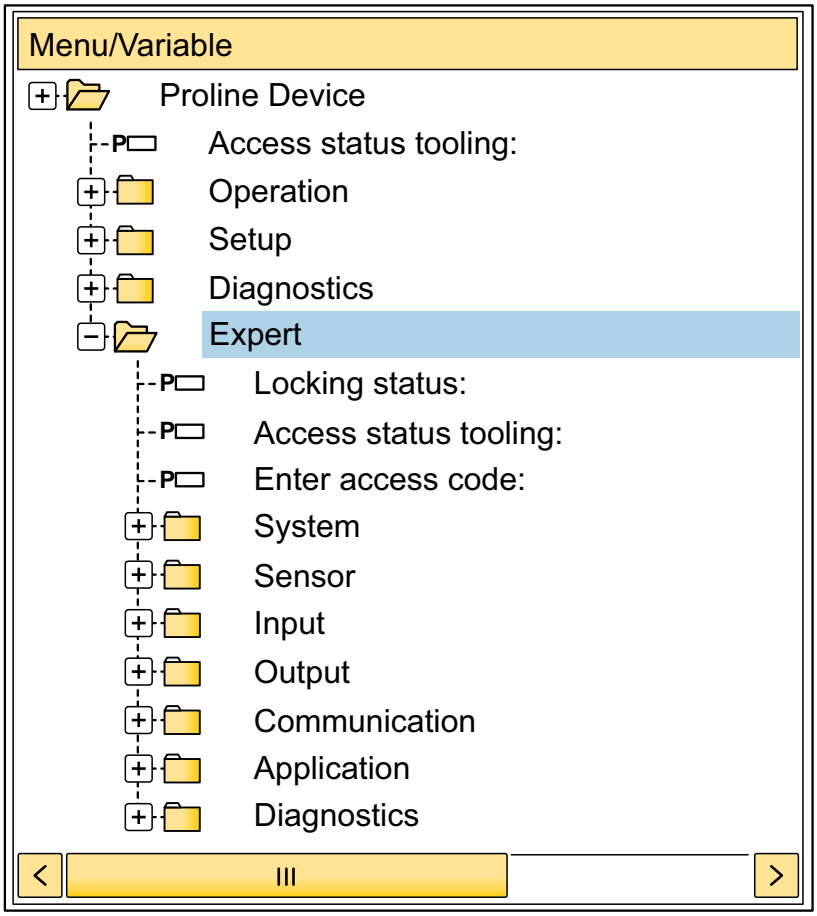
Valid as of version
01.00.zz (Device firmware)

Description of Device Parameters
Proline Prosonic Flow 500 HART

Ultrasonic time-of-flight flowmeter



Endress+Hauser
People for Process Automation

Table of contents

1 About this document

1.1 Document function

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

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

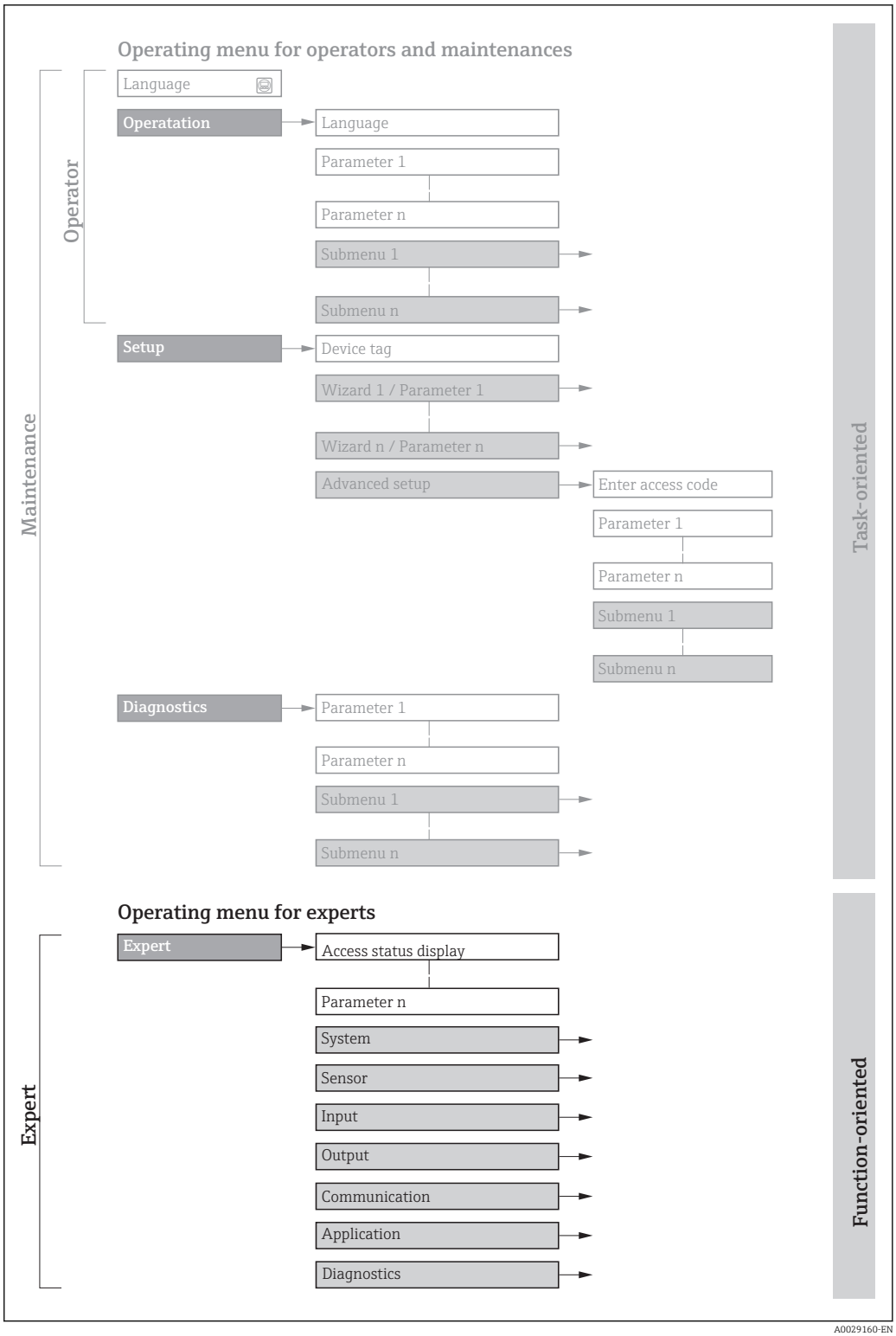
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

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



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

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

1.3.2 Structure of a parameter description

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

Complete parameter name	Write-protected parameter =

Navigation	Navigation path to the parameter via the local display (direct access code) or web browser Navigation path to the parameter via the operating tool The names of the menus, submenus and parameters are abbreviated to the form in which they appear on the display and in the operating tool.
Prerequisite	The parameter is only available under these specific conditions
Description	Description of the parameter function
Selection	List of the individual options for the parameter ▪ Option 1 ▪ Option 2
User entry	Input range for the parameter
User interface	Display value/data for the parameter
Factory setting	Default setting ex works
Additional information	Additional explanations (e.g. in examples): ▪ On individual options ▪ On display values/data ▪ On the input range ▪ On the factory setting ▪ On the parameter function

1.4 Symbols used

1.4.1 Symbols for certain types of information

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

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

Measuring device	Documentation code
Prosonic Flow G 500	BA01836D

1.5.2 Supplementary device-dependent documentation

Special documentation

Content	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Advanced gas analysis	SD02351D
Functional Safety Manual	SD02308D
Heartbeat Technology	SD02304D
Web server	SD02311D

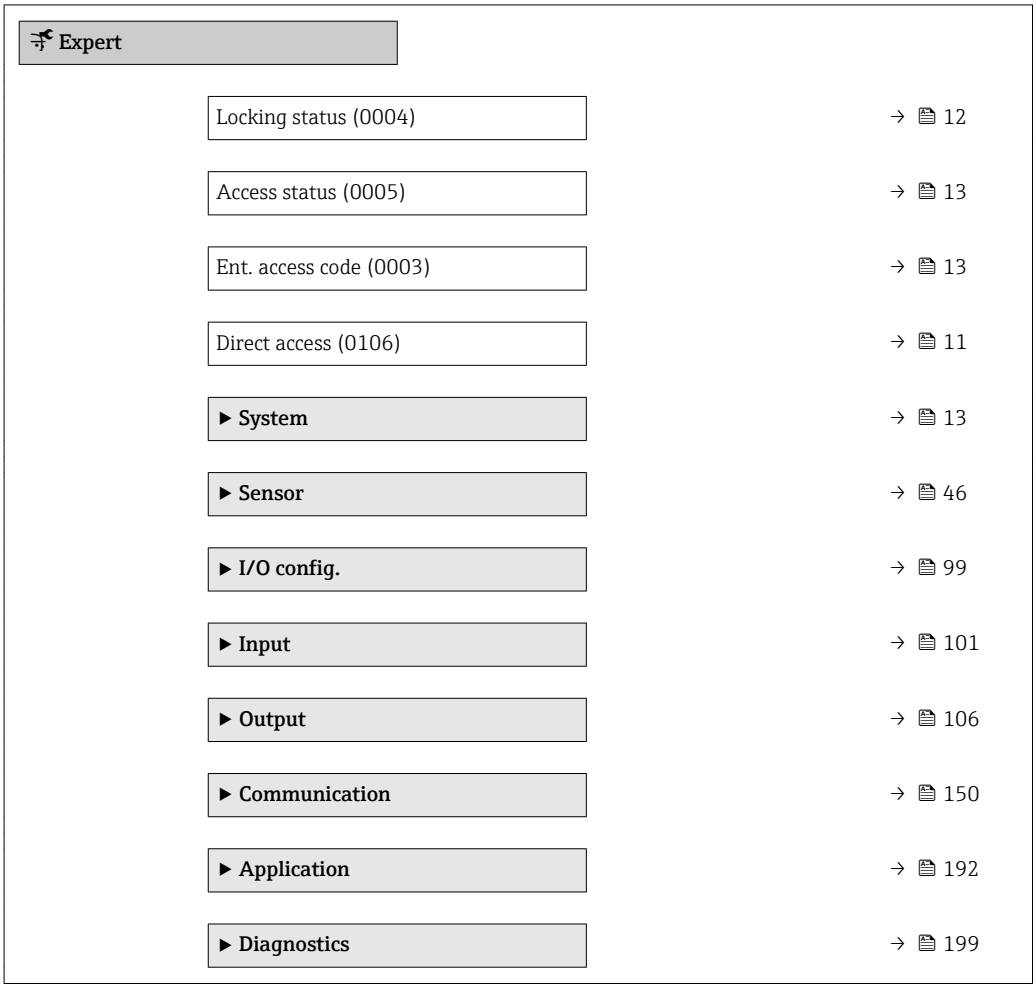
2 Overview of the Expert operating menu

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.

▶ Event logbook	→ 206
▶ Device info	→ 208
▶ Main elec.+I/O1	→ 212
▶ Sens. electronic	→ 213
▶ I/O module 2	→ 215
▶ I/O module 3	→ 216
▶ I/O module 4	→ 218
▶ Display module	→ 219
▶ Data logging	→ 220
▶ Heartbeat	→ 228
▶ 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

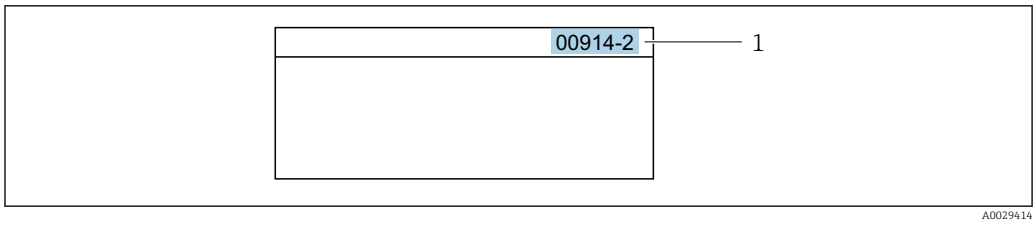
Navigation Expert → Direct access (0106)

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

User entry 0 to 65 535

Additional information *User entry*

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



1 Direct access code

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

Locking status

Navigation Expert → Locking status (0004)

Description Displays the active write protection.

User interface
- Hardware locked
- SIL locked
- CT act.-def.par.
- CT act.-all par.
- Temp. locked

Additional information

Display

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

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

Selection

Options	Description
None	The access status displayed in the **Access status** parameter (→ 13) applies . Only appears on local display.
Hardware locked (priority 1)	The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool) .
SIL locked (priority 2)	The SIL mode is enabled. This locks write access to the parameters (e.g. via local display or operating tool).
Temp. locked	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.

Access status

Navigation Expert → Access status (0005)

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

User interface
- Operator
- Maintenance

Factory setting Maintenance

Additional information

Description

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

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

Display

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

Ent. access code

Navigation Expert → Ent. access code (0003)

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

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

3.1 "System" submenu

Navigation Expert → System

▶ System	
▶ Display	→ 14
▶ Config. backup	→ 27
▶ Diagn. handling	→ 30
▶ Administration	→ 41

3.1.1 "Display" submenu

Navigation Expert → System → Display

▶ **Display**

Display language

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

Prerequisite A local display is provided.

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

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

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

Format display

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

Prerequisite A local display is provided.

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

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

Factory setting 1 value, max.

Additional information

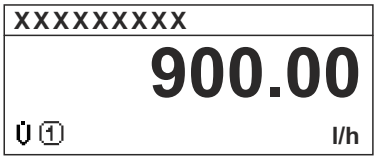
Description

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

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

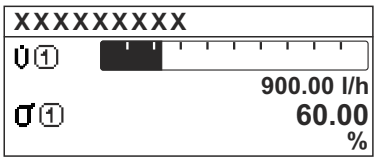
Possible measured values shown on the local display:

"1 value, max." option



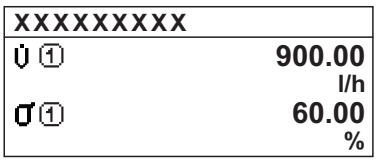
A0016529

"Bargr. + 1 value" option



A0016530

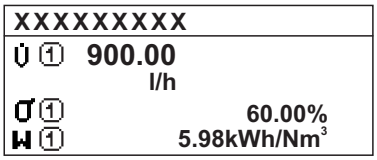
"2 values" option



A0016531

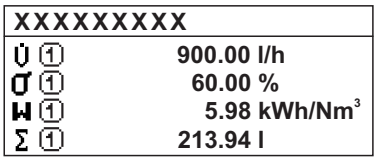
2

"Val. large+2val." 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 shown on the local display.

Selection

- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1 *
- Curr.output 2 *
- Curr.output 3 *
- Curr.output 4 *

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.

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

* Visibility depends on order options or device settings

0% bargraph 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

Factory setting Country-dependent

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 (→ 62).

100% bargraph 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter → 239

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 (→ 62).

Decimal places 1

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

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

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

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

Factory setting x.xx

Additional information *Description*

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

Value 2 display

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

Prerequisite A local display is provided.

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

Selection
- None
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1 *
- Curr.output 2 *
- Curr.output 3 *
- Curr.output 4 *

* Visibility depends on order options or device settings

Factory setting None

Additional information *Description*

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

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

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

Decimal places 2

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

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

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

Selection

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

Factory setting x.xx

Additional information *Description*

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

Value 3 display

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

Prerequisite A local display is provided.

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

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

Factory setting None

Additional information

Description

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

0% bargraph 3

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

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

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

User entry Signed floating-point number

Factory setting Country-dependent

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 (→ 62).

100% bargraph 3

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

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

Decimal places 3

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

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

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

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

Factory setting x.xx

Additional information *Description*

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

Value 4 display

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

Prerequisite A local display is provided.

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

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

Factory setting None

Additional information

Description

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

Decimal places 4

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

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

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

Selection

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

Factory setting x.xx

Additional information

Description

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

Display interval

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

Prerequisite A local display is provided.

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

User entry 1 to 10 s

Factory setting 5 s

Additional information *Description*

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

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

Display damping

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

Prerequisite A local display is provided.

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

User entry 0.0 to 999.9 s

Factory setting 0.0 s

Additional information *User entry*

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

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

Header

Navigation Expert → System → Display → Header (0097)

Prerequisite A local display is provided.

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

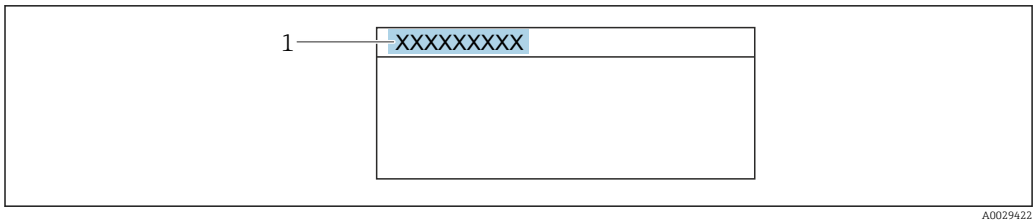
Selection
- Device tag
- Free text

Factory setting Device tag

Additional information *Description*

The header text only appears during normal operation.

1) proportional transmission behavior with first order delay



1 Position of the header text on the display

Selection

- Device tag
  Is defined in the **Device tag** parameter (→ 209).
- Free text
  Is defined in the **Header text** parameter (→ 26).

Header text

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

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

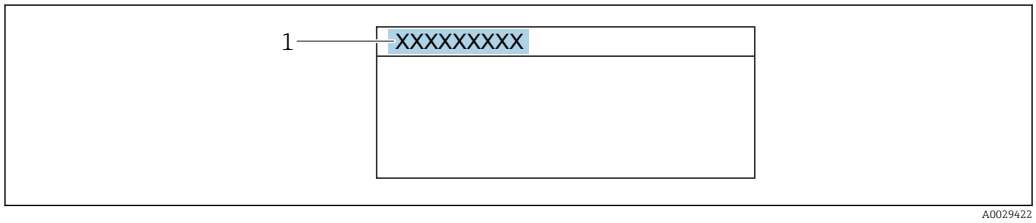
Description Use this function to enter a customer-specific text for the header of the local display.

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

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

Additional information *Description*

The header text only appears during normal operation.



1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator

Navigation Expert → System → Display → Separator (0101)

Prerequisite A local display is provided.

Description Use this function to select the decimal separator.

Selection
- . (point)
- , (comma)

Factory setting . (point)

Contrast display

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

Prerequisite A local display is provided.

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

User entry 20 to 80 %

Factory setting Depends on the display

Backlight

Navigation Expert → System → Display → Backlight (0111)

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

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

Selection
- Disable
- Enable

Factory setting Enable

3.1.2 "Configuration backup" submenu

Navigation Expert → System → Config. backup

▶ Config. backup	
Operating time (0652)	→ 28
Last backup (2757)	→ 28

Config. managem. (2758)	→ 28
Backup state (2759)	→ 29
Compar. result (2760)	→ 29

Operating time

Navigation Expert → System → Config. backup → Operating time (0652)

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

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

Additional information *User interface*
The maximum number of days is 9999, which is equivalent to 27 years.

Last backup

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

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

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

Config. managem.

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

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

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

Factory setting Cancel

* Visibility depends on order options or device settings

Additional information *Selection*

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

HistoROM

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

Backup state

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

Description Displays the status of the data backup process.

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

Factory setting None

Compar. result

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

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

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

- Backup corrupt
- Check not done
- Dataset incomp.

Factory setting Check not done

Additional information *Description*

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

Selection

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

HistoROM

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

3.1.3 "Diagn. handling" submenu

Navigation Expert → System → Diagn. handling

▶ **Diagn. handling**	
Alarm delay (0651)	→ 31
▶ **Diagn. behavior**	→ 31

Alarm delay

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

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

The diagnostic message is reset without a time delay.

User entry 0 to 60 s

Factory setting 0 s

Additional information *Result*

This setting affects the following diagnostic messages:
- ⚠S452 Calc. error
- 832 Electronic temp.
- 833 Electronic temp.
- 834 Process temp.
- 835 Process temp.
- ⊗S836 Process pressure
- ⚠S837 Process pressure
- ⚠S840 Sensor range
- ⚠S870 Meas. inaccuracy
- ⚠S930 Process fluid
- ⚠S931 Process fluid

"Diagn. behavior" submenu

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

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

Options	Description
Alarm	The device stops measurement. The signal outputs and totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.
Warning	The device continues to measure. The signal outputs and totalizers are not affected. A diagnostic message is generated.
Logbook only	The device continues to measure. The diagnostic message is displayed only in the **Event logbook** submenu (→ 206) (**Event list** submenu (→ 207)) and is not displayed in alternation with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

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

▶ **Diagn. behavior**

Diagnostic no. 124 (Rel.sig.strength)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 124 (0774)

Description Option for changing the diagnostic behavior of the diagnostic message **124 Rel.sig.strength**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 125 (Rel. sound vel.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 125 (0775)

Description Option for changing the diagnostic behavior of the diagnostic message **125 Rel. sound vel.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 160 (Signal path off)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 160 (0776)

Description Option for changing the diagnostic behavior of the diagnostic message **160 Signal path off**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 302 (Verific. active)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 31

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

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 443 (Pulse output)

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 31

Diagnostic no. 444 (Current input 1 to n)

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

Prerequisite The device has one current input.

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 452 (Calc. error)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 452 (0713)

Description Option for changing the diagnostic behavior of the diagnostic message **452 Calc. error**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 543 (Double pulse out)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 543 (0643)

Description Option for changing the diagnostic behavior of the diagnostic message **543 Double pulse out**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 832 (Electronic temp.)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 833 (Electronic temp.)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 31

Diagnostic no. 834 (Process temp.)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 31

Diagnostic no. 835 (Process temp.)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 31

Diagnostic no. 837 (Process pressure)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 837 (0714)

Description Option for changing the diagnostic behavior of the diagnostic message **837 Process pressure**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 841 (Sensor range)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 840 (0680)

Description Option for changing the diagnostic behavior of the diagnostic message **841 Sensor range**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 842 (Process limit)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Off

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

Diagnostic no. 870 (Meas. inaccuracy)

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

Description Option for changing the diagnostic behavior of the diagnostic message **870 Meas. inaccuracy**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 31

Diagnostic no. 881 (Sen.sig. path 1 to n)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 881 (0724)

Description Option for changing the diagnostic behavior of the diagnostic message **881 Sen.sig. path 1 to n**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 930 (Process fluid)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 930 (0639)

Description Option for changing the diagnostic behavior of the diagnostic message ⚠**S930 Process fluid**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Alarm

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

Diagnostic no. 931 (Process fluid)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 931 (0640)

Description Option for changing the diagnostic behavior of the diagnostic message ⚠**S931 Process fluid**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Alarm

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

Diagnostic no. 953 (Asy.noise path 1 to n)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 953 (0636)

Description Option for changing the diagnostic behavior of the diagnostic message ⚠**M953 Asy.noise path 1 to n**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

Diagnostic no. 954 (Sound v. dev. hi)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 954 (0637)

Description Option for changing the diagnostic behavior of the diagnostic message ⚠**S954 Sound v. dev. hi**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

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

3.1.4 "Administration" submenu

Navigation Expert → System → Administration

▶ **Administration**	
▶ **Def. access code**	→ 41
▶ **Reset acc. code**	→ 43
Device reset (0000)	→ 44
Activate SW opt. (0029)	→ 44
SW option overv. (0015)	→ 45

"Def. access code" wizard

The **Def. access code** wizard (→ 41) is only available when operating via the local display or Web browser.

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

Navigation Expert → System → Administration → Def. access code

▶ **Def. access code**		
	Def. access code	→ 42
	Confirm code	→ 42

Def. access code

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

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

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

Additional information

Description

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

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

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

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

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

User entry

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

Factory setting

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

Confirm code

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

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

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

"Reset access code" submenu

Navigation Expert → System → Administration → Reset acc. code

▶ Reset acc. code		
	Operating time (0652)	→ 43
	Reset acc. code (0024)	→ 43

Operating time

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

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

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

Additional information *User interface*

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

Reset acc. code

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

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

User entry Character string comprising numbers, letters and special characters

Factory setting 0x00

Additional information *Description*

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

User entry

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

Additional parameters in the "Administration" submenu

Device reset

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

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

Selection
- Cancel
- To delivery set.
- Restart device

Factory setting Cancel

Additional information *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
To delivery set.	Every parameter for which a customer-specific default setting was ordered is reset to this customer-specific value. All other parameters are reset to the factory setting.
Restart device	The restart resets every parameter whose data are in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.
Rest.S-DATBackup	Restore the data that are saved on the S-DAT. The data record is restored from the electronics memory to the S-DAT. This option is displayed only in an alarm condition.

Activate SW opt.

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

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

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

Factory setting Depends on the software option ordered

Additional information *Description*

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

User entry

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

NOTE!

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

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

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

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

▸ Once the activation code has been entered, check if the new software option is displayed in the **SW option overv.** parameter (→ 🗎 45).

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

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

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

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

Example for a software option

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

ℹ The software options currently enabled are displayed in the **SW option overv.** parameter (→ 🗎 45).

Web browser

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

SW option overv.

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

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

User interface
- Extend. HistoROM
- SIL
- HBT Monitoring
- HBT Verification
- Ad. gas analysis

Additional information

Description

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

"Extend. HistoROM" option

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

"SIL" option

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

"HBT Verification" option and "HBT Monitoring" option

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

"Ad. gas analysis" option

Order code for "Application package", option EF "Advanced gas analysis"

3.2 "Sensor" submenu

Navigation Expert → Sensor

▶ Sensor		
	▶ Measured val.	→ 46
	▶ System units	→ 62
	▶ Process param.	→ 74
	▶ Measurement mode	→ 78
	▶ External comp.	→ 85
	▶ Sensor adjustm.	→ 87
	▶ Calibration	→ 97

3.2.1 "Measured val." submenu

Navigation Expert → Sensor → Measured val.

▶ Measured val.		
	▶ Process variab.	→ 47
	▶ System values	→ 52

▶ **Totalizer**	→ 📄 54
▶ **Input values**	→ 📄 56
▶ **Output values**	→ 📄 58

"Process variables" submenu

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

▶ **Process variab.**	
Volume flow (1838)	→ 📄 47
Correct.vol.flow (1857)	→ 📄 50
Mass flow (1847)	→ 📄 48
Flow velocity (1852)	→ 📄 49
Sound velocity (1850)	→ 📄 48
Temperature (1853)	→ 📄 49
Pressure (1872)	→ 📄 48
Dry CH4 in % (1863)	→ 📄 50
Molar mass (1864)	→ 📄 51
Density (1865)	→ 📄 51
Dynam. viscosity (1887)	→ 📄 52
Calorific value (1893)	→ 📄 52
Wobbe index (1854)	→ 📄 50
Energy flow (1851)	→ 📄 49

Volume flow

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

Description Displays the volume flow that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

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

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 *Dependency*

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

Sound velocity

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

Description Displays the sound velocity that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

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

Pressure

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

Prerequisite For the following order code:
"Measuring tube; Transducer; Sensor version", option AC "316L; Titanium Gr. 2; pressure + temperature measurement integrated"

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

Description Displays the pressure that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

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

Energy flow

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

Description Displays the energy flow that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Energy flow unit** parameter (→ 72)

Flow velocity

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

Description Displays the flow velocity that is currently measured.

User interface Signed floating-point number

Temperature

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

Prerequisite For the following order codes:
- "Measuring tube; Transducer; Sensor version", option AB "316L; Titanium Gr. 2; temperature measurement integrated"
- "Measuring tube; Transducer; Sensor version", option AC "316L; Titanium Gr. 2; pressure + temperature measurement integrated"

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

Description Displays the medium temperature that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

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

Wobbe index

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

Prerequisite For the following order code:
"Application package", option EF "Advanced gas analysis"

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

Description Displays the Wobbe index that is currently calculated.

User interface Signed floating-point number

Additional information *Description*

The Wobbe index compares the combustion energy output of different composition fuel gases in an appliance. If two fuels have identical Wobbe indices then for given pressure and valve settings the energy output will also be identical.

The Wobbe index is the ratio of the calorific value (heating value) and the square root of the gases' relative density (often called specific gravity). The relative density is the ratio of the density of the gas and the density of dry air under the same pressure and temperature conditions. This index refers to the gross calorific value (sometimes called gross energy or upper heating value or higher calorific value) or net calorific value (sometimes called net energy or lower heating value or lower calorific value).

Dependency

The unit is taken from the **Cal. value unit** parameter (→ 71)

Correct.vol.flow

Navigation Expert → Sensor → Measured val. → Process variab. → Correct.vol.flow (1857)

Description Displays the corrected volume flow that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Cor.volflow unit** parameter (→ 66)

Dry CH4 in %

Navigation Expert → Sensor → Measured val. → Process variab. → Dry CH4 in % (1863)

Prerequisite For the following order code:
"Application package", option EF "Advanced gas analysis"

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

Description Displays the methane content in Mol% that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

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

Molar mass

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

Prerequisite For the following order code:
"Application package", option EF "Advanced gas analysis"

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

Description Displays the molar mass in g/mol that is currently calculated.

User interface Signed floating-point number

Density

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

Prerequisite For the following order code:
"Application package", option EF "Advanced gas analysis"

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

Description Displays the density that is currently calculated.

Dependency

The unit is taken from the **Density unit** parameter (→ 70).

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Density unit** parameter (→ 70)

Dynam. viscosity

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

Prerequisite For the following order code:
"Application package", option EF "Advanced gas analysis"

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

Description Displays the dynamic viscosity that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Dyn. visc. unit** parameter (→ 71).

Calorific value

Navigation Expert → Sensor → Measured val. → Process variab. → Calorific value (1893)

Prerequisite For the following order code:
"Application package", option EF "Advanced gas analysis"

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

Description Displays the calorific value that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Cal. value unit** parameter (→ 71)

"System values" submenu

Navigation Expert → Sensor → Measured val. → System values

▶ System values	
Signal strength (2914)	→ 53
SNR (2917)	→ 53

Turbulence (2907)	→ 📄 54
Flow asymmetry (2913)	→ 📄 54

Signal strength

Navigation Expert → Sensor → Measured val. → System values → Signal strength (2914)

Description Displays the current signal strength.

User interface Signed floating-point number

Additional information *Description*

A drop in the signal strength over time can be an indicator of deposit buildup on the converter or high ultrasonic damping in the gas.

SNR

Navigation Expert → Sensor → Measured val. → System values → SNR (2917)

Description Displays the current signal-to-noise ratio.

User interface Signed floating-point number

Additional information *Description*

A low value or a drop in the signal to noise ratio over time is an indicator of poor signal quality.

Acceptance rate

Navigation Expert → Sensor → Measured val. → System values → Acceptance rate (2912)

Description Displays the ratio of the number of ultrasonic signals accepted for flow calculation and the total number of ultrasonic signals emitted.

Multipath measuring devices only: Displays the minimum of all acceptance rates measured.

User interface 0 to 100 %

Turbulence

Navigation Expert → Sensor → Measured val. → System values → Turbulence (2907)

Description Displays the current turbulence.

User interface Signed floating-point number

Additional information *Description*

A high turbulence value indicates a disturbance in the flow profile.

Flow asymmetry

Navigation Expert → Sensor → Measured val. → System values → Flow asymmetry (2913)

Prerequisite Only available from nominal diameter DN 50 (2").

Description Displays the asymmetry of the flow velocity between signal path 1 and signal path 2.

User interface Signed floating-point number

Additional information *Limit values*

If the value 0 is displayed, both flow velocities are the same. The higher the displayed value, the greater the difference between the two measured values of the signal paths.

"Totalizer" submenu

Navigation Expert → Sensor → Measured val. → Totalizer

▶ **Totalizer**		
	Totalizer val. 1 to n (0911–1 to n)	→ 55
	Tot. overflow 1 to n (0910–1 to n)	→ 55

Totalizer val. 1 to n

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 194) of the **Totalizer 1 to n** submenu:
- Volume flow
- Correct.vol.flow
- Mass flow
- Energy flow

Description Displays the current totalizer reading.

User interface Signed floating-point number

Additional information

Description

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

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 197).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Operation mode** parameter (→ 196).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 194).

Example

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

Tot. overflow 1 to n

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 194) of the **Totalizer 1 to n** submenu:
- Volume flow
- Correct.vol.flow
- Mass flow
- Energy flow

Description Displays the current totalizer overflow.

User interface Integer with sign

Additional information

Description

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

User interface

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 194).

Example

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

"Input values" submenu

Navigation Expert → Sensor → Measured val. → Input values

▶ **Input values**	
▶ **Current input 1 to n**	→ 56
▶ **Val.stat.inp. 1 to n**	→ 57

"Current input 1 to n" submenu

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

▶ **Current input 1 to n**	
Measured val. 1 to n (1603–1 to n)	→ 56
Measur. curr. 1 to n (1604–1 to n)	→ 57

Measured val. 1 to n

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

Description Displays the current input value.

User interface Signed floating-point number

Additional information *Dependency*

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

Measur. curr. 1 to n

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

Description Displays the current value of the current input.

User interface 0 to 22.5 mA

"Value status input 1 to n" submenu

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

▶ **Val.stat.inp. 1 to n**		
	Val.stat.inp. (1353–1 to n)	→ 57

Val.stat.inp.

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

Description Displays the current input signal level.

User interface
- High
- Low

"Output values" submenu

Navigation Expert → Sensor → Measured val. → Output values

▶ **Output values**	
▶ **Value curr.out 1 to n**	→ 📄 58
▶ **PFS output 1 to n**	→ 📄 59
▶ **Relay output 1 to n**	→ 📄 60
▶ **Double pulse out**	→ 📄 61

"Value current output 1 to n" submenu

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

▶ **Value curr.out 1 to n**	
Output curr. 1 to n (0361–1 to n)	→ 📄 58
Measur. curr. 1 to n (0366–1 to n)	→ 📄 58

Output curr. 1 to n

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

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

User interface 0 to 22.5 mA

Measur. curr. 1 to n

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

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

User interface 0 to 30 mA

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

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

▶ PFS output 1 to n	
Output freq. 1 to n (0471–1 to n)	→ 59
Pulse output 1 to n (0456–1 to n)	→ 59
Switch status 1 to n (0461–1 to n)	→ 60

Output freq. 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 121), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Pulse output 1 to n

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

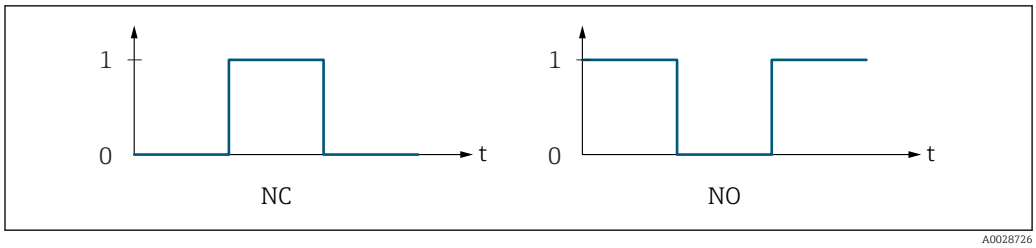
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 121) parameter.

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

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



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

The output behavior can be reversed via the **Invert outp.sig.** parameter (→ 138) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 125)) can be configured.

Switch status 1 to n

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 121).

Description Displays the current switch status of the status output.

User interface
- Open
- Closed

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

"Relay output 1 to n" submenu

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

▶ **Relay output 1 to n**	
Switch status (0801–1 to n)	→ 61
Switch cycles (0815–1 to n)	→ 61
Max. cycles no. (0817–1 to n)	→ 61

Switch status

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

Description Displays the current status of the relay output.

User interface
- Open
- Closed

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

Switch cycles

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

Description Displays all the switch cycles performed.

User interface Positive integer

Max. cycles no.

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

Description Displays the maximum number of guaranteed switch cycles.

User interface Positive integer

"Double pulse output" submenu

Navigation Expert → Sensor → Measured val. → Output values → Double pulse out

▶ **Double pulse out**	
Pulse output (0987)	→ 📄 62

Pulse output

Navigation	Expert → Sensor → Measured val. → Output values → Double pulse out → Pulse output (0987)
Description	Displays the pulse frequency of the double pulse output which is currently output.
User interface	Positive floating-point number
Additional information	For a detailed description and example: **Pulse output** parameter (→ 59)

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units

▶ System units	
Volume flow unit (0553)	→ 63
Volume unit (0563)	→ 65
Cor.volflow unit (0558)	→ 66
Corr. vol. unit (0575)	→ 66
Mass flow unit (0554)	→ 67
Mass unit (0574)	→ 68
Velocity unit (0566)	→ 68
Temperature unit (0557)	→ 69
Pressure unit (0564)	→ 69
Density unit (0555)	→ 70
Energy unit (0559)	→ 70
Dyn. visc. unit (0577)	→ 71
Cal. value unit (0552)	→ 71
Energy flow unit (0565)	→ 72
Length unit (0551)	→ 72

SpecHeatCapaUnit (0604)	→ 📄 73
Date/time format (2812)	→ 📄 73

Volume flow unit

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

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

Selection

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

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

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

Additional information

Result

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

Selection

For an explanation of the abbreviated units: → 243

Customer-specific units

The unit for the customer-specific volume is specified in the **Volume text** parameter.

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
- $/cm^3$
- dm^3
- $/dm^3$
- m^3
- $/m^3$
- ml
- /ml
- l
- /l
- hl
- /hl
- Ml Mega
- /Ml

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

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

Factory setting

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

Additional information

Selection

For an explanation of the abbreviated units: → 243

Cor.volflow unit

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

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

Selection

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

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

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

Factory setting

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

Additional information

Result

The selected unit applies for:
Correct.vol.flow (→ 50)

Selection

For an explanation of the abbreviated units: → 243

Corr. vol. unit

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

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

Selection

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

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

Imperial units
- Sgal (imp)
- /Sgal (imp)

Factory setting

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

Additional information

Selection

For an explanation of the abbreviated units: → 243

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

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

Factory setting

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

Additional information

Result

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

Selection

For an explanation of the abbreviated units: → 243

Mass unit

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

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

Selection

SI units	*US units*
▪ g	▪ oz
▪ /g	▪ /oz
▪ kg	▪ lb
▪ /kg	▪ /lb
▪ t	▪ STon
▪ /t	▪ /STon

Factory setting Country-specific:
- kg
- lb

Additional information *Selection*

For an explanation of the abbreviated units: → 243

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 (→ 49)
- Sound velocity (→ 48)
- Maximum value
- Minimum value

Selection

For an explanation of the abbreviated units: → 243

Temperature unit

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

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

Selection

SI units	*US units*
▪ °C	▪ °F
▪ K	▪ °R

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

Additional information *Result*

The selected unit applies for:
Temperature (→ 49)

Selection

For an explanation of the abbreviated units: → 243

Pressure unit

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

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

Selection

SI units	*US units*
▪ MPa	psi
▪ kPa	
▪ Pa	
▪ bar	

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

Additional information *Result*

The unit is taken from:
Process pressure parameter (5640)

Selection

For an explanation of the abbreviated units: → 243

Density unit

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

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

Selection

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

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

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

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

Additional information *Selection*

For an explanation of the abbreviated units: → 243

Energy unit

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

Description Use this function to select the unit for energy.

Selection

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

Imperial units
- Btu
- MBtu
- MMBtu

Factory setting Country-specific:
- kWh
- Btu

Additional information *Selection*

For an explanation of the abbreviated units: → 243

Dyn. visc. unit

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

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

Selection

SI units
- cP
- mPa s
- Pa s
- P

Factory setting Pa s

Additional information

Result

The selected unit applies for:
Dynam. viscosity parameter (gases)

Additional information

Selection

For an explanation of the abbreviated units: → 243

Cal. value unit

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

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

Selection

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

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

Factory setting

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

Additional information

Result

The selected unit applies for:
- **Calorific value** parameter (→ 49)
- **Wobbe index** parameter (→ 50)

Selection

For an explanation of the abbreviated units: → 243

Energy flow unit

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

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

Selection

SI units
- kW
- MW
- kJ/s
- kJ/min
- kJ/h
- kJ/d
- MJ/h
- MJ/d
- kcal/s
- kcal/min
- kcal/h
- kcal/d

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

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

Additional information *Selection*

For an explanation of the abbreviated units: → 243

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
- m
- mm
- µm

US units
- ft
- in

Factory setting Country-specific:
- mm
- in

Additional information *Selection*

For an explanation of the abbreviated units: → 243

SpecHeatCapaUnit

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

Prerequisite The following conditions are met:
Selected medium:
The **User-spec. gas** option is selected in the **Select gas type** parameter parameter.

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

Selection

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

Factory setting J/(kgK)

Additional information *Result*

The selected unit applies for:
Spec. heat cap. parameter

Selection

For an explanation of the abbreviated units: → 243

Date/time format

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

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

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

Factory setting dd.mm.yy hh:mm

Additional information *Selection*

For an explanation of the abbreviated units: → 243

3.2.3 "Process param." submenu

Navigation Expert → Sensor → Process param.

▶ **Process param.**	
Flow override (1839)	→ 74
Flow damping (1802)	→ 74
Gas prop. damp. (1888)	→ 75
Temp. damping (1803)	→ 76
Pressure damping (1889)	→ 76
▶ **Low flow cut off**	→ 76

Flow override

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

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

Selection
- Off
- On

Factory setting Off

Additional information *Description*

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

The **Flow override** option can also be activated in the **Status input** submenu: **Assign stat.inp.** parameter (→ 105).

Flow damping

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

Description Use this function to enter a time constant for flow damping (PT1 element). Reduction of the variability of the flow measured value (in relation to interference). For this purpose,

the depth of the flow filter is adjusted: when the filter setting increases, the reaction time of the device also increases.

User entry 0 to 999.9 s

Factory setting 1 s

Additional information *Description*

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

User entry

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

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

Result

The damping affects the following variables of the device:
- Outputs → 106
- Low flow cut off → 76
- Totalizers → 193

Gas prop. damp.

Navigation Expert → Sensor → Process param. → Gas prop. damp. (1888)

Description Use this function to enter the time constant for gas properties 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 1 s

Additional information *Result*

The damping has an effect on the following outputs:
- Correct.vol.flow (→ 50)
- Density (→ 51)
- Dry CH4 in % (→ 50)
- Dynam. viscosity (→ 52)
- Calorific value (→ 52)
- Wobbe index (→ 50)
- Energy flow (→ 49)

2) Proportional behavior with first-order lag

Temp. damping

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

Description Enter the value for damping the temperature value and the sound velocity.

User entry 0 to 999.9 s

Factory setting 10 s

Additional information *Description*

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

User entry

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

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

Pressure damping

Navigation Expert → Sensor → Process param. → Pressure damping (1889)

Description Enter value for damping the pressure.

User entry 0 to 999.9 s

Factory setting 0 s

"Low flow cut off" submenu

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

▶ Low flow cut off	
Assign variable (1837)	→ 77
On value (1805)	→ 77
Off value (1804)	→ 77

3) Proportional behavior with first-order lag

Assign variable

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

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

Selection
- Off
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Energy flow *

Factory setting Volume flow

On value

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 77).

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 Depends on country and nominal diameter→ 240

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign variable** parameter (→ 77).

Off value

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 77).

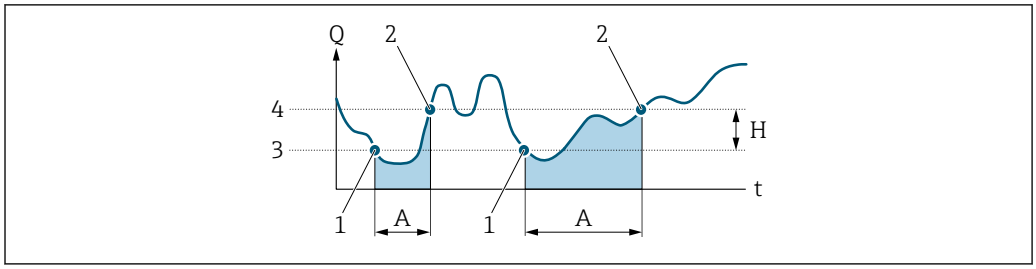
Description Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value→ 77.

User entry 0 to 100.0 %

Factory setting 50 %

* Visibility depends on order options or device settings

Additional information *Example*



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

3.2.4 "Measurement mode" submenu

Navigation Expert → Sensor → Measurement mode

▶ **Measurement mode**	
Select gas type (3109)	→ 78
Density calc. (3102)	→ 79
Enthalpy calc. (3103)	→ 79
Ref. conditions (3155)	→ 79
Ref. pressure (3146)	→ 80
Ref. temperature (3147)	→ 80
Ref. comb. temp. (3165)	→ 80
▶ **Medium property**	→ 81

Select gas type

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

Description Select measured gas type.

Selection
- Single gas *
- Gas mixture *
- Coal gas/bio gas *
- Natur.gas (std) *
- Nat.gas (s.vel.) *
- User-spec. gas

Factory setting User-spec. gas

Density calc.

Navigation Expert → Sensor → Measurement mode → Density calc. (3102)

Description Select the norm the density calculation is based on.

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

Factory setting ISO 12213- 3

Cal.value calc.

Navigation Expert → Sensor → Measurement mode → Cal.value calc. (3103)

Description Select the standard used for calculating the calorific value.

Selection
- AGA5
- ISO 6976

Factory setting ISO 6976

Ref. conditions

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

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

Selection
- 1013.25hPa, 0°C
- 1013.25hPa, 15°C
- 1013.25hPa, 20°C
- 1013.25hPa, 25°C
- 1000.00hPa, 0°C
- 1000.00hPa, 15°C

* Visibility depends on order options or device settings

- 1000.00hPa, 20°C
- 1000.00hPa, 25°C
- 14.696Psi, 59°F
- 14.696Psi, 60°F
- 14.730Psi, 60°F
- Others

Factory setting 1013.25hPa, 0°C

Ref. pressure

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

Prerequisite The **Others** option is selected in the **Ref. conditions** parameter (→ 79).

Description Select reference conditions for the corrected volume flow.

User entry 0 to 250 bar

Factory setting 1.01325 bar

Ref. temperature

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

Prerequisite The **Others** option is selected in the **Ref. conditions** parameter (→ 79).

Description Select reference conditions for the corrected volume flow.

User entry −200 to 450 °C

Factory setting 0 °C

Ref. comb. temp.

Navigation Expert → Sensor → Measurement mode → Ref. comb. temp. (3165)

Description Select ref. temp. (reference combustion temperature) for calculating the gas energy value.

Selection
- 0 °C
- 15 °C
- 20 °C
- 25 °C
- 60 °F

Factory setting 25 °C

"Medium properties" submenu

Navigation Expert → Sensor → Measurement mode → Medium property

▶ Medium property	
Calorif.val.type (3101)	→ 81
Humidity type (3156)	→ 82
Ref.density (3144)	→ 82
Ref. GrossCalVal (3145)	→ 82
Ref. Z-factor (3148)	→ 82
Relative density (3149)	→ 83
Spec. heat cap. (3162)	→ 83
Calorific value (3105)	→ 83
Z-factor (3108)	→ 83
Dynam. viscosity (3106)	→ 84
Add. gas compon. (3154)	→ 84
St.vol.fl. cal. (3164)	→ 84

Calorif.val.type

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

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

Selection
- GrossCalorValVol
- NetCalorValVol

Factory setting GrossCalorValVol

Humidity type

Navigation Expert → Sensor → Measurement mode → Medium property → Humidity type (3156)

Description Select the input value for the gas humidity.

Selection
- Rel. humidity
- Water fraction
- Dew point

Factory setting Depends on the selected gas type.

Ref.density

Navigation Expert → Sensor → Measurement mode → Medium property → Ref.density (3144)

Description Enter fixed value for reference density.

User entry 0.01 to 100 kg/m³

Factory setting 1 kg/m³

Ref. GrossCalVal

Navigation Expert → Sensor → Measurement mode → Medium property → Ref. GrossCalVal (3145)

Description Enter the reference gross calorific value of the gas.

User entry 0 to 1 000 MJ/Nm³

Factory setting 40 MJ/Nm³

Ref. Z-factor

Navigation Expert → Sensor → Measurement mode → Medium property → Ref. Z-factor (3148)

Description Enter 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 (3149)

Description Enter the relative density of the gas.

User entry 0.5 to 1.0

Factory setting 0.58

Spec. heat cap.

Navigation Expert → Sensor → Measurement mode → Medium property → Spec. heat cap. (3162)

Description Enter the specific heat capacity of the medium.

User entry 0 to 50 000 J/(kgK)

Factory setting Depends on the selected gas type.

Calorific value

Navigation Expert → Sensor → Measurement mode → Medium property → Calorific value (3105)

Description Enter gross calorific value to calculate the energy flow.

User entry 0 to 1000 MJ/Nm³

Factory setting 40 MJ/Nm³

Z-factor

Navigation Expert → Sensor → Measurement mode → Medium property → Z-factor (3108)

Description Enter real gas constant Z for gas under operation conditions.

User entry 0.1 to 2.0

Factory setting 1

Dynam. viscosity

Navigation Expert → Sensor → Measurement mode → Medium property → Dynam. viscosity (3106)

Description Value of the dynamic viscosity for user-specific gas.

User entry 0 to 0.001 Pa s

Factory setting 0.000015 Pa s

Add. gas compon.

Navigation Expert → Sensor → Measurement mode → Medium property → Add. gas compon. (3154)

Prerequisite The **Coal gas/bio gas** option is selected in the **Select gas type** parameter (→ 78).

Description Specify the additional gas component of the gas.

Selection
- None
- Hydrogen H2
- Hydrog.sulf. H2S

Factory setting None

St.vol.fl. cal.

Navigation Expert → Sensor → Measurement mode → Medium property → St.vol.fl. cal. (3164)

Prerequisite The **Coal gas/bio gas** option is selected in the **Select gas type** parameter (→ 78).

Description Setting specifying how the corrected volume flow is calculated for wet coal gas/biogas.

Selection
- Wet gas
- Dry gas

Factory setting Dry gas

3.2.5 "External comp." submenu

Navigation Expert → Sensor → External comp.

▶ External comp.	
Pressure compen. (3023)	→ 85
Pressure (3022)	→ 85
Ext. press.meas. (3033)	→ 86
Atmosph. press. (3024)	→ 86
Temp. compensat. (3025)	→ 86
Medium temp. (2925)	→ 87

Pressure compen.

Navigation Expert → Sensor → External comp. → Pressure compen. (3023)

Description Select pressure compensation type.

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

Factory setting Fixed value

Pressure

Navigation Expert → Sensor → External comp. → Pressure (3022)

Description Enter fixed value for the process pressure.

User entry 0 to 250 bar

Factory setting 5 bar

* Visibility depends on order options or device settings

Ext. press.meas.

Navigation Expert → Sensor → External comp. → Ext. press.meas. (3033)

Description Select pressure type for external pressure measurement.

Selection
- Abs. pressure
- Gauge pressure

Factory setting Abs. pressure

Atmosph. press.

Navigation Expert → Sensor → External comp. → Atmosph. press. (3024)

Prerequisite The **External value** option or **Current input 1...3** option is selected in the **Pressure compen.** parameter (→ 85).

The **Gauge pressure** option is selected in the **Ext. press.meas.** parameter (→ 86).

Description Enter atmospheric pressure value to be used for pressure correction.

User entry 0.7 to 1.1 bar

Factory setting 1.01325 bar

Temp. compensat.

Navigation Expert → Sensor → External comp. → Temp. compensat. (3025)

Description Select temperature mode for temperature compensation.

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

Factory setting Fixed value

* Visibility depends on order options or device settings

Medium temp.

Navigation Expert → Sensor → External comp. → Medium temp. (2925)

Description Enter a fixed value for process temperature.

User entry −50 to 150 °C

Factory setting 20 °C

3.2.6 "Sensor adjustm." submenu

Navigation Expert → Sensor → Sensor adjustm.

▶ **Sensor adjustm.**	
Install. direct. (1809)	→ 87
Ref. pressure (5670)	→ 88
Press. cell adj. (5669)	→ 88
p cell offs.val (5671)	→ 88
▶ **Variable adjust**	→ 88

Install. direct.

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

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

Selection
- In arrow direct.
- Against arrow

Factory setting In arrow direct.

Additional information *Description*

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

Ref. pressure

Navigation Expert → Sensor → Sensor adjustm. → Ref. pressure (5670)

Description Enter the reference pressure for calculating the offset for the internal pressure measuring cell.

User entry Positive floating-point number

Factory setting 1.01325 bar

Press. cell adj.

Navigation Expert → Sensor → Sensor adjustm. → Press. cell adj. (5669)

Description Select process for the offset adjustment for the integrated pressure measurement.

Selection
- Yes
- Discard offset
- Cancel

Factory setting Cancel

p cell offs.val

Navigation Expert → Sensor → Sensor adjustm. → p cell offs.val (5671)

Description Displays the offset value currently used by the device to correct the pressure measured value that is measured internally.

User interface Signed floating-point number

Factory setting 0 bar

"Process variable adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust

▶ **Variable adjust**		
	Vol. flow offset (1831)	→ 90
	Vol. flow factor (1832)	→ 90

Vol. flow offset

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

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

User entry Signed floating-point number

Factory setting 0 m^3/h

Additional information *Description*

Corrected value = (factor × value) + offset

Vol. flow factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Corr. vol offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol offset (1855)

Description Use this function to enter the zero point shift for the temperature trim. The temperature unit on which the shift is based is 1 K.

User entry Signed floating-point number

Factory setting 0 Sm^3/h

Additional information *Description*

Corrected value = (factor × value) + offset

Corr. vol factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol factor (1856)

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

User entry Positive floating-point number

Factory setting 1

Mass flow offset

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

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

User entry Signed floating-point number

Factory setting 0 kg/h

Additional information *Description*

Corrected value = (factor × value) + offset

Mass flow factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

S. veloc. offset

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

Description Use this function to enter the zero point shift for the sound velocity trim. The sound velocity unit on which the shift is based is m/s.

User entry Signed floating-point number

Factory setting 0 m/s

Additional information *Description*

Corrected value = (factor × value) + offset

S. veloc. factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Temp. offset

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

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

User entry Signed floating-point number

Factory setting 0 K

Additional information *Description*

Corrected value = (factor × value) + offset

Temp. factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Pressure offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Pressure offset (1881)

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

User entry Signed floating-point number

Factory setting 0 bar

Additional information *Description*

Corrected value = (factor × value) + offset

Pressure factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Pressure factor (1882)

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

User entry Positive floating-point number

Factory setting 1

Methane offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Methane offset (1873)

Description Use this function to enter the zero point shift for the methane fraction trim.

User entry Signed floating-point number

Factory setting 0 %

Methane factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Methane factor (1874)

Description Use this function to enter a quantity factor for the methane fraction.

User entry Positive floating-point number

Factory setting 1

Molar mass offs.

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Molar mass offs. (1875)

Description Use this function to enter the zero point shift for the molar mass trim.

User entry Signed floating-point number

Factory setting 0 g/mol

Mol mass factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Mol mass factor (1876)

Description Use this function to enter a quantity factor for the molar mass.

User entry Positive floating-point number

Factory setting 1

Density offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Density offset (1877)

Description Use this function to enter the zero point shift for the density trim.

User entry Signed floating-point number

Factory setting 0 kg/m³

Density factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Density factor (1878)

Description Use this function to enter a quantity factor for the density.

User entry Positive floating-point number

Factory setting 1

Dyn.visc. offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Dyn.visc. offset (1898)

Description Use this function to enter the zero point shift for the dynamic viscosity trim.

User entry Signed floating-point number

Factory setting 0 Pa s

Dyn.visc. factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Dyn.visc. factor (1897)

Description Use this function to enter a quantity factor for the dynamic viscosity.

User entry Positive floating-point number

Factory setting 1

Cal. val. offs.

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Cal. val. offs. (1899)

Description Use this function to enter the zero point shift for the calorific value trim.

User entry Signed floating-point number

Factory setting 0 MJ/Nm³

Cal. val. fact.

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Cal. val. fact. (1900)

Description Use this function to enter a quantity factor for the calorific value.

User entry Positive floating-point number

Factory setting 1

Wobbe index offs

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Wobbe index offs (1879)

Description Use this function to enter the zero point shift for the Wobbe index trim.

User entry Signed floating-point number

Factory setting 0 MJ/Nm³

Additional information *Description*

Corrected value = (factor × value) + offset

Wobbe index fact

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Wobbe index fact (1880)

Description Use this function to enter a quantity factor for the Wobbe index factor.

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

En. flow offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → En. flow offset (1866)

Description Use this function to enter the zero point shift for the energy flow trim. The energy flow unit on which the shift is based is 1 W.

User entry Signed floating-point number

Factory setting 0 kW

Additional information *Description*

Corrected value = (factor × value) + offset

En. flow factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → En. flow factor (1867)

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

3.2.7 "Calibration" submenu

Navigation Expert → Sensor → Calibration

▶ Calibration		
	Cal. factor (2920)	→ 98

Zero point (2921)	→ 📄 98
Nominal diameter (2807)	→ 📄 98

Cal. factor

Navigation Expert → Sensor → Calibration → Cal. factor (2920)

Description Displays the current calibration factor for the sensor.

User interface Signed floating-point number

Factory setting 1

Zero point

Navigation Expert → Sensor → Calibration → Zero point (2921)

Description Displays the current zero point correction value for the sensor.

User interface Signed floating-point number

Factory setting 0

Nominal diameter

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

Description Displays the nominal diameter of the sensor.

User interface DNxx / x"

Factory setting Depends on the size of the sensor

Additional information *Description*

The value is also specified on the sensor nameplate.

3.3 "I/O configuration" submenu

Navigation Expert → I/O config.

▶ I/O config.	
I/O 1 to n terminals (3902–1 to n)	→ 99
I/O 1 to n info (3906–1 to n)	→ 99
I/O 1 to n type (3901–1 to n)	→ 100
Apply I/O config (3907)	→ 100
I/O alterat.code (2762)	→ 101

I/O 1 to n terminals

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

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

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

I/O 1 to n info

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

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

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

* Visibility depends on order options or device settings

Additional information

"Not plugged" option

The I/O module is not plugged in.

"Invalid" option

The I/O module is not plugged correctly.

"Not configurable" option

The I/O module is not configurable.

"Configurable" option

The I/O module is configurable.

"Fieldbus" option

The I/O module is configured for HART.

I/O 1 to n type

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

Prerequisite

For the following order code:
- "Output; input 2", option **D** "Configurable I/O initial setting off"
- "Output; input 3", option **D** "Configurable I/O initial setting off"
- "Output; input 4", option **D** "Configurable I/O initial setting off"

Description

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

Selection

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

Factory setting

Off

Apply I/O config

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

Description

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

Selection

- No
- Yes

Factory setting

No

* Visibility depends on order options or device settings

I/O alterat.code

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

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

User entry Positive integer

Factory setting 0

Additional information *Description*

The I/O configuration is changed in the **I/O type** parameter (→ 100).

3.4 "Input" submenu

Navigation Expert → Input

▶ **Input**	
▶ **Current input 1 to n**	→ 101
▶ **Status input 1 to n**	→ 104

3.4.1 "Current input 1 to n" submenu

Navigation Expert → Input → Current input 1 to n

▶ **Current input 1 to n**	
Terminal no. (1611–1 to n)	→ 102
Signal mode (1610–1 to n)	→ 102
Current span (1605–1 to n)	→ 102
0/4 mA value (1606–1 to n)	→ 103
20 mA value (1607–1 to n)	→ 103
Failure mode (1601–1 to n)	→ 103
Failure value (1602–1 to n)	→ 104

Terminal no.

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

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

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

Additional information *"Not used" option*

The current input module does not use any terminal numbers.

Signal mode

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

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

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

Selection
- Passive
- Active

Factory setting Active

Current span

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

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

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

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

* Visibility depends on order options or device settings

Additional information *Examples*

Sample values for the current range: **Current span** parameter (→ 109)

0/4 mA value

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Current input behavior*

The current input behaves differently depending on the settings configured in the following parameters:
- Current span (→ 102)
- Failure mode (→ 103)

Configuration examples

Pay attention to the configuration examples for **4 mA value** parameter (→ 110).

20 mA value

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

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Configuration examples*

Pay attention to the configuration examples for **4 mA value** parameter (→ 110).

Failure mode

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

Description Use this function to select the input behavior when measuring a current outside the configured **Current span** parameter (→ 102).

Selection
- Alarm
- Last valid value
- Defined value

Factory setting Alarm

Additional information *Options*
- Alarm
  An error message is set.
- Last valid value
  The last valid measured value is used.
- Defined value
  A user-defined measured value is used (**Failure value** parameter (→ 104)).

Failure value

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

Prerequisite In the **Failure mode** parameter (→ 103), the **Defined value** option is selected.

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

User entry Signed floating-point number

Factory setting 0

3.4.2 "Status input 1 to n" submenu

Navigation Expert → Input → Status input 1 to n

▶ Status input 1 to n	
Terminal no. (1358–1 to n)	→ 105
Assign stat.inp. (1352–1 to n)	→ 105
Val.stat.inp. (1353–1 to n)	→ 106
Active level (1351–1 to n)	→ 106
Response time (1354–1 to n)	→ 106

Terminal no.

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

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

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

Additional information *"Not used" option*

The status input module does not use any terminal numbers.

Assign stat.inp.

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

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

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

Factory setting Off

Additional information *Selection*

- Off
  The status input is switched off.
- Reset totaliz. 1…3
  The individual totalizers are reset.
- Reset all tot.
  All totalizers are reset.
- Flow override
  The Flow override (→ 74) is activated.

Note on the Flow override (→ 74):
- The Flow override (→ 74) is enabled as long as the level is at the status input (continuous signal).
- All other assignments react to a change in level (pulse) at the status input.

* Visibility depends on order options or device settings

Val.stat.inp.

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

Description Displays the current input signal level.

User interface
- High
- Low

Active level

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

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

Selection
- High
- Low

Factory setting High

Response time

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

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

User entry 5 to 200 ms

Factory setting 50 ms

3.5 "Output" submenu

Navigation Expert → Output

▶ **Output**		
	▶ **Curr.output 1 to n**	→ 107
	▶ **PFS output 1 to n**	→ 119

▶ **Relay output 1 to n**	→ 139
▶ **Double pulse out**	→ 145

3.5.1 "Current output 1 to n" submenu

Navigation Expert → Output → Curr.output 1 to n

▶ **Curr.output 1 to n**	
Terminal no. (0379–1 to n)	→ 107
Signal mode (0377–1 to n)	→ 108
Assign curr. 1 to n (0359–1 to n)	→ 108
Current span (0353–1 to n)	→ 109
Fixed current (0365–1 to n)	→ 110
0/4 mA value (0367–1 to n)	→ 110
20 mA value (0372–1 to n)	→ 112
Measuring mode (0351–1 to n)	→ 113
Damping out. 1 to n (0363–1 to n)	→ 117
Failure mode (0364–1 to n)	→ 118
Failure current (0352–1 to n)	→ 119
Output curr. 1 to n (0361–1 to n)	→ 119
Measur. curr. 1 to n (0366–1 to n)	→ 119

Terminal no.

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

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

User interface

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

Additional information

"Not used" option

The current output module does not use any terminal numbers.

Signal mode

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

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

Selection

- Passive
- Active

Factory setting Active

Assign curr. 1 to n

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

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

Selection

- Off *
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.

* Visibility depends on order options or device settings

Factory setting Volume flow

Current span

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

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

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

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

Additional information *Description*

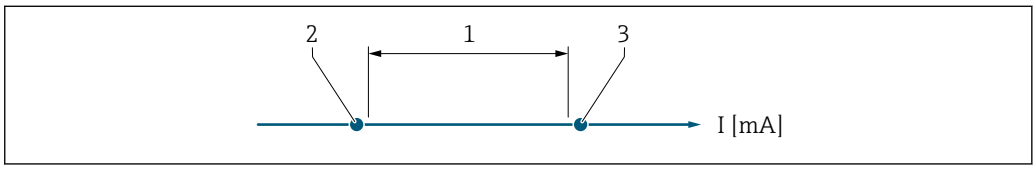
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 118).
- If the measured value is outside the measuring range, the diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.
- The measuring range is specified via the **0/4 mA value** parameter (→ 110) and **20 mA value** parameter (→ 112).

"Fixed current" option

- This option is used for a HART Multidrop network.
- It can only be used for the 4...20 mA HART current output (current output 1).
- The current value is set via the **Fixed current** parameter (→ 110).

Example

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



A0034351

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

Selection

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

Selection	1	2	3
4...20 mA	4 to 20.5 mA	< 3.6 mA	> 21.95 mA
0...20 mA	0 to 20.5 mA	< 0 mA	> 21.95 mA

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

Fixed current

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

Prerequisite The **Fixed current** option is selected in the **Current span** parameter (→ 109).

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

User entry 0 to 22.5 mA

Factory setting 22.5 mA

0/4 mA value

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

Prerequisite In the **Current span** parameter (→ 109), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

User entry Signed floating-point number

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

Additional information *Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign curr.** parameter (→ 108). In addition, the value can be greater than or

smaller than the value assigned for the 20 mA current in the **20 mA value** parameter (→ 🗎 112).

Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 🗎 108).

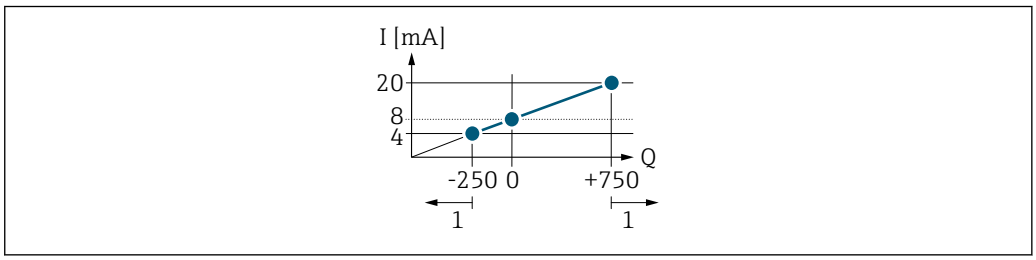
Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:
- Current span (→ 🗎 109)
- Failure mode (→ 🗎 118)

Configuration examples

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

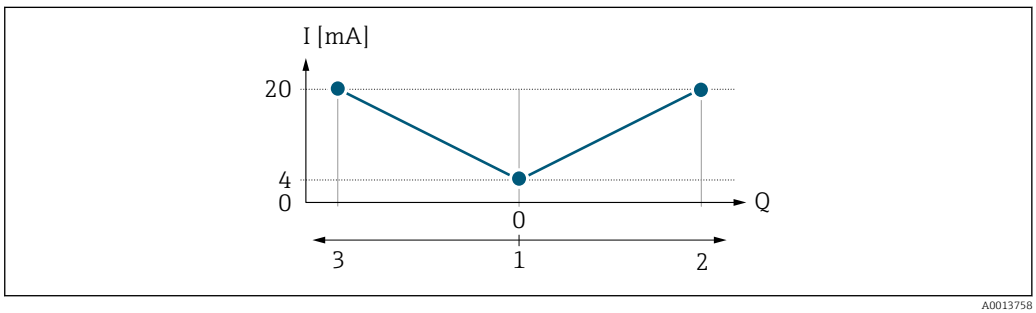
Configuration example A
Measuring mode with **Forward flow** option
- **0/4 mA value** parameter (→ 🗎 110) = not equal to zero flow (e.g. −250 m^3/h)
- **20 mA value** parameter (→ 🗎 112) = not equal to zero flow (e.g. +750 m^3/h)
- Calculated current value = 8 mA at zero flow



Q Flow
I Current
1 Measuring range is exceeded or undershot

The operational range of the measuring device is defined by the values entered for the **0/4 mA value** parameter (→ 🗎 110) and **20 mA value** parameter (→ 🗎 112). If the effective flow exceeds or falls below this operational range, the diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.

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



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

The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **0/4 mA value** parameter (→ 110) and **20 mA value** parameter (→ 112) must have the same sign. The value for the **20 mA value** parameter (→ 112) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 112) (e.g. forward flow).

Configuration example C
Measuring mode with **Rev. flow comp.** option
If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s → 113.

20 mA value

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

Prerequisite One of the following options is selected in the **Current span** parameter (→ 109):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign curr.** parameter (→ 108). In addition, the value can be greater than or smaller than the value assigned for the 0/4 mA current in the **0/4 mA value** parameter (→ 110).

Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 108).

Example

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

If the **Forward/Reverse** option is selected in the **Measuring mode** parameter (→ 113), different signs cannot be entered for the values of the **0/4 mA value** parameter (→ 110) and **20 mA value** parameter (→ 112). The diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.

Configuration examples

Observe the configuration examples for the **0/4 mA value** parameter (→ 110).

Measuring mode

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

Prerequisite In the **Current span** parameter (→ 109), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

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

Factory setting Forward flow

Additional information *Description*

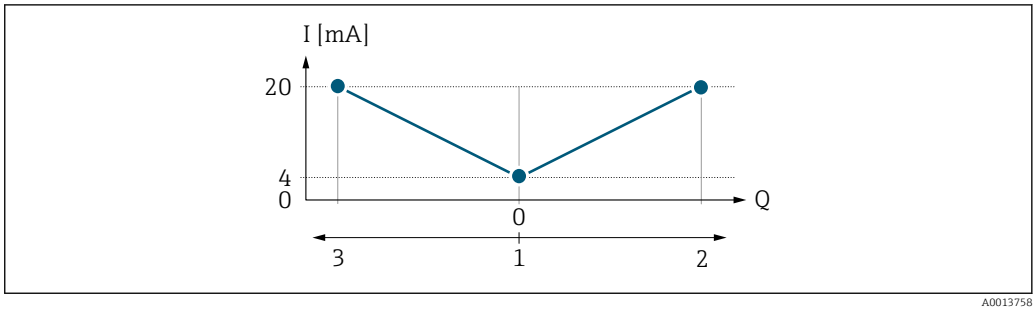
The process variable that is assigned to the current output via the **Assign curr.** parameter (→ 108) is displayed below the parameter.

"Forward flow" option

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

The flow components outside the scaled measuring range are taken into account for signal output as follows:
Both values are defined such that they are not equal to zero flow e.g.:
- 0/4 mA current value = −5 m^3/h
- 20 mA current value = 10 m^3/h

"Forward/Reverse" option



A0013758

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

* Visibility depends on order options or device settings

- The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **0/4 mA value** parameter (→ 🗎 110) and **20 mA value** parameter (→ 🗎 112) must have the same sign.
- The value for the **20 mA value** parameter (→ 🗎 112) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 🗎 112) (e.g. forward flow).

"Rev. flow comp." option

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

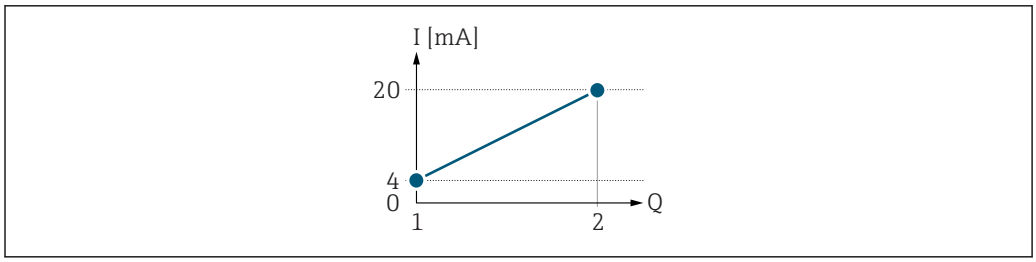
Flow values can aggregate in the buffer in the event of prolonged and unwanted fluid reverse flow. However, these flows are not taken into consideration by the current output configuration, i.e. the reverse flow is not compensated.

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

Examples of how the current output behaves

Example 1

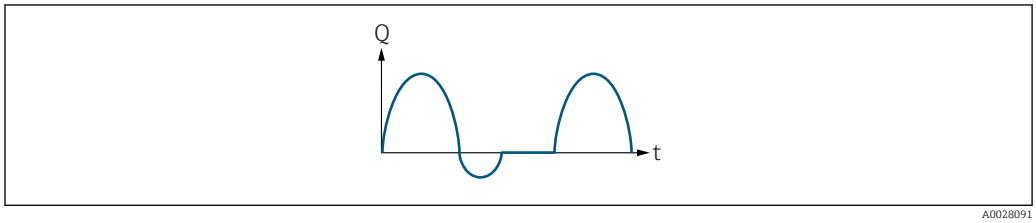
Defined measuring range: lower range value and upper range value with the **same** sign



3 Measuring range

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

With the following flow response:

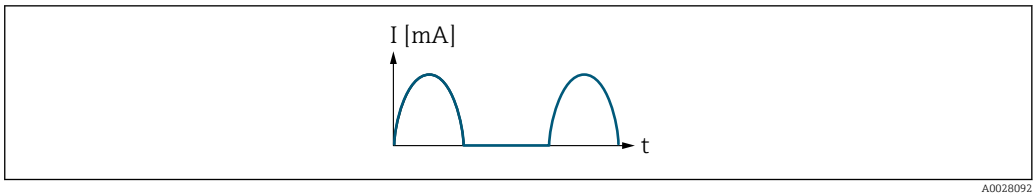


4 Flow response

Q Flow
t Time

With **Forward flow** option

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

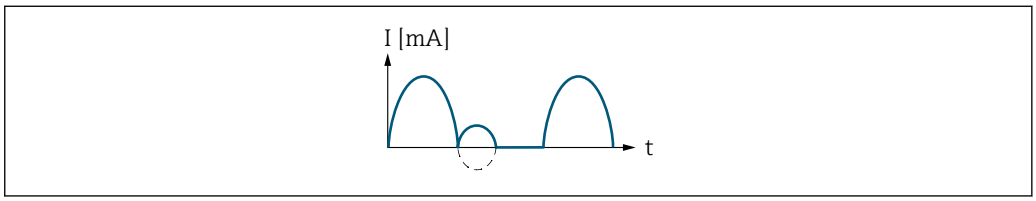


A0028092

I *Current*
t *Time*

With **Forward/Reverse** option

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

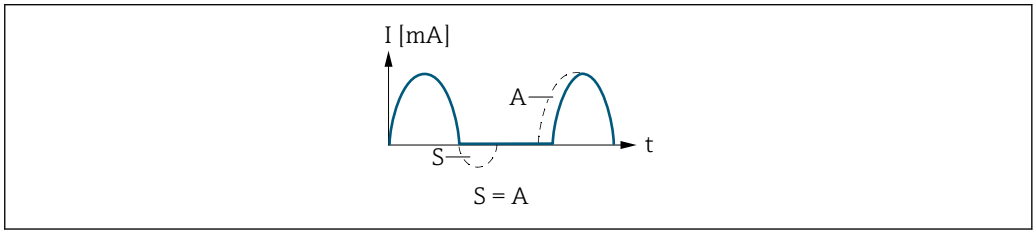


A0028093

I *Current*
t *Time*

With **Rev. flow comp.** option

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

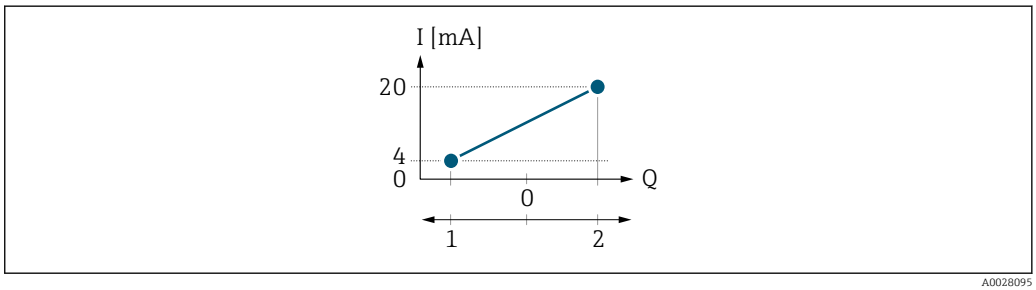


A0028094

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

Example 2

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

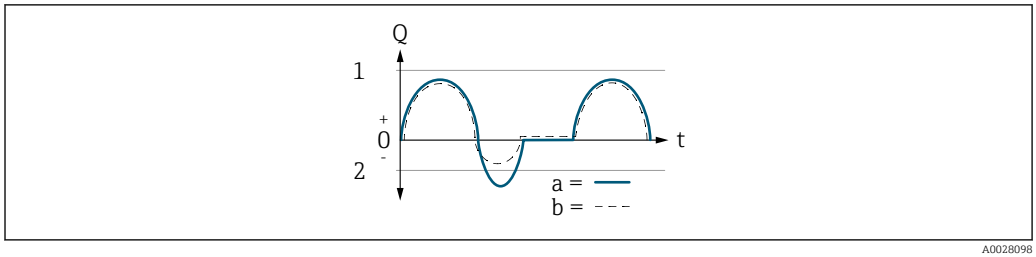


A0028095

5 *Measuring range*

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

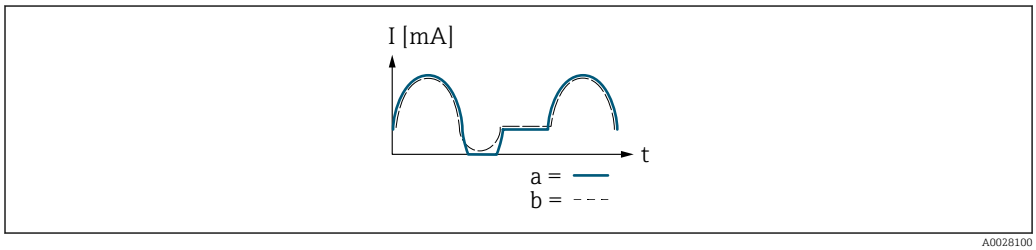
With flow a (—) outside, b (- -) inside the measuring range



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

With **Forward flow** option

- a (—): The flow components outside the scaled measuring range cannot be taken into account for signal output.
- b (- -): The current output signal is proportional to the process variable assigned.



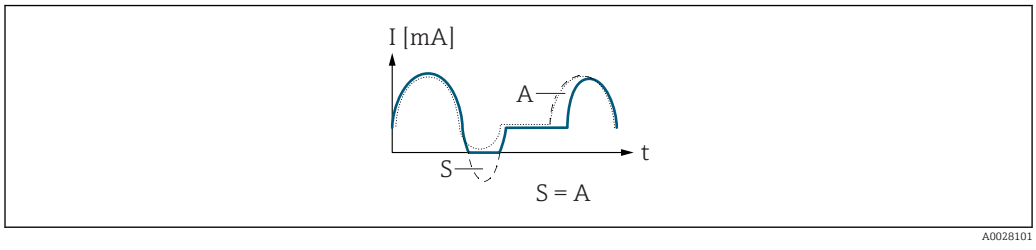
I Current
t Time

With **Forward/Reverse** option

This option is not possible in this case as the values for the **0/4 mA value** parameter (→ 📄 110) and **20 mA value** parameter (→ 📄 112) have different signs.

With **Rev. flow comp.** option

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



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

Damping out. 1 to n

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

Prerequisite A process variable is selected in the **Assign curr.** parameter (→ 108) and one of the following options is selected in the **Current span** parameter (→ 109):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

User entry 0.0 to 999.9 s

Factory setting 1.0 s

Additional information *User entry*

Use this function to enter a time constant (PT1 element [4]) for current output damping:
- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

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

Response time

Navigation Expert → Output → Curr.output 1 to n → Response time (0378–1 to n)

Prerequisite One of the following options is selected in the **Current span** parameter (→ 109):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

User interface Positive floating-point number

Additional information *Description*

The response time is made up of the time specified for the following dampings:
- Current output damping → 117
  and
- Depending on the measured variable assigned to the output.
  Flow damping

4) proportional transmission behavior with first order delay

Failure mode

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

Prerequisite A process variable is selected in the **Assign curr.** parameter (→ 108) and one of the following options is selected in the **Current span** parameter (→ 109):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

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

Factory setting Max.

Additional information

Description

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

"Min." option

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

The signal on alarm level is defined via the **Current span** parameter (→ 109).

"Max." option

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

The signal on alarm level is defined via the **Current span** parameter (→ 109).

"Last valid value" option

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

"Actual value" option

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

"Defined value" option

The current output adopts a defined measured value.

The measured value is defined via the **Failure current** parameter (→ 119).

Failure current

Navigation	Expert → Output → Curr.output 1 to n → Failure current (0352–1 to n)
Prerequisite	The **Defined value** option is selected in the **Failure mode** parameter (→ 118).
Description	Use this function to enter a fixed value that the current output adopts in the event of a device alarm.
User entry	0 to 22.5 mA
Factory setting	22.5 mA

Output curr. 1 to n

Navigation	Expert → Output → Curr.output 1 to n → Output curr. 1 to n (0361–1 to n)
Description	Displays the current value currently calculated for the current output.
User interface	3.59 to 22.5 mA

Measur. curr. 1 to n

Navigation	Expert → Output → Curr.output 1 to n → Measur. curr. 1 to n (0366–1 to n)
Description	Use this function to display the actual measured value of the output current.
User interface	0 to 30 mA

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

Navigation Expert → Output → PFS output 1 to n

▶ PFS output 1 to n	
Terminal no. (0492–1 to n)	→ 121
Signal mode (0490–1 to n)	→ 121
Operating mode (0469–1 to n)	→ 121
Assign pulse 1 to n (0460–1 to n)	→ 123

Failure mode (0486–1 to n)	→ 137
Switch status 1 to n (0461–1 to n)	→ 138
Invert outp.sig. (0470–1 to n)	→ 138

Terminal no.

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

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

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

Additional information *"Not used" option*

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

Signal mode

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

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

Selection
- Passive
- Active
- Passive NAMUR

Factory setting Passive

Operating mode

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

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

Selection
- Pulse
- Frequency
- Switch

* Visibility depends on order options or device settings

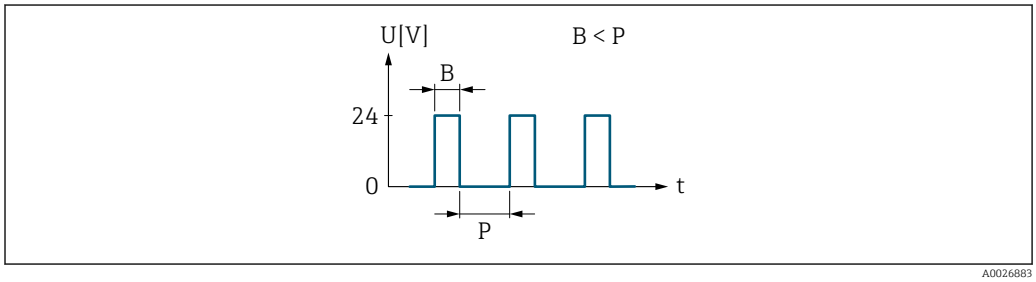
Factory setting Pulse

Additional information

"Pulse" option

Quantity-dependent pulse with configurable pulse width
- Whenever a specific volume or mass is reached (pulse value), a pulse is output, the duration of which was set previously (pulse width).
- The pulses are never shorter than the set duration.

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



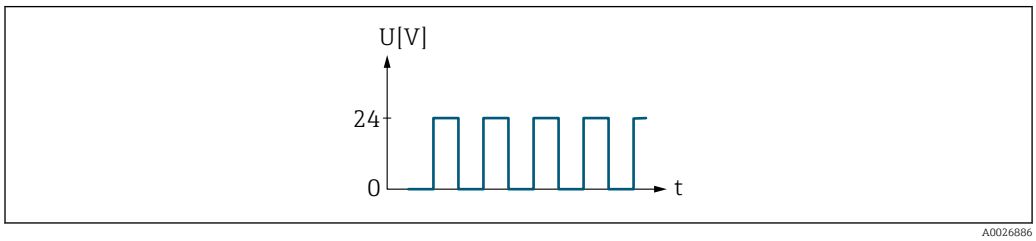
6 Quantity-proportional pulse (pulse value) with pulse width to be configured

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, mass flow, temperature, sound velocity, flow velocity, acceptance rate, flow asymmetry, turbulence, signal strength or signal-to-noise ratio.

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

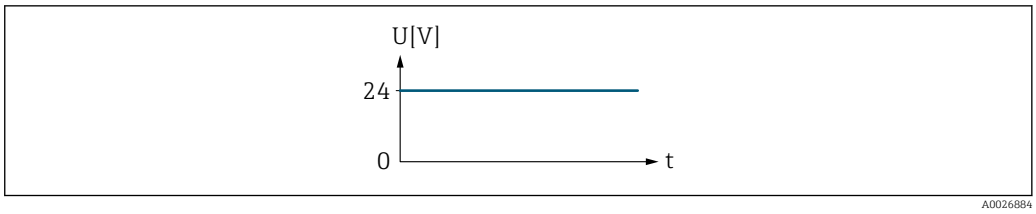


7 Flow-proportional frequency output

"Switch" option

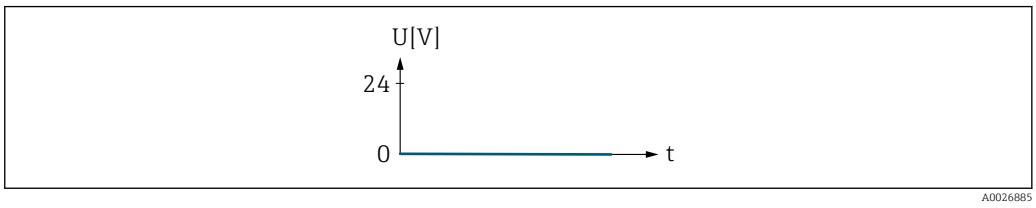
Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

Example
Alarm response without alarm



8 *No alarm, high level*

Example
Alarm response in case of alarm



9 *Alarm, low level*

Assign pulse 1 to n

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 121) parameter.

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

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

Factory setting Off

Pulse scaling

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 121) and a process variable is selected in the **Assign pulse** parameter (→ 123).

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

User entry Positive floating point number

* Visibility depends on order options or device settings

Factory setting Depends on country and nominal diameter→ 📄 240

Additional information *User entry*

Weighting of the pulse output with a quantity.

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

Pulse width

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 📄 121) and a process variable is selected in the **Assign pulse** parameter (→ 📄 123).

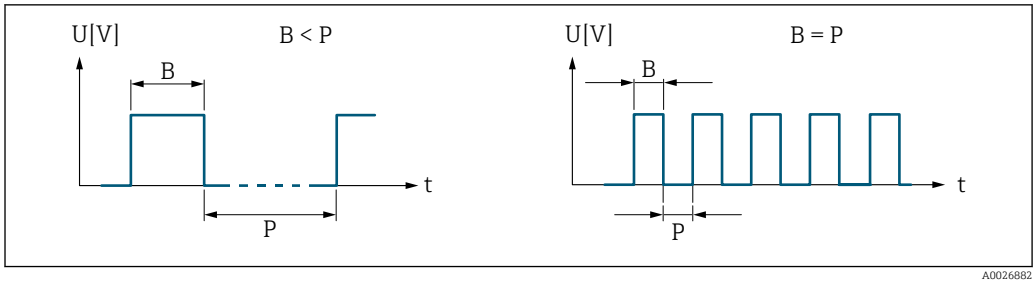
Description Use this function to enter the duration of the output pulse.

User entry 0.05 to 2 000 ms

Factory setting 100 ms

Additional information *Description*

- Define how long a pulse is (duration).
- The maximum pulse rate is defined by f_{max} = 1 / (2 × pulse width).
- The interval between two pulses lasts at least as long as the set pulse width.
- The maximum flow is defined by Q_{max} = f_{max} × pulse value.
- If the flow exceeds these limit values, the measuring device displays the diagnostic message ⚠**S443 Pulse output 1 to n**.



A0026882

B *Pulse width entered*
P *Pauses between the individual pulses*

Example

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

Measuring mode

Navigation Expert → Output → PFS output 1 to n → Measuring mode (0457–1 to n)

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

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

Factory setting Forward flow

Additional information

Selection
- Forward flow
  Positive flow is output, negative flow is not output.
- Forward/Reverse
  Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
- Reverse flow
  Negative flow is output, positive flow is not output.
- Rev. flow comp.
  The flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.

For a detailed description of the options available, see the **Measuring mode** parameter (→ 113)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 113)

Failure mode

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 121) and a process variable is selected in the **Assign pulse** parameter (→ 123).

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

Selection
- Actual value
- No pulses

Factory setting No pulses

Additional information

Description

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

Selection

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

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

Pulse output 1 to n

Navigation

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

Prerequisite

The **Pulse** option is selected in the **Operating mode** parameter (→ 121) parameter.

Description

Displays the pulse frequency currently output.

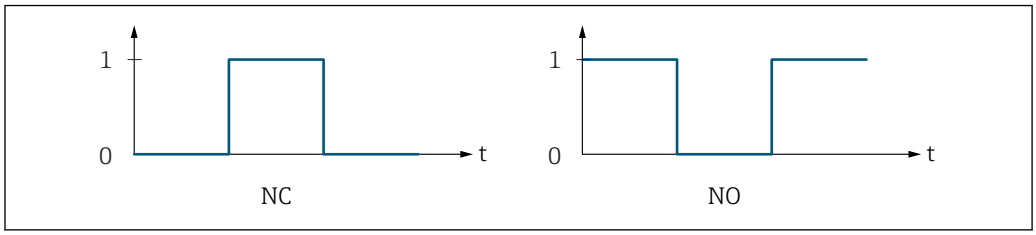
User interface

Positive floating-point number

Additional information

Description

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



A0028726

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

The output behavior can be reversed via the **Invert outp.sig.** parameter (→ 138) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 125)) can be configured.

Assign freq.

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 121).

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

Selection
- Off
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.

Factory setting Off

Min. freq. value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 121) and a process variable is selected in the **Assign freq.** parameter (→ 127).

Description Use this function to enter the minimum frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 0.0 Hz

* Visibility depends on order options or device settings

Max. freq. value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 121) and a process variable is selected in the **Assign freq.** parameter (→ 127).

Description Use this function to enter the end value frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 10 000.0 Hz

Val. at min.freq

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 121) and a process variable is selected in the **Assign freq.** parameter (→ 127).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Dependency*

The entry depends on the process variable selected in the **Assign freq.** parameter (→ 127).

Val. at max.freq

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 121) and a process variable is selected in the **Assign freq.** parameter (→ 127).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information

Description

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

Dependency

The entry depends on the process variable selected in the **Assign freq.** parameter (→ 127).

Measuring mode

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

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

Selection

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

Factory setting Forward flow

Additional information

Selection

For a detailed description of the options available, see the **Measuring mode** parameter (→ 113)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 113)

Damping out. 1 to n

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

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

User entry 0 to 999.9 s

Factory setting 0.0 s

Additional information *User entry*

Use this function to enter a time constant (PT1 element [5]) for frequency output damping:
- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

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

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

Response time

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

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 → 117
  and
- Depending on the measured variable assigned to the output.
  - Flow damping
    or
  - Temperature damping

Failure mode

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 121) and a process variable is selected in the **Assign freq.** parameter (→ 127).

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

Selection
- Actual value
- Defined value
- 0 Hz

Factory setting 0 Hz

5) proportional transmission behavior with first order delay

Additional information *Selection*

- Actual value
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure freq. (→ 131) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

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

Failure freq.

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 121) and a process variable is selected in the **Assign freq.** parameter (→ 127).

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

User entry 0.0 to 12 500.0 Hz

Factory setting 0.0 Hz

Output freq. 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 121), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Switch out funct

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 121).

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

Selection
- Off
- On
- Diag. behavior
- Limit
- Fl. direct.check
- Status

Factory setting Off

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

Assign diag. beh

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

Prerequisite
- In the **Operating mode** parameter (→ 121), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 131), the **Diag. behavior** option is selected.

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

Selection
- Alarm
- Alarm or warning
- Warning

Factory setting Alarm

Additional information

Description

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

Selection

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

Assign limit

Navigation

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

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ 121).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 131).

Description

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

Selection

- Off
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting

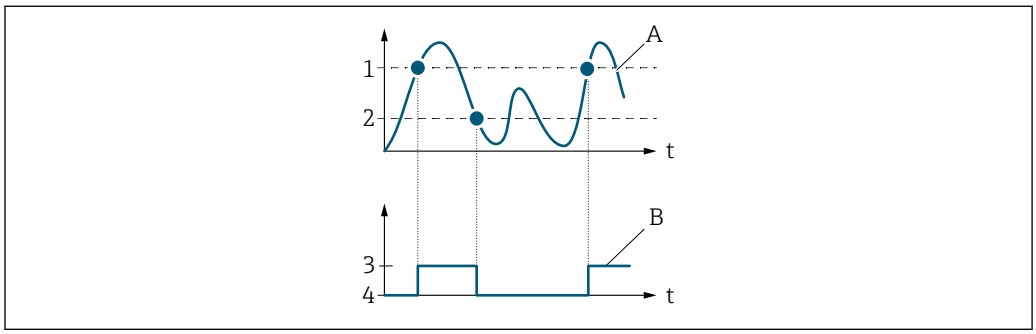
Volume flow

* Visibility depends on order options or device settings

Additional information

Description

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



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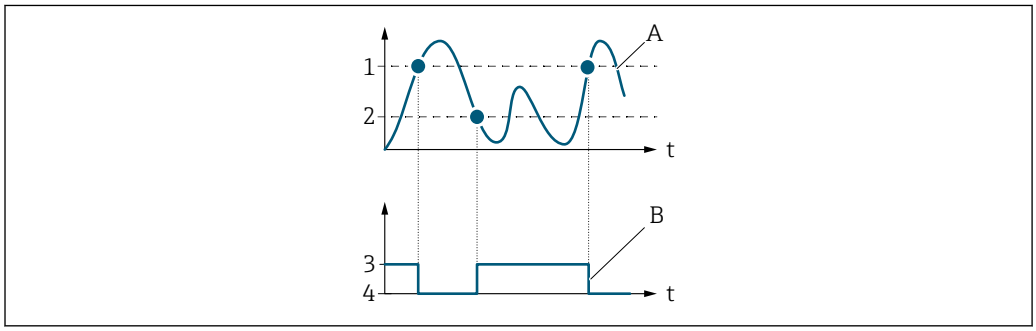
1 Switch-on value
2 Switch-off value
3 Conductive
4 Non-conductive
A Process variable
B Status output

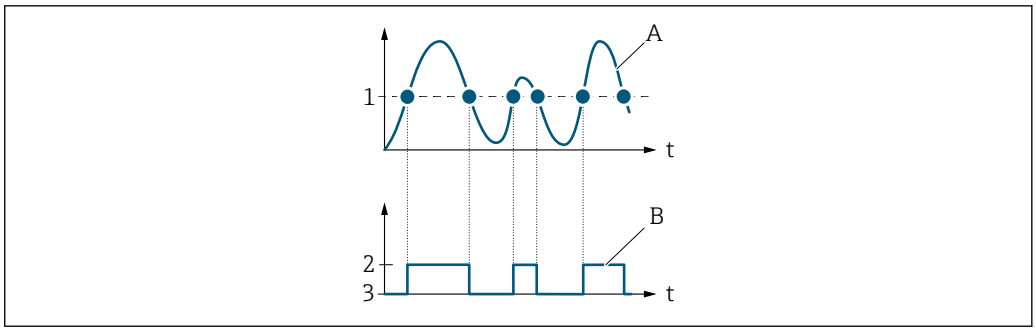
Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive



A0026892

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

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



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

Switch-on value

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 121).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 131).

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

User entry Signed floating-point number

Factory setting Country-dependent

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 (→ 133).

Switch-off value

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 121).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 131).

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

User entry Signed floating-point number

Factory setting Country-dependent

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 (→ 133).

Assign dir.check

Navigation Expert → Output → PFS output 1 to n → Assign dir.check (0484–1 to n)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 121).
- The **Fl. direct.check** option is selected in the **Switch out funct** parameter (→ 131).

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

Selection
- Off
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Energy flow *

Factory setting Volume flow

Assign status

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 121).
- The **Status** option is selected in the **Switch out funct** parameter (→ 131).

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

Selection
- Off
- Low flow cut off

Factory setting Low flow cut off

* Visibility depends on order options or device settings

Additional information *Options*

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

Switch-on delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 121).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 131).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-off delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 121).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 131).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Failure mode

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

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

Selection
- Actual status
- Open
- Closed

Factory setting Open

Additional information *Options*

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

Switch status 1 to n

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 121).

Description Displays the current switch status of the status output.

User interface

- Open
- Closed

Additional information *User interface*

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

Invert outp.sig.

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

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

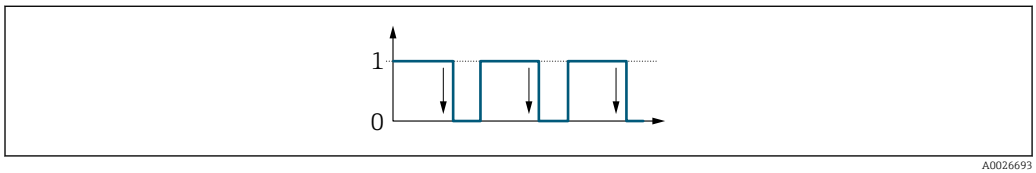
Selection

- No
- Yes

Factory setting No

Additional information *Selection*

No option (passive - negative)



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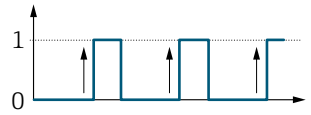
Yes option (passive - positive)



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3.5.3 "Relay output 1 to n" submenu

Navigation Expert → Output → Relay output 1 to n

▶ Relay output 1 to n	
Terminal no.	→ 139
Relay outp.func.	→ 140
Assign dir.check	→ 140
Assign limit	→ 141
Assign diag. beh	→ 142
Assign status	→ 142
Switch-off value	→ 142
Switch-off delay	→ 143
Switch-on value	→ 143
Switch-on delay	→ 144
Failure mode	→ 144
Switch status	→ 144
Powerless relay	→ 145

Terminal no.

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

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

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

Additional information

"Not used" option

The relay output module does not use any terminal numbers.

Relay outp.func.

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

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

Selection
- Closed
- Open
- Diag. behavior
- Limit
- Fl. direct.check
- Digital Output

Factory setting Closed

Additional information

Selection

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

Assign dir.check

Navigation Expert → Output → Relay output 1 to n → Assign dir.check (0808–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 140), the **Fl. direct.check** option is selected.

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

Selection
- Off
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Energy flow *

Factory setting Volume flow

Assign limit

Navigation Expert → Output → Relay output 1 to n → Assign limit (0807–1 to n)

Prerequisite The **Limit** option is selected in the **Relay outp.func.** parameter (→ 140).

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

Selection
- Off
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Volume flow

* Visibility depends on order options or device settings

Assign diag. beh

Navigation Expert → Output → Relay output 1 to n → Assign diag. beh (0806–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 140), the **Diag. behavior** option is selected.

Description Use this function to select the category of the diagnostic events that are displayed for the relay output.

Selection
- Alarm
- Alarm or warning
- Warning

Factory setting Alarm

Additional information *Description*

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

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

Assign status

Navigation Expert → Output → Relay output 1 to n → Assign status (0805–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 140), the **Digital Output** option is selected.

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

Selection
- Off
- Low flow cut off

Factory setting Off

Switch-off value

Navigation Expert → Output → Relay output 1 to n → Switch-off value (0809–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 140), the **Limit** option is selected.

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

User entry Signed floating-point number

Factory setting 0 m^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 is dependent on the process variable selected in the **Assign limit** parameter (→ 141).

Switch-off delay

Navigation Expert → Output → Relay output 1 to n → Switch-off delay (0813–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 140), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-on value

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

Prerequisite The **Limit** option is selected in the **Relay outp.func.** parameter (→ 140).

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

User entry Signed floating-point number

Factory setting 0 m^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 is dependent on the process variable selected in the **Assign limit** parameter (→ 141).

Switch-on delay

Navigation Expert → Output → Relay output 1 to n → Switch-on delay (0814–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 140), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Failure mode

Navigation Expert → Output → Relay output 1 to n → Failure mode (0811–1 to n)

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

Selection
- Actual status
- Open
- Closed

Factory setting Open

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

Switch status

Navigation Expert → Output → Relay output 1 to n → Switch status (0801–1 to n)

Description Displays the current status of the relay output.

User interface
- Open
- Closed

Additional information *User interface*

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

Powerless relay

Navigation Expert → Output → Relay output 1 to n → Powerless relay (0816–1 to n)

Description Use this function to select the quiescent state for the relay output.

Selection

- Open
- Closed

Factory setting Open

Additional information *Selection*

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

3.5.4 "Double pulse output" submenu

Navigation Expert → Output → Double pulse out

▶ Double pulse out	
Master term. no. (0981)	→ 146
Slave term. no. (0990)	→ 146
Signal mode (0991)	→ 146
Assign pulse 1 (0982–1)	→ 147
Value per pulse (0983)	→ 147
Pulse width (0986)	→ 147
Phase shift (0992)	→ 148
Measuring mode (0984)	→ 148

Failure mode (0985)	→ 📄 149
Pulse output (0987)	→ 📄 149
Invert outp.sig. (0993)	→ 📄 149

Master term. no.

Navigation Expert → Output → Double pulse out → Master term. no. (0981)

Description Displays the master terminal number for the double pulse output.

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

Additional information *"Not used" option*

The double pulse output does not use any terminal numbers.

Slave term. no.

Navigation Expert → Output → Double pulse out → Slave term. no. (0990)

Description Displays the slave terminal number for the double pulse output.

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

Additional information *"Not used" option*

The double pulse output does not use any terminal numbers.

Signal mode

Navigation Expert → Output → Double pulse out → Signal mode (0991)

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

Selection
- Passive
- Active
- Passive NAMUR

Factory setting Passive

Assign pulse 1

Navigation Expert → Output → Double pulse out → Assign pulse 1 (0982–1)

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

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

Factory setting Off

Value per pulse

Navigation Expert → Output → Double pulse out → Value per pulse (0983)

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

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 → Double pulse out → Pulse width (0986)

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

User entry 0.5 to 2 000 ms

Factory setting 0.5 ms

Additional information For a detailed description and example: **Pulse width** parameter (→ 124)

* Visibility depends on order options or device settings

Phase shift

Navigation Expert → Output → Double pulse out → Phase shift (0992)

Description Use this function to select the degree of phase shift.

Selection
- 90°
- 180°

Factory setting 90°

Additional information *Selection*
- 90°
  Phase shift by a quarter period.
- 180°
  Phase shift by a half period, which is equivalent to a phase reversal.

Measuring mode

Navigation Expert → Output → Double pulse out → Measuring mode (0984)

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

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

Factory setting Forward flow

Additional information *Selection*
- Forward flow
  Positive flow is output, negative flow is not output.
- Forward/Reverse
  Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
- Reverse flow
  Negative flow is output, positive flow is not output.
- Rev. flow comp.
  The flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.

For a detailed description of the options available, see the **Measuring mode** parameter (→ 113)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 113)

Failure mode

Navigation Expert → Output → Double pulse out → Failure mode (0985)

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

Selection

- Actual value
  In the event of a device alarm, the double 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 double 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 → Double pulse out → Pulse output (0987)

Description Displays the pulse frequency of the double pulse output which is currently output.

User interface Positive floating-point number

Additional information For a detailed description and example: **Pulse output** parameter (→ 59)

Invert outp.sig.

Navigation Expert → Output → Double pulse out → Invert outp.sig. (0993)

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

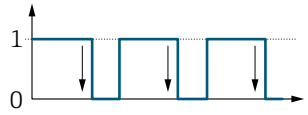
Selection
- No
- Yes

Factory setting No

Additional information

Selection

No option (passive - negative)



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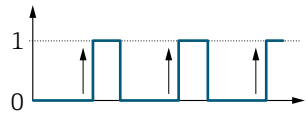
Yes option (passive - positive)



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3.6 "Communication" submenu

Navigation Expert → Communication

▶ **Communication**	
▶ **HART input**	→ 150
▶ **HART output**	→ 156
▶ **Web server**	→ 173
▶ **Diag. config.**	→ 176
▶ **WLAN settings**	→ 186

3.6.1 "HART input" submenu

Navigation Expert → Communication → HART input

▶ **HART input**	
▶ **Configuration**	→ 151
▶ **Input**	→ 155

"Configuration" submenu

Navigation Expert → Communication → HART input → Configuration

▶ Configuration	
Capture mode (7001)	→ 151
Device ID (7007)	→ 152
Device type (7008)	→ 152
Manufacturer ID (7009)	→ 152
Burst command (7006)	→ 153
Slot number (7010)	→ 153
Timeout (7005)	→ 154
Failure mode (7011)	→ 154
Failure value (7012)	→ 155

Capture mode

Navigation Expert → Communication → HART input → Configuration → Capture mode (7001)

Description Use this function to select the capture mode via burst or master communication.

Selection
- Off
- Burst network
- Master network

Factory setting Off

Additional information *"Burst network" option*

The device records data transmitted via burst in the network.

An external pressure sensor must be in the burst mode.

"Master network" option

In this case, the device must be located in a HART network in which a HART master (control) queries the measured values of the up to 64 network participants. The device reacts only to the responses of a specific device in the network. Device ID,device type, manufacturer ID and the HART commands used by the master must be defined.

Device ID

Navigation Expert → Communication → HART input → Configuration → Device ID (7007)

Prerequisite The **Master network** option is selected in the **Capture mode** parameter (→ 151).

Description Use this function to enter the device ID of the HART slave device whose data are to be recorded.

User entry
6-digit value:
- Via local operation: enter as hexadecimal or decimal number
- Via operating tool: enter as decimal number

Factory setting 0

Additional information In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.

Device type

Navigation Expert → Communication → HART input → Configuration → Device type (7008)

Prerequisite In the **Capture mode** parameter (→ 151), the **Master network** option is selected.

Description Use this function to enter the device type of the HART slave device whose data are to be recorded.

User entry 2-digit hexadecimal number

Factory setting 0x00

Additional information In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.

Manufacturer ID

Navigation Expert → Communication → HART input → Configuration → Manufacturer ID (7009)

Prerequisite The **Master network** option is selected in the **Capture mode** parameter (→ 151).

Description Use this function to enter the manufacturer ID of the HART slave device whose data are to be recorded.

User entry
2-digit value:
- Via local operation: enter as hexadecimal or decimal number
- Via operating tool: enter as decimal number

Factory setting 0

Additional information In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.

Burst command

Navigation Expert → Communication → HART input → Configuration → Burst command (7006)

Prerequisite The **Burst network** option or the **Master network** option are selected in the **Capture mode** parameter (→ 151).

Description Use this function to select the burst command to be recorded.

Selection
- Command 1
- Command 3
- Command 9
- Command 33

Factory setting Command 1

Additional information *Selection*
- Command 1
  Use this function to capture the primary variable.
- Command 3
  Use this function to capture the dynamic HART variables and the current.
- Command 9
  Use this function to capture the dynamic HART variables including the associated status.
- Command 33
  Use this function to capture the dynamic HART variables including the associated unit.

Slot number

Navigation Expert → Communication → HART input → Configuration → Slot number (7010)

Prerequisite The **Burst network** option or the **Master network** option is selected in the **Capture mode** parameter (→ 151).

Description Use this function to enter the position of the process variable to be recorded in the burst command.

User entry 1 to 8

Factory setting 1

Additional information *User entry*

Slot	Command			
	1	3	9	33
1	PV	PV	HART variable (slot 1)	HART variable (slot 1)
2	–	SV	HART variable (slot 2)	HART variable (slot 2)
3	–	TV	HART variable (slot 3)	HART variable (slot 3)
4	–	QV	HART variable (slot 4)	HART variable (slot 4)
5	–	–	HART variable (slot 5)	–
6	–	–	HART variable (slot 6)	–
7	–	–	HART variable (slot 7)	–
8	–	–	HART variable (slot 8)	–

Timeout

Navigation Expert → Communication → HART input → Configuration → Timeout (7005)

Prerequisite The **Burst network** option or the **Master network** option is selected in the **Capture mode** parameter (→ 151).

Description Use this function to enter the maximum permitted interval between two HART frames.

User entry 1 to 120 s

Factory setting 5 s

Additional information *Description*

If the interval is exceeded, the measuring device displays the diagnostic message **F882 Input signal**.

Failure mode

Navigation Expert → Communication → HART input → Configuration → Failure mode (7011)

Prerequisite In the **Capture mode** parameter (→ 151), the **Burst network** option or **Master network** option is selected.

Description Use this function to select the device behavior if no data are recorded within the maximum permitted interval.

Selection
- Alarm
- Last valid value
- Defined value

Factory setting Alarm

Additional information *Options*

- Alarm
  An error message is set.
- Last valid value
  The last valid measured value is used.
- Defined value
  A user-defined measured value is used: (**Failure value** parameter (→ 155)).

Failure value

Navigation Expert → Communication → HART input → Configuration → Failure value (7012)

Prerequisite The following conditions are met:
- In the **Capture mode** parameter (→ 151), the **Burst network** option or **Master network** option is selected.
- In the **Failure mode** parameter (→ 154), the **Defined value** option is selected.

Description Use this function to enter the measured value to be used if no data are recorded within the maximum permitted interval.

User entry Signed floating-point number

Factory setting 1.01325 bar

Additional information *Dependency*

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

"Input" submenu

Navigation Expert → Communication → HART input → Input

▶ **Input**	
Value (7003)	→ 155
Status (7004)	→ 156

Value

Navigation Expert → Communication → HART input → Input → Value (7003)

Description Displays the value of the device variable recorded by the HART input.

User interface Signed floating-point number

Status

Navigation Expert → Communication → HART input → Input → Status (7004)

Description Displays the value of the device variable recorded by the HART input in accordance with the HART specification.

User interface
- Manual/Fixed
- Good
- Poor accuracy
- Bad

Additional information *Description*

If the measuring device reads in an invalid pressure measured value, the diagnostic message ⊗**F882 Input signal** is output

3.6.2 "HART output" submenu

Navigation Expert → Communication → HART output

▶ **HART output**	
▶ **Configuration**	→ 156
▶ **Burst config.**	→ 158
▶ **Information**	→ 165
▶ **Output**	→ 168

"Configuration" submenu

Navigation Expert → Communication → HART output → Configuration

▶ **Configuration**	
HART short tag (0220)	→ 157
Device tag (0215)	→ 157
HART address (0219)	→ 157

No. of preambles (0217)	→ 📄 158
Fieldb.writ.acc. (0273)	→ 📄 158

HART short tag

Navigation Expert → Communication → HART output → Configuration → HART short tag (0220)

Description Use this function to enter a brief description for the measuring point. This can be edited and displayed via HART protocol or using the local display.

User entry Max. 8 characters: A to Z, 0 to 9 and certain special characters (e.g. punctuation marks, @, %).

Factory setting PROSONIC

Device tag

Navigation Expert → Communication → HART output → Configuration → Device tag (0215)

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

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

Factory setting Prosonic Flow

HART address

Navigation Expert → Communication → HART output → Configuration → HART address (0219)

Description Use this function to enter the address via which the data exchange takes place via HART protocol.

User entry 0 to 63

Factory setting 0

Additional information *Description*

For addressing in a HART Multidrop network, the **Fixed current** option must be set in the **Current span** parameter (→ 📄 109) (current output 1).

No. of preambles

Navigation Expert → Communication → HART output → Configuration → No. of preambles (0217)

Description Use this function to enter the number of preambles in the HART protocol.

User entry 2 to 20

Factory setting 5

Additional information *User entry*

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

Fieldb.writ.acc.

Navigation Expert → Communication → HART output → Configuration → Fieldb.writ.acc. (0273)

Description Use this function to restrict access to the measuring device via fieldbus (HART interface).

Selection
- Read + write
- Read only

Factory setting Read + write

Additional information *Description*

If read and/or write protection is enabled, the parameter can only be controlled and reset via local operation. Access is no longer possible via operating tools.

Selection
- Read + write
  The parameters are readable and writable.
- Read only
  The parameters are only readable.

"Burst configuration 1 to n" submenu

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

▶ Burst config.

▶ Burst config. 1 to n

Burst mode 1 to n (2032–1 to n) → 159

Burst command 1 to n (2031–1 to n)	→ 160
Burst variable 0 (2033)	→ 161
Burst variable 1 (2034)	→ 162
Burst variable 2 (2035)	→ 162
Burst variable 3 (2036)	→ 162
Burst variable 4 (2037)	→ 162
Burst variable 5 (2038)	→ 163
Burst variable 6 (2039)	→ 163
Burst variable 7 (2040)	→ 163
Trigger mode (2044–1 to n)	→ 163
Trigger level (2043–1 to n)	→ 164
Min. upd. per. (2042–1 to n)	→ 164
Max. upd. per. (2041–1 to n)	→ 165

Burst mode 1 to n

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

Description Use this function to select whether to activate the HART burst mode for burst message X.

Selection
- Off
- On

Factory setting Off

Additional information *Options*
- Off
  The measuring device transmits data only when requested by the HART master.
- On
  The measuring device transmits data regularly without being requested.

Burst command 1 to n

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

Description Use this function to select the HART command that is sent to the HART master.

Selection
- Command 1
- Command 2
- Command 3
- Command 9
- Command 33
- Command 48

Factory setting Command 2

Additional information *Selection*

- Command 1
  Read out the primary variable.
- Command 2
  Read out the current and the main measured value as a percentage.
- Command 3
  Read out the dynamic HART variables and the current.
- Command 9
  Read out the dynamic HART variables including the related status.
- Command 33
  Read out the dynamic HART variables including the related unit.
- Command 48
  Read out the complete device diagnostics.

"Command 33" option

The HART device variables are defined via Command 107.

The following measured variables (HART device variables) can be read out:
- Volume flow
- Mass flow
- Temperature
- Totalizer 1…3
- Sound velocity
- Flow velocity
- Acceptance rate *
- Turbulence *
- Signal strength *
- SNR *
- Percent of range
- Measur. curr.
- Primary var (PV)

* Visibility depends on order options or device settings

- Second.var(SV)
- Tertiary var(TV)
- Quaterna.var(QV)

Commands

- Information about the defined details of the command: HART specifications
- The measured variables (HART device variables) are assigned to the dynamic variables in the **Output** submenu (→ 106).

Burst variable 0

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

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

Selection

- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Percent of range
- Measur. curr.
- Current input 1 *
- Current input 2 *
- Current input 3 *
- HART input
- Primary var (PV)
- Second.var(SV)
- Tertiary var(TV)
- Quaterna.var(QV)
- Not used

Factory setting Volume flow

* Visibility depends on order options or device settings

Additional information *Selection*

The **Not used** option is set if a burst message is not configured.

Burst variable 1

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

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

Selection See the **Burst variable 0** parameter (→ 161).

Factory setting Not used

Burst variable 2

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

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

Selection See the **Burst variable 0** parameter (→ 161).

Factory setting Not used

Burst variable 3

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

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

Selection See the **Burst variable 0** parameter (→ 161).

Factory setting Not used

Burst variable 4

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

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

Selection See the **Burst variable 0** parameter (→ 161).

Factory setting Not used

Burst variable 5

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

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

Selection See the **Burst variable 0** parameter (→ 161).

Factory setting Not used

Burst variable 6

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

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

Selection See the **Burst variable 0** parameter (→ 161).

Factory setting Not used

Burst variable 7

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

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

Selection See the **Burst variable 0** parameter (→ 161).

Factory setting Not used

Trigger mode

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

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

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

Factory setting
Continuous

Additional information
Selection
- Continuous
  The message is sent continuously, at least at intervals corresponding to the time frame specified in the **Burst min per** parameter (→ 164).
- Window
  The message is sent if the specified measured value has changed by the value in the **Trigger level** parameter (→ 164).
- Rising
  The message is sent if the specified measured value exceeds the value in the **Trigger level** parameter (→ 164).
- Falling
  The message is sent if the specified measured value drops below the value in the **Trigger level** parameter (→ 164).
- On change
  The message is sent if a measured value changes in the burst message.

Trigger level

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

Description
For entering the burst trigger value.

User entry
Signed floating-point number

Additional information
Description
Together with the option selected in the **Trigger mode** parameter (→ 163) the burst trigger value determines the time of burst message X.

Min. upd. per.

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

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

User entry
Positive integer

Factory setting
1 000 ms

Max. upd. per.

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

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

User entry Positive integer

Factory setting 2 000 ms

"Information" submenu

Navigation Expert → Communication → HART output → Information

▶ Information	
Device revision (0204)	→ 165
Device ID (0221)	→ 166
Device type (0209)	→ 166
Manufacturer ID (0259)	→ 166
HART revision (0205)	→ 167
HART descriptor (0212)	→ 167
HART message (0216)	→ 167
Hardware rev. (0206)	→ 167
Software rev. (0224)	→ 168
HART date code (0202)	→ 168

Device revision

Navigation Expert → Communication → HART output → Information → Device revision (0204)

Description Displays the device revision with which the device is registered with the HART Communication Foundation.

User interface 2-digit hexadecimal number

Factory setting 1

Additional information *Description*

The device revision is needed to assign the appropriate device description file (DD) to the device.

Device ID

Navigation Expert → Communication → HART output → Information → Device ID (0221)

Description Use this function to view the device ID for identifying the measuring device in a HART network.

User interface 6-digit hexadecimal number

Additional information *Description*

In addition to the device type and manufacturer ID, the device ID is part of the unique ID. Each HART device is uniquely identified by the unique device ID.

Device type

Navigation Expert → Communication → HART output → Information → Device type (0209)

Description Displays the device type with which the measuring device is registered with the HART Communication Foundation.

User interface 2-digit hexadecimal number

Factory setting 0x3B (for Prosonic Flow 300/500)

Additional information *Description*

The device type is specified by the manufacturer. It is needed to assign the appropriate device description file (DD) to the device.

Manufacturer ID

Navigation Expert → Communication → HART output → Information → Manufacturer ID (0259)

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

User interface 2-digit hexadecimal number

Factory setting 0x11 (for Endress+Hauser)

HART revision

Navigation Expert → Communication → HART output → Information → HART revision (0205)

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

User interface 5 to 7

Factory setting 7

HART descriptor

Navigation Expert → Communication → HART output → Information → HART descriptor (0212)

Description Use this function to enter a description for the measuring point. This can be edited and displayed via HART protocol or using the local display.

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

Factory setting Pros.Flow300/500

HART message

Navigation Expert → Communication → HART output → Information → HART message (0216)

Description Use this function to enter a HART message which is sent via the HART protocol when requested by the master.

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

Factory setting Pros.Flow300/500

Hardware rev.

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

Description Displays the hardware revision of the measuring device.

User interface 0 to 30

Factory setting 1

Software rev.

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

Description Displays the software revision of the measuring device.

User interface 0 to 255

Factory setting 1

HART date code

Navigation Expert → Communication → HART output → Information → HART date code (0202)

Description Use this function to enter the date information for individual use.

User entry Date entry format: yyyy-mm-dd

Factory setting 2009-07-20

Additional information *Example*
Device installation date

"Output" submenu

Navigation Expert → Communication → HART output → Output

▶ Output	
Assign PV (0234)	→ 169
Primary var (PV) (0201)	→ 169
Assign SV (0235)	→ 170
Second.var(SV) (0226)	→ 170
Assign TV (0236)	→ 171
Tertiary var(TV) (0228)	→ 172
Assign QV (0237)	→ 172
Quaterna.var(QV) (0203)	→ 173

Assign PV

Navigation Expert → Communication → HART output → Output → Assign PV (0234)

Description Use this function to select a measured variable (HART device variable) for the primary dynamic variable (PV).

Selection
- Off *
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.

Factory setting Volume flow

Primary var (PV)

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

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

User interface Signed floating-point number

Additional information

User interface

The measured value displayed depends on the process variable selected in the **Assign PV** parameter (→ 169).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

* Visibility depends on order options or device settings

Assign SV

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

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

Selection
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1 *
- Current input 2 *
- Current input 3 *
- HART input

Factory setting Totalizer 1

Second.var(SV)

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

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

User interface Signed floating-point number

* Visibility depends on order options or device settings

Additional information

User interface

The measured value displayed depends on the process variable selected in the **Assign SV** parameter (→ 170).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

Assign TV

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

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

Selection

- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1 *
- Current input 2 *
- Current input 3 *
- HART input

Factory setting Totalizer 2

* Visibility depends on order options or device settings

Tertiary var(TV)

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

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

User interface Signed floating-point number

Additional information

User interface

The measured value displayed depends on the process variable selected in the **Assign TV** parameter (→ 171).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

Assign QV

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

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

Selection

- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1 *
- Current input 2 *
- Current input 3 *
- HART input

* Visibility depends on order options or device settings

Factory setting Totalizer 3

Quaterna.var(QV)

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

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

User interface Signed floating-point number

Additional information *User interface*

The measured value displayed depends on the process variable selected in the **Assign QV** parameter (→ 172).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 62).

3.6.3 "Web server" submenu

Navigation Expert → Communication → Web server

▶ Web server	
Webserv.language (7221)	→ 174
MAC Address (7214)	→ 174
DHCP client (7212)	→ 174
IP address (7209)	→ 175
Subnet mask (7211)	→ 175
Default gateway (7210)	→ 175
Webserver funct. (7222)	→ 176
Login page (7273)	→ 176

Webserv.language

Navigation Expert → Communication → Web server → Webserv.language (7221)

Description Use this function to select the Web server language setting.

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

Factory setting English

MAC Address

Navigation Expert → Communication → Web server → MAC Address (7214)

Description Displays the MAC [6] address of the measuring device.

User interface Unique 12-digit character string comprising letters and numbers

Factory setting Each measuring device is given an individual address.

Additional information *Example*

For the display format
00:07:05:10:01:5F

DHCP client

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

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

6) Media Access Control

Selection
- Off
- On

Factory setting
Off

Additional information
Result

If the DHCP client functionality of the Web server is activated, the IP address (→ 175), Subnet mask (→ 175) and Default gateway (→ 175) are set automatically.

- Identification is via the MAC address of the measuring device.
- The IP address (→ 175) in the **IP address** parameter (→ 175) is ignored as long as the **DHCP client** parameter (→ 174) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ 175) in the parameter of the same name is only used if the **DHCP client** parameter (→ 174) is inactive.

IP address

Navigation
Expert → Communication → Web server → IP address (7209)

Description
Display or enter the IP address of the Web server integrated in the measuring device.

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

Factory setting
192.168.1.212

Subnet mask

Navigation
Expert → Communication → Web server → Subnet mask (7211)

Description
Display or enter the subnet mask.

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

Factory setting
255.255.255.0

Default gateway

Navigation
Expert → Communication → Web server → Default gateway (7210)

Description
Display or enter the Default gateway (→ 175).

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

Factory setting
0.0.0.0

Webserver funct.

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

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

Selection
- Off
- HTML Off
- On

Factory setting On

Additional information *Description*

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

Selection

Option	Description
Off	▪ The web server is completely disabled. ▪ Port 80 is locked.
HTML Off	The HTML version of the web server is not available.
On	▪ The complete functionality of the web server is available. ▪ JavaScript is used. ▪ The password is transferred in an encrypted state. ▪ Any change to the password is also transferred in an encrypted state.

Login page

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

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

Selection
- Without header
- With header

Factory setting With header

3.6.4 "Diag. config." submenu

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

Assign a category to the particular diagnostic event:

Category	Meaning
Failure (F)	A device error is present. The measured value is no longer valid.
Funct. check (C)	The device is in service mode (e.g. during a simulation).

Category	Meaning
Out of spec. (S)	The device is being operated: ▪ Outside its technical specification limits (e.g. outside the process temperature range) ▪ Outside of the configuration carried out by the user (e.g. maximum flow in parameter 20 mA value)
Mainten. req.(M)	Maintenance is required. The measured value is still valid.
No effect (N)	Has no effect on the condensed status [1].

1) Condensed status according to NAMUR recommendation NE107

Navigation Expert → Communication → Diag. config.

▶ **Diag. config.**

Event category 124 (0270)	→ 178
Event category 125 (0271)	→ 178
Event category 160 (0272)	→ 178
Event category 441 (0210)	→ 179
Event category 442 (0230)	→ 179
Event category 443 (0231)	→ 180
Event category 444 (0211)	→ 180
Event category 452 (0265)	→ 180
Event category 543 (0276)	→ 181
Event category 832 (0218)	→ 181
Event category 833 (0225)	→ 182
Event category 834 (0227)	→ 182
Event category 835 (0229)	→ 182
Event category 837 (0266)	→ 183
Event category 840 (0267)	→ 183
Event category 842 (0295)	→ 183
Event category 881 (0268)	→ 184
Event category 930 (0296)	→ 184

Event category 931 (0297)	→ 185
Event category 953 (0292)	→ 185
Event category 954 (0293)	→ 185

Event category 124 (Rel.sig.strength)

Navigation Expert → Communication → Diag. config. → Event category 124 (0270)

Description Use this function to select a category for the diagnostic message **124 Rel.sig.strength**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Mainten. req.(M)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 125 (Rel. sound vel.)

Navigation Expert → Communication → Diag. config. → Event category 125 (0271)

Description Use this function to select a category for the diagnostic message **125 Rel. sound vel.**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Mainten. req.(M)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 160 (Signal path off)

Navigation Expert → Communication → Diag. config. → Event category 160 (0272)

Description Use this function to select a category for the diagnostic message **160 Signal path off**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Mainten. req.(M)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 441 (Curr.output 1 to n)

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

Description Use this function to select a category for the diagnostic message **441 Curr.output 1 to n**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 442 (Freq. output 1 to n)

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

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select a category for the diagnostic message **442 Freq. output 1 to n**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 443 (Pulse output 1 to n)

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

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select a category for the diagnostic message **443 Pulse output 1 to n**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 444 (Current input 1 to n)

Navigation Expert → Communication → Diag. config. → Event category 444 (0211)

Prerequisite The current input is available.

Description Use this function to select a category for the diagnostic message **444 Current input 1 to n**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

Event category 452 (Calc. error)

Navigation Expert → Communication → Diag. config. → Event category 452 (0265)

Description Use this function to select a category for the diagnostic message **452 Calc. error**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting
Out of spec. (S)

Additional information
For a detailed description of the event categories available for selection: → 176

Event category 543 (Double pulse out)

Navigation
Expert → Communication → Diag. config. → Event category 543 (0276)

Description
Use this option to select a category for the diagnostic message **543 Double pulse out**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting
Out of spec. (S)

Additional information
For a detailed description of the event categories available for selection: → 176

Event category 832 (Electronic temp.)

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

Description
Use this function to select a category for the diagnostic message **832 Electronic temp.**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting
Out of spec. (S)

Additional information
Selection

For a detailed description of the event categories available for selection: → 176

Event category 833 (Electronic temp.)

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

Description Use this option to select a category for the diagnostic message **833 Electronic temp.**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

Event category 834 (Process temp.)

Navigation Expert → Communication → Diag. config. → Event category 834 (0227)

Description Use this option to select a category for the diagnostic message **834 Process temp.**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

Event category 835 (Process temp.)

Navigation Expert → Communication → Diag. config. → Event category 835 (0229)

Description Use this option to select a category for the diagnostic message **835 Process temp.**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

Event category 837 (Process pressure)

Navigation Expert → Communication → Diag. config. → Event category 837 (0266)

Description Use this function to select a category for the diagnostic message **837 Process pressure**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 841 (Sensor range)

Navigation Expert → Communication → Diag. config. → Event category 840 (0267)

Description Use this function to select a category for the diagnostic message **841 Sensor range**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 842 (Process limit)

Navigation Expert → Communication → Diag. config. → Event category 842 (0295)

Description Use this function to select a category for the diagnostic message ⚠**S842 Process limit**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

Event category 881 (Sen.sig. path 1 to n)

Navigation Expert → Communication → Diag. config. → Event category 881 (0268)

Description Use this function to select a category for the diagnostic message **881 Sen.sig. path 1 to n**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Mainten. req.(M)

Additional information For a detailed description of the event categories available for selection: → 176

Event category 930 (Process fluid)

Navigation Expert → Communication → Diag. config. → Event category 930 (0296)

Description Use this function to select a category for the diagnostic message ⚠**S930 Process fluid**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

Event category 931 (Process fluid)

Navigation Expert → Communication → Diag. config. → Event category 931 (0297)

Description Use this function to select a category for the diagnostic message ⚠**S931 Process fluid**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

Event category 953 (Asy.noise path 1 to n)

Navigation Expert → Communication → Diag. config. → Event category 953 (0292)

Description Use this function to select a category for the diagnostic message ⚠**M953 Asy.noise path 1 to n**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Mainten. req.(M)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

Event category 954 (Sound v. dev. hi)

Navigation Expert → Communication → Diag. config. → Event category 954 (0293)

Description Use this function to select a category for the diagnostic message ⚠**S954 Sound v. dev. hi**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 176

3.6.5 "WLAN settings" submenu

Navigation Expert → Communication → WLAN settings

▶ **WLAN settings**

WLAN (2702)	→ 187
WLAN mode (2717)	→ 187
SSID name (2714)	→ 187
Network security (2705)	→ 188
Sec. identific. (2718)	→ 188
User name (2715)	→ 188
WLAN password (2716)	→ 189
WLAN IP address (2711)	→ 189
WLAN MAC address (2703)	→ 189
WLAN subnet mask (2709)	→ 189
WLAN MAC address (2703)	→ 189
WLAN passphrase (2706)	→ 190
WLAN MAC address (2703)	→ 189
Assign SSID name (2708)	→ 190
SSID name (2707)	→ 190
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Select antenna (2713)	→ 191
Connection state (2722)	→ 191

Rec.sig.strength (2721)	→ 192
WLAN IP address (2711)	→ 189
Gateway IP addr. (2719)	→ 192
IP address DNS (2720)	→ 192

WLAN

Navigation Expert → Communication → WLAN settings → WLAN (2702)

Description Use this function to enable and disable the WLAN connection.

Selection
- Disable
- Enable

Factory setting Enable

WLAN mode

Navigation Expert → Communication → WLAN settings → WLAN mode (2717)

Description Use this function to select the WLAN mode.

Selection
- Access point
- WLAN Client

Factory setting Access point

SSID name

Navigation Expert → Communication → WLAN settings → SSID name (2714)

Prerequisite The client is activated.

Description Use this function to enter the user-defined SSID name (max. 32 characters) of the WLAN network.

User entry –

Factory setting –

Network security

Navigation Expert → Communication → WLAN settings → Network security (2705)

Description Use this function to select the type of security for the WLAN interface.

Selection
- Unsecured
- WPA2-PSK
- EAP-PEAP MSCHAP2 *
- EAP-PEAP NoAuth. *
- EAP-TLS *

Factory setting WPA2-PSK

Additional information *Selection*
- Unsecured
  Access the WLAN connection without identification.
- WPA2-PSK
  Access the WLAN connection with a network key.

Sec. identific.

Navigation Expert → Communication → WLAN settings → Sec. identific. (2718)

Description Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).

User interface
- Trust. iss.cert.
- Device certific.
- Dev. private key

User name

Navigation Expert → Communication → WLAN settings → User name (2715)

Description Use this function to enter the username of the WLAN network.

User entry –

Factory setting –

* Visibility depends on order options or device settings

WLAN password

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

Description Use this function to enter the WLAN password for the WLAN network.

User entry –

Factory setting –

WLAN IP address

Navigation Expert → Communication → WLAN settings → WLAN IP address (2711)

Description Use this function to enter the IP address of the measuring device's WLAN connection.

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

Factory setting 192.168.1.212

WLAN MAC address

Navigation Expert → Communication → WLAN settings → WLAN MAC address (2703)

Description Displays the MAC [7] address of the measuring device.

User interface Unique 12-digit character string comprising letters and numbers

Factory setting Each measuring device is given an individual address.

Additional information *Example*
For the display format
00:07:05:10:01:5F

WLAN subnet mask

Navigation Expert → Communication → WLAN settings → WLAN subnet mask (2709)

Description Use this function to enter the subnet mask.

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

7) Media Access Control

Factory setting 255.255.255.0

WLAN passphrase

Navigation Expert → Communication → WLAN settings → WLAN passphrase (2706)

Prerequisite The **WPA2-PSK** option is selected in the **Security type** parameter (→ 188).

Description Use this function to enter the network key.

User entry 8 to 32-digit character string comprising numbers, letters and special characters (without spaces)

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

Assign SSID name

Navigation Expert → Communication → WLAN settings → Assign SSID name (2708)

Description Use this function to select which name is used for the SSID [8].

Selection
- Device tag
- User-defined

Factory setting User-defined

Additional information *Selection*
- Device tag
  The device tag name is used as the SSID.
- User-defined
  A user-defined name is used as the SSID.

SSID name

Navigation Expert → Communication → WLAN settings → SSID name (2707)

Prerequisite
- The **User-defined** option is selected in the **Assign SSID name** parameter (→ 190).
- The **Access point** option is selected in the **WLAN mode** parameter (→ 187).

Description Use this function to enter a user-defined SSID name.

User entry Max. 32-digit character string comprising numbers, letters and special characters

8) Service Set Identifier

Factory setting EH_device designation_last 7 digits of the serial number (e.g. EH_Prosonic_Flow_500_A802000)

WLAN channel

Navigation Expert → Communication → WLAN settings → WLAN channel (2704)

Description Use this function to enter the WLAN channel.

User entry 1 to 11

Factory setting 6

Additional information *Description*

- It is only necessary to enter a WLAN channel if multiple WLAN devices are in use.
- If just one measuring device is in use, it is recommended to keep the factory setting.

Select antenna

Navigation Expert → Communication → WLAN settings → Select antenna (2713)

Description Use this function to select whether the external or internal antenna is used for reception.

Selection
- External antenna
- Internal antenna

Factory setting Internal antenna

Connection state

Navigation Expert → Communication → WLAN settings → Connection state (2722)

Description The connection status is displayed.

User interface
- Connected
- Not connected

Factory setting Not connected

Rec.sig.strength

Navigation Expert → Communication → WLAN settings → Rec.sig.strength (2721)

Description Displays the signal strength received.

User interface
- Low
- Medium
- High

Factory setting High

Gateway IP addr.

Navigation Expert → Communication → WLAN settings → Gateway IP addr. (2719)

Description Use this function to enter the IP address of the gateway.

Factory setting 192.168.1.212

IP address DNS

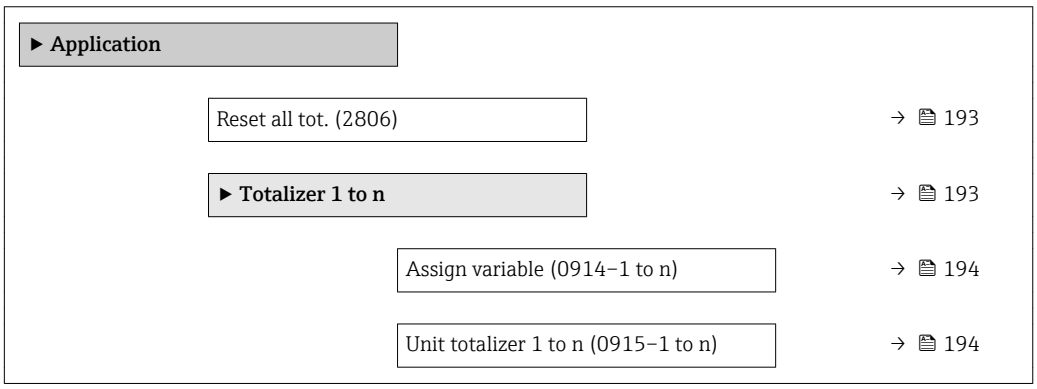
Navigation Expert → Communication → WLAN settings → IP address DNS (2720)
Expert → Communication → WLAN settings → IP address DNS (2720)

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

Factory setting 192.168.1.212

3.7 "Application" submenu

Navigation Expert → Application



Operation mode (0908–1 to n)	→ 196
Control Tot. 1 to n (0912–1 to n)	→ 196
Preset value 1 to n (0913–1 to n)	→ 197
Failure mode (0901–1 to n)	→ 197

Reset all tot.

Navigation Expert → Application → Reset all tot. (2806)

Description Use this function to reset all totalizers to the value **0** and restart the totaling process. This deletes all the flow values previously totalized.

Selection
- Cancel
- Reset + totalize

Factory setting Cancel

Additional information *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
Reset + totalize	Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totalized.

3.7.1 "Totalizer 1 to n" submenu

Navigation Expert → Application → Totalizer 1 to n

▶ **Totalizer 1 to n**	
Assign variable (0914–1 to n)	→ 194
Unit totalizer 1 to n (0915–1 to n)	→ 194
Operation mode (0908–1 to n)	→ 196
Control Tot. 1 to n (0912–1 to n)	→ 196
Preset value 1 to n (0913–1 to n)	→ 197
Failure mode (0901–1 to n)	→ 197

Assign variable

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

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

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

Factory setting Volume flow

Additional information

Description

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

Selection

If the **Off** option is selected, only **Assign variable** parameter (→ 194) is still displayed in the **Totalizer 1 to n** submenu. All other parameters in the submenu are hidden.

Unit totalizer 1 to n

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 194) of the **Totalizer 1 to n** submenu.

Description Use this function to select the process variable unit for the Totalizer 1 to n (→ 193).

Selection

SI units
- g *
- kg *
- t *

US units
- oz *
- lb *
- STon *

*	Visibility depends on order options or device settings

or

* Visibility depends on order options or device settings

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

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

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

*	Visibility depends on order options or device settings

or

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

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

Imperial units
Sgal (imp) *

*	Visibility depends on order options or device settings

or

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

Imperial units
- Btu *
- MBtu *
- MMBtu *

*	Visibility depends on order options or device settings

or

Other units
None *

*	Visibility depends on order options or device settings

Factory setting

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

Additional information

Description

The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→ 🗎 62).

Selection

The selection is dependent on the process variable selected in the **Assign variable** parameter (→ 🗎 194).

Operation mode

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 🗎 194) of the **Totalizer 1 to n** submenu.

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

Selection
- Net flow total
- Forward total
- Reverse total

Factory setting Net flow total

Additional information

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

Control Tot. 1 to n

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 🗎 194) of the **Totalizer 1 to n** submenu.

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

Selection
- Totalize
- Reset + hold
- Preset + hold
- Reset + totalize
- Preset+totalize
- Hold

Factory setting Totalize

Additional information *Selection*

Options	Description
Totalize	The totalizer is started or continues running.
Reset + hold	The totaling process is stopped and the totalizer is reset to 0.
Preset + hold	The totaling process is stopped and the totalizer is set to its defined start value from the **Preset value** parameter.
Reset + totalize	The totalizer is reset to 0 and the totaling process is restarted.
Preset+totalize	The totalizer is set to the defined start value from the **Preset value** parameter and the totaling process is restarted.
Hold	Totalizing is stopped.

Preset value 1 to n

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 194) of the **Totalizer 1 to n** submenu.

Description Use this function to enter a start value for the Totalizer 1 to n.

User entry Signed floating-point number

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

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 194).

Example

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

Failure mode

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 194) of the **Totalizer 1 to n** submenu.

Description Use this function to select how a totalizer behaves in the event of a device alarm.

Selection
- Stop
- Actual value
- Last valid value

Factory setting Stop

Additional information *Description*

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

Selection

- Stop
  The totalizer is stopped in the event of a device alarm.
- Actual value
  The totalizer continues to count based on the actual measured value; the device alarm is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the device alarm occurred.

3.7.2 "Inventory count." submenu

Navigation Expert → Application → Inventory count.

▶ Inventory count.		
	Unit (0974)	→ 198

Unit

Navigation Expert → Application → Inventory count. → Unit (0974)

Description Displays the unit of the inventory counter.

User interface

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

US units
- ft^3
- af
- 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)

Additional information *Description*

The parameter cannot be configured or reset.

3.8 "Diagnostics" submenu

Navigation Expert → Diagnostics

▶ **Diagnostics**	
Actual diagnos. (0691)	→ 199
Prev.diagnostics (0690)	→ 200
Time fr. restart (0653)	→ 201
Operating time (0652)	→ 201
▶ **Diagnostic list**	→ 202
▶ **Event logbook**	→ 206
▶ **Device info**	→ 208
▶ **Main elec.+I/O1**	→ 212
▶ **Sens. electronic**	→ 213
▶ **I/O module 2**	→ 215
▶ **I/O module 3**	→ 216
▶ **I/O module 4**	→ 218
▶ **Display module**	→ 219
▶ **Data logging**	→ 220
▶ **Heartbeat**	→ 228
▶ **Simulation**	→ 228

Actual diagnos.

Navigation Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite A diagnostic event has occurred.

Description Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.

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

Additional information

Display

Additional pending diagnostic messages can be viewed in the **Diagnostic list** submenu (→ 202).

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Example

For the display format:
⊗F271 Main electronics

Timestamp

Navigation Expert → Diagnostics → Timestamp

Description Displays the operating time when the current diagnostic message occurred.

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

Additional information

Display

The diagnostic message can be viewed via the **Actual diagnos.** parameter (→ 199).

Example

For the display format:
24d12h13m00s

Prev.diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics (0690)

Prerequisite Two diagnostic events have already occurred.

Description Displays the diagnostic message that occurred before the current message.

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

Additional information

Display

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Example

For the display format:
⊗F271 Main electronics

Timestamp

Navigation Expert → Diagnostics → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Prev.diagnostics** parameter (→ 200).

Example

For the display format:
24d12h13m00s

Time fr. restart

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

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

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

Operating time

Navigation Expert → Diagnostics → Operating time (0652)

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

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

Additional information *User interface*

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

3.8.1 "Diagnostic list" submenu

Navigation Expert → Diagnostics → Diagnostic list

▶ Diagnostic list	
Diagnostics 1 (0692)	→ 202
Diagnostics 2 (0693)	→ 203
Diagnostics 3 (0694)	→ 204
Diagnostics 4 (0695)	→ 204
Diagnostics 5 (0696)	→ 205

Diagnostics 1

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 1 (0692)

Description Displays the current diagnostics message with the highest priority.

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 202).

Example

For the display format:
24d12h13m00s

Diagnostics 2

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

Description Displays the current diagnostics message with the second-highest priority.

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the second-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 203).

Example

For the display format:
24d12h13m00s

Diagnostics 3

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

Description Displays the current diagnostics message with the third-highest priority.

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the third-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 204).

Example

For the display format:
24d12h13m00s

Diagnostics 4

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

Description Displays the current diagnostics message with the fourth-highest priority.

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fourth-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ 204).

Example

For the display format:
24d12h13m00s

Diagnostics 5

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

Description Displays the current diagnostics message with the fifth-highest priority.

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fifth-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 205).

Example

For the display format:
24d12h13m00s

3.8.2 "Event logbook" submenu

Navigation Expert → Diagnostics → Event logbook

▶ **Event logbook**	
Filter options (0705)	→ 206
▶ **Event list**	→ 207

Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options (0705)

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

Selection
- All
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- Information (I)

Factory setting All

Additional information *Description*

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

Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options

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

Selection
- All
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- Information (I)

Factory setting All

Additional information *Description*

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

"Event list" submenu

The **Event list** submenu is only displayed if operating via the local display.

If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module.

If operating via the Web browser, the event messages can be found directly in the **Event logbook** submenu.

Navigation Expert → Diagnostics → Event logbook → Event list

▸ **Event list**		
	Event list	→ 208

Event list

Navigation Expert → Diagnostics → Event logbook → Event list

Description Displays the history of event messages of the category selected in the **Filter options** parameter (→ 206).

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

Additional information

Description

A maximum of 20 event messages are displayed in chronological order.

If the **Extended HistoROM** application package (order option) is enabled in the device, the event list can contain up to 100 entries .

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

Examples

For the display format:
- I1091 Configuration modified
  ⊖ 24d12h13m00s
- ⊗F271 Main electronics
  ⊖ 01d04h12min30s

HistoROM

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

3.8.3 "Device info" submenu

Navigation Expert → Diagnostics → Device info

▶ Device info	
Device tag (0011)	→ 209
Serial number (0009)	→ 209
Firmware version (0010)	→ 210
Device name (0020)	→ 210
Order code (0008)	→ 210

Ext. order cd. 1 (0023)	→ 📄 211
Ext. order cd. 2 (0021)	→ 📄 211
Ext. order cd. 3 (0022)	→ 📄 211
Config. counter (0233)	→ 📄 211
ENP version (0012)	→ 📄 212

Device tag

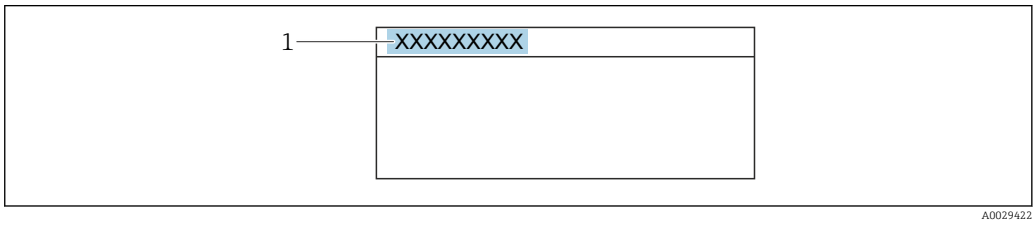
Navigation Expert → Diagnostics → Device info → Device tag (0011)

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 Prosonic Flow

Additional information *User interface*



1 Position of the header text on the display

The number of characters displayed depends on the characters used.

Serial number

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

Description Displays the serial number of the measuring device.

The number can be found on the nameplate of the sensor and transmitter.

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

Additional information *Description*

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

Firmware version

Navigation Expert → Diagnostics → Device info → Firmware version (0010)

Description Displays the device firmware version installed.

User interface Character string in the format xx.yy.zz

Additional information *Display*

The Firmware version is also located:
- On the title page of the Operating instructions
- On the transmitter nameplate

Device name

Navigation Expert → Diagnostics → Device info → Device name (0020)

Description Displays the name of the transmitter. It can also be found on the nameplate of the transmitter.

User interface Prosonic Flow 500

Order code

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

Description Displays the device order code.

User interface Character string composed of letters, numbers and certain punctuation marks (e.g. /).

Additional information *Description*

The order code can be found on the nameplate of the sensor and transmitter in the "Order code" field.

The order code is generated from the extended order code through a process of reversible transformation. The extended order code indicates the attributes for all the device features in the product structure. The device features are not directly readable from the order code.

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

Ext. order cd. 1

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

Description Displays the first part of the extended order code.

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

User interface Character string

Additional information *Description*

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

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

Ext. order cd. 2

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

Description Displays the second part of the extended order code.

User interface Character string

Additional information For additional information, see **Ext. order cd. 1** parameter (→ 211)

Ext. order cd. 3

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

Description Displays the third part of the extended order code.

User interface Character string

Additional information For additional information, see **Ext. order cd. 1** parameter (→ 211)

Config. counter

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

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

User interface 0 to 65 535

ENP version

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

Description Displays the version of the electronic nameplate.

User interface Character string

Factory setting 2.02.00

Additional information *Description*

This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.

3.8.4 "Main elec.+I/O1" submenu

Navigation Expert → Diagnostics → Mainboard I/O1

▶ Main elec.+I/O1	
Software rev.	→ 212
Build no. softw.	→ 212
Bootloader rev.	→ 213

Software rev.

Navigation Expert → Diagnostics → Mainboard I/O1 → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → Mainboard I/O1 → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

Navigation Expert → Diagnostics → Mainboard I/O1 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.5 "Sens. electronic" submenu

Navigation Expert → Diagnostics → Sens. electronic

▶ **Sens. electronic**		
	Software rev. (0072)	→ 213
	Build no. softw. (0079)	→ 213
	Bootloader rev. (0073)	→ 214

Software rev.

Navigation Expert → Diagnostics → Sens. electronic → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

Navigation Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.6 "I/O module 1" submenu

Navigation Expert → Diagnostics → I/O module 1

▶ I/O module 1	
I/O 1 terminals (3902–1)	→ 214
Software rev. (0072)	→ 214
Build no. softw. (0079)	→ 215
Bootloader rev. (0073)	→ 215

I/O 1 terminals

Navigation Expert → Diagnostics → I/O module 1 → I/O 1 terminals (3902–1)

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

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

Software rev.

Navigation Expert → Diagnostics → I/O module → Software rev. (0072)

Description Use this function to display the software revision of the module.

* Visibility depends on order options or device settings

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

Navigation Expert → Diagnostics → I/O module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.7 "I/O module 2" submenu

Navigation Expert → Diagnostics → I/O module 2

▶ **I/O module 2**		
	I/O 2 terminals (3902–2)	→ 215
	Software rev. (0072)	→ 216
	Build no. softw. (0079)	→ 216
	Bootloader rev. (0073)	→ 216

I/O 2 terminals

Navigation Expert → Diagnostics → I/O module 2 → I/O 2 terminals (3902–2)

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

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

Software rev.

Navigation Expert → Diagnostics → I/O module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

Navigation Expert → Diagnostics → I/O module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.8 "I/O module 3" submenu

Navigation Expert → Diagnostics → I/O module 3

▶ **I/O module 3**		
	I/O 3 terminals (3902–3)	→ 217
	Software rev. (0072)	→ 217

* Visibility depends on order options or device settings

Build no. softw. (0079)	→ 217
Bootloader rev. (0073)	→ 217

I/O 3 terminals

Navigation Expert → Diagnostics → I/O module 3 → I/O 3 terminals (3902–3)

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

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

Software rev.

Navigation Expert → Diagnostics → I/O module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

Navigation Expert → Diagnostics → I/O module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

* Visibility depends on order options or device settings

User interface Positive integer

3.8.9 "I/O module 4" submenu

Navigation Expert → Diagnostics → I/O module 4

▶ I/O module 4	
I/O 4 terminals (3902–4)	→ 218
Software rev. (0072)	→ 218
Build no. softw. (0079)	→ 219
Bootloader rev. (0073)	→ 219

I/O 4 terminals

Navigation Expert → Diagnostics → I/O module 4 → I/O 4 terminals (3902–4)

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

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

Software rev.

Navigation Expert → Diagnostics → I/O module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

* Visibility depends on order options or device settings

Build no. softw.

Navigation Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

Navigation Expert → Diagnostics → I/O module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.10 "Display module" submenu

Navigation Expert → Diagnostics → Display module

▶ Display module	
Software rev. (0072)	→ 219
Build no. softw. (0079)	→ 220
Bootloader rev. (0073)	→ 220

Software rev.

Navigation Expert → Diagnostics → Display module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → Display module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

Navigation Expert → Diagnostics → Display module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.11 "Data logging" submenu

Navigation Expert → Diagnostics → Data logging

▶ Data logging	
Assign chan. 1 (0851)	→ 221
Assign chan. 2 (0852)	→ 222
Assign chan. 3 (0853)	→ 222
Assign chan. 4 (0854)	→ 223
Logging interval (0856)	→ 223
Clear logging (0855)	→ 224
Data logging (0860)	→ 224
Logging delay (0859)	→ 224
Data log.control (0857)	→ 225
Data log. status (0858)	→ 225
Logging duration (0861)	→ 226

▶ Displ.channel 1	→ 📄 226
▶ Displ.channel 2	→ 📄 227
▶ Displ.channel 3	→ 📄 227
▶ Displ.channel 4	→ 📄 228

Assign chan. 1

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

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 📄 45).

Description Use this function to select a process variable for the data logging channel.

Selection
- Off
- Volume flow
- Correct.vol.flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow
- Signal strength *
- SNR *
- Acceptance rate *
- Turbulence *
- Flow asymmetry *
- Electronic temp.
- Curr.output 2 *
- Curr.output 3 *
- Curr.output 4 *
- Curr.output 1

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 chan. 2

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

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

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

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

Selection Picklist, see **Assign channel 1** parameter (→ 221)

Factory setting Off

Assign chan. 3

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

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

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

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

Selection Picklist, see **Assign channel 1** parameter (→ 221)

Factory setting Off

Assign chan. 4

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

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

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

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

Selection Picklist, see **Assign channel 1** parameter (→ 221)

Factory setting Off

Logging interval

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

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

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

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

User entry 0.1 to 3 600.0 s

Factory setting 1.0 s

Additional information *Description*

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

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

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

Example

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

Clear logging

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

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

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

Description Use this function to clear the entire logging data.

Selection
- Cancel
- Clear data

Factory setting Cancel

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

Data logging

Navigation Expert → Diagnostics → Data logging → Data logging (0860)

Description Use this function to select the data logging method.

Selection
- Overwriting
- Not overwriting

Factory setting Overwriting

Additional information *Selection*
- Overwriting
  The device memory applies the FIFO principle.
- Not overwriting
  Data logging is canceled if the measured value memory is full (single shot).

Logging delay

Navigation Expert → Diagnostics → Data logging → Logging delay (0859)

Prerequisite In the **Data logging** parameter (→ 224), the **Not overwriting** option is selected.

Description Use this function to enter the time delay for measured value logging.

User entry 0 to 999 h

Factory setting 0 h

Additional information *Description*

Once measured value logging has been started with the **Data log.control** parameter (→ 🗎 225), the device does not save any data for the duration of the time delay entered.

Data log.control

Navigation Expert → Diagnostics → Data logging → Data log.control (0857)

Prerequisite In the **Data logging** parameter (→ 🗎 224), the **Not overwriting** option is selected.

Description Use this function to start and stop measured value logging.

Selection
- None
- Delete + start
- Stop

Factory setting None

Additional information *Selection*
- None
  Initial measured value logging status.
- Delete + start
  All the measured values recorded for all the channels are deleted and measured value logging starts again.
- Stop
  Measured value logging is stopped.

Data log. status

Navigation Expert → Diagnostics → Data logging → Data log. status (0858)

Prerequisite In the **Data logging** parameter (→ 🗎 224), the **Not overwriting** option is selected.

Description Displays the measured value logging status.

User interface
- Done
- Delay active
- Active
- Stopped

Factory setting Done

Additional information *Selection*

- Done
  Measured value logging has been performed and completed successfully.
- Delay active
  Measured value logging has been started but the logging interval has not yet elapsed.
- Active
  The logging interval has elapsed and measured value logging is active.
- Stopped
  Measured value logging is stopped.

Logging duration

Navigation Expert → Diagnostics → Data logging → Logging duration (0861)

Prerequisite In the **Data logging** parameter (→ 224), the **Not overwriting** option is selected.

Description Displays the total logging duration.

User interface Positive floating-point number

Factory setting 0 s

"Displ.channel 1" submenu

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

▸ **Displ.channel 1**		
	Display channel 1	→ 226

Display channel 1

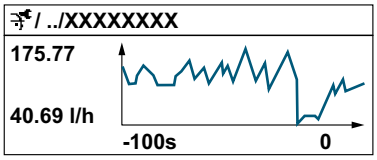
Navigation Expert → Diagnostics → Data logging → Displ.channel 1

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

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

Description Displays the measured value trend for the logging channel in the form of a chart.

Additional information *Description*



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10 Chart of a measured value trend

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

"Displ.channel 2" submenu

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

▸ **Displ.channel 2**		
	Display channel 2	→ 227

Display channel 2

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

Prerequisite A process variable is defined in the **Assign chan. 2** parameter.

Description See the **Display channel 1** parameter → 226

"Displ.channel 3" submenu

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

▸ **Displ.channel 3**		
	Display channel 3	→ 228

Display channel 3

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

Prerequisite A process variable is defined in the **Assign chan. 3** parameter.

Description See the **Display channel 1** parameter → 226

"Displ.channel 4" submenu

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

▸ **Displ.channel 4**		
	Display channel 4	→ 228

Display channel 4

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

Prerequisite A process variable is defined in the **Assign chan. 4** parameter.

Description See the **Display channel 1** parameter → 226

3.8.12 "Heartbeat" submenu

For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring**refer to the Special Documentation for the device → 7

Navigation Expert → Diagnostics → Heartbeat

▸ **Heartbeat**

3.8.13 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation

▸ **Simulation**		
	Assign proc.var. (1810)	→ 229

Proc. var. value (1811)	→ 230
Status inp.sim (1355)	→ 230
Signal level (1356)	→ 231
Curr.inp 1 to n sim. (1608–1 to n)	→ 231
Value curr.inp 1 to n (1609–1 to n)	→ 232
Curr.out. 1 to n sim. (0354–1 to n)	→ 232
Value curr.out 1 to n (0355–1 to n)	→ 233
FreqOutputSim 1 to n (0472–1 to n)	→ 233
Freq value 1 to n (0473–1 to n)	→ 233
Puls.outp.sim. 1 to n (0458–1 to n)	→ 234
Pulse value 1 to n (0459–1 to n)	→ 234
Switch sim. 1 to n (0462–1 to n)	→ 235
Switch status 1 to n (0463–1 to n)	→ 235
Relay out. 1 to n sim (0802–1 to n)	→ 236
Switch status 1 to n (0803–1 to n)	→ 236
Puls.outp.sim. (0988)	→ 237
Pulse value (0989)	→ 237
Dev. alarm sim. (0654)	→ 237
Event category (0738)	→ 238
Diag. event sim. (0737)	→ 238

Assign proc.var.

Navigation Expert → Diagnostics → Simulation → Assign proc.var. (1810)

Description Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- Volume flow
- Correct.vol.flow *
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Methane fraction *
- Molar mass *
- Density *
- Dynam. viscosity *
- Calorific value *
- Wobbe index *
- Energy flow *

Factory setting

Off

Additional information

Description

The simulation value of the process variable selected is defined in the **Proc. var. value** parameter (→ 230).

Proc. var. value

Navigation

Expert → Diagnostics → Simulation → Proc. var. value (1811)

Prerequisite

A process variable is selected in the **Assign proc.var.** parameter (→ 229).

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 (→ 62).

Status inp.sim 1 to n

Navigation

Expert → Diagnostics → Simulation → Status inp.sim 1 to n (1355–1 to n)

Description

Use this function to switch simulation of the status input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

* Visibility depends on order options or device settings

Selection
- Off
- On

Factory setting
Off

Additional information
Description

The desired simulation value is defined in the **Signal level** parameter (→ 231).

Selection
- Off
  Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Simulation for the status input is active.

Signal level 1 to n

Navigation
Expert → Diagnostics → Simulation → Signal level 1 to n (1356–1 to n)

Prerequisite
In the **Status inp.sim** parameter (→ 230), the **On** option is selected.

Description
Use this function to select the signal level for the simulation of the status input. In this way, users can verify the correct configuration of the status input and the correct function of upstream feed-in units.

Selection
- High
- Low

Curr.inp 1 to n sim.

Navigation
Expert → Diagnostics → Simulation → Curr.inp 1 to n sim. (1608–1 to n)

Description
Option for switching simulation of the current input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

The desired simulation value is defined in the **Value curr.inp 1 to n** parameter.

Selection
- Off
- On

Factory setting
Off

Additional information *Selection*

- Off
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Current simulation is active.

Value curr.inp 1 to n

Navigation Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609–1 to n)

Prerequisite In the **Curr.inp 1 to n sim.** parameter, the **On** option is selected.

Description Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.

User entry 0 to 22.5 mA

Curr.out. 1 to n sim.

Navigation Expert → Diagnostics → Simulation → Curr.out. 1 to n sim. (0354–1 to n)

Description Use this function to switch simulation of the current output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Factory setting Off

Additional information *Description*

The desired simulation value is defined in the **Value curr.out 1 to n** parameter.

Selection

- Off
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Current simulation is active.

Value curr.out 1 to n

Navigation Expert → Diagnostics → Simulation → Value curr.out 1 to n (0355–1 to n)

Prerequisite In the **Curr.out. 1 to n sim.** parameter, the **On** option is selected.

Description Use this function to enter a current value for the simulation. In this way, users can verify the correct adjustment of the current output and the correct function of downstream switching units.

User entry 3.59 to 22.5 mA

Additional information *Dependency*

The input range is dependent on the option selected in the **Current span** parameter (→ 109).

FreqOutputSim 1 to n

Navigation Expert → Diagnostics → Simulation → FreqOutputSim 1 to n (0472–1 to n)

Prerequisite In the **Operating mode** parameter (→ 121), the **Frequency** option is selected.

Description Use this function to switch simulation of the frequency output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- On

Factory setting Off

Additional information *Description*

The desired simulation value is defined in the **Freq value 1 to n** parameter.

Selection
- Off
  Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Frequency simulation is active.

Freq value 1 to n

Navigation Expert → Diagnostics → Simulation → Freq value 1 to n (0473–1 to n)

Prerequisite In the **FreqOutputSim 1 to n** parameter, the **On** option is selected.

Description Use this function to enter a frequency value for the simulation. In this way, users can verify the correct adjustment of the frequency output and the correct function of downstream switching units.

User entry 0.0 to 12 500.0 Hz

Puls.outp.sim. 1 to n

Navigation Expert → Diagnostics → Simulation → Puls.outp.sim. 1 to n (0458–1 to n)

Prerequisite In the **Operating mode** parameter (→ 121), the **Pulse** option is selected.

Description Use this function to switch simulation of the pulse output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- Fixed value
- Down-count. val.

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Pulse value 1 to n** parameter.

Selection

- Off
  Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
  Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (→ 124).
- Down-count. val.
  The pulses specified in the **Pulse value** parameter (→ 234) are output.

Pulse value 1 to n

Navigation Expert → Diagnostics → Simulation → Pulse value 1 to n (0459–1 to n)

Prerequisite In the **Puls.outp.sim. 1 to n** parameter, the **Down-count. val.** option is selected.

Description Use this function to enter a pulse value for the simulation. In this way, users can verify the correct adjustment of the pulse output and the correct function of downstream switching units.

User entry 0 to 65 535

Switch sim. 1 to n

Navigation Expert → Diagnostics → Simulation → Switch sim. 1 to n (0462–1 to n)

Prerequisite In the **Operating mode** parameter (→ 121), the **Switch** option is selected.

Description Use this function to switch simulation of the switch output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- On

Factory setting Off

Additional information *Description*

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection
- Off
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Switch simulation is active.

Switch status 1 to n

Navigation Expert → Diagnostics → Simulation → Switch status 1 to n (0463–1 to n)

Description Use this function to select a switch value for the simulation. In this way, users can verify the correct adjustment of the switch output and the correct function of downstream switching units.

Selection
- Open
- Closed

Additional information *Selection*
- Open
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Switch simulation is active.

Relay out. 1 to n sim

Navigation Expert → Diagnostics → Simulation → Relay out. 1 to n sim (0802–1 to n)

Description Use this function to switch simulation of the relay output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- On

Factory setting Off

Additional information *Description*

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection
- Off
  Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Relay simulation is active.

Switch status 1 to n

Navigation Expert → Diagnostics → Simulation → Switch status 1 to n (0803–1 to n)

Prerequisite The **On** option is selected in the **Switch sim. 1 to n** parameter parameter.

Description Use this function to select a relay value for the simulation. In this way, users can verify the correct adjustment of the relay output and the correct function of downstream switching units.

Selection
- Open
- Closed

Additional information *Selection*
- Open
  Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Relay simulation is active.

Puls.outp.sim.

Navigation Expert → Diagnostics → Simulation → Puls.outp.sim. (0988)

Description Use this function to switch simulation of the double pulse output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- Fixed value
- Down-count. val.

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Pulse value** parameter (→ 237).

Selection
- Off
  Simulation of the double pulse output is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
  Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (→ 147).
- Down-count. val.
  The pulses specified in the **Pulse value** parameter (→ 237) are output.

Pulse value

Navigation Expert → Diagnostics → Simulation → Pulse value (0989)

Prerequisite In the **Puls.outp.sim.** parameter (→ 237), the **Down-count. val.** option is selected.

Description Use this function to enter a pulse value for simulation of the double pulse output. In this way, users can verify the correct adjustment of the double pulse output and the correct function of downstream switching units.

User entry 0 to 65 535

Dev. alarm sim.

Navigation Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

Description Use this function to switch the device alarm on and off.

Selection
- Off
- On

Factory setting Off

Additional information *Description*

The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Event category

Navigation Expert → Diagnostics → Simulation → Event category (0738)

Description Use this function to select the category of the diagnostic events that are displayed for the simulation in the **Diag. event sim.** parameter (→ 238).

Selection
- Sensor
- Electronics
- Configuration
- Process

Factory setting Process

Diag. event sim.

Navigation Expert → Diagnostics → Simulation → Diag. event sim. (0737)

Description Use this function to select a diagnostic event for the simulation process that is activated.

Selection
- Off
- Diagnostic event picklist (depends on the category selected)

Factory setting Off

Additional information *Description*

For the simulation, you can choose from the diagnostic events of the category selected in the **Event category** parameter (→ 238).

4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

Mass	kg
Mass flow	kg/h
Volume	m^3
Volume flow	m^3/h
Corrected volume	Nm^3
Corrected volume flow	Nm^3/h
Density	kg/l
Reference density	kg/Nl
Energy	kWh
Energy flow	kW
Calorific value	kWh/Nm^3
Velocity	m/s
Dynamic viscosity	Pa s
Spec. heat capacity	kJ/(kgK)
Temperature	°C
Pressure	mbar a

4.1.2 Full scale values

The factory settings applie to the following parameters:
- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

Nominal diameter [mm]	[m^3/h]
25	50
50	210
80	460
100	800
150	1 800
200	3 200
250	5 000
300	7 100

4.1.3 Output current span

Current output 1 to n	4 to 20 mA NAMUR

4.1.4 Pulse value

Nominal diameter [mm]	[m³/pulse]
25	0.007
50	0.03
80	0.06
100	0.1
150	0.3
200	0.4
250	0.7
300	1.0

4.1.5 On value low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

Nominal diameter [mm]	Switch-on point [m³/h]
25	0.17
50	0.68
80	1.5
100	2.7
150	6.0
200	11
250	17
300	24

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

Mass	lb
Mass flow	lb/min
Volume	ft³
Volume flow	ft³/min
Corrected volume	Sft³
Corrected volume flow	Sft³/h
Density	lb/ft³
Reference density	lb/Sft³
Energy	Btu
Energy flow	Btu/h
Calorific value	Btu/Sft³
Velocity	ft/s

Temperature	°F
Pressure	psi a

4.2.2 Full scale values

The factory settings applie to the following parameters:
- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

Nominal diameter [in]	[ft³/hr]
1	1800
2	7300
3	16000
4	28000
6	64000
8	110000
10	180000
12	250000

4.2.3 Output current span

Current output 1 to n	4 to 20 mA US

4.2.4 Pulse value

Nominal diameter [in]	[ft³/pulse]
1	0.2
2	1
3	2
4	4
6	9
8	16
10	25
12	35

4.2.5 On value low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

Nominal diameter [in]	Switch-on point [ft³/hr]
1	5.9
2	24
3	54
4	94

Nominal diameter [in]	Switch-on point [ft^3/hr]
6	213
8	374
10	588
12	832

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Mass	g, kg, t	Gram, kilogram, metric ton
Mass flow	g/s, g/min	Gram/time unit
	kg/s, kg/min, kg/h, kg/d	Kilogram/time unit
	t/h, t/d	Metric ton/time unit
Volume	cm^3, dm^3, m^3	Cubic centimeter, cubic decimeter, cubic meter
	ml, l	Milliliter, liter
Volume flow	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
	l/s, l/min, l/h, l/d	Liter/time unit
Corrected volume	Nl, Nm^3, Sm^3	Normal liter, normal cubic meter, standard cubic meter
Corrected volume flow	Nl/s, Nl/min, Nl/h, Nl/d	Normal liter/time unit
	Nm^3/s, Nm^3/min, Nm^3/h, Nm^3/d	Normal cubic meter/time unit
	Sm^3/s, Sm^3/min, Sm^3/h, Sm^3/d	Standard cubic meter/time unit
Density	kg/l	Kilogram/liter
Reference density	kg/Nl	Kilogram/standard liter
Energy	kWh, MWh, GWh	Kilowatt hour, megawatt hour, gigawatt hour
	kJ, MJ, GJ	Kilojoule, megajoule, gigajoule
	kcal, Mcal	Kilocalories, megacalories
Energy flow	kW, MW	Kilowatt, megawatt
	kJ/s, kJ/min, kJ/h, kJ/d	Kilojoule/time unit
	MJ/h, MJ/d	Megajoule/time unit
	kcal/s, kcal/min, kcal/h, kcal/d	Kilocalories/time unit
	Mcal/h, Mcal/d	Megacalories/time unit
Calorific value	kWh/Nm^3, kJ/Nm^3	Kilowatt hour/standard cubic meter, kilojoule/ standard cubic meter
	kWh/Sm^3, kJ/Sm^3	Kilowatt hour/standard cubic meter, kilojoule/ standard cubic meter
Velocity	m/s	Meter/time unit
Dynamic viscosity	Pa s	Pascal second
Specific heat capacity	kJ/(kgK)	Kilojoule/(kilogram Kelvin)
Temperature	°C , K	Celsius, Kelvin
Pressure	Pa, kPa, MPa	Pascal, kilopascal, megapascal
	mbar, bar	Millibar, bar
Time	m, h, d, y	Minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Mass	oz, lb, STon	Ounce, pound, standard ton
Mass flow	oz/s, oz/min	Ounce/time unit
	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	STon/h, STon/d	Standard ton/time unit
Volume	ft^3	Cubic foot
Volume flow	ft^3/s, ft^3/min, ft^3/h, ft^3/d	Cubic foot/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
Density	lb/ft^3	Pound/cubic foot
Reference density	lb/Sft^3	Pound/standard cubic foot
Energy	kWh, MWh, GWh	Kilowatt hour, megawatt hour, gigawatt hour
	kJ, MJ, GJ	Kilojoule, megajoule, gigajoule
	kcal, Mcal	Kilocalories, megacalories
Energy flow	kW, MW	Kilowatt, megawatt
	kJ/s, kJ/min, kJ/h, kJ/d	Kilojoule/time unit
	MJ/h, MJ/d	Megajoule/time unit
	kcal/s, kcal/min, kcal/h, kcal/d	Kilocalories/time unit
	Mcal/h, Mcal/d	Megacalories/time unit
Calorific value	kWh/Sft^3, kJ/Sft^3	Kilowatt hour/standard cubic foot, kilojoule/standard cubic foot
Velocity	ft/s	Foot/time unit
Temperature	°F, °R	Fahrenheit, Rankine
Pressure	psi a	Psi absolute
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
Volume	bbl (imp;beer)	Barrel (beer)
Volume flow	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
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/min, MBtu/h, MBtu/d	Thousand British thermal units/time unit
	MMBtu/h, MMBtu/d	Million British thermal units/time unit
Calorific value	Btu/Sm^3, $MBtu/Sm^3$	British thermal unit/standard cubic meter, thousand British thermal units/standard cubic meter

Process variable	Units	Explanation
	Btu/Sft³, MBtu/Sft³	British thermal unit/standard cubic foot, thousand British thermal units/standard cubic foot
Time	m, h, d, y	Minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

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