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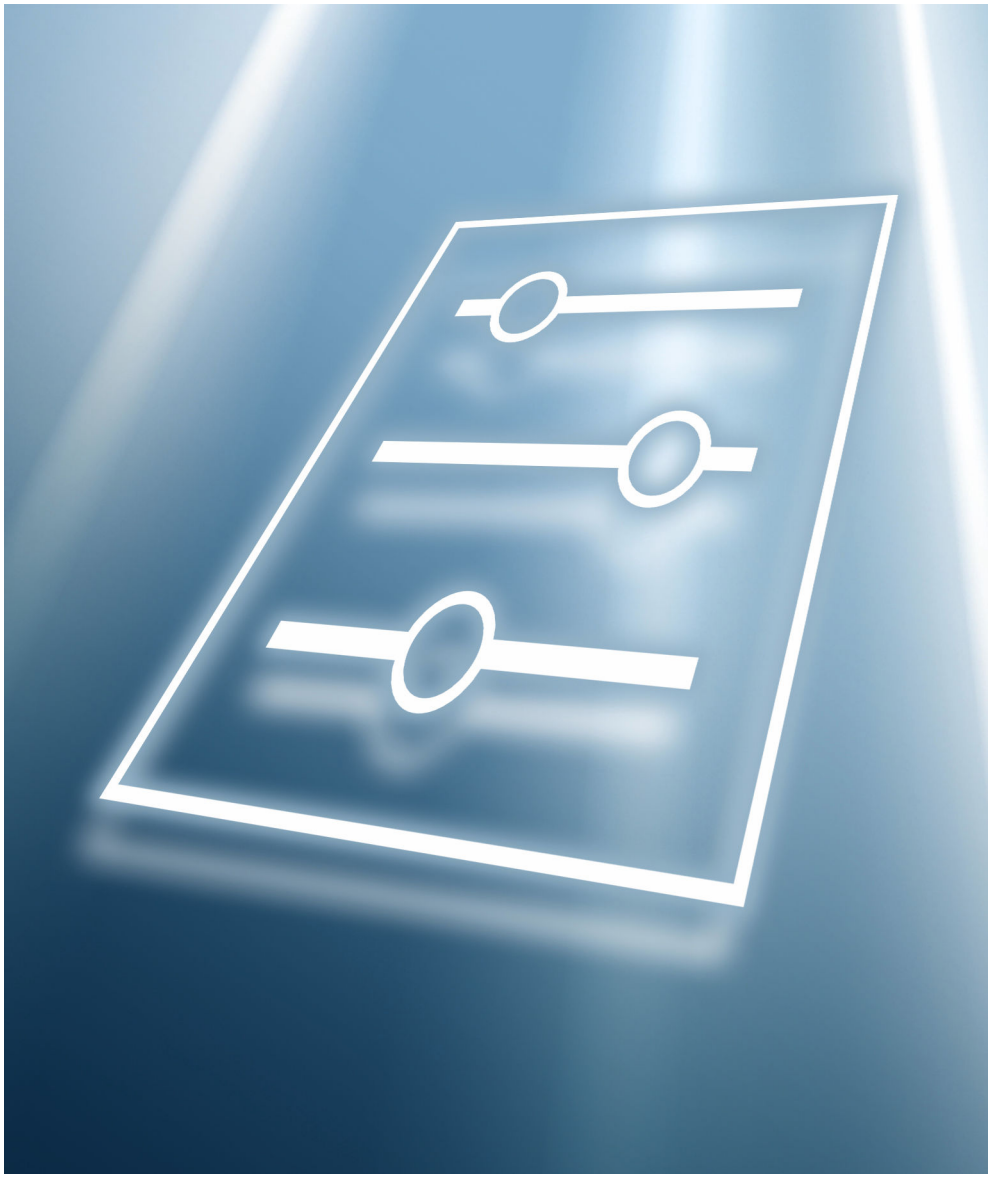
Valid as of version
01.01.zz (Device firmware)

Description of Device Parameters
Proline Prosonic Flow P 500

Ultrasonic time-of-flight flowmeter
Modbus RS485



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

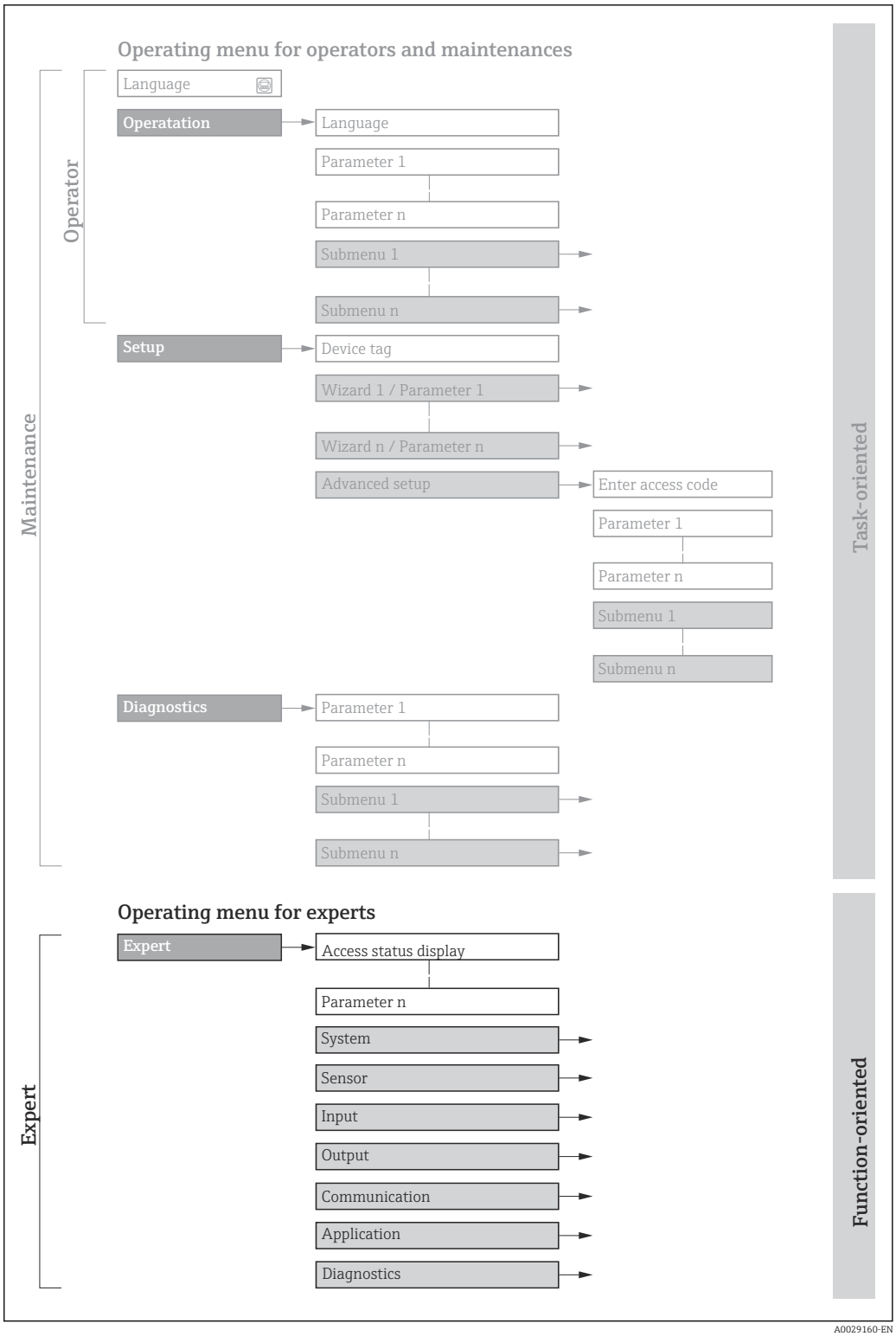
1.2 Target group

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 → 7
- Operating concept of the operating menus: Operating Instructions → 7

1.3.2 Structure of a parameter description

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

Complete parameter name	Write-protected parameter =

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

1.4 Symbols used

1.4.1 Symbols for certain types of information

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

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

Measuring device	Documentation code
Prosonic Flow P 500	BA02026D

1.5.2 Supplementary device-dependent documentation

Special documentation

Contents	Documentation code
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
FlowDC	SD02674D
Heartbeat Technology	SD02594D
Web server	SD02604D

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.

Expert			
	Locking status (0004)		→ 12
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		▶ **Display**	→ 15
		▶ **Configuration backup**	→ 27
		▶ **Diagnostic handling**	→ 30
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		▶ **Process parameters**	→ 75
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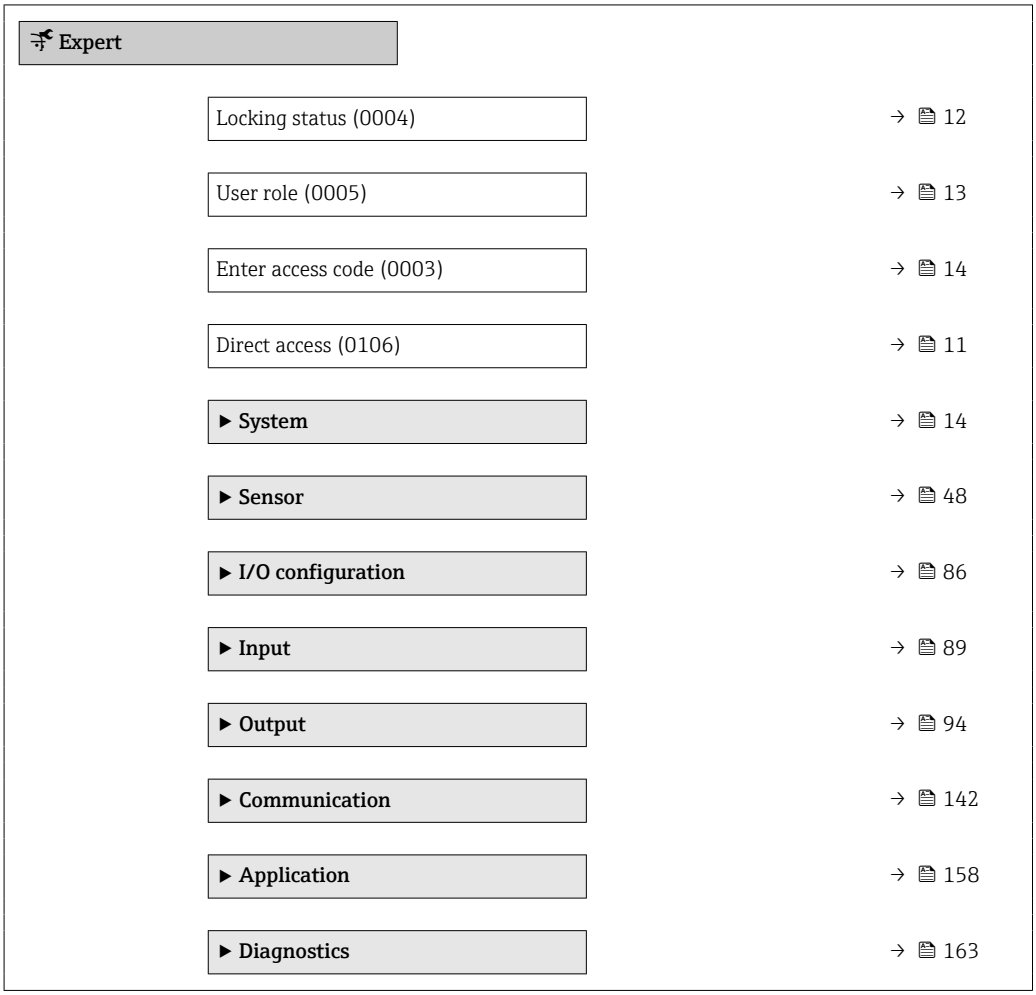
Operating time (0652)	→ 166
▶ **Diagnostic list**	→ 166
▶ **Event logbook**	→ 170
▶ **Device information**	→ 172
▶ **Main electronic module + I/O module 1**	→ 176
▶ **Sensor electronic module (ISEM)**	→ 177
▶ **I/O module 2**	→ 178
▶ **I/O module 3**	→ 179
▶ **Display module**	→ 180
▶ **Data logging**	→ 181
▶ **Heartbeat Technology**	→ 189
▶ **Simulation**	→ 189

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

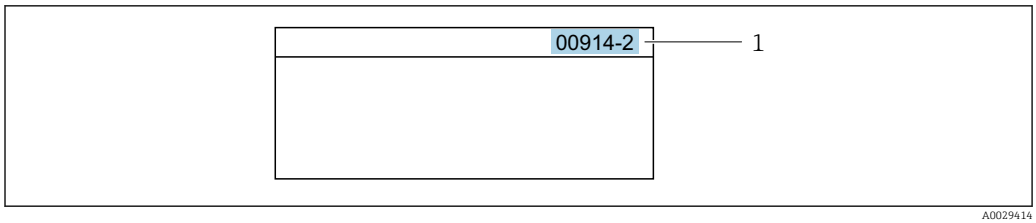
Navigation Expert → Direct access (0106)

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 opened automatically.
  Example: Enter **00914** → **Assign process variable** parameter
- If a different channel is opened: Enter the direct access code with the corresponding channel number.
  Example: Enter **00914-2** → **Assign process variable** parameter

Locking status

Navigation Expert → Locking status (0004)

Description Displays the active write protection.

User interface
- Hardware locked
- Temporarily locked

Additional information

User interface

- **Hardware locked** option
  The DIP switch for the hardware lock is enabled. As a result write access to the parameters is locked.
- **Temporarily locked** option
  Due to internal procedures that are currently in progress (e.g. data upload/download, reset, etc.), write access to the parameters is temporarily locked.The parameters can be modified again, once the internal procedures are complete.

User interface

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

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

Selection

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

User role

Navigation Expert → User role (0005)

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

User interface

- Operator
- Maintenance

Additional information

User interface

- **Operator** option
  Provides only read access to parameters.
- **Maintenance** option
  Provides read and write access to parameters.
  Additional information:
  For some parameters, the user must be logged on in the Service role to obtain write access.

Description

Access authorization can be modified via the **Enter access code** parameter (→ 14).

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

User interface

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

Enter access code

Navigation Expert → Ent. access code (0003)

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

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

3.1 "System" submenu

Navigation Expert → System

▶ System	
▶ Display	→ 15
▶ Configuration backup	→ 27
▶ Diagnostic handling	→ 30
▶ Administration	→ 43

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 (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- Bahasa Indonesia
- tiếng Việt (Vietnamese)
- čeština (Czech)

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

Format display

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

Prerequisite A local display is provided.

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

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

Factory setting 1 value, max. size

Additional information

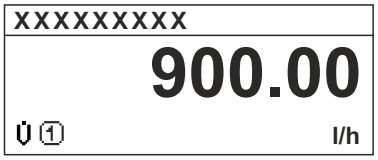
Description

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

- The **Value 1 display** parameter (→ 19) to **Value 4 display** parameter (→ 24) 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).

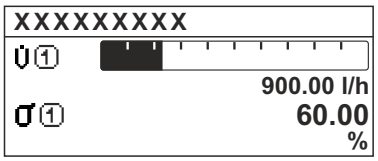
Possible measured values shown on the local display:

"1 value, max. size" option



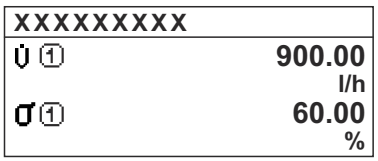
A0016529

"1 bargraph + 1 value" option



A0016530

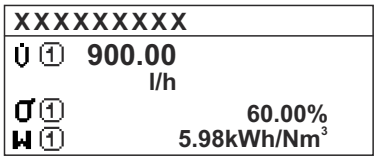
"2 values" option



A0016531

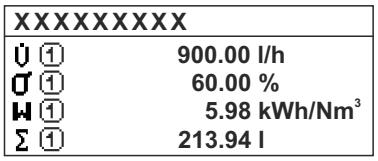
2

"1 value large + 2 values" option



A0016532

"4 values" option



A0016533

Value 1 display

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

Prerequisite A local display is provided.

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

Selection
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Electronics temperature
- Acceptance rate *
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current output 1 *
- Current output 2 *
- Current output 3 *
- Current 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 (→ 16) is used to specify how many measured values are displayed simultaneously and how.

Dependency

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

0% bargraph value 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

Factory setting Country-dependent

* Visibility depends on order options or device settings

Additional information

Description

The **Format display** parameter (→ 16) is used to specify that the measured value is to be displayed as a bar graph.

User entry

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

100% bargraph value 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information

Description

The **Format display** parameter (→ 16) is used to specify that the measured value is to be displayed as a bar graph.

User entry

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

Decimal places 1

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

Prerequisite A measured value is defined in the **Value 1 display** parameter (→ 19).

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
- Mass flow
- Flow velocity
- Sound velocity
- Turbulence *
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Electronics temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current output 1 *
- Current output 2 *
- Current output 3 *
- Current output 4 *

Additional information *Description*

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

The **Format display** parameter (→ 16) is used to specify how many measured values are displayed simultaneously and how.

Dependency

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

Decimal places 2

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

Prerequisite A measured value is specified in the **Value 2 display** parameter (→ 21).

* Visibility depends on order options or device settings

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

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

Additional information *Description*

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

Value 3 display

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

Prerequisite A local display is provided.

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

Selection For the picklist, see the **Value 2 display** parameter (→ 21)

Additional information *Description*

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

The **Format display** parameter (→ 16) is used to specify how many measured values are displayed simultaneously and how.

Selection

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

0% bargraph value 3

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

Prerequisite A selection was made in the **Value 3 display** parameter (→ 22).

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 (→ 16) is used to specify that the measured value is to be displayed as a bar graph.

User entry

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

100% bargraph value 3

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

Prerequisite A selection was made in the **Value 3 display** parameter (→ 22).

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

User entry Signed floating-point number

Additional information *Description*

The **Format display** parameter (→ 16) is used to specify that the measured value is to be displayed as a bar graph.

User entry

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

Decimal places 3

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

Prerequisite A measured value is specified in the **Value 3 display** parameter (→ 22).

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

Selection

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

Additional information *Description*

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

Value 4 display

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

Prerequisite A local display is provided.

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

Selection For the picklist, see the **Value 2 display** parameter (→ 21)

Additional information *Description*

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

The **Format display** parameter (→ 16) is used to specify how many measured values are displayed simultaneously and how.

Selection

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

Decimal places 4

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

Prerequisite A measured value is specified in the **Value 4 display** parameter (→ 24).

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

Selection

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

Additional information *Description*

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

Display interval

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

Prerequisite A local display is provided.

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

User entry 1 to 10 s

Additional information *Description*

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

- The **Value 1 display** parameter (→ 19) to **Value 4 display** parameter (→ 24) are used to specify which measured values are shown on the local display.
- The display format of the displayed measured values is specified using the **Format display** parameter (→ 16).

Display damping

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

Prerequisite A local display is provided.

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

User entry 0.0 to 999.9 s

Additional information *User entry*

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

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

Header

Navigation Expert → System → Display → Header (0097)

Prerequisite A local display is provided.

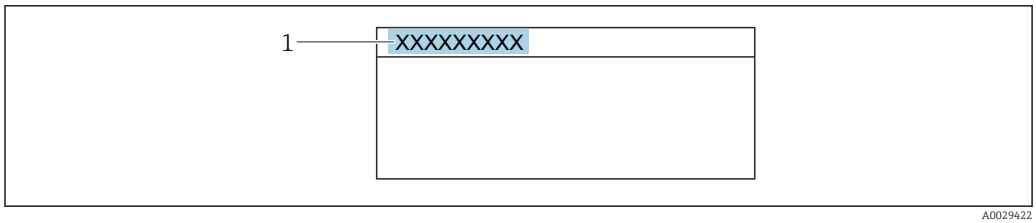
Description Use this function to select the contents of the header of the local display.

Selection
- Device tag
- Free text

Additional information *Description*

The header text only appears during normal operation.

1) 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 (→ 173).
- Free text
  Is defined in the **Header text** parameter (→ 26).

Header text

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

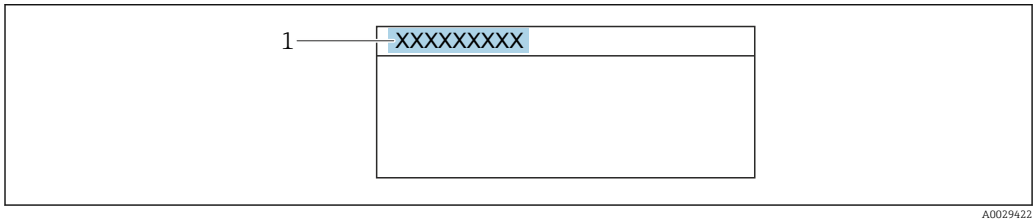
Prerequisite In the **Header** parameter (→ 25), the **Free text** option is selected.

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. @, %, /)

Additional information *Description*

The header text only appears during normal operation.



1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator

Navigation Expert → System → Display → Separator (0101)

Prerequisite A local display is provided.

Description Use this function to select the decimal separator.

Selection
- . (point)
- , (comma)

Factory setting . (point)

Contrast display

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

Prerequisite A local display is provided.

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

User entry 20 to 80 %

Factory setting Depends on the display

Backlight

Navigation Expert → System → Display → Backlight (0111)

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

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

Selection
- Disable
- Enable

3.1.2 "Configuration backup" submenu

Navigation Expert → System → Config. backup

▶ Configuration backup	
Operating time (0652)	→ 28
Last backup (2757)	→ 28
Configuration management (2758)	→ 28

Backup state (2759)	→ 29
Comparison 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)

Configuration management

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

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

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

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

HistoROM

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

Backup state

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

Description Displays the status of the data backup process.

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

Comparison result

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

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

User interface
- Settings identical
- Settings not identical
- No backup available

- Backup settings corrupt
- Check not done
- Dataset incompatible

Additional information

Description

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

Selection

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

HistoROM

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

3.1.3 "Diagnostic handling" submenu

Navigation Expert → System → Diagn. handling

▶ **Diagnostic handling**	
Alarm delay (0651)	→ 31
▶ **Diagnostic 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

Additional information *Result*

This setting affects the following diagnostic messages:
- 832 Electronics temperature too high
- 833 Electronics temperature too low
- ⚠S840 Sensor range
- ⚠S870 Measuring inaccuracy increased

"Diagnostic behavior" submenu

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

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

Options	Description
Alarm	The device stops measurement. The measured value output via Modbus RS485 and the totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.
Warning	The device continues to measure. The measured value output via Modbus RS485 and the totalizers are not affected. A diagnostic message is generated.
Logbook entry only	The device continues to measure. The diagnostic message is displayed only in the **Event logbook** submenu (→ 170) (**Event list** submenu (→ 171)) 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

▶ **Diagnostic behavior**

Assign behavior of diagnostic no. 160 (0776)	→ 32
Assign behavior of diagnostic no. 302 (0742)	→ 33

Assign behavior of diagnostic no. 441 (0657)	→ 33
Assign behavior of diagnostic no. 442 (0658)	→ 34
Assign behavior of diagnostic no. 443 (0659)	→ 35
Assign behavior of diagnostic no. 444 (0740)	→ 35
Assign behavior of diagnostic no. 543 (0643)	→ 36
Assign behavior of diagnostic no. 832 (0675)	→ 37
Assign behavior of diagnostic no. 833 (0676)	→ 37
Assign behavior of diagnostic no. 840 (0680)	→ 38
Assign behavior of diagnostic no. 842 (0638)	→ 39
Assign behavior of diagnostic no. 870 (0726)	→ 39
Assign behavior of diagnostic no. 930 (0639)	→ 41
Assign behavior of diagnostic no. 931 (0640)	→ 41

Assign behavior of diagnostic no. 160 (Signal path switched off)

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

Description Use this function to change the diagnostic behavior of the **160 Signal path switched off** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Warning
- Logbook entry only

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

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information

Selection

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Selection

Detailed description of the options available for selection: → 31

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

Navigation

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

Prerequisite

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

Description

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

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information

Selection

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 443 (Pulse output)

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Selection

Detailed description of the options available for selection: → 31

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

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

Prerequisite The device has one current input.

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 543 (Double pulse output)

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

Description Use this function to change the diagnostic behavior of the **543 Double pulse output** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information

Selection

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Selection

Detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 840 (Sensor range)

Navigation

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

Description

Use this function to change the diagnostic behavior of the **840 Sensor range** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information

Selection

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 842 (Process limit)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information

Selection

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Selection

Detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 881 (Sensor signal path 1 to n)

Navigation

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

Description

Use this function to change the diagnostic behavior of the **881 Sensor signal path 1 to n** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information

Selection

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 930 (Process fluid)

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

Description Use this function to change the diagnostic behavior of the ⚠**S930 Process fluid** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 931 (Process fluid)

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

Description Use this function to change the diagnostic behavior of the ⚠**S931 Process fluid** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 953 (Asymmetry noise signal too high path 1 to n)

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

Description Use this function to change the diagnostic behavior of the ⚠**M953 Asymmetry noise signal too high path 1 to n** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Detailed description of the options available for selection: → 31

3.1.4 "Administration" submenu

Navigation Expert → System → Administration

▶ **Administration**		
	▶ **Define access code**	→ 43
	▶ **Reset access code**	→ 44
	Device reset (0000)	→ 45
	Transmitter identifier (2765)	→ 47
	Activate SW option (0029)	→ 47
	Software option overview (0015)	→ 48

"Define access code" wizard

The **Define access code** wizard (→ 43) is only available when operating via the local display or Web browser.

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

Navigation Expert → System → Administration → Def. access code

▶ **Define access code**		
	Define access code	→ 43
	Confirm access code	→ 44

Define access code

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

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

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

Additional information *Description*

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

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

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

Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the **Enter access code** parameter (→ 📄 14).

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

User entry

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

Factory setting

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

Confirm access code 🔒

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

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

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

"Reset access code" submenu

Navigation Expert → System → Administration → Reset acc. code

▶ **Reset access code**		
	Operating time (0652)	→ 📄 44
	Reset access code (0024)	→ 📄 45

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 access 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

Additional information *Description*

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

User entry

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

Additional parameters in the "Administration" submenu

Device reset

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

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

Selection
- Cancel
- To delivery settings
- Restart device

Additional information

Selection

- **To delivery settings** option
  Every parameter for which a customer-specific default setting was ordered is reset to the customer-specific value. All other parameters are reset to the factory setting.
- **Restart device** option
  The restart resets every parameter with data stored in volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.
- **Delete powerfail data** option
  Deletes the powerfail data segment in the T-DAT or (if applicable) the T-DAT partition of the S-DAT.
  Additional information:
  This function resolves the following memory content error: "283 Memory content inconsistent" with Service ID 225 and Service ID 721.
- **Delete T-DAT** option
  Deletes the T-DAT or (if applicable) the T-DAT partition of the S-DAT. On performing this delete operation, all parameters on the T-DAT are reset to the default values.
  Additional information:
  This function can be used to resolve any memory content issue on the T-DAT.
  NOTE
  The powerfail data and device delivery settings will no longer be available on performing this delete operation!
- **Reset faulty parameters** option
  Resets all faulty parameters to default values when the following memory content error occurs: "283 Memory content inconsistent" with Service ID 367.
  Additional information:
  Only faulty parameters are reset. All parameters that are reset are logged in the logbook.
- **Delete delivery settings** option
  Deletes the delivery settings on the T-DAT or (if applicable) T-DAT partition of the S-DAT.
  Additional information:
  This function resolves the following memory content error: "311 Sensor electronics (ISEM) faulty" with Service ID 226.
  NOTE
  The device delivery settings will no longer be available on performing this delete operation!

Selection

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

Transmitter identifier

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

Description Select transmitter identifier.

User interface
- Unknown
- 500
- 300

Factory setting 500

Activate SW option

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

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

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

Factory setting Depends on the software option ordered

Additional information

Description

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

User entry

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

NOTE!

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

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

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

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

▸ Once the activation code has been entered, check if the new software option is displayed in the **Software option overview** parameter (→ 48).

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

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

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

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

Example for a software option

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 48).

Web browser

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

Software option overview

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

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

User interface
- Extended HistoROM
- Heartbeat Verification
- FlowDC - **Flow disturbance compensation** option
- Heartbeat Monitoring

Additional information

Description

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

"Extended HistoROM" option

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

"Heartbeat Verification" option and "Heartbeat Monitoring" option

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

"Flow disturbance compensation" option

This option is available by default if 2 sensor pairs have been ordered.

3.2 "Sensor" submenu

Navigation Expert → Sensor

▸ **Sensor**	
▸ **Measured values**	→ 49
▸ **System units**	→ 60

▶ Measuring point 1	→ 📄 67
▶ Process parameters	→ 📄 75
▶ External compensation	→ 📄 79
▶ Sensor adjustment	→ 📄 81
▶ Calibration	→ 📄 85

3.2.1 "Measured values" submenu

Navigation Expert → Sensor → Measured val.

▶ Measured values	
▶ Process variables	→ 📄 49
▶ System values	→ 📄 51
▶ Totalizer	→ 📄 52
▶ Input values	→ 📄 54
▶ Output values	→ 📄 55

"Process variables" submenu

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

▶ Process variables	
Volume flow (1838)	→ 📄 49
Mass flow (1847)	→ 📄 50
Flow velocity (1852)	→ 📄 50
Sound velocity (1850)	→ 📄 50

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 (→ 61)

Mass flow

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

Description Displays the mass flow that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

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

Flow velocity

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

Description Displays the average flow velocity that is currently calculated.

User interface Signed floating-point number

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 (→ 64)

"System values" submenu

Navigation Expert → Sensor → Measured val. → System values

▶ System values	
Signal strength (2914)	→ 📄 51
Signal to noise ratio (2917)	→ 📄 51
Acceptance rate (2912)	→ 📄 52
Turbulence (2907)	→ 📄 52

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 process changes, such as the development of deposits in the measuring pipe at the measuring point. This can only be quantified by performing a direct process comparison with different deposit layer thicknesses and associated signal strengths.

Signal to noise ratio

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.

"Totalizer" submenu

Navigation Expert → Sensor → Measured val. → Totalizer

▶ **Totalizer**		
	Totalizer value 1 to n (0911–1 to n)	→ 52
	Totalizer overflow 1 to n (0910–1 to n)	→ 53

Totalizer value 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 process variable** parameter (→ 159) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass 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 **Totalizer overflow 1 to n** parameter if the display range is exceeded.

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 162).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Totalizer operation mode** parameter (→ 161).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 160).

Example

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

Totalizer 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 process variable** parameter (→ 159) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass 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 value 1 to n** parameter.

User interface

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 160).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
- Value in the **Totalizer value 1** parameter: 1 968 457 m^3
- Value in the **Totalizer 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**	→ 54
▶ **Value status input 1 to n**	→ 55

"Current input 1 to n" submenu

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

▶ **Current input 1 to n**	
Measured values 1 to n (1603–1 to n)	→ 54
Measured current 1 to n (1604–1 to n)	→ 55

Measured values 1 to n

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

Description Displays the current input value.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Pressure unit** parameter

Measured current 1 to n

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

Description Displays the current value of the current input.

User interface 0 to 22.5 mA

"Value status input 1 to n" submenu

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

▶ **Value status input 1 to n**		
	Value status input (1353–1 to n)	→ 55

Value status input

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

Description Displays the current input signal level.

User interface
- High
- Low

"Output values" submenu

Navigation Expert → Sensor → Measured val. → Output values

▶ **Output values**		
	▶ **Value current output 1 to n**	→ 56

▶ **Pulse/frequency/switch output 1 to n**	→ 📄 57
▶ **Relay output 1 to n**	→ 📄 58
▶ **Double pulse output**	→ 📄 60

"Value current output 1 to n" submenu

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

▶ **Value current output 1 to n**	
Output current 1 to n (0361–1 to n)	→ 📄 56
Measured current 1 to n (0366–1 to n)	→ 📄 56

Output current 1 to n

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

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

User interface 0 to 22.5 mA

Measured current 1 to n

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

Description Displays 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

▶ **Pulse/frequency/switch output 1 to n**		
	Output frequency 1 to n (0471–1 to n)	→ 📄 57
	Pulse output 1 to n (0456–1 to n)	→ 📄 57
	Switch status 1 to n (0461–1 to n)	→ 📄 58

Output frequency 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 📄 111), 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)

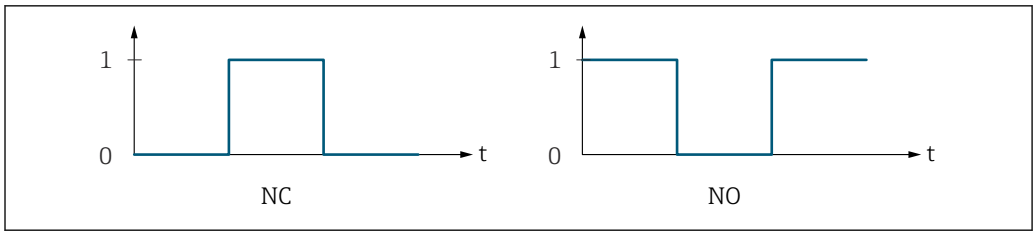
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 📄 111) parameter.

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 output signal** parameter (→ 130) 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 (→ 115)) 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 (→ 111).

Description Displays the current switch status of the status output.

User interface
- Open
- Closed

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

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)	→ 59
Switch cycles (0815–1 to n)	→ 59
Max. switch cycles number (0817–1 to n)	→ 59

Switch status

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

Description Displays the current status of the relay output.

User interface
- Open
- Closed

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

Switch cycles

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

Description Displays all the switch cycles performed.

User interface Positive integer

Max. switch cycles number

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

Description Displays the maximum number of guaranteed switch cycles.

User interface Positive integer

"Double pulse output" submenu

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

▶ Double pulse output	
Pulse output (0987)	→ 60

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 (→ 57)

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units

▶ System units	
Volume flow unit (0553)	→ 61
Volume unit (0563)	→ 63
Mass flow unit (0554)	→ 63
Mass unit (0574)	→ 64
Velocity unit (0566)	→ 64
Temperature unit (0557)	→ 65
Density unit (0555)	→ 65
Kinematic viscosity unit (0578)	→ 66

Length unit (0551)	→ 📄 66
Date/time format (2812)	→ 📄 67

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/min

Additional information

Result

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

Selection

For an explanation of the abbreviated units: → 201

Customer-specific units

The unit for the customer-specific volume is specified in the **User 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
- dm^3
- m^3
- ml
- l
- hl
- Ml Mega

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

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

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

Additional information

Selection

For an explanation of the abbreviated units: → 201

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/min

Additional information

Result

The selected unit applies for:
Mass flow parameter

Selection

For an explanation of the abbreviated units: → 201

Mass unit

Navigation

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

Description

Use this function to select the unit for the mass.

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

Factory setting

Country-specific:
- kg
- lb

Additional information

Selection

For an explanation of the abbreviated units: → 201

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
m/s

US units
ft/s

Factory setting

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

Additional information

Result

The selected unit applies for:
- Flow velocity (→ 📄 50)
- Sound velocity (→ 📄 50)

Selection

For an explanation of the abbreviated units: → 📄 201

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
- Electronic temperature
- External temperature
- Reference temperature

Selection

For an explanation of the abbreviated units: → 📄 201

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/dm³
- lb/ft³

Additional information

Selection

For an explanation of the abbreviated units: → 📄 201

Kinematic viscosity unit

Navigation Expert → Sensor → System units → Kin. visc. unit (0578)

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

Selection

SI units
- cSt
- m²/s
- St

Factory setting

Country-specific:
- m²/s
- cSt

Length unit

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

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

Selection

SI units
- m
- mm

US units
- ft
- in

Factory setting

Country-specific:
- mm
- in

Additional information *Selection*

For an explanation of the abbreviated units: → 201

Date/time format

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

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

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

Additional information *Selection*

For an explanation of the abbreviated units: → 201

3.2.3 "Measuring point" wizard

Navigation Expert → Sensor → Meas. point 1

▶ Measuring point 1	
Measuring point configuration (5675–1)	→ 68
Process fluid (2926–1)	→ 69
Medium temperature (3053–1)	→ 69
Sound velocity (2929–1)	→ 69
Viscosity (2932–1)	→ 69
Pipe material (2927–1)	→ 70
Pipe sound velocity (2933–1)	→ 70
Pipe dimensions (2943–1)	→ 70
Pipe circumference (2934–1)	→ 71
Pipe outer diameter (2910–1)	→ 71

Measuring point configuration

Navigation Expert → Sensor → Meas. point 1 → Meas. pt config. (5675–1)

Description Displays the measuring point configuration. The measuring point has either 1 or 2 measuring paths depending on the sensor version.

Selection
- 1 measuring point - signal path 1
- 1 measuring point - signal path 2 *
- 1 measuring point - 2 signal paths *

Factory setting Depending on the sensor version

* Visibility depends on order options or device settings

Process fluid

Navigation Expert → Sensor → Meas. point 1 → Process fluid (2926–1)

Description Select process fluid.

Selection
- Water
- Sea water
- Distilled water
- Ammonia NH3
- Benzene
- Ethanol
- Glycol
- Kerosene
- Milk
- Methanol
- User-specific liquid

Factory setting Water

Medium temperature

Navigation Expert → Sensor → Meas. point 1 → Medium temp. (3053–1)

Description Enter a fixed value for process temperature.

User entry –200 to 550 °C

Sound velocity

Navigation Expert → Sensor → Meas. point 1 → Sound velocity (2929–1)

Prerequisite The **User-specific liquid** option is selected in the **Process fluid** parameter (→ 69).

Description Enter sound velocity of fluid.

User entry 200 to 3 000 m/s

Viscosity

Navigation Expert → Sensor → Meas. point 1 → Viscosity (2932–1)

Prerequisite The **User-specific liquid** option is selected in the **Process fluid** parameter (→ 69).

Description Enter medium viscosity at installation temperature.

User entry 1E-10 to 0.01 m^2/s

Pipe material

Navigation Expert → Sensor → Meas. point 1 → Pipe material (2927–1)

Description Select pipe material.

Selection
- Carbon steel
- Ductile cast iron
- Stainless steel
- 1.4301 (UNS S30400)
- 1.4401 (UNS S31600)
- 1.4550 (UNS S34700)
- Hastelloy C
- PVC
- PE
- LDPE
- HDPE
- GRP
- PVDF
- PA
- PP
- PTFE
- Pyrex glass
- Asbestos cement
- Copper
- Unknown pipe material

Pipe sound velocity

Navigation Expert → Sensor → Meas. point 1 → Pipe sound vel. (2933–1)

Prerequisite The **Unknown pipe material** option is selected in the **Pipe material** parameter (→ 70).

Description Enter sound velocity of pipe material.

User entry 800.0 to 3 800.0 m/s

Pipe dimensions

Navigation Expert → Sensor → Meas. point 1 → Pipe dimensions (2943–1)

Description Select if pipe dimensions are defined by diameter or circumference.

Selection
- Diameter
- Pipe circumference

Pipe circumference

Navigation Expert → Sensor → Meas. point 1 → Pipe circumfer. (2934–1)

Prerequisite The **Pipe circumference** option is selected in the **Pipe dimensions** parameter (→ 70).

Description Define the pipe circumference.

User entry 30 to 62 800 mm

Pipe outer diameter

Navigation Expert → Sensor → Meas. point 1 → Pipe outer diam. (2910–1)

Prerequisite The **Diameter** option is selected in the **Pipe dimensions** parameter (→ 70).

Description Define the outer diameter of the pipe.

User entry 10 to 5 000 mm

Factory setting 100 mm

Pipe wall thickness

Navigation Expert → Sensor → Meas. point 1 → Wall thickness (2916–1)

Description Enter the pipe wall thickness.

User entry Positive floating point number

Factory setting 3 mm

Liner material

Navigation Expert → Sensor → Meas. point 1 → Liner material (2928–1)

Description Select liner material.

Selection
- None
- Cement
- Rubber
- Epoxy resin
- Unknown liner material

Liner sound velocity

Navigation Expert → Sensor → Meas. point 1 → Liner sound vel. (2936–1)

Prerequisite The **Unknown liner material** option is selected in the **Liner material** parameter (→ 71).

Description Define the sound velocity of liner material.

User entry 800.0 to 3 800.0 m/s

Liner thickness

Navigation Expert → Sensor → Meas. point 1 → Liner thickness (2935–1)

Prerequisite One of the following options is selected in the **Liner material** parameter (→ 71):
- Cement
- Rubber
- Epoxy resin
- Unknown liner material

Description Define the thickness of liner.

User entry 0 to 100 mm

Sensor type

Navigation Expert → Sensor → Meas. point 1 → Sensor type (2924–1)

Description Select sensor type.

Selection
- C-030-A *
- C-050-A *
- C-100-A *
- C-100-B *
- C-100-C *
- C-200-A *
- C-200-B *
- C-200-C *
- C-500-A *

Factory setting As per order

* Visibility depends on order options or device settings

Sensor coupling

Navigation Expert → Sensor → Meas. point 1 → Sensor coupling (2957–1)

Description Select coupling medium.

Selection
- Coupling pad
- Coupling paste

Mounting type

Navigation Expert → Sensor → Meas. point 1 → Mounting type (2938–1)

Description
- **(1) direct** option: sensor arrangement with 1 traverse
- **(2) V-mounting** option: sensor arrangement with 2 traverses
- **(3) Z-Mounting** option: sensor arrangement with 3 traverses
- **(4) W-mounting** option: sensor arrangement with 4 traverses

Selection
- (1) direct
- (2) V-mounting
- (3) Z-Mounting
- (4) W-mounting
- Automatic

Factory setting Automatic

Cable length

Navigation Expert → Sensor → Meas. point 1 → Cable length (2939–1)

Description Enter length of sensor cables.

User entry 0 to 200 000 mm

Factory setting As per order

Inlet configuration

Navigation Expert → Sensor → Meas. point 1 → Inlet config. (3049–1)

Prerequisite The **1 measuring point - 2 signal paths** option is selected in the **Measuring point configuration** parameter (→ 68).

Description Select inlet configuration.

Selection

- Off
- Single elbow
- Double elbow
- Double elbow 3D
- Concentric diameter change

Inlet diameter

Navigation Expert → Sensor → Meas. point 1 → Inlet diameter (3054–1)

Prerequisite

- The **1 measuring point - 2 signal paths** option is selected in the **Measuring point configuration** parameter (→ 68).
- The **Concentric diameter change** option is selected in the **Inlet configuration** parameter (→ 73).

Description Enter the outer diameter of the pipe before the cross-section change. For convenience, the same measuring pipe wall thickness as for the clamp-on system is applied.

User entry 1 to 10 000 mm

Transition length

Navigation Expert → Sensor → Meas. point 1 → Transit. length (3065–1)

Prerequisite

- The **1 measuring point - 2 signal paths** option is selected in the **Measuring point configuration** parameter (→ 68).
- The **Concentric diameter change** option is selected in the **Inlet configuration** parameter (→ 73).

Description Enter length of the concentric diameter change.

User entry 0 to 10 000 mm

Inlet run

Navigation Expert → Sensor → Meas. point 1 → Inlet run (3050–1)

Prerequisite The **1 measuring point - 2 signal paths** option is selected in the **Measuring point configuration** parameter (→ 68).

Description Enter length of the available straight inlet run.

User entry 0 to 50 000 mm

Relative sensor position

Navigation Expert → Sensor → Meas. point 1 → Rel. sensor pos. (2985–1)

Prerequisite The **1 measuring point - 2 signal paths** option is selected in the **Measuring point configuration** parameter (→ 68).

Description Shows the correct position for the sensor.

User interface
- 90°
- 180°

Factory setting –

Result sensor type / mounting type

Navigation Expert → Sensor → Meas. point 1 → Sensor/mounting (2946–1)

Description Shows the selected sensor type and (if applicable automatically) selected mounting type.

User interface e.g. **C-100-A** option / **(2) V-mounting** option

Result sensor distance / measuring aid

Navigation Expert → Sensor → Meas. point 1 → Dist./meas. aid (2947–1)

Description Shows the calculated sensor distance and vernier or wire length (if applicable) required for installation.

User interface e.g. 201.3 mm / B 21

3.2.4 "Process parameters" submenu

Navigation Expert → Sensor → Process param.

▶ **Process parameters**	
Flow override (1839)	→ 76
Flow damping (1802)	→ 76
▶ **Low flow cut off**	→ 77

Flow override

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

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

Selection
- Off
- On

Additional information

Selection

"On" option
Activates flow override. The diagnostic message "453 Flow override active" is generated.

Additional information:
Output values:
- Temperature: Measurement continues
- Totalizers 1 to 3: No longer totalize

Description

Flow override is active
- The **453 Flow override** diagnostic message is output.
- Output values
  - Temperature: 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 status input** parameter (→ 92).

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 → 94
- Low flow cut off → 77
- Totalizers → 159

"Low flow cut off" submenu

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

▶ Low flow cut off	
Assign process variable (1837)	→ 77
On value low flow cutoff (1805)	→ 78
Off value low flow cutoff (1804)	→ 78

Assign process variable

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

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

Selection
- Off
- Volume flow
- Mass flow
- Flow velocity

2) Proportional behavior with first-order lag

On value low flow cutoff

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

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 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 → 78.

User entry Positive floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Dependency*

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

Off value low flow cutoff

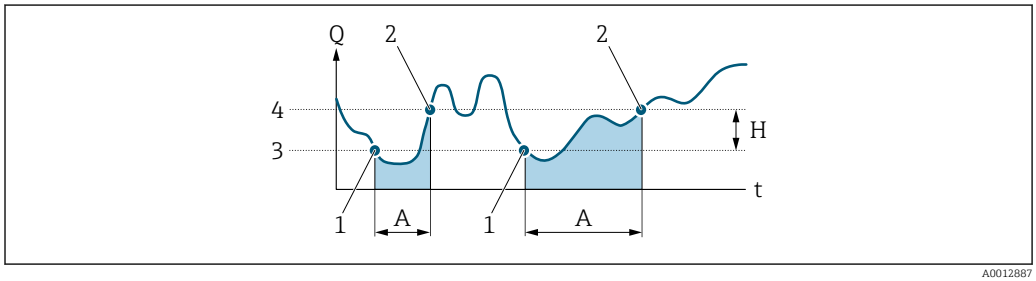
Navigation Expert → Sensor → Process param. → Low flow cut off → Off value (1804)

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 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→ 78.

User entry 0 to 100.0 %

Additional information *Example*



A0012887

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

3.2.5 "External compensation" submenu

Navigation Expert → Sensor → External comp.

▶ External compensation	
External temperature (3058)	→ 79
Density source (3048)	→ 79
Fixed density (3171)	→ 80
External density (3060)	→ 80
Fixed reference density (3178)	→ 80
Linear expansion coefficient (3153)	→ 81
Square expansion coefficient (3172)	→ 81
Reference temperature (3147)	→ 81

External temperature

Navigation Expert → Sensor → External comp. → External temp. (3058)

Prerequisite The **Calculated value** option is selected in the **Density source** parameter (→ 79) and the **Fixed value** option is selected in the **Temperature compensation** parameter.

Description Shows the external process temperature read in from the external device.

User entry −273.15 to 99 999 °C

Density source

Navigation Expert → Sensor → External comp. → Density source (3048)

Description Select source of the density for the density compensation.

Selection
- Fixed density
- External density *
- Calculated value

* Visibility depends on order options or device settings

- Current input 1 *
- Current input 2 *
- Current input 3 *

Fixed density

Navigation Expert → Sensor → External comp. → Fixed density (3171)

Description Enter fixed value for medium density.

User entry 0.01 to 15 000 kg/m³

External density

Navigation Expert → Sensor → External comp. → External density (3060)

Description Shows the density read in from the external device.

User entry Positive floating-point number

Fixed reference density

Navigation Expert → Sensor → External comp. → Fix ref.density (3178)

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

User entry 0.01 to 15 000 kg/m³

Additional information *To calculate the reference density*

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

A0044558

- ρ: density currently used to calculate the mass flow
- ρ_N: reference density
- t: temperature currently read in or fixed temperature as per setting **Temperature compensation** parameter
- t_N: reference temperature at which the reference density applies (e.g. 20 °C)
- Δt: $t - t_N$
- α: linear expansion coefficient of the medium, unit = [1/K]; K = Kelvin
- β: square expansion coefficient of the medium, unit = [1/K²]

* Visibility depends on order options or device settings

Linear expansion coefficient

Navigation Expert → Sensor → External comp. → Linear exp coeff (3153)

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

User entry $1.0 \cdot 10^{-6}$ to $2.0 \cdot 10^{-3}$

Square expansion coefficient

Navigation Expert → Sensor → External comp. → Square exp coeff (3172)

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

User entry $1.0 \cdot 10^{-8}$ to $2.0 \cdot 10^{-3}$

Reference temperature

Navigation Expert → Sensor → External comp. → Ref. temperature (3147)

Description Use this function to enter the reference temperature for which the Fixed reference density (→ 80) applies.

User entry −200 to 450 °C

3.2.6 "Sensor adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm.

▶ **Sensor adjustment**		
	Installation direction (1809)	→ 82
	▶ **Process variable adjustment**	→ 82

Installation direction

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

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

Selection
- Forward flow
- Reverse flow

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.

"Process variable adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust

▶ Process variable adjustment	
Volume flow offset (1831)	→ 83
Volume flow factor (1832)	→ 83
Mass flow offset (1841)	→ 83
Mass flow factor (1846)	→ 83
Sound velocity offset (1848)	→ 84
Sound velocity factor (1849)	→ 84
Temperature offset (1870)	→ 84
Temperature factor (1871)	→ 85
Density offset (1877)	→ 85
Density factor (1878)	→ 85

Volume 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

Additional information *Description*

Corrected value = (factor × value) + offset

Volume 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

Additional information *Description*

Corrected value = (factor × value) + offset

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

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

Additional information *Description*

Corrected value = (factor × value) + offset

Sound velocity 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

Additional information *Description*

Corrected value = (factor × value) + offset

Sound velocity 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

Additional information *Description*

Corrected value = (factor × value) + offset

Temperature 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

Additional information *Description*

Corrected value = (factor × value) + offset

Temperature 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

Additional information *Description*

Corrected value = (factor × value) + offset

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

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

3.2.7 "Calibration" submenu

Navigation Expert → Sensor → Calibration

▶ Calibration	
Calibration factor (2920)	→ 86
Zero point (2921)	→ 86
Nominal diameter (2807)	→ 86

Calibration factor

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

Description Displays the current calibration factor for the sensor.

User interface Signed floating-point number

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

Nominal diameter

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

Description Displays the nominal diameter of the sensor.

User interface ----------

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

3.3 "I/O configuration" submenu

Navigation Expert → I/O config.

▶ I/O configuration	
I/O module 1 to n terminal numbers (3902–1 to n)	→ 87
I/O module 1 to n information (3906–1 to n)	→ 87
I/O module 1 to n type (3901–1 to n)	→ 88

Apply I/O configuration (3907)	→ 88
I/O alteration code (2762)	→ 88

I/O module 1 to n terminal numbers

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

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

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

I/O module 1 to n information

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

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

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

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.

"MODBUS" option

The I/O module is configured for Modbus.

I/O module 1 to n type

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

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

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

Selection
- Off
- Current output *
- Current input *
- Status input *
- Pulse/frequency/switch output *
- Double pulse output *
- Relay output *

Apply I/O configuration

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

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

Selection
- No
- Yes

I/O alteration code

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

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

User entry
Positive integer

Additional information
Description
The I/O configuration is changed in the **I/O module type** parameter (→ 88).

* Visibility depends on order options or device settings

3.4 "Input" submenu

Navigation Expert → Input

▶ **Input**	
▶ **Current input 1 to n**	→ 📄 89
▶ **Status input 1 to n**	→ 📄 92

3.4.1 "Current input 1 to n" submenu

Navigation Expert → Input → Current input 1 to n

▶ **Current input 1 to n**	
Terminal number (1611–1 to n)	→ 📄 89
Signal mode (1610–1 to n)	→ 📄 90
Current span (1605–1 to n)	→ 📄 90
0/4 mA value (1606–1 to n)	→ 📄 90
20 mA value (1607–1 to n)	→ 📄 91
Failure mode (1601–1 to n)	→ 📄 91
Failure value (1602–1 to n)	→ 📄 91

Terminal number

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

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

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

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)

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

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

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

Additional information *Examples*

Sample values for the current range: **Current span** parameter (→ 96)

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

Additional information *Current input behavior*

The current input behaves differently depending on the settings configured in the following parameters:
- Current span (→ 90)
- Failure mode (→ 91)

Configuration examples

Pay attention to the configuration examples for **4 mA value** parameter (→ 97).

* Visibility depends on order options or device settings

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 (→ 97).

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 (→ 90).

Selection
- Alarm
- Last valid value
- Defined value

Additional information *Options*
- Alarm
  An error message is set.
- Last valid value
  The last valid measured value is used.
- Defined value
  A user-defined measured value is used (**Failure value** parameter (→ 91)).

Failure value

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

Prerequisite In the **Failure mode** parameter (→ 91), the **Defined value** option is selected.

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

User entry Signed floating-point number

3.4.2 "Status input 1 to n" submenu

Navigation Expert → Input → Status input 1 to n

▶ Status input 1 to n	
Terminal number (1358–1 to n)	→ 92
Assign status input (1352–1 to n)	→ 92
Value status input (1353–1 to n)	→ 93
Active level (1351–1 to n)	→ 93
Response time status input (1354–1 to n)	→ 93

Terminal number

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

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

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

Additional information *"Not used" option*

The status input module does not use any terminal numbers.

Assign status input

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

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

Selection
- Off
- Reset totalizer 1
- Reset totalizer 2
- Reset totalizer 3
- Reset all totalizers
- Flow override

Additional information *Selection*

- Off
  The status input is switched off.
- Reset totalizer 1…3
  The individual totalizers are reset.
- Reset all totalizers
  All totalizers are reset.
- Flow override
  The Flow override (→ 76) is activated.

Note on the Flow override (→ 76):
- The Flow override (→ 76) is enabled as long as the level is at the status input (continuous signal).
- All other assignments react to a change in level (pulse) at the status input.

Value status input

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

Description Displays the current input signal level.

User interface
- High
- Low

Active level

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

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

Selection
- High
- Low

Response time status input

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

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

User entry 5 to 200 ms

3.5 "Output" submenu

Navigation Expert → Output

▶ **Output**		
	▶ **Current output 1 to n**	→ 94
	▶ **Pulse/frequency/switch output 1 to n**	→ 108
	▶ **Relay output 1 to n**	→ 130
	▶ **Double pulse output**	→ 137

3.5.1 "Current output 1 to n" submenu

Navigation Expert → Output → Curr.output 1 to n

▶ **Current output 1 to n**		
	Terminal number (0379–1 to n)	→ 95
	Signal mode (0377–1 to n)	→ 95
	Process variable current output (0359–1 to n)	→ 95
	Current range output (0353–1 to n)	→ 96
	Fixed current (0365–1 to n)	→ 97
	Lower range value output (0367–1 to n)	→ 97
	Upper range value output (0372–1 to n)	→ 99
	Measuring mode current output (0351–1 to n)	→ 100
	Damping current output (0363–1 to n)	→ 105
	Failure behavior current output (0364–1 to n)	→ 106
	Failure current (0352–1 to n)	→ 108

Output current 1 to n (0361–1 to n)	→ 108
Measured current 1 to n (0366–1 to n)	→ 108

Terminal number

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

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

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

Additional information *"Not used" option*

The current output module does not use any terminal numbers.

Signal mode

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

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

Selection
- Active *
- Passive *

Factory setting Active

Process variable current output

Navigation Expert → Output → Curr.output 1 to n → Proc.var. outp (0359–1 to n)

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

Selection
- Off *
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Signal strength *
- Signal to noise ratio *
- Turbulence *

* Visibility depends on order options or device settings

- Acceptance rate *
- Temperature *
- Density *
- Electronics temperature

Current range output

Navigation Expert → Output → Curr.output 1 to n → Curr.range out (0353–1 to n)

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

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

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

Additional information

Selection

"Fixed value" option
Select this option to set the current output to a current value instead of a range.

Description

- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 106).
- If the measured value is outside the measuring range, the ⚠**S441 Current output 1 to n** diagnostic message is displayed.
- The measuring range is specified via the **0/4 mA value** parameter (→ 97) and **20 mA value** parameter (→ 99).

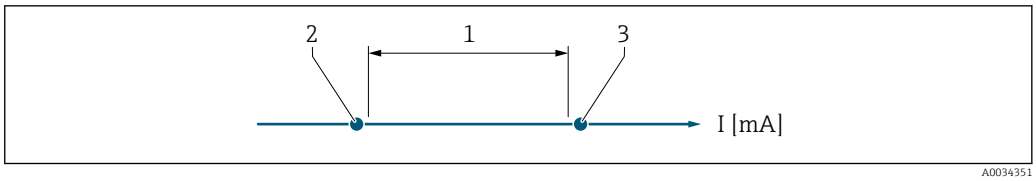
"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 97).

Example

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

* Visibility depends on order options or device settings



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

Selection

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

If the flow exceeds or falls below the upper or lower signal on alarm level, the ⚠**S441 Current output 1 to n** diagnostic message 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 (→ 96).

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

Lower range value output

Navigation Expert → Output → Curr.output 1 to n → Low.range outp (0367–1 to n)

Prerequisite In the **Current span** parameter (→ 96), one of the following options is selected:
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

User entry Signed floating-point number

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 current output** parameter (→ 95). 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 (→ 99).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 95).

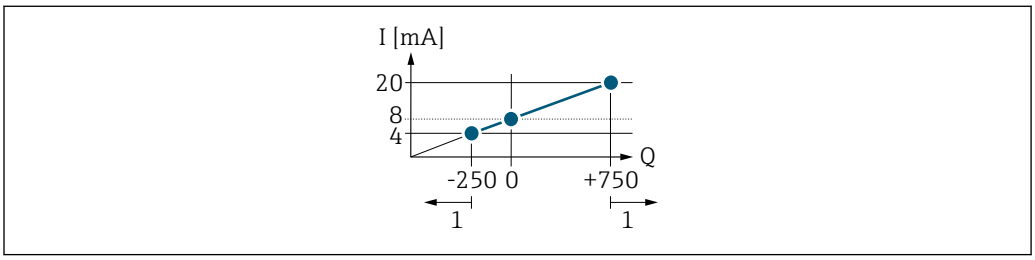
Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:
- Current span (→ 96)
- Failure mode (→ 106)

Configuration examples

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

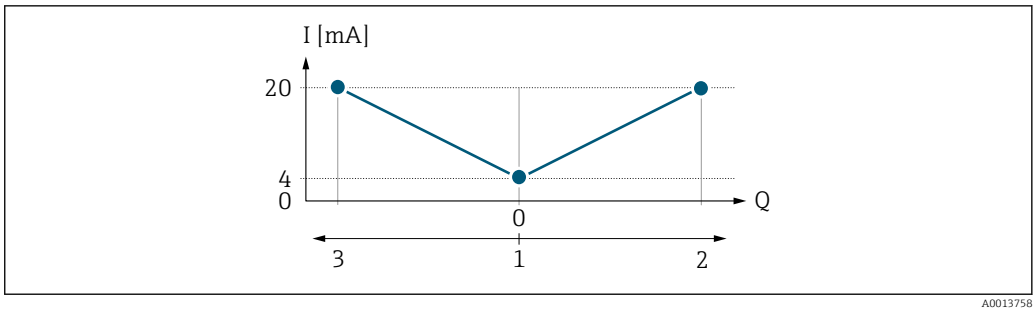
Configuration example A
Measuring mode with **Forward flow** option
- **0/4 mA value** parameter (→ 97) = not equal to zero flow (e.g. −250 m^3/h)
- **20 mA value** parameter (→ 99) = not equal to zero flow (e.g. +750 m^3/h)
- Calculated current value = 8 mA at zero flow



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 (→ 97) and **20 mA value** parameter (→ 99). If the effective flow exceeds or falls below this operational range, the ⚠**S441 Current output 1 to n** diagnostic message is displayed.

Configuration example B
Measuring mode with **Forward/Reverse flow** 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 (→ 📄 97) and **20 mA value** parameter (→ 📄 99) must have the same sign. The value for the **20 mA value** parameter (→ 📄 99) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 📄 99) (e.g. forward flow).

Configuration example C
Measuring mode with **Reverse flow compensation** 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 → 📄 100.

Upper range value output

Navigation Expert → Output → Curr.output 1 to n → Upp.range outp (0372−1 to n)

Prerequisite In the **Current span** parameter (→ 📄 96), one of the following options is selected:
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 📄 95). 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 (→ 🗎 97).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 🗎 95).

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 flow** option is selected in the **Measuring mode** parameter (→ 🗎 100), different signs cannot be entered for the values of the **0/4 mA value** parameter (→ 🗎 97) and **20 mA value** parameter (→ 🗎 99). The ⚠**S441 Current output 1 to n** diagnostic message is displayed.

Configuration examples

Observe the configuration examples for the **0/4 mA value** parameter (→ 🗎 97).

Measuring mode current output

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

Prerequisite

One of the following options is selected in the **Assign current output** parameter (→ 🗎 95):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Acceptance rate *
- Temperature *
- Density *
- Electronics temperature

One of the following options is selected in the **Current span** parameter (→ 🗎 96):
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

Selection
- Forward flow
- Forward/Reverse flow *
- Reverse flow compensation

* Visibility depends on order options or device settings

Additional information

Selection

- **Forward flow** option
  The current output signal is proportional to the measured value for the process variable assigned.
  Additional information:
  - The lower limit value ("Lower range value output " parameter) and the upper limit value ("Upper range value output " parameter) of the measured value range do not have to have the same algebraic sign, i.e. the lower limit value can be negative and the upper limit value positive.
  - If the measured value lies outside the scaled measured value range, diagnostic message "441 Current output faulty" is generated.
- **Forward/Reverse flow** option
  The current output outputs the absolute value for the assigned process variable (reflection across the lower limit value of the measured value range).
  Additional information:
  - The lower limit value ("Lower range value output " parameter) and the upper limit value ("Upper range value output " parameter) of the measured value range must have the same algebraic sign.
  - If the absolute value exceeds the upper limit value of the measured value range, diagnostic message "441 Current output faulty" is generated.
  - This setting is generally only used for flow-related process variables.
- **Reverse flow compensation** option
  The current output signal is proportional to the measured value for the process variable assigned.
  Additional information:
  - The lower limit value ("Lower range value output " parameter) and the upper limit value ("Upper range value output " parameter) of the measured value range do not have to have the same algebraic sign, i.e. the lower limit value can be negative and the upper limit value positive.
  - Reverse flow (a measured value below the lower limit value of the measured value range) is stored in a buffer and processed after a maximum delay of 60 s with the next forward flow.
  - When the flow exceeds the maximum value or the reverse flow stored in the buffer cannot be processed within approx. 60 s, diagnostic message "441 Current output faulty" is generated.
  - This option is used e.g. to compensate intermittent reverse flow, which may occur in connection with positive displacement pumps as a result of wear and tear or high viscosity.
  - There is no flow damping with this setting.

Description

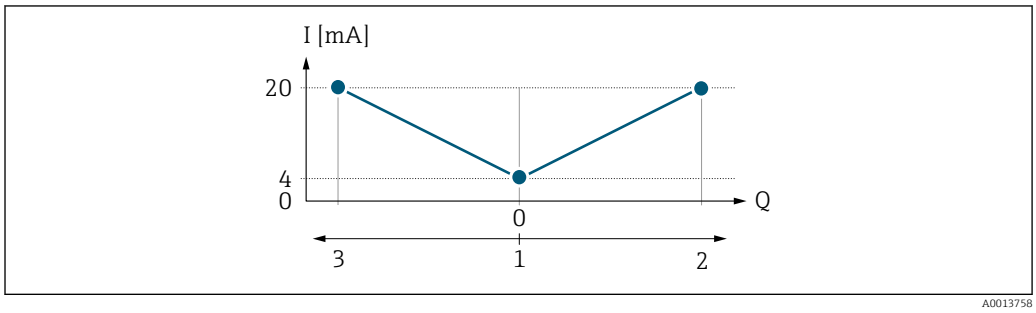
The process variable that is assigned to the current output via the **Assign current output** parameter (→ 95) is displayed below the parameter.

"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 flow" 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 (→ 📄 97) and **20 mA value** parameter (→ 📄 99) must have the same sign.
- The value for the **20 mA value** parameter (→ 📄 99) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 📄 99) (e.g. forward flow).

"Reverse flow compensation" option

The **Reverse flow compensation** option is primarily used to compensate for abrupt reverse flow that can occur with positive displacement pumps as a result of wear or high viscosity. The reverse flow is recorded in a buffer memory and offset against the next forward flow.

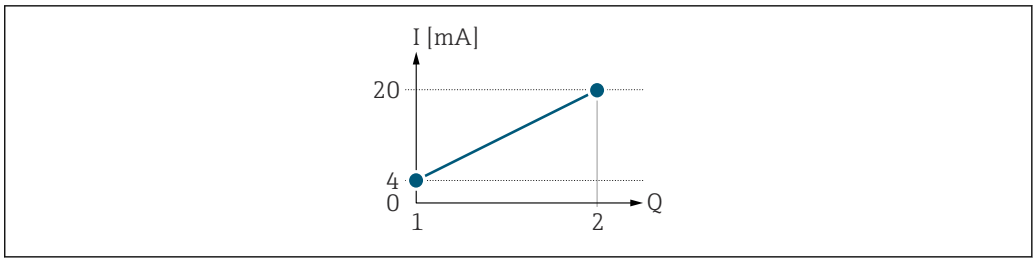
In the event of prolonged and undesired reverse flow, flow values can accumulate in the buffer memory. Due to the configuration of the current output, these values are not factored in, however, i.e. there is no compensation for the reverse flow.

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

Examples of how the current output behaves

Example 1

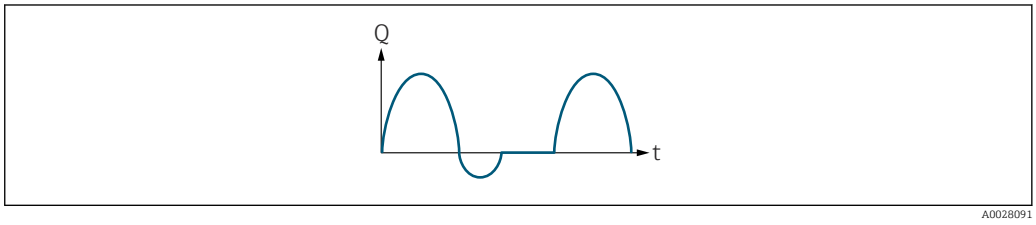
Defined measuring range: lower range value and upper range value with the **same** sign



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:

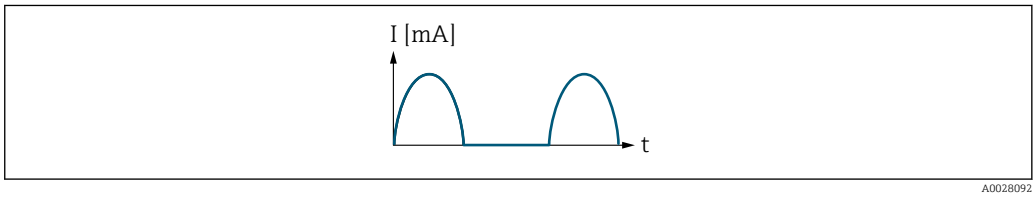


4 Flow response

Q Flow
t Time

With **Forward flow** option

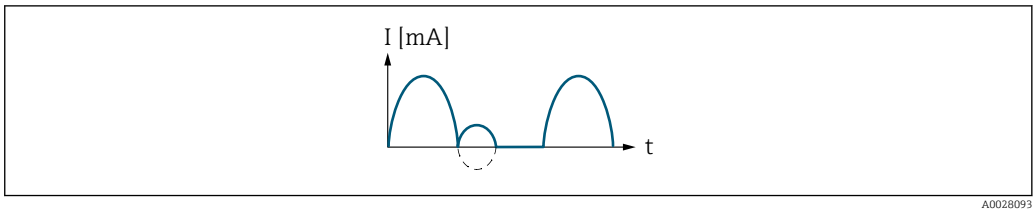
The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output:.



I Current
t Time

With **Forward/Reverse flow** option

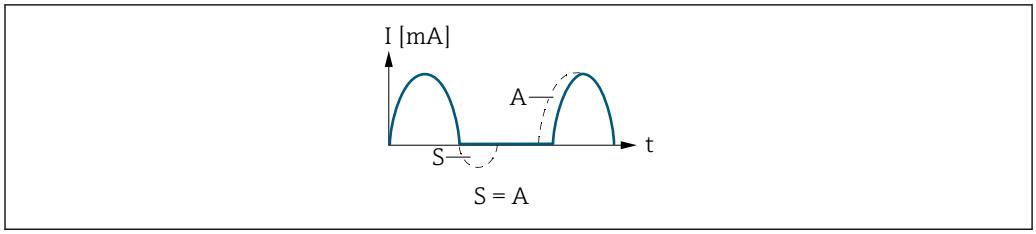
The current output signal is independent of the direction of flow.



I Current
t Time

With **Reverse flow compensation** option

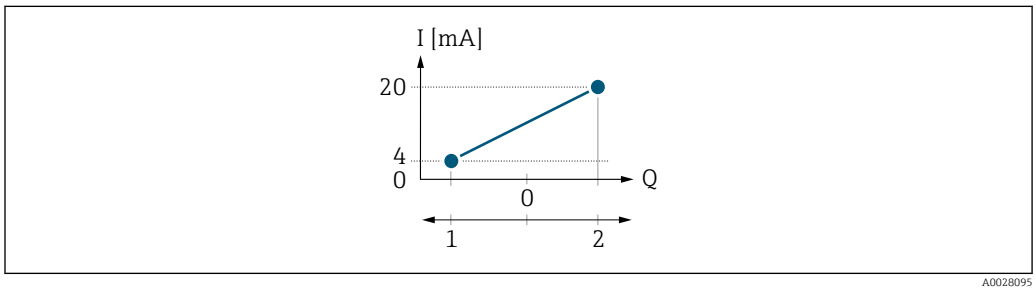
Flow components outside of the measuring range are buffered, balanced and output after a maximum delay of 60 s.



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

Example 2

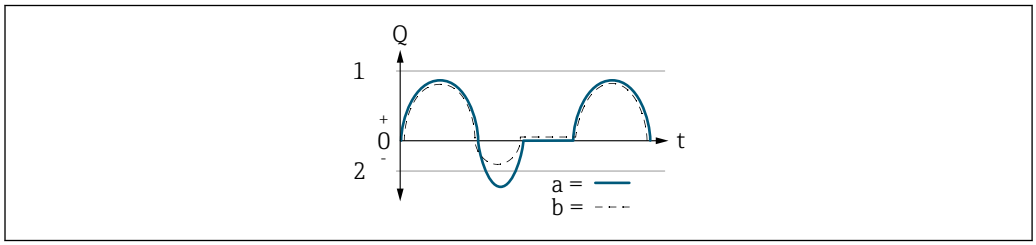
Defined measuring range: lower range value and upper range value with **different** signs



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)*

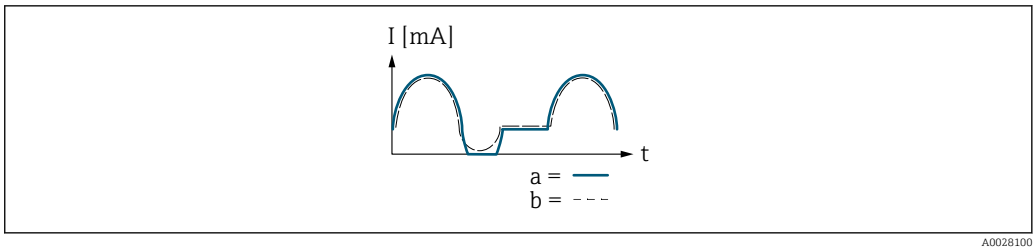
With flow a (—) outside, b (- -) inside the measuring range



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.
  The ⚠**S441 Current output 1 to n** diagnostic message is output.
- b (- -): The current output signal is proportional to the process variable assigned.



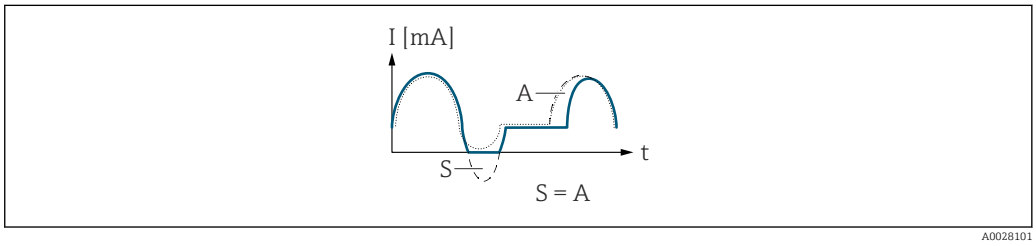
I *Current*
t *Time*

With **Forward/Reverse flow** option

This option cannot be selected here since the values for the **0/4 mA value** parameter (→ 97) and **20 mA value** parameter (→ 99) have different algebraic signs.

With **Reverse flow compensation** option

Flow components outside of the measuring range 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 current output

Navigation Expert → Output → Curr.output 1 to n → Damp.curr.outp (0363–1 to n)

Prerequisite A process variable is selected in the **Assign current output** parameter (→ 95) and one of the following options is selected in the **Current span** parameter (→ 96):
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

User entry 0.0 to 999.9 s

Additional information *User entry*

Use this function to enter a time constant (PT1 element [3]) for current output damping:
- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

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

Failure behavior current output

Navigation Expert → Output → Curr.output 1 to n → Fail.behav.out (0364–1 to n)

Prerequisite A process variable is selected in the **Assign current output** parameter (→ 95) and one of the following options is selected in the **Current span** parameter (→ 96):
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

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

3) proportional transmission behavior with first order delay

Additional information

Selection

- **Min.** option
  The current output outputs the lower fault condition signal level for the specified current range.
  Additional information:
  The current range is specified in the "Current range output " parameter.
- **Max.** option
  The current output outputs the upper fault condition signal level for the specified current range.
  Additional information:
  The current range is specified in the "Current range output " parameter.
- **Last valid value** option
  The current output outputs the last valid value measured before the device alarm occurred.
- **Actual value** option
  The current output outputs the flow value currently measured. The device alarm is ignored.
- **Fixed value** option
  The current output outputs the value specified.
  Additional information:
  The value is specified in the "Failure current " parameter.

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 (→ 96).

"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 (→ 96).

"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 (→ 108).

Failure current

Navigation	Expert → Output → Curr.output 1 to n → Fail. current (0352–1 to n)
Prerequisite	The **Defined value** option is selected in the **Failure mode** parameter (→ 106).
Description	Use this function to enter a fixed value that the current output adopts in the event of a device alarm.
User entry	0 to 22.5 mA
Factory setting	22.5 mA

Output current 1 to n

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

Measured current 1 to n

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

▶ **Pulse/frequency/switch output 1 to n**	
Terminal number (0492–1 to n)	→ 110
Signal mode (0490–1 to n)	→ 110
Operating mode (0469–1 to n)	→ 111

Assign flow direction check (0484–1 to n)	→ 128
Assign status (0485–1 to n)	→ 128
Switch-on delay (0467–1 to n)	→ 128
Switch-off delay (0465–1 to n)	→ 129
Failure mode (0486–1 to n)	→ 129
Switch status 1 to n (0461–1 to n)	→ 129
Invert output signal (0470–1 to n)	→ 130

Terminal number

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

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

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

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

* Visibility depends on order options or device settings

Operating mode

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

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

Selection
- Pulse
- Frequency
- Switch

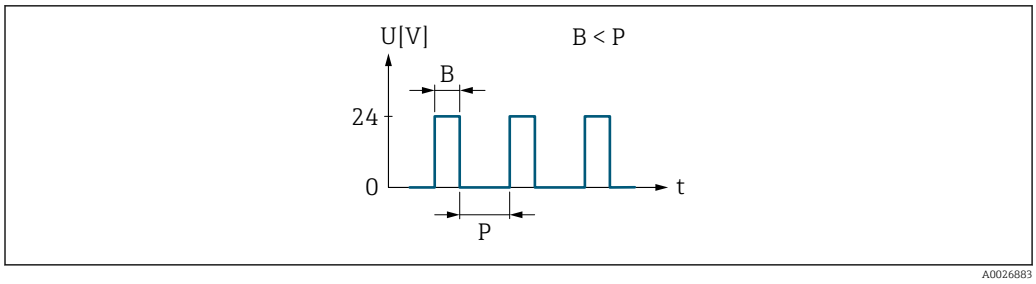
Additional information *Selection*

- **Pulse** option
  Quantitatively proportional pulse with pulse width to be configured. Whenever the pulse value for the specified process variable has been reached, a pulse is emitted, the duration of which is set within the "Pulse width" parameter.
  Additional information:
  The process variable for the pulse output is specified in the "Assign pulse output " parameter.
- **Frequency** option
  The output frequency is proportional to the value for the process variable assigned, with a pulse-to-interval ratio of 1:1.
  Additional information:
  The process variable for the frequency output is specified in the "Assign frequency output" parameter.
- **Switch** option
  Indicates when the state of the device changes, e.g. when a specified limit value is reached or an alarm or warning is triggered.
  Additional information:
  - The switch output can be in one of two states: either it is conductive or it is non-conductive.
  - When the function assigned to the switch output is triggered, the switch output will depending on the output configuration either be continuously conductive or continuously non-conductive.
  - The switch output is used to display diagnostic information at the system level, e.g. by connecting a lamp that lights up when the function assigned is triggered.

"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



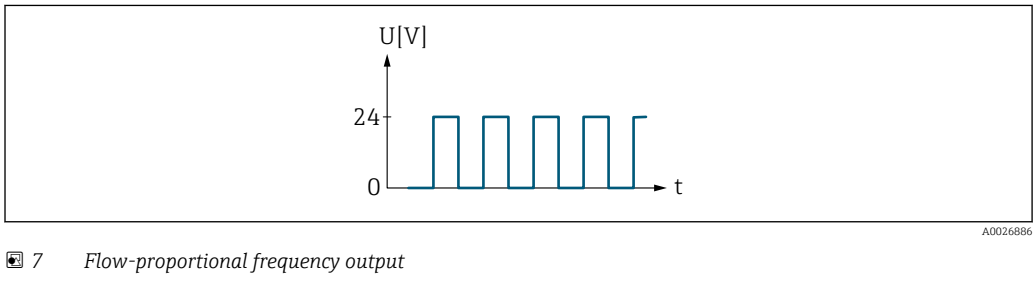
6 Quantity-proportional pulse (pulse value) with pulse width to be configured

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

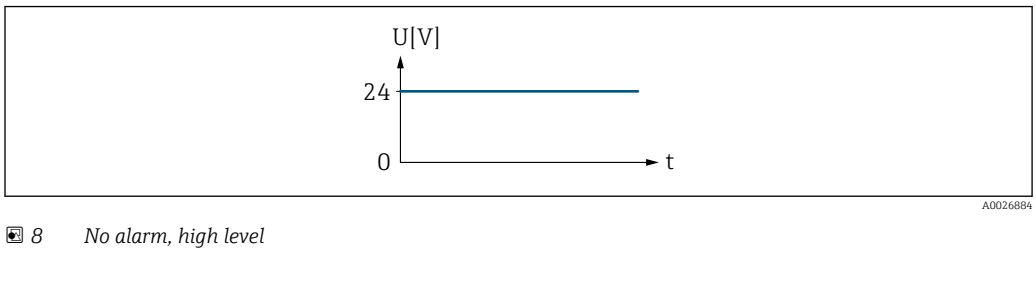


7 Flow-proportional frequency output

"Switch" option

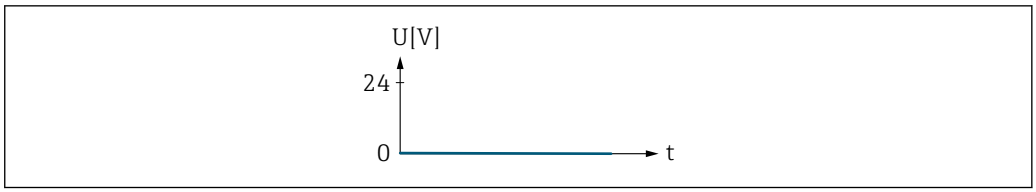
Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

Example
Alarm response without alarm



8 No alarm, high level

Example
Alarm response in case of alarm



9 *Alarm, low level*

Assign pulse output 1 to n

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 111).

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

Selection
- Off
- Volume flow
- Mass flow

Pulse scaling

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 111) and a process variable is selected in the **Assign pulse output** parameter (→ 113).

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

User entry Positive floating point number

Factory setting Depends on country and nominal diameter

Additional information *User entry*

Weighting of the pulse output with a quantity.

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

Pulse width

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

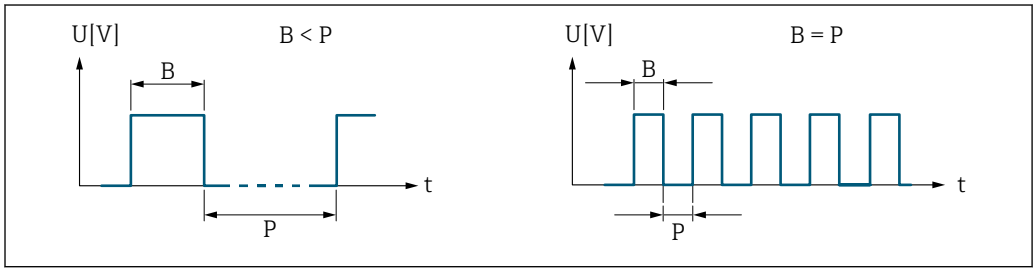
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 111) and a process variable is selected in the **Assign pulse output** parameter (→ 113).

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

User entry 0.05 to 2 000 ms

Additional information *Description*

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



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)

Prerequisite In the **Operating mode** parameter (→ 111), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse output** parameter (→ 113):

- Volume flow
- Mass flow

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

Selection

- Forward flow
- Forward/Reverse flow
- Reverse flow
- Reverse flow compensation

Additional information

Selection

- **Forward flow** option
  Positive flow is output, negative flow not output.
- **Forward/Reverse flow** option
  Both positive and negative flow are output (absolute value), whereby no distinction is made between positive and negative flow.
- **Reverse flow** option
  Negative flow is output, positive flow is not output.
- **Reverse flow compensation** option
  Positive flow is output. Negative flow quantities are buffered, processed, and output after a maximum delay of 60 s.
  Additional information:
  This option is used e.g. to compensate intermittent negative flow, which may occur in connection with positive displacement pumps as a result of wear and tear or high viscosity.

Selection

- Forward flow
  Positive flow is output, negative flow is not output.
- Forward/Reverse flow
  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.
- Reverse flow compensation
  The flow components outside the measuring range 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 (→ 100)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 100)

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 (→ 111) and a process variable is selected in the **Assign pulse output** parameter (→ 113).

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

Selection

- Actual value
- No pulses

Additional information

Selection

- **Actual value** option
  In the event of a device alarm, the pulse output continues based on the current flow measurement. The issue is ignored.
  Additional information:
  A device alarm indicates a serious malfunction of the measuring device that may impact the measurement quality to the point that accuracy can no longer be ensured. This option is only recommended if the necessary safeguards are in place to ensure that no alarm condition can impact the measurement quality.
- **No pulses** option
  In the event of a device alarm, no pulses are emitted.

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 (→ 111) parameter.

Description

Displays the pulse frequency currently output.

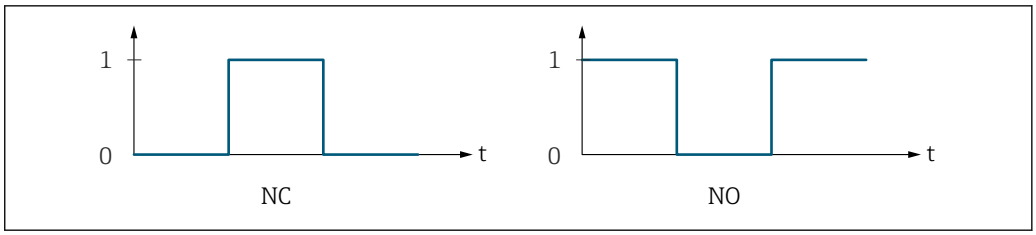
User interface

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 output signal** parameter (→ 130) 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 (→ 115)) can be configured.

Assign frequency output

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 111).

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

Selection
- Off
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Acceptance rate *
- Electronics temperature
- Density *

Minimum frequency value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 111) and a process variable is selected in the **Assign frequency output** parameter (→ 117).

Description Use this function to enter the minimum frequency.

* Visibility depends on order options or device settings

User entry 0.0 to 10 000.0 Hz

Maximum frequency value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 111) and a process variable is selected in the **Assign frequency output** parameter (→ 117).

Description Use this function to enter the end value frequency.

User entry 0.0 to 10 000.0 Hz

Measuring value at minimum frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 111) and a process variable is selected in the **Assign frequency output** parameter (→ 117).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Dependency*

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 117).

Measuring value at maximum frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 111) and a process variable is selected in the **Assign frequency output** parameter (→ 117).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information

Description

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

Dependency

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 117).

Measuring mode

Navigation

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

Prerequisite

In the "Operating mode" parameter, the "Frequency" option is selected, and one of the following options is selected in the "Assign frequency output" parameter:

- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Electronics temperature
- Density *

Description

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

Selection

- Forward flow
- Forward/Reverse flow
- Reverse flow compensation

* Visibility depends on order options or device settings

Additional information

Selection

- **Forward flow** option
  The output signal is proportional to the measured value for the process variable assigned.
  Additional information:
  - The lower limit value ("Measuring value at minimum frequency" parameter) and the upper limit value ("Measuring value at maximum frequency" parameter) of the measured value range do not have to have the same algebraic sign, i.e. the lower limit value can be negative and the upper limit value positive.
  - If the measured value lies outside the scaled measured value range, diagnostic message "442 Frequency output faulty" is generated.
- **Forward/Reverse flow** option
  The output outputs the absolute value for the assigned process variable (reflection across the lower limit value of the measured value range).
  Additional information:
  - The lower limit value ("Measuring value at minimum frequency" parameter) and the upper limit value ("Measuring value at maximum frequency" parameter) of the measured value range must have the same algebraic sign.
  - If the absolute value exceeds the upper limit value of the measured value range, diagnostic message "442 Frequency output faulty" is generated.
  - This setting is generally used for flow-related process variables.
- **Reverse flow compensation** option
  The output signal is proportional to the measured value for the process variable assigned.
  Additional information:
  - The lower limit value ("Measuring value at minimum frequency" parameter) and the upper limit value ("Measuring value at maximum frequency" parameter) of the measured value range do not have to have the same algebraic sign, i.e. the lower limit value can be negative and the upper limit value positive.
  - Reverse flow (a measured value below the lower limit value of the measured value range) is stored in a buffer and processed after a maximum delay of 60 s with the next forward flow.
  - When the flow exceeds the maximum value or the reverse flow stored in the buffer cannot be processed within approx. 60 s, diagnostic message "442 Frequency output faulty" is generated.
  - This option is used e.g. to compensate intermittent reverse flow, which may occur in connection with positive displacement pumps as a result of wear and tear or high viscosity.
  - There is no flow damping with this setting.

Selection

For a detailed description of the options available, see the **Measuring mode** parameter (→ 100)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 100)

Damping output 1 to n

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

Prerequisite *In the "Operating mode" parameter, the "Frequency" option is selected, and one of the following options is selected in the "Assign frequency output" parameter:*

- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Electronics temperature
- Density *

Description

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

User entry

0 to 999.9 s

Additional information

User entry

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

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

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

Response time

Navigation

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

Prerequisite

In the "Operating mode" parameter, the "Frequency" option is selected, and one of the following options is selected in the "Assign frequency output" parameter:

- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Electronics temperature
- Density *

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

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

Additional information *Description*

The response time is made up of the time specified for the following dampings:
- Damping of pulse/frequency/switch output → 105
  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 (→ 111) and a process variable is selected in the **Assign frequency output** parameter (→ 117).

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

Selection
- Actual value
- Defined value
- 0 Hz

Additional information *Selection*

- **Actual value** option
  The frequency output outputs the flow value currently measured.
- **Defined value** option
  The frequency output outputs the value specified.
  Additional information:
  The value is specified in the "Failure frequency" parameter.
- **0 Hz** option
  In the event of a device alarm, the frequency output outputs 0 Hz.

Selection

- Actual value
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure frequency (→ 123) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

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

Failure frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 111) and a process variable is selected in the **Assign frequency output** parameter (→ 117).

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

User entry 0.0 to 12 500.0 Hz

Output frequency 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 111), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Switch output function

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 111) parameter.

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

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

Additional information *Selection*
- **Off** option
  The switch output is permanently switched off (open, non-conductive).
- **On** option
  The switch output is permanently switched on (closed, conductive).
- **Diagnostic behavior** option
  The switch output is switched on (closed, conductive), if there is a pending diagnostic event of the assigned behavioral category.

- **Limit** option
  The switch output is switched on (closed, conductive), if a limit value specified for the process variable is reached.
- **Flow direction check** option
  The switch output is switched on (closed, conductive), when the flow direction changes (forward or reverse flow).
- **Status** option
  The switch output is switched on (closed, conductive) to indicate the device status for the selected detection method, e.g. empty pipe detection or low flow cut off.

Selection

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

Assign diagnostic behavior

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

Prerequisite
- In the **Operating mode** parameter (→ 111), the **Switch** option is selected.
- In the **Switch output function** parameter (→ 123), the **Diagnostic behavior** option is selected.

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

Selection
- Alarm
- Alarm or warning
- Warning

Additional information

Selection

- **Alarm** option
  The switch output is only switched on for diagnostic events of the "Alarm" category.
- **Alarm or warning** option
  The switch output is switched on for diagnostic events of the "Alarm" or "Warning" category.
- **Warning** option
  The switch output is only switched on for diagnostic events of the "Warning" category.

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 (→ 111).
- The **Limit** option is selected in the **Switch output function** parameter (→ 123).

Description

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

Selection

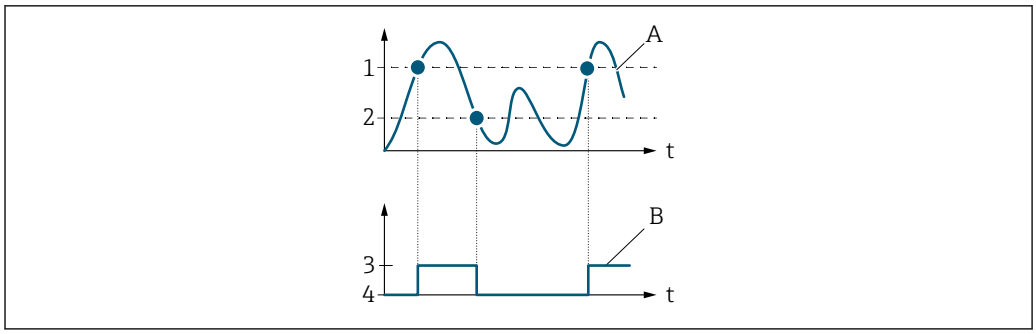
- Off
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Electronics temperature
- Acceptance rate *
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Density *

Additional information

Description

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

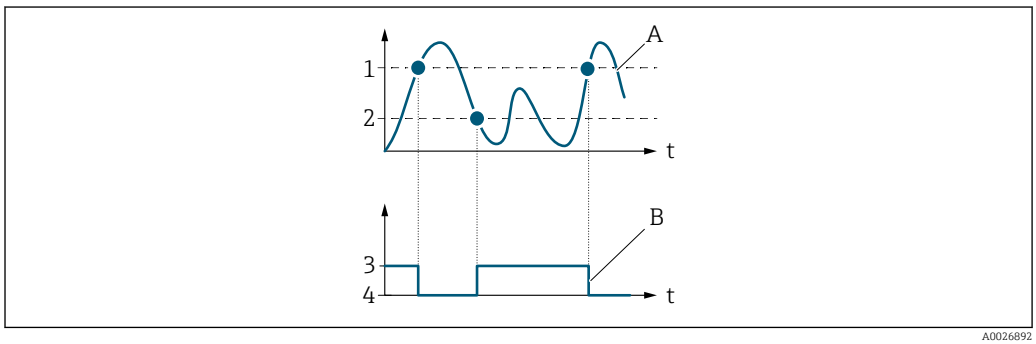
* Visibility depends on order options or device settings



A0026891

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

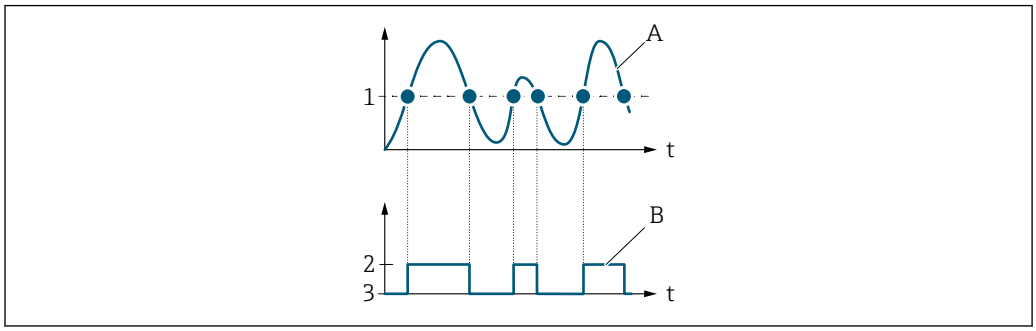
Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive



A0026892

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

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



A0026893

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

Switch-on value

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 111) parameter.
- The **Limit** option is selected in the **Switch output function** parameter (→ 123) parameter.

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 (→ 125).

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 (→ 111).
- The **Limit** option is selected in the **Switch output function** parameter (→ 123).

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 (→ 125).

Assign flow direction 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 (→ 111).
- The **Flow direction check** option is selected in the **Switch output function** parameter (→ 123).

Description Use this function to select a process variable for monitoring the flow direction.

Selection
- Off
- Volume flow
- Mass flow
- Flow velocity

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 (→ 111).
- The **Status** option is selected in the **Switch output function** parameter (→ 123).

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

Selection
- Off
- Low flow cut off

Additional information *Options*

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

Switch-on delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 111).
- The **Limit** option is selected in the **Switch output function** parameter (→ 123).

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

User entry 0.0 to 100.0 s

Switch-off delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 111).
- The **Limit** option is selected in the **Switch output function** parameter (→ 123).

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

User entry 0.0 to 100.0 s

Failure mode

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

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

Selection
- Actual status
- Open
- Closed

Additional information

Selection

- **Actual status** option
  In the event of a device alarm, the issue is ignored and the switch output adopts the behavior currently specified for the "Switch output function" parameter.
- **Open** option
  In the event of a device alarm, the switch output's transistor is set to "non-conductive".

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 (→ 111).

Description Displays the current switch status of the status output.

User interface

- Open
- Closed

Additional information

User interface

- **Open** option
  The switch output is not conductive.
- **Closed** option
  The switch output is conductive.

User interface

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

Invert output signal

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

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

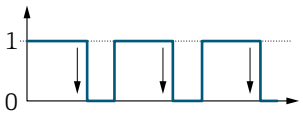
Selection

- No
- Yes

Additional information

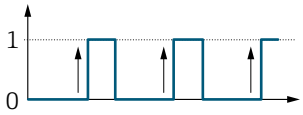
Selection

No option (passive - negative)



A0026693

Yes option (passive - positive)



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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 number

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

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

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

Additional information *"Not used" option*

The relay output module does not use any terminal numbers.

Relay output function

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

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

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

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

Assign flow direction check

Navigation Expert → Output → Relay output 1 to n → Assign dir.check (0808–1 to n)

Prerequisite The **Flow direction check** option is selected in the **Relay output function** parameter (→ 132).

Description Use this function to select a process variable for monitoring the flow direction.

Selection
- Off
- Volume flow
- Mass flow
- Flow velocity

Assign limit

Navigation Expert → Output → Relay output 1 to n → Assign limit (0807–1 to n)

Prerequisite The **Limit** option is selected in the **Relay output function** parameter (→ 132).

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

Selection
- Off
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Electronics temperature
- Acceptance rate *
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Density *

Assign diagnostic behavior

Navigation Expert → Output → Relay output 1 to n → Assign diag. beh (0806–1 to n)

Prerequisite In the **Relay output function** parameter (→ 132), the **Diagnostic behavior** option is selected.

Description Use this function to select the category of the diagnostic events that are displayed for the relay output.

Selection
- Alarm
- Alarm or warning
- Warning

* Visibility depends on order options or device settings

Additional information

Selection

- **Alarm** option
  The switch output is only switched on for diagnostic events of the "Alarm" category.
- **Alarm or warning** option
  The switch output is switched on for diagnostic events of the "Alarm" or "Warning" category.
- **Warning** option
  The switch output is only switched on for diagnostic events of the "Warning" category.

Description

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

Selection

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

Assign status

Navigation Expert → Output → Relay output 1 to n → Assign status (0805–1 to n)

Prerequisite In the **Relay output function** parameter (→ 132), the **Digital Output** option is selected.

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

Selection

- Off
- Low flow cut off

Switch-off value

Navigation Expert → Output → Relay output 1 to n → Switch-off value (0809–1 to n)

Prerequisite In the **Relay output function** parameter (→ 132), the **Limit** option is selected.

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

User entry Signed floating-point number

Additional information

Description

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

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

Dependency

The unit is dependent on the process variable selected in the **Assign limit** parameter (→ 133).

Switch-off delay

Navigation Expert → Output → Relay output 1 to n → Switch-off delay (0813–1 to n)

Prerequisite In the **Relay output function** parameter (→ 132), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Switch-on value

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

Prerequisite The **Limit** option is selected in the **Relay output function** parameter (→ 132).

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 (→ 133).

Switch-on delay

Navigation Expert → Output → Relay output 1 to n → Switch-on delay (0814–1 to n)

Prerequisite In the **Relay output function** parameter (→ 132), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Failure mode

Navigation Expert → Output → Relay output 1 to n → Failure mode (0811–1 to n)

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

Selection
- Actual status
- Open
- Closed

Additional information

Selection

- **Actual status** option
  In the event of a device alarm, the issue is ignored and the switch output adopts the behavior currently specified for the "Switch output function" parameter.
- **Open** option
  In the event of a device alarm, the switch output's transistor is set to "non-conductive".

Selection

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

Switch status

Navigation Expert → Output → Relay output 1 to n → Switch status (0801–1 to n)

Description Displays the current status of the relay output.

User interface
- Open
- Closed

Additional information *User interface*

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

Powerless relay status

Navigation Expert → Output → Relay output 1 to n → Powerless relay (0816–1 to n)

Description Use this function to select the quiescent state for the relay output.

Selection

- Open
- Closed

Additional information *Selection*

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

3.5.4 "Double pulse output" submenu

Navigation Expert → Output → Double pulse out

▶ Double pulse output	
Master terminal number (0981)	→ 138
Slave terminal number (0990)	→ 138
Signal mode (0991)	→ 138
Assign pulse output 1 (0982–1)	→ 139
Value per pulse (0983)	→ 139
Pulse width (0986)	→ 139
Phase shift (0992)	→ 139
Measuring mode (0984)	→ 140
Failure mode (0985)	→ 141

Pulse output (0987)	→ 141
Invert output signal (0993)	→ 142

Master terminal number

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 terminal number

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

* Visibility depends on order options or device settings

Assign pulse output 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
- Mass flow

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

Additional information For a detailed description and example: **Pulse width** parameter (→ 113)

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°

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 flow
- Reverse flow
- Reverse flow compensation

Additional information *Selection*

- **Forward flow** option
  Positive flow is output, negative flow not output.
- **Forward/Reverse flow** option
  Both positive and negative flow are output (absolute value), whereby no distinction is made between positive and negative flow.
- **Reverse flow** option
  Negative flow is output, positive flow is not output.
- **Reverse flow compensation** option
  Positive flow is output. Negative flow quantities are buffered, processed, and output after a maximum delay of 60 s.
  Additional information:
  This option is used e.g. to compensate intermittent negative flow, which may occur in connection with positive displacement pumps as a result of wear and tear or high viscosity.

Selection

- Forward flow
  Positive flow is output, negative flow is not output.
- Forward/Reverse flow
  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.
- Reverse flow compensation
  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 (→ 100)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 100)

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

Additional information

Selection

- **Actual value** option
  In the event of a device alarm, the pulse output continues based on the current flow measurement. The issue is ignored.
  Additional information:
  A device alarm indicates a serious malfunction of the measuring device that may impact the measurement quality to the point that accuracy can no longer be ensured. This option is only recommended if the necessary safeguards are in place to ensure that no alarm condition can impact the measurement quality.
- **No pulses** option
  In the event of a device alarm, no pulses are emitted.

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 (→ 57)

Invert output signal

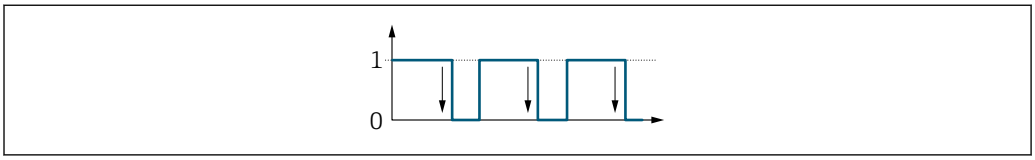
Navigation Expert → Output → Double pulse out → Invert outp.sig. (0993)

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

Selection
- No
- Yes

Additional information *Selection*

No option (passive - negative)



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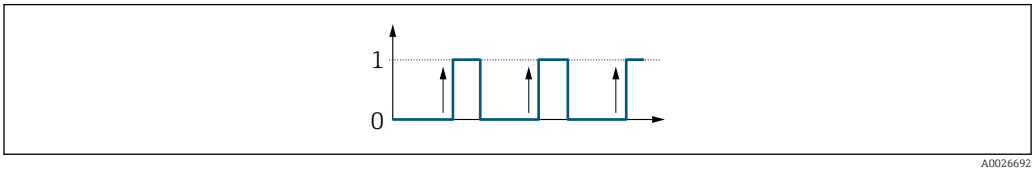
Yes option (passive - positive)



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3.6 "Communication" submenu

Navigation Expert → Communication

▶ **Communication**	
▶ **Modbus configuration**	→ 143
▶ **Modbus information**	→ 147
▶ **Modbus data map**	→ 148
▶ **Web server**	→ 149

3.6.1 "Modbus configuration" submenu

Navigation Expert → Communication → Modbus config.

▶ Modbus configuration	
Bus address (7112)	→ 143
Baudrate (7111)	→ 143
Data transfer mode (7115)	→ 144
Parity (7122)	→ 144
Byte order (7113)	→ 144
Telegram delay (7146)	→ 146
Failure mode (7116)	→ 146
Bus termination (7155)	→ 146
Fieldbus writing access (7156)	→ 147

Bus address

Navigation Expert → Communication → Modbus config. → Bus address (7112)

Description For entering the device address.

User entry 1 to 247

Baudrate

Navigation Expert → Communication → Modbus config. → Baudrate (7111)

Description Use this function to select a transmission rate.

Selection
- 1200 BAUD
- 2400 BAUD
- 4800 BAUD
- 9600 BAUD
- 19200 BAUD
- 38400 BAUD
- 57600 BAUD
- 115200 BAUD

Data transfer mode

Navigation Expert → Communication → Modbus config. → Data trans. mode (7115)

Description Use this function to select the data transmission mode.

Selection
- ASCII
- RTU

Additional information *Options*
- ASCII
  Transmission of data in the form of readable ASCII characters. Error protection via LRC.
- RTU
  Transmission of data in binary form. Error protection via CRC16.

Parity

Navigation Expert → Communication → Modbus config. → Parity (7122)

Description Use this function to select the parity bit.

Selection
- Odd
- Even
- None / 1 stop bit
- None / 2 stop bits

Additional information *Options*

Picklist **ASCII** option:
- 0 = **Even** option
- 1 = **Odd** option

Picklist **RTU** option:
- 0 = **Even** option
- 1 = **Odd** option
- 2 = **None / 1 stop bit** option
- 3 = **None / 2 stop bits** option

Byte order

Navigation Expert → Communication → Modbus config. → Byte order (7113)

Description Use this function to select the sequence in which the bytes are transmitted. The transmission sequence must be coordinated with the Modbus master.

Selection
- 0-1-2-3
- 3-2-1-0
- 1-0-3-2
- 2-3-0-1

Additional information

Description

The byte sequence is not standardized by the Modbus protocol. However, if the host system and the measuring device do not use the same byte sequence, correct data exchange is not possible.

Changing the byte sequence in the host system often requires a extensive knowledge and significant programming efforts. Endress+Hauser introduced the **Byte order** parameter (→ 144) for this reason.

This makes it possible to use the standard settings of the host system and change the byte sequence on the measuring device by trial and error. If correct data exchange cannot be achieved by changing the byte sequence, the settings for the byte sequence of the host system must be adapted accordingly.

Byte transmission sequence

Byte addressing, i.e. the transmission sequence of the bytes, is not specified in the Modbus specification. For this reason, it is important to coordinate or match the addressing method between the master and slave during commissioning. This can be configured in the measuring device using the **Byte order** parameter (→ 144).

The bytes are transmitted depending on the selection in the **Byte order** parameter (→ 144):

FLOAT				
	Sequence			
Options	1.	2.	3.	4.
1 – 0 – 3 – 2 *	Byte 1 (MMMMMMMM)	Byte 0 (MMMMMMMM)	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM)
0 – 1 – 2 – 3	Byte 0 (MMMMMMMM)	Byte 1 (MMMMMMMM)	Byte 2 (EMMMMMMM)	Byte 3 (SEEEEEEE)
2 – 3 – 0 – 1	Byte 2 (EMMMMMMM)	Byte 3 (SEEEEEEE)	Byte 0 (MMMMMMM)	Byte 1 (MMMMMMM)
3 – 2 – 1 – 0	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM)	Byte 1 (MMMMMMMM)	Byte 0 (MMMMMMMM)
* = factory setting, S = sign, E = exponent, M = mantissa				

INTEGER		
	Sequence	
Options	1.	2.
1 – **0** – 3 – 2 * 3 – 2 – **1** – **0**	Byte 1 (MSB)	Byte 0 (LSB)
0 – **1** – 2 – 3 2 – 3 – **0** – **1**	Byte 0 (LSB)	Byte 1 (MSB)
* = factory setting, MSB = most significant byte, LSB = least significant byte		

STRING Presentation taking the example of a device parameter with a data length of 18 bytes.					
	Sequence				
Options	1.	2.	...	17.	18.
1 – **0** – 3 – 2 * 3 – 2 – **1** – **0**	Byte 17 (MSB)	Byte 16	...	Byte 1	Byte 0 (LSB)

0 – **1** – 2 – 3 2 – 3 – **0** – **1**	Byte 16	Byte 17 (MSB)	...	Byte 0 (LSB)	Byte 1
* = factory setting, MSB = most significant byte, LSB = least significant byte					

Telegram delay

Navigation Expert → Communication → Modbus config. → Telegram delay (7146)

Description Use this function to enter a delay time after which the measuring device replies to the request telegram of the Modbus master. This allows communication to be adapted to slow Modbus RS485 masters.

User entry 0 to 100 ms

Failure mode

Navigation Expert → Communication → Modbus config. → Failure mode (7116)

Description Use this function to select the measured value output in the event of a diagnostic message via Modbus communication.

Selection
- NaN value
- Last valid value

Additional information *Selection*

- **NaN value** option
  The device outputs the NaN value ("Not a number" value).
- **Last valid value** option
  The device displays the last valid measured value before the issue occurred.

Options

- NaN value
  The device outputs the NaN value [5].
- Last valid value
  The device outputs the last valid measured value before the fault occurred.

This effect of this parameter depends on the option selected in the **Assign diagnostic behavior** parameter.

Bus termination

Navigation Expert → Communication → Modbus config. → Bus termination (7155)

Description Displays whether the terminating resistor is enabled or disabled.

5) Not a Number

User interface

- Off
- On

Additional information

Selection

- Off
  The terminating resistor is disabled.
- On
  The terminating resistor is enabled.

For detailed information about enabling the terminating resistor, see the Operating Instructions for the device, "Enabling the terminating resistor" section

Fieldbus writing access

Navigation Expert → Communication → Modbus config. → Fieldb.writ.acc. (7156)

Description Use this function to restrict access to the measuring device via fieldbus (Modbus protocol).

Selection

- Read + write
- Read only

Additional information

Description

If read and/or write protection is enabled, the parameter can only be controlled and reset via local operation. Access is no longer possible via operating tools.

This does not affect cyclic measured value transmission to the higher-order system, which is always guaranteed.

Selection

- Read + write
  The parameters are read and write parameters.
- Read only
- The parameters are read only parameters.

3.6.2 "Modbus information" submenu

Navigation Expert → Communication → Modbus info

▶ Modbus information	
Device ID (7153)	→ 148
Device revision (7154)	→ 148

Device ID

Navigation Expert → Communication → Modbus info → Device ID (7153)

Description Displays the device ID for identifying the measuring device.

User interface 4-digit hexadecimal number

Device revision

Navigation Expert → Communication → Modbus info → Device revision (7154)

Description Displays the device revision.

User interface 4-digit hexadecimal number

3.6.3 "Modbus data map" submenu

Navigation Expert → Communication → Modbus data map

▶ Modbus data map	
Scan list register 0 to 15 (7114)	→ 148

Scan list register 0 to 15

Navigation Expert → Communication → Modbus data map → Scan list reg.0 to 15 (7114)

Description Use this function to enter the scan list register. By entering the register address (1-based), up to 16 device parameters can be grouped by assigning them to the scan list registers 0 to 15. The data of the device parameters assigned here are read out via the register addresses 5051 to 5081.

User entry 1 to 65 535

3.6.4 "Web server" submenu

Navigation Expert → Communication → Web server

▶ Web server	
Web server language (7221)	→ 149
MAC address (7214)	→ 150
DHCP client (7212)	→ 150
IP address (7209)	→ 150
Subnet mask (7211)	→ 151
Default gateway (7210)	→ 151
Web server functionality (7222)	→ 151
Login page (7273)	→ 151

Web server language

Navigation Expert → Communication → Web server → Webserv.language (7221)

Description Use this function to select the Web server language setting.

Selection
- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- Bahasa Indonesia
- tiếng Việt (Vietnamese)
- čeština (Czech)

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.

Selection
- Off
- On

Additional information *Result*

If the DHCP client functionality of the Web server is activated, the IP address (→ 150), Subnet mask (→ 151) and Default gateway (→ 151) are set automatically.

- Identification is via the MAC address of the measuring device.
- The IP address (→ 150) in the **IP address** parameter (→ 150) is ignored as long as the **DHCP client** parameter (→ 150) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ 150) in the parameter of the same name is only used if the **DHCP client** parameter (→ 150) 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)

6) Media Access Control

Subnet mask

Navigation Expert → Communication → Web server → Subnet mask (7211)

Description Display or enter the subnet mask.

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

Default gateway

Navigation Expert → Communication → Web server → Default gateway (7210)

Description Display or enter the Default gateway (→ 151).

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

Web server functionality

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

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

Selection
- Off
- HTML Off
- On

Additional information *Description*

Once disabled, the Web server functionality can only be re-enabled via or the operating tool FieldCare.

Selection

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

Login page

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

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

Selection

- Without header
- With header

3.6.5 "WLAN settings" wizard

Navigation Expert → Communication → WLAN settings

▶ **WLAN settings**

WLAN (2702)	→ 153
WLAN mode (2717)	→ 153
SSID name (2714)	→ 153
Network security (2705)	→ 154
Security identification (2718)	→ 154
User name (2715)	→ 154
WLAN password (2716)	→ 155
WLAN IP address (2711)	→ 155
WLAN MAC address (2703)	→ 155
WLAN subnet mask (2709)	→ 155
WLAN MAC address (2703)	→ 155
WLAN passphrase (2706)	→ 156
WLAN MAC address (2703)	→ 155
Assign SSID name (2708)	→ 156
SSID name (2707)	→ 156
2.4 GHz WLAN channel (2704)	→ 157
Select antenna (2713)	→ 157
Connection state (2722)	→ 157
Received signal strength (2721)	→ 157

WLAN IP address (2711)	→ 155
Gateway IP address (2719)	→ 158
IP address domain name server (2720)	→ 158

WLAN

Navigation Expert → Communication → WLAN settings → WLAN (2702)

Description Use this function to enable and disable the WLAN connection.

Selection
- Disable
- Enable

WLAN mode

Navigation Expert → Communication → WLAN settings → WLAN mode (2717)

Description Use this function to select the WLAN mode.

Selection
- WLAN access point
- WLAN Client

SSID name

Navigation Expert → Communication → WLAN settings → SSID name (2714)

Prerequisite The client is activated.

Description Use this function to enter the user-defined SSID name (max. 32 characters) of the WLAN network.

User entry –

Factory setting –

Network security

Navigation Expert → Communication → WLAN settings → Network security (2705)

Description Use this function to select the type of security for the WLAN interface.

Selection
- Unsecured
- WPA2-PSK
- EAP-PEAP with MSCHAPv2 *
- EAP-PEAP MSCHAPv2 no server authentic. *
- EAP-TLS *

Additional information *Selection*
- Unsecured
  Access the WLAN connection without identification.
- WPA2-PSK
  Access the WLAN connection with a network key.

Security identification

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
- Trusted issuer certificate
- Device certificate
- Device 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)

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

WLAN passphrase

Navigation Expert → Communication → WLAN settings → WLAN passphrase (2706)

Prerequisite The **WPA2-PSK** option is selected in the **Security type** parameter (→ 154).

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

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 (→ 156).
- The **WLAN access point** option is selected in the **WLAN mode** parameter (→ 153).

Description Use this function to enter a user-defined SSID name.

User entry Max. 32-digit character string comprising numbers, letters and special characters

Factory setting EH_device designation_last 7 digits of the serial number (e.g. EH_Prosonic_Flow_500_A802000)

8) Service Set Identifier

2.4 GHz WLAN channel

Navigation Expert → Communication → WLAN settings → WLAN channel (2704)

Description Use this function to enter the 2.4 GHz WLAN channel.

User entry 1 to 11

Additional information *Description*

- It is only necessary to enter a 2.4 GHz WLAN channel if multiple WLAN devices are in use.
- If just one measuring device is in use, it is recommended to keep the factory setting.

Select antenna

Navigation Expert → Communication → WLAN settings → Select antenna (2713)

Description Use this function to select whether the external or internal antenna is used for reception.

Selection
- External antenna
- Internal antenna

Connection state

Navigation Expert → Communication → WLAN settings → Connection state (2722)

Description The connection status is displayed.

User interface
- Connected
- Not connected

Received signal strength

Navigation Expert → Communication → WLAN settings → Rec.sig.strength (2721)

Description Displays the signal strength received.

User interface
- Low
- Medium
- High

Gateway IP address

Navigation Expert → Communication → WLAN settings → Gateway IP addr. (2719)

Description Use this function to enter the IP address of the gateway.

User interface Character string comprising numbers, letters and special characters (#15)

IP address domain name server

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

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

User interface Character string comprising numbers, letters and special characters (#15)

3.7 "Application" submenu

Navigation Expert → Application

▶ **Application**		
	Reset all totalizers (2806)	→ 158
	▶ **Totalizer 1 to n**	→ 159

Reset all totalizers

Navigation Expert → Application → Reset all tot. (2806)

Description Use this function to reset all totalizers to the value **0** and restart the totaling process. This deletes all the flow values previously totalized.

Selection
- Cancel
- Reset + totalize

Additional information *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
Reset + totalize	Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totalized.

3.7.1 "Totalizer 1 to n" submenu

Navigation Expert → Application → Totalizer 1 to n

▶ Totalizer 1 to n	
Assign process variable (0914–1 to n)	→ 159
Unit totalizer 1 to n (0915–1 to n)	→ 160
Totalizer operation mode (0908–1 to n)	→ 161
Control Totalizer 1 to n (0912–1 to n)	→ 161
Preset value 1 to n (0913–1 to n)	→ 162
Failure mode (0901–1 to n)	→ 162

Assign process variable

Navigation Expert → Application → Totalizer 1 to n → Assign variable (0914–1 to n)

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

Selection
- Off
- Volume flow
- Mass 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 process variable** parameter (→ 159) 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 process variable** parameter (→ 159) of the **Totalizer 1 to n** submenu.

Description Use this function to select the process variable unit for the Totalizer 1 to n (→ 159).

Selection

- g *
- kg *
- t *
- oz *
- lb *
- STon *
- cm^3 *
- dm^3 *
- m^3 *
- ml *
- l *
- hl *
- Ml Mega *
- 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) *
- gal (imp) *
- Mgal (imp) *
- bbl (imp;beer) *
- bbl (imp;oil) *
- None *

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 (→ 60).

Selection

The selection is dependent on the process variable selected in the **Assign process variable** parameter (→ 159).

* Visibility depends on order options or device settings

Totalizer operation mode

Navigation Expert → Application → Totalizer 1 to n → Operation mode (0908–1 to n)

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 159) of the **Totalizer 1 to n** submenu.

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

Selection
- Net flow total
- Forward flow total
- Reverse flow total

Factory setting Net flow total

Additional information *Selection*

- **Net flow total** option
  The flow values in the forward and reverse flow directions are totalized and netted against each other. Net flow is recorded in the flow direction.
- **Forward flow total** option
  Only the flow in the forward flow direction is totalized.
- **Reverse flow total** option
  Only the flow in the reverse flow direction is totalized (= reverse flow quantity).

Selection

- Net flow total
  Flow values in the forward and reverse flow direction are totalized and balanced against one another. Net flow is registered in the flow direction.
- Forward flow total
  Only the flow in the forward flow direction is totalized.
- Reverse flow total
  Only the flow in the reverse flow direction is totalized (= reverse flow quantity).

Control Totalizer 1 to n

Navigation Expert → Application → Totalizer 1 to n → Control Tot. 1 to n (0912–1 to n)

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 159) of the **Totalizer 1 to n** submenu.

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

Selection
- Totalize
- Reset + hold
- Preset + hold
- Reset + totalize
- Preset + totalize
- Hold

Additional information *Selection*

Options	Description
Totalize	The totalizer is started or continues running.
Reset + hold	The totaling process is stopped and the totalizer is reset to 0.
Preset + hold	The totaling process is stopped and the totalizer is set to its defined start value from the **Preset value** parameter.
Reset + totalize	The totalizer is reset to 0 and the totaling process is restarted.
Preset + totalize	The totalizer is set to the defined start value from the **Preset value** parameter and the totaling process is restarted.
Hold	Totalizing is stopped.

Preset value 1 to n

Navigation Expert → Application → Totalizer 1 to n → Preset value 1 to n (0913–1 to n)

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 159) 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 (→ 160).

Example

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

Failure mode

Navigation Expert → Application → Totalizer 1 to n → Failure mode (0901–1 to n)

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 159) 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 *Selection*

- **Stop** option
  The totalizer is stopped in the event of a device alarm.
- **Actual value** option
  The totalizer continues to totalize based on the current value measured; the device alarm is ignored.
- **Last valid value** option
  The totalizer continues to totalize based on the last valid value measured before the device alarm occurred.

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.

3.8 "Diagnostics" submenu

Navigation Expert → Diagnostics

▶ **Diagnostics**	
Actual diagnostics (0691)	→ 164
Previous diagnostics (0690)	→ 165
Operating time from restart (0653)	→ 166
Operating time (0652)	→ 166
▶ **Diagnostic list**	→ 166
▶ **Event logbook**	→ 170
▶ **Device information**	→ 172
▶ **Main electronic module + I/O module 1**	→ 176

▶ Sensor electronic module (ISEM)	→ 177
▶ I/O module 2	→ 178
▶ I/O module 3	→ 179
▶ Display module	→ 180
▶ Data logging	→ 181
▶ Heartbeat Technology	→ 189
▶ Simulation	→ 189

Actual diagnostics

Navigation Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite A diagnostic event has occurred.

Description Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information *Display*

Additional pending diagnostic messages can be viewed in the **Diagnostic list** submenu (→ 166).

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 failure

Timestamp

Navigation Expert → Diagnostics → Timestamp

Description Displays the operating time when the current diagnostic message occurred.

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

Additional information

Display

The diagnostic message can be viewed via the **Actual diagnostics** parameter (→ 164).

Example

For the display format:
24d12h13m00s

Previous diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics (0690)

Prerequisite Two diagnostic events have already occurred.

Description Displays the diagnostic message that occurred before the current message.

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Display

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Example

For the display format:
⊗F271 Main electronics failure

Timestamp

Navigation Expert → Diagnostics → Timestamp

Description Displays the operating time when the last diagnostic message before the current message occurred.

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

Additional information

Display

The diagnostic message can be viewed via the **Previous diagnostics** parameter (→ 165).

Example

For the display format:
24d12h13m00s

Operating time from restart

Navigation Expert → Diagnostics → Time fr. restart (0653)

Description Use this function to display the time the device has been in operation since the last device restart.

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

Operating time

Navigation Expert → Diagnostics → Operating time (0652)

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

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

Additional information *User interface*

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

3.8.1 "Diagnostic list" submenu

Navigation Expert → Diagnostics → Diagnostic list

▶ **Diagnostic list**	
Diagnostics 1 (0692)	→ 📄 166
Diagnostics 2 (0693)	→ 📄 167
Diagnostics 3 (0694)	→ 📄 168
Diagnostics 4 (0695)	→ 📄 169
Diagnostics 5 (0696)	→ 📄 170

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 failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 166).

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 failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the second-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 167).

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 failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the third-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 168).

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 failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fourth-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ 169).

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 failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fifth-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 170).

Example

For the display format:
24d12h13m00s

3.8.2 "Event logbook" submenu

Viewing event messages

Event messages are displayed in chronological order. The event history includes both diagnostic events and information events. The symbol in front of the timestamp indicates whether the event has started or ended.

Navigation Expert → Diagnostics → Event logbook

▶ **Event logbook**

Filter options (0705)	→ 171
▶ **Event list**	→ 171

Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options (0705)

Description Use this function to select the category whose event messages are displayed in the event list of the local display.

Selection
- All
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- Information (I)

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	→ 172

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 (→ 171).

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 failure
  ⊖ 01d04h12min30s

HistoROM

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

3.8.3 "Device information" submenu

Navigation Expert → Diagnostics → Device info

▶ Device information	
Device tag	→ 173
Serial number	→ 173
Firmware version	→ 174
Device name	→ 174
Order code	→ 174

Extended order code 1	→ 175
Extended order code 2	→ 175
Extended order code 3	→ 175
ENP version	→ 175

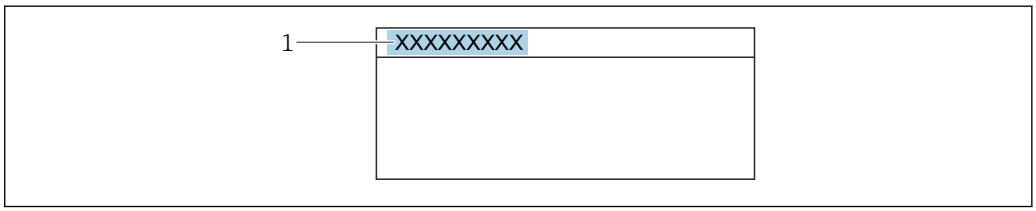
Device tag

Navigation Expert → Diagnostics → Device info → Device tag (0011)

Description Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

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

Additional information *User interface*



1 Position of the header text on the display

The number of characters displayed depends on the characters used.

Serial number

Navigation Expert → Diagnostics → Device info → Serial number (0009)

Description Displays the serial number of the measuring device.

The number can be found on the nameplate of the sensor and transmitter.

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

Additional information *Description*

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

Firmware version

Navigation Expert → Diagnostics → Device info → Firmware version (0010)

Description Displays the device firmware version installed.

User interface Character string in the format xx.yy.zz

Additional information *Display*

The Firmware version is also located:
- On the title page of the Operating instructions
- On the transmitter nameplate

Device name

Navigation Expert → Diagnostics → Device info → Device name (0020)

Description Displays the name of the transmitter. It can also be found on the nameplate of the transmitter.

User interface 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.

Extended order code 1

Navigation Expert → Diagnostics → Device info → Ext. order cd. 1 (0023)

Description Displays the first part of the extended order code.

On account of length restrictions, the extended order code is split into a maximum of 3 parameters.

User interface Character string

Additional information *Description*

The extended order code indicates the version of all the features of the product structure for the measuring device and thus uniquely identifies the measuring device.

The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.

Extended order code 2

Navigation Expert → Diagnostics → Device info → Ext. order cd. 2 (0021)

Description Displays the second part of the extended order code.

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 175)

Extended order code 3

Navigation Expert → Diagnostics → Device info → Ext. order cd. 3 (0022)

Description Displays the third part of the extended order code.

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 175)

ENP version

Navigation Expert → Diagnostics → Device info → ENP version (0012)

Description Displays the version of the electronic nameplate.

User interface Character string

Additional information *Description*

This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.

3.8.4 "Main electronic module + I/O module 1" submenu

Navigation Expert → Diagnostics 1 → Main elec.+I/O1

▶ **Main electronic module + I/O module 1**		
	Firmware version	→ 176
	Build no. software	→ 176
	Bootloader revision	→ 176

Firmware version

Navigation Expert → Diagnostics → Main elec.+I/O1 → Firmware version (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → Main elec.+I/O1 → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

Navigation Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.5 "Sensor electronic module (ISEM)" submenu

Navigation Expert → Diagnostics → Sens. electronic

▶ Sensor electronic module (ISEM)	
Firmware version (0072)	→ 177
Build no. software (0079)	→ 177
Bootloader revision (0073)	→ 177

Firmware version

Navigation Expert → Diagnostics → Sens. electronic → Firmware version (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

Navigation Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.6 "I/O module 2" submenu

Navigation Expert → Diagnostics → I/O module 2

▶ I/O module 2	
I/O module 2 terminal numbers (3902–2)	→ 178
Firmware version (0072)	→ 178
Build no. software (0079)	→ 178
Bootloader revision (0073)	→ 179

I/O module 2 terminal numbers

Navigation Expert → Diagnostics → I/O module 2 → I/O 2 terminals (3902–2)

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

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

Firmware version

Navigation Expert → Diagnostics → I/O module 2 → Firmware version (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → I/O module 2 → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

Navigation Expert → Diagnostics → I/O module 2 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.7 "I/O module 3" submenu

Navigation Expert → Diagnostics → I/O module 3

▶ I/O module 3	
I/O module 3 terminal numbers (3902–3)	→ 179
Firmware version (0072)	→ 179
Build no. software (0079)	→ 180
Bootloader revision (0073)	→ 180

I/O module 3 terminal numbers

Navigation Expert → Diagnostics → I/O module 3 → I/O 3 terminals (3902–3)

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

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

Firmware version

Navigation Expert → Diagnostics → I/O module 3 → Firmware version (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → I/O module 3 → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

Navigation Expert → Diagnostics → I/O module 3 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.8 "Display module" submenu

Navigation Expert → Diagnostics → Display module

▶ **Display module**	
Firmware version (0072)	→ 180
Build no. software (0079)	→ 181
Bootloader revision (0073)	→ 181

Firmware version

Navigation Expert → Diagnostics → Display module → Firmware version (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → Display module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

Navigation Expert → Diagnostics → Display module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.9 "Data logging" submenu

Navigation Expert → Diagnostics → Data logging

▶ Data logging	
Assign channel 1 (0851)	→ 182
Assign channel 2 (0852)	→ 183
Assign channel 3 (0853)	→ 183
Assign channel 4 (0854)	→ 183
Logging interval (0856)	→ 183
Clear logging data (0855)	→ 184
Data logging (0860)	→ 184
Logging delay (0859)	→ 185
Data logging control (0857)	→ 185
Data logging status (0858)	→ 186
Entire logging duration (0861)	→ 186

▶ Display channel 1	→ 📄 186
▶ Display channel 2	→ 📄 188
▶ Display channel 3	→ 📄 188
▶ Display channel 4	→ 📄 188

Assign channel 1

Navigation Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

Prerequisite The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 📄 48).

Description Use this function to select a process variable for the data logging channel.

Selection
- Off
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Acceptance rate *
- Electronics temperature
- Temperature *
- Density *
- Current output 2 *
- Current output 3 *
- Current output 4 *
- Current output 1 *

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.

* Visibility depends on order options or device settings

Assign channel 2

Navigation Expert → Diagnostics → Data logging → Assign chan. 2 (0852)

Prerequisite The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 48).

Description Use this function to select a process variable for the data logging channel.

Selection For the picklist, see the **Assign channel 1** parameter (→ 182)

Assign channel 3

Navigation Expert → Diagnostics → Data logging → Assign chan. 3 (0853)

Prerequisite The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 48).

Description Use this function to select a process variable for the data logging channel.

Selection For the picklist, see the **Assign channel 1** parameter (→ 182)

Assign channel 4

Navigation Expert → Diagnostics → Data logging → Assign chan. 4 (0854)

Prerequisite The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 48).

Description Use this function to select a process variable for the data logging channel.

Selection For the picklist, see the **Assign channel 1** parameter (→ 182)

Logging interval

Navigation Expert → Diagnostics → Data logging → Logging interval (0856)

Prerequisite The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 48).

Description Use this function to enter the logging interval T_{log} for data logging.

User entry 0.1 to 3 600.0 s

Additional information *Description*

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time T_{log}:
- If 1 logging channel is used: $T_{log} = 1000 \times t_{log}$
- If 2 logging channels are used: $T_{log} = 500 \times t_{log}$
- If 3 logging channels are used: $T_{log} = 333 \times t_{log}$
- If 4 logging channels are used: $T_{log} = 250 \times t_{log}$

Once this time elapses, the oldest data points in the data log are cyclically overwritten such that a time of T_{log} always remains in the memory (ring memory principle).

The log contents are cleared if the length of the logging interval is changed.

Example

If 1 logging channel is used:
- $T_{log} = 1000 \times 1$ s = 1 000 s ≈15 min
- $T_{log} = 1000 \times 10$ s = 10 000 s ≈ 3 h
- $T_{log} = 1000 \times 80$ s = 80 000 s ≈ 1 d
- $T_{log} = 1000 \times 3\,600$ s = 3 600 000 s ≈ 41 d

Clear logging data

Navigation Expert → Diagnostics → Data logging → Clear logging (0855)

Prerequisite The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 48).

Description Use this function to clear the entire logging data.

Selection
- Cancel
- Clear data

Additional information *Selection*

- Cancel
  The data is not cleared. All the data is retained.
- Clear data
  The logging data is cleared. The logging process starts from the beginning.

Data logging

Navigation Expert → Diagnostics → Data logging → Data logging (0860)

Description Use this function to select the data logging method.

Selection
- Overwriting
- Not overwriting

Additional information

Selection

- Overwriting
  The device memory applies the FIFO principle.
- Not overwriting
  Data logging is canceled if the measured value memory is full (single shot).

Logging delay

Navigation Expert → Diagnostics → Data logging → Logging delay (0859)

Prerequisite In the **Data logging** parameter (→ 184), the **Not overwriting** option is selected.

Description Use this function to enter the time delay for measured value logging.

User entry 0 to 999 h

Additional information

Description

Once measured value logging has been started with the **Data logging control** parameter (→ 185), the device does not save any data for the duration of the time delay entered.

Data logging control

Navigation Expert → Diagnostics → Data logging → Data log.control (0857)

Prerequisite In the **Data logging** parameter (→ 184), the **Not overwriting** option is selected.

Description Use this function to start and stop measured value logging.

Selection
- None
- Delete + start
- Stop

Additional information

Selection

- None
  Initial measured value logging status.
- Delete + start
  All the measured values recorded for all the channels are deleted and measured value logging starts again.
- Stop
  Measured value logging is stopped.

Data logging status

Navigation Expert → Diagnostics → Data logging → Data log. status (0858)

Prerequisite In the **Data logging** parameter (→ 184), the **Not overwriting** option is selected.

Description Displays the measured value logging status.

User interface
- Done
- Delay active
- Active
- Stopped

Additional information *Selection*
- Done
  Measured value logging has been performed and completed successfully.
- Delay active
  Measured value logging has been started but the logging interval has not yet elapsed.
- Active
  The logging interval has elapsed and measured value logging is active.
- Stopped
  Measured value logging is stopped.

Entire logging duration

Navigation Expert → Diagnostics → Data logging → Logging duration (0861)

Prerequisite In the **Data logging** parameter (→ 184), the **Not overwriting** option is selected.

Description Displays the total logging duration.

User interface Positive floating-point number

"Display channel 1" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 1

▸ **Display channel 1**		
	Display channel 1	→ 187

Display channel 1

Navigation Expert → Diagnostics → Data logging → Displ.channel 1

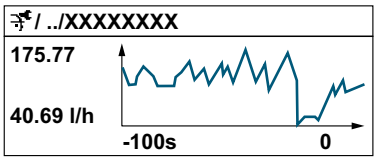
Prerequisite The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 48).

One of the following options is selected in the **Assign channel 1** parameter (→ 182):
- Volume flow
- Mass flow
- Density *
- Temperature *
- Electronics temperature
- Current output 2 *
- Current output 3 *
- Current output 4 *
- Acceptance rate *
- Signal strength *
- Signal to noise ratio *
- Turbulence *
- Current output 1
- Sound velocity
- Flow velocity

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.

* Visibility depends on order options or device settings

"Display channel 2" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 2

▸ **Display channel 2**		
	Display channel 2	→ 188

Display channel 2

Navigation Expert → Diagnostics → Data logging → Displ.channel 2

Prerequisite A process variable is defined in the **Assign channel 2** parameter.

Description See the **Display channel 1** parameter → 187

"Display channel 3" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 3

▸ **Display channel 3**		
	Display channel 3	→ 188

Display channel 3

Navigation Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite A process variable is defined in the **Assign channel 3** parameter.

Description See the **Display channel 1** parameter → 187

"Display channel 4" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 4

▸ **Display channel 4**		
	Display channel 4	→ 189

Display channel 4

Navigation Expert → Diagnostics → Data logging → Displ.channel 4

Prerequisite A process variable is defined in the **Assign channel 4** parameter.

Description See the **Display channel 1** parameter → 187

3.8.10 "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 → HBT

▶ **Heartbeat Technology**

3.8.11 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation

▶ **Simulation**

Assign simulation process variable (1810)	→ 190
Process variable value (1811)	→ 191
Current input 1 to n simulation (1608–1 to n)	→ 191
Value current input 1 to n (1609–1 to n)	→ 191
Status input simulation 1 to n (1355–1 to n)	→ 192
Input signal level 1 to n (1356–1 to n)	→ 192
Current output 1 to n simulation (0354–1 to n)	→ 192
Current output value (0355)	→ 193
Frequency output 1 to n simulation (0472–1 to n)	→ 193

Frequency output 1 to n value (0473–1 to n)	→ 194
Pulse output simulation 1 to n (0458–1 to n)	→ 194
Pulse value 1 to n (0459–1 to n)	→ 195
Switch output simulation 1 to n (0462–1 to n)	→ 195
Switch status 1 to n (0463–1 to n)	→ 196
Relay output 1 to n simulation (0802–1 to n)	→ 196
Switch status 1 to n (0803–1 to n)	→ 197
Pulse output simulation (0988)	→ 197
Pulse value (0989)	→ 198
Device alarm simulation (0654)	→ 198
Diagnostic event category (0738)	→ 199
Diagnostic event simulation (0737)	→ 199

Assign simulation process variable

Navigation Expert → Diagnostics → Simulation → Assign proc.var. (1810)

Description Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Density *

Additional information *Description*

The simulation value of the process variable selected is defined in the **Process variable value** parameter (→ 191).

* Visibility depends on order options or device settings

Process variable value

Navigation Expert → Diagnostics → Simulation → Proc. var. value (1811)

Prerequisite A process variable is selected in the **Assign simulation process variable** parameter (→ 190).

Description Use this function to enter a simulation value for the selected process variable. Subsequent measured value processing and the signal output use this simulation value. In this way, users can verify whether the measuring device has been configured correctly.

User entry Depends on the process variable selected

Additional information *User entry*

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

Current input 1 to n simulation

Navigation Expert → Diagnostics → Simulation → Curr.inp 1 to n sim. (1608–1 to n)

Description Option for switching simulation of the current input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

The desired simulation value is defined in the **Value current input 1 to n** parameter.

Selection
- Off
- On

Additional information *Selection*
- Off
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Current simulation is active.

Value current input 1 to n

Navigation Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609–1 to n)

Prerequisite In the **Current input 1 to n simulation** parameter, the **On** option is selected.

Description Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.

User entry 0 to 22.5 mA

Status input simulation 1 to n

Navigation Expert → Diagnostics → Simulation → Status inp.sim 1 to n (1355–1 to n)

Description Use this function to switch simulation of the status input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- On

Additional information *Description*

The desired simulation value is defined in the **Input signal level** parameter (→ 192).

Selection
- Off
  Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Simulation for the status input is active.

Input signal level 1 to n

Navigation Expert → Diagnostics → Simulation → Signal level 1 to n (1356–1 to n)

Prerequisite In the **Status input simulation** parameter (→ 192), the **On** option is selected.

Description Use this function to select the signal level for the simulation of the status input. In this way, users can verify the correct configuration of the status input and the correct function of upstream feed-in units.

Selection
- High
- Low

Current output 1 to n simulation

Navigation Expert → Diagnostics → Simulation → Curr.out. 1 to n sim. (0354–1 to n)

Description Use this function to switch simulation of the current output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- On

Additional information *Description*

The desired simulation value is defined in the **Value current output 1 to n** parameter.

Selection

- Off
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Current simulation is active.

Current output value

Navigation Expert → Diagnostics → Simulation → Curr.outp val. (0355)

Prerequisite In the **Current output 1 to n simulation** parameter, the **On** option is selected.

Description Use this function to enter a current value for the simulation. In this way, users can verify the correct adjustment of the current output and the correct function of downstream switching units.

User entry 3.59 to 22.5 mA

Additional information *Dependency*

The input range is dependent on the option selected in the **Current span** parameter (→ 96).

Frequency output 1 to n simulation

Navigation Expert → Diagnostics → Simulation → Freq.outp 1 to n sim. (0472–1 to n)

Prerequisite In the **Operating mode** parameter (→ 111), the **Frequency** option is selected.

Description Use this function to switch simulation of the frequency output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- On

Additional information

Description

The desired simulation value is defined in the **Frequency value 1 to n** parameter.

Selection

- Off
  Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Frequency simulation is active.

Frequency output 1 to n value

Navigation Expert → Diagnostics → Simulation → Freq.outp 1 to n val. (0473–1 to n)

Prerequisite In the **Frequency output simulation 1 to n** parameter, the **On** option is selected.

Description Use this function to enter a frequency value for the simulation. In this way, users can verify the correct adjustment of the frequency output and the correct function of downstream switching units.

User entry 0.0 to 12 500.0 Hz

Pulse output simulation 1 to n

Navigation Expert → Diagnostics → Simulation → Puls.outp.sim. 1 to n (0458–1 to n)

Prerequisite In the **Operating mode** parameter (→ 111), the **Pulse** option is selected.

Description Use this function to switch simulation of the pulse output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- Fixed value
- Down-counting value

Additional information

Selection

- **Off** option
  Simulation of the pulse output is switched off. The device is in standard operation mode or another process variable is being simulated.
- **Fixed value** option
  Pulses are emitted continuously with the pulse width specified in the "Pulse width" parameter.
- **Down-counting value** option
  The number of pulses specified in the "Pulse value " parameter are emitted.

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 (→ 113).
- Down-counting value
  The pulses specified in the **Pulse value** parameter (→ 195) are output.

Pulse value 1 to n

Navigation Expert → Diagnostics → Simulation → Pulse value 1 to n (0459–1 to n)

Prerequisite In the **Pulse output simulation 1 to n** parameter, the **Down-counting value** option is selected.

Description Use this function to enter a pulse value for the simulation. In this way, users can verify the correct adjustment of the pulse output and the correct function of downstream switching units.

User entry 0 to 65 535

Switch output simulation 1 to n

Navigation Expert → Diagnostics → Simulation → Switch sim. 1 to n (0462–1 to n)

Prerequisite In the **Operating mode** parameter (→ 111), the **Switch** option is selected.

Description Use this function to switch simulation of the switch output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Additional information

Description

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection

- Off
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Switch simulation is active.

Switch status 1 to n

Navigation

Expert → Diagnostics → Simulation → Switch status 1 to n (0463–1 to n)

Description

Use this function to select a switch value for the simulation. In this way, users can verify the correct adjustment of the switch output and the correct function of downstream switching units.

Selection

- Open
- Closed

Additional information

Selection

- **Open** option
  The switch output is not conductive.
- **Closed** option
  The switch output is conductive.

Selection

- Open
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Switch simulation is active.

Relay output 1 to n simulation

Navigation

Expert → Diagnostics → Simulation → Relay out. 1 to n sim (0802–1 to n)

Description

Use this function to switch simulation of the relay output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Additional information

Description

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection

- Off
  Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Relay simulation is active.

Switch status 1 to n

Navigation Expert → Diagnostics → Simulation → Switch status 1 to n (0803–1 to n)

Prerequisite The **On** option is selected in the **Switch output simulation 1 to n** parameter parameter.

Description Use this function to select a relay value for the simulation. In this way, users can verify the correct adjustment of the relay output and the correct function of downstream switching units.

Selection

- Open
- Closed

Additional information

Selection

- Open
  Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Relay simulation is active.

Pulse output simulation

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-counting value

Additional information

Selection

- **Off** option
  Simulation of the pulse output is switched off. The device is in standard operation mode or another process variable is being simulated.
- **Fixed value** option
  Pulses are emitted continuously with the pulse width specified in the "Pulse width" parameter.
- **Down-counting value** option
  The number of pulses specified in the "Pulse value " parameter are emitted.

Description

The desired simulation value is defined in the **Pulse value** parameter (→ 198).

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 (→ 139).
- Down-counting value
  The pulses specified in the **Pulse value** parameter (→ 198) are output.

Pulse value

Navigation Expert → Diagnostics → Simulation → Pulse value (0989)

Prerequisite In the **Pulse output simulation** parameter (→ 197), the **Down-counting value** 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

Device alarm simulation

Navigation Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

Description Use this function to switch the device alarm on and off.

Selection

- Off
- On

Additional information

Description

The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Diagnostic event category

Navigation Expert → Diagnostics → Simulation → Event category (0738)

Description Use this function to select the category of the diagnostic events that are displayed for the simulation in the **Diagnostic event simulation** parameter (→ 199).

Selection
- Sensor
- Electronics
- Configuration
- Process

Diagnostic event simulation

Navigation Expert → Diagnostics → Simulation → Diag. event sim. (0737)

Description Use this function to select a diagnostic event for the simulation process that is activated.

Selection
- Off
- Diagnostic event picklist (depends on the category selected)

Additional information *Description*

For the simulation, you can choose from the diagnostic events of the category selected in the **Diagnostic event category** parameter (→ 199).

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
Density	kg/dm^3
Velocity	m/s
Kinematic viscosity	m2/s
Temperature	°C
Length	mm

4.1.2 Output current span

Current output 1 to n	4 to 20 mA NAMUR

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

Mass	lb
Mass flow	lb/min
Volume	ft^3
Volume flow	ft^3/min
Density	lb/ft^3
Velocity	ft/s
Kinematic viscosity	cSt
Temperature	°F
Length	in

4.2.2 Output current span

Current output 1 to n	4 to 20 mA US

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
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
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
Density	kg/l	Kilogram/liter
Velocity	m/s	Meter/time unit
Kinematic viscosity	m2/s	Square meter/second
Temperature	°C , K	Celsius, Kelvin
Length	mm	Millimeters
Time	m, h, d, y	Minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Volume	ft^3	Cubic foot
Volume flow	ft^3/s, ft^3/min, ft^3/h, ft^3/d	Cubic foot/time unit
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
Density	lb/ft^3	Pound/cubic foot
Velocity	ft/s	Foot/time unit
Kinematic viscosity	cSt	Centistokes
Temperature	°F, °R	Fahrenheit, Rankine
Length	in	Inch
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
Time	m, h, d, y	Minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

6 Modbus RS485 register information

6.1 Notes

6.1.1 Structure of the register information

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

Navigation: navigation path to the parameter					
Parameter	**Register**	**Data type**	**Access type**	**Selection/input**	**→ 🗎**
Name of parameter	Indicated in decimal numerical format	▪ Float length = 4 byte ▪ Integer length = 2 byte ▪ String length, depending on parameter	Possible type of access to parameter: ▪ Read access via function codes 03, 04 or 23 ▪ Write access via function codes 06, 16 or 23	**Options** List of the individual options for the parameter ▪ Option 1 ▪ **Option 2** ▪ **Option 3** (+) ℹ ▪ Factory setting highlighted in bold ▪ (+) = Factory setting depends on country, order options or device settings **User entry** Input range for the parameter	Page number information and cross-reference to the standard parameter description

NOTICE

If non-volatile device parameters are modified via the MODBUS RS485 function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device.

The number of writes to the EEPROM is technically restricted to a maximum of 1 million.

- ▶ Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.
- ▶ Avoid constantly writing non-volatile device parameters via the MODBUS RS485.

6.1.2 Address model

The Modbus RS485 register addresses of the measuring device are implemented in accordance with the "Modbus Applications Protocol Specification V1.1".

In addition, systems are used that work with the register address model "Modicon Modbus Protocol Reference Guide (PI-MBUS-300 Rev. J)".

Depending on the function code used, a number is added at the start of the register address with this specification:

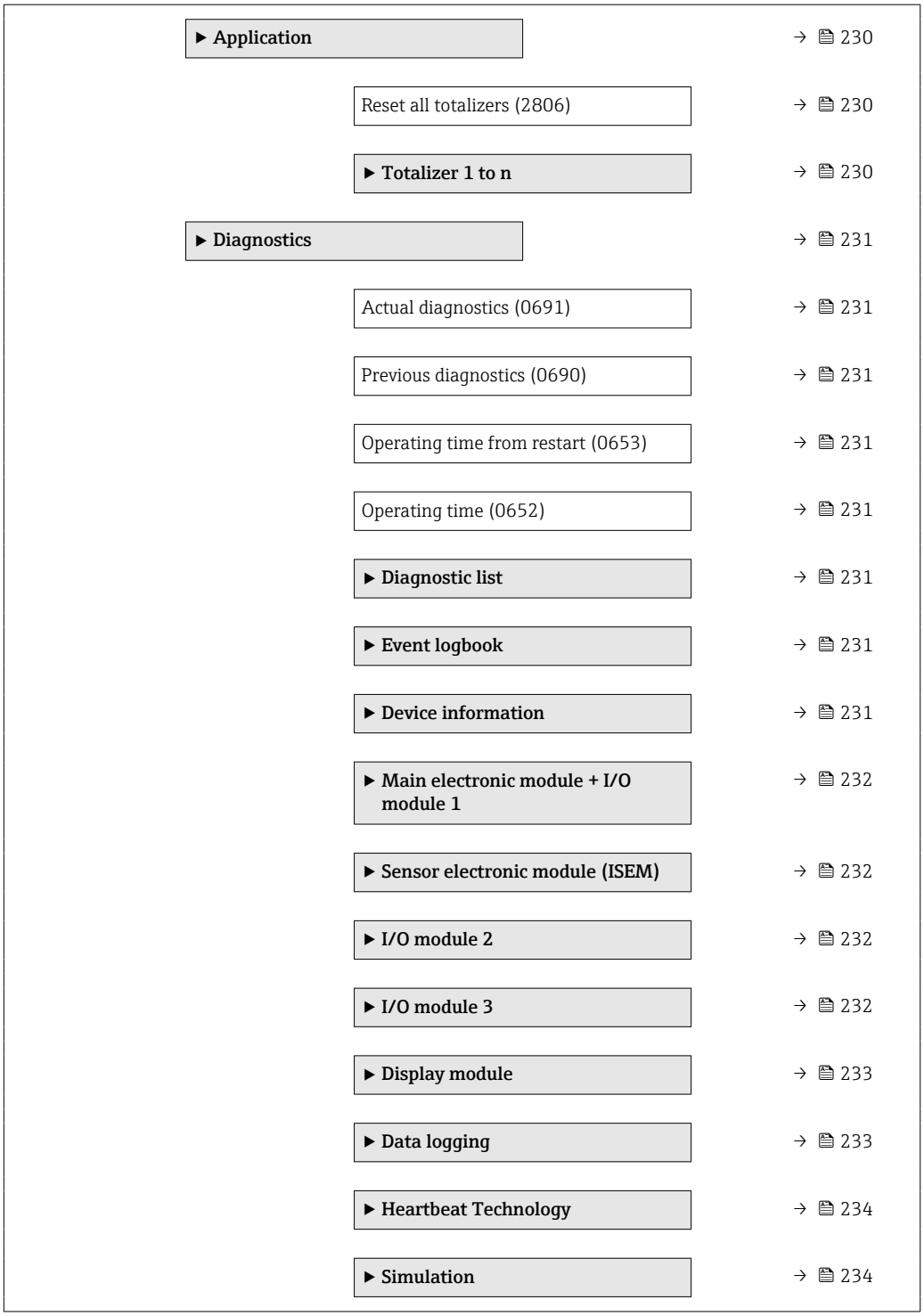
- "3" → "Read" access
- "4" → "Write" access

Function code	Access type	Register in accordance with "Modbus Applications Protocol Specification"	Register in accordance with "Modicon Modbus Protocol Reference Guide"
03 04 23	Read	XXXX Example: mass flow = 2007	3XXXX Example: mass flow = 32007
06 16 23	Write	XXXX Example: reset totalizer = 6401	4XXXX Example: reset totalizer = 46401

6.2 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.

Expert			
	Locking status (0004)		→ 206
	User role (0005)		→ 206
	Enter access code (0003)		→ 207
	Direct access (0106)		→ 207
	▶ **System**		→ 207
		▶ **Display**	→ 207
		▶ **Configuration backup**	→ 209
		▶ **Diagnostic handling**	→ 209
		▶ **Administration**	→ 210
	▶ **Sensor**		→ 211
		▶ **Measured values**	→ 211
		▶ **System units**	→ 214
		▶ **Measuring point 1**	→ 217
		▶ **Process parameters**	→ 218
		▶ **External compensation**	→ 219
		▶ **Sensor adjustment**	→ 219
		▶ **Calibration**	→ 220



6.3 Register information

Navigation: Expert					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
Locking status (0004)	4918	Integer	Read	256 = Hardware locked 512 = Temporarily locked	12
User role (0005)	2178	Integer	Read	0 = Operator 1 = Maintenance	13

Navigation: Expert					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Enter access code (0003)	2177	Integer	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	14
Direct access (0106)	3878	Integer	Read / Write	0 to 65 535	11

6.3.1 "System" submenu

"Display" submenu

Navigation: Expert → System → Display					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Display language (0104)	3673	Integer	Read / Write	0 = English 1 = Deutsch 2 = Français 3 = Español 4 = Italiano 5 = Nederlands 8 = Svenska 10 = Bahasa Indonesia 11 = 日本語 (Japanese) 12 = Portuguesa 13 = Polski 14 = русский язык (Russian) 15 = čeština (Czech) 16 = 中文 (Chinese) 18 = Türkçe 19 = tiếng Việt (Vietnamese) 20 = 한국어 (Korean)	16
Format display (0098)	3625	Integer	Read / Write	0 = 1 value, max. size 1 = 1 bargraph + 1 value 2 = 2 values 3 = 1 value large + 2 values 4 = 4 values	16
Value 1 display (0107)	3963	Integer	Read / Write	1 = Mass flow 2 = Volume flow 3 = Flow velocity 4 = Sound velocity 5 = Totalizer 1 6 = Totalizer 2 7 = Totalizer 3 15 = Signal strength * 16 = Signal to noise ratio * 17 = Turbulence * 20 = Acceptance rate * 24 = Test point 1 * 25 = Test point 2 * 39 = Electronics temperature 121 = Current output 1 * 122 = Current output 2 * 123 = Current output 3 * 124 = Current output 4 *	19
0% bargraph value 1 (0123)	4136 to 4137	Float	Read / Write	Signed floating-point number	19
100% bargraph value 1 (0125)	4142 to 4143	Float	Read / Write	Signed floating-point number	20
Decimal places 1 (0095)	3365	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	20

Navigation: Expert → System → Display					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Value 2 display (0108)	3964	Integer	Read / Write	1 = Mass flow 2 = Volume flow 3 = Flow velocity 4 = Sound velocity 5 = Totalizer 1 6 = Totalizer 2 7 = Totalizer 3 15 = Signal strength * 16 = Signal to noise ratio * 17 = Turbulence * 20 = Acceptance rate * 24 = Test point 1 * 25 = Test point 2 * 39 = Electronics temperature 121 = Current output 1 * 122 = Current output 2 * 123 = Current output 3 * 124 = Current output 4 * 251 = None	21
Decimal places 2 (0117)	4049	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	21
Value 3 display (0110)	3966	Integer	Read / Write	For the picklist, see the **Value 2 display** parameter (→ 🗎 21)	22
0% bargraph value 3 (0124)	4138 to 4139	Float	Read / Write	Signed floating-point number	22
100% bargraph value 3 (0126)	4140 to 4141	Float	Read / Write	Signed floating-point number	23
Decimal places 3 (0118)	4050	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	23
Value 4 display (0109)	3965	Integer	Read / Write	For the picklist, see the **Value 2 display** parameter (→ 🗎 21)	24
Decimal places 4 (0119)	4051	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	24
Display interval (0096)	3604 to 3605	Float	Read / Write	1 to 10 s	24
Display damping (0094)	3554 to 3555	Float	Read / Write	0.0 to 999.9 s	25
Header (0097)	3624	Integer	Read / Write	0 = Device tag 1 = Free text	25
Header text (0112)	3968 to 3973	String	Read / Write	Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)	26
Separator (0101)	3671	Integer	Read / Write	▪ . (point) ▪ , (comma)	26
Contrast display (0105)	3674 to 3675	Float	Read / Write	20 to 80 %	27
Backlight (0111)	3967	Integer	Read / Write	0 = Disable 1 = Enable	27

* Visibility depends on order options or device settings

"Configuration backup" submenu

Navigation: Expert → System → Configuration backup					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Operating time (0652)	2631	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	28
Last backup (2757)	6430	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	28
Configuration management (2758)	5500	Integer	Read / Write	0 = Cancel 1 = Execute backup 2 = Restore * 4 = Clear backup data 5 = Compare *	28
Backup state (2759)	5502	Integer	Read	1 = Backup in progress 2 = Restoring in progress 4 = Delete in progress 5 = Compare in progress 6 = Restoring failed 7 = Backup failed 251 = None	29
Comparison result (2760)	5514	Integer	Read	0 = Settings identical 1 = Settings not identical 2 = No backup available 3 = Check not done 4 = Backup settings corrupt 5 = Dataset incompatible	29

* Visibility depends on order options or device settings

"Diagnostic handling" submenu

Navigation: Expert → System → Diagnostic handling					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Alarm delay (0651)	6808 to 6809	Float	Read / Write	0 to 60 s	31

"Diagnostic behavior" submenu

Navigation: Expert → System → Diagnostic handling → Diagnostic behavior					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Assign behavior of diagnostic no. 160 (0776)	2873	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	32
Assign behavior of diagnostic no. 302 (0742)	6484	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning	33
Assign behavior of diagnostic no. 441 (0657)	4742	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	33
Assign behavior of diagnostic no. 442 (0658)	4919	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	34

Navigation: Expert → System → Diagnostic handling → Diagnostic behavior					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Assign behavior of diagnostic no. 443 (0659)	5000	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	35
Assign behavior of diagnostic no. 444 (0740)	5120	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	35
Assign behavior of diagnostic no. 543 (0643)	2362	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	36
Assign behavior of diagnostic no. 832 (0675)	6440	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	37
Assign behavior of diagnostic no. 833 (0676)	6439	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	37
Assign behavior of diagnostic no. 840 (0680)	2434	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	38
Assign behavior of diagnostic no. 842 (0638)	9661	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	39
Assign behavior of diagnostic no. 870 (0726)	33279	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	39
Assign behavior of diagnostic no. 930 (0639)	30668	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	41
Assign behavior of diagnostic no. 931 (0640)	30930	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	41

"Administration" submenu

Navigation: Expert → System → Administration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Device reset (0000)	6817	Integer	Read / Write	0 = Cancel 1 = Restart device 2 = To delivery settings 5 = Delete powerfail data 21 = Delete T-DAT 22 = Reset faulty parameters 23 = Delete delivery settings 24 = Delete HistoROM backup	45
Transmitter identifier (2765)	4510	Integer	Read	0 = Unknown 1 = 300 2 = 500	47

Navigation: Expert → System → Administration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Activate SW option (0029)	2795	Integer	Read / Write	Max. 10-digit string consisting of numbers.	47
Software option overview (0015)	2902	Integer	Read	= 1 = Extended HistoROM 16384 = Heartbeat Monitoring 32768 = Heartbeat Verification	48

"Define access code" wizard

Navigation: Expert → System → Administration → Define access code					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Define access code	8677 to 8684	String	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	43
Confirm access code	8685 to 8692	String	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	44

"Reset access code" submenu

Navigation: Expert → System → Administration → Reset access code					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Operating time (0652)	2631	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	44
Reset access code (0024)	8880 to 8895	String	Read / Write	Character string comprising numbers, letters and special characters	45

6.3.2 "Sensor" submenu

"Measured values" submenu

"Process variables" submenu

Navigation: Expert → Sensor → Measured values → Process variables					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Volume flow (1838)	2007 to 2008	Float	Read	Signed floating-point number	49
Mass flow (1847)	2009 to 2010	Float	Read	Signed floating-point number	50
Flow velocity (1852)	2015 to 2016	Float	Read	Signed floating-point number	50
Sound velocity (1850)	2013 to 2014	Float	Read	Signed floating-point number	50

"System values" submenu

Navigation: Expert → Sensor → Measured values → System values					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Signal strength (2914)	4959 to 4960	Float	Read	Signed floating-point number	51
Signal to noise ratio (2917)	4983 to 4984	Float	Read	Signed floating-point number	51
Acceptance rate (2912)	4551 to 4552	Float	Read	0 to 100 %	52
Turbulence (2907)	22772 to 22773	Float	Read	Signed floating-point number	52

"Totalizer" submenu

Navigation: Expert → Sensor → Measured values → Totalizer					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Totalizer value 1 to n (0911–1 to n)	1: 2610 to 2611 2: 2810 to 2811 3: 3010 to 3011	Float	Read	Signed floating-point number	52
Totalizer overflow 1 to n (0910–1 to n)	1: 2612 to 2613 2: 2812 to 2813 3: 3012 to 3013	Float	Read	Integer with sign	53

"Input values" submenu

"Current input 1 to n" submenu

Navigation: Expert → Sensor → Measured values → Input values → Current input 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Measured values 1 to n (1603–1 to n)	1: 6151 to 6152 2: 6153 to 6154 3: 6155 to 6156	Float	Read	Signed floating-point number	54
Measured current 1 to n (1604–1 to n)	1: 6131 to 6132 2: 6133 to 6134 3: 6135 to 6136	Float	Read	0 to 22.5 mA	55

"Value status input 1 to n" submenu

Navigation: Expert → Sensor → Measured values → Input values → Value status input 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Value status input (1353–1 to n)	1: 2746 2: 4699 3: 4700	Integer	Read	0 = Low 1 = High	55

"Output values" submenu

"Value current output 1 to n" submenu

Navigation: Expert → Sensor → Measured values → Output values → Value current output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Output current 1 to n (0361–1 to n)	1: 5931 to 5932 2: 5933 to 5934 3: 5935 to 5936	Float	Read	0 to 22.5 mA	56
Measured current 1 to n (0366–1 to n)	1: 5779 to 5780 2: 5781 to 5782 3: 5783 to 5784	Float	Read	0 to 30 mA	56

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

Navigation: Expert → Sensor → Measured values → Output values → Pulse/frequency/switch output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 📄**
Output frequency 1 to n (0471–1 to n)	1: 3462 to 3463 2: 3464 to 3465 3: 9910 to 9911	Float	Read	0.0 to 12 500.0 Hz	57
Pulse output 1 to n (0456–1 to n)	1: 3082 to 3083 2: 3084 to 3085 3: 4718 to 4719	Float	Read	Positive floating-point number	57
Switch status 1 to n (0461–1 to n)	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed	58

"Relay output 1 to n" submenu

Navigation: Expert → Sensor → Measured values → Output values → Relay output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 📄**
Switch status (0801–1 to n)	1: 3518 2: 3519 3: 9875	Integer	Read	1 = Open 6 = Closed	59
Switch cycles (0815–1 to n)	1: 7625 2: 7627 3: 7629	Integer	Read	Positive integer	59
Max. switch cycles number (0817–1 to n)	1: 21919 2: 21921 3: 21923	Integer	Read	Positive integer	59

"Double pulse output" submenu

Navigation: Expert → Sensor → Measured values → Output values → Double pulse output					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 📄**
Pulse output (0987)	7041 to 7042	Float	Read	Positive floating-point number	60

"System units" submenu

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Volume flow unit (0553)	2103	Integer	Read / Write	0 = cm^3/s 1 = cm^3/min 2 = cm^3/h 3 = cm^3/d 4 = dm^3/s 5 = dm^3/min 6 = dm^3/h 7 = dm^3/d 8 = m^3/s 9 = m^3/min **10 = m^3/h** (+) 11 = m^3/d 12 = ml/s 13 = ml/min 14 = ml/h 15 = ml/d 16 = l/s 17 = l/min 18 = l/h 19 = l/d 20 = hl/s 21 = hl/min 22 = hl/h 23 = hl/d 24 = Ml/s 25 = Ml/min 26 = Ml/h 27 = Ml/d 32 = af/s 33 = af/min 34 = af/h 35 = af/d 36 = ft^3/s 37 = ft^3/min 38 = ft^3/h 39 = ft^3/d 40 = fl oz/s (us) 41 = fl oz/min (us) 42 = fl oz/h (us) 43 = fl oz/d (us) 44 = gal/s (us) 45 = gal/min (us) 46 = gal/h (us) 47 = gal/d (us) 48 = Mgal/s (us) 49 = Mgal/min (us) 50 = Mgal/h (us) 51 = Mgal/d (us) 52 = bbl/s (us;liq.) 53 = bbl/min (us;liq.) 54 = bbl/h (us;liq.) 55 = bbl/d (us;liq.) 56 = bbl/s (us;beer) 57 = bbl/min (us;beer) 58 = bbl/h (us;beer) 59 = bbl/d (us;beer) 60 = bbl/s (us;oil) 61 = bbl/min (us;oil) 62 = bbl/h (us;oil) 63 = bbl/d (us;oil) 64 = bbl/s (us;tank) 65 = bbl/min (us;tank) 66 = bbl/h (us;tank) 67 = bbl/d (us;tank) 68 = gal/s (imp)	61

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
				69 = gal/min (imp) 70 = gal/h (imp) 71 = gal/d (imp) 72 = Mgal/s (imp) 73 = Mgal/min (imp) 74 = Mgal/h (imp) 75 = Mgal/d (imp) 76 = bbl/s (imp;beer) 77 = bbl/min (imp;beer) 78 = bbl/h (imp;beer) 79 = bbl/d (imp;beer) 80 = bbl/s (imp;oil) 81 = bbl/min (imp;oil) 82 = bbl/h (imp;oil) 83 = bbl/d (imp;oil) 88 = kgal/s (us) 89 = kgal/min (us) 90 = kgal/h (us) 91 = kgal/d (us) 92 = MMft^3/s 93 = MMft^3/min 94 = MMft^3/h 96 = Mft^3/d	
Volume unit (0563)	2104	Integer	Read / Write	0 = cm^3 1 = dm^3 **2 = m^3 (+)** 3 = ml 4 = l 5 = hl 6 = Ml Mega 8 = af 9 = ft^3 10 = fl oz (us) 11 = gal (us) 12 = Mgal (us) 13 = bbl (us;liq.) 14 = bbl (us;beer) 15 = bbl (us;oil) 16 = bbl (us;tank) 17 = gal (imp) 18 = Mgal (imp) 19 = bbl (imp;beer) 20 = bbl (imp;oil) 22 = kgal (us) 23 = Mft^3	63
Mass flow unit (0554)	2101	Integer	Read / Write	0 = g/s 1 = g/min 4 = kg/s 5 = kg/min **6 = kg/h (+)** 7 = kg/d 10 = t/h 11 = t/d 12 = oz/s 13 = oz/min 16 = lb/s 17 = lb/min 18 = lb/h 19 = lb/d 22 = STon/h 23 = STon/d	63

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Mass unit (0574)	2102	Integer	Read / Write	50 = g **51 = kg** (+) 52 = t 53 = oz 54 = lb 55 = STon	64
Velocity unit (0566)	2600	Integer	Read / Write	20 = ft/s **21 = m/s** (+)	64
Temperature unit (0557)	2109	Integer	Read / Write	**0 = °C** (+) 1 = K 2 = °F 3 = °R	65
Density unit (0555)	2107	Integer	Read / Write	0 = g/cm³ **2 = kg/dm³** (+) 3 = kg/l 4 = kg/m³ 5 = SD4°C 6 = SD15°C 7 = SD20°C 8 = SG4°C 9 = SG15°C 10 = SG20°C 11 = lb/ft³ 12 = lb/gal (us) 13 = lb/bbl (us;liq.) 14 = lb/bbl (us;beer) 15 = lb/bbl (us;oil) 16 = lb/bbl (us;tank) 17 = lb/gal (imp) 18 = lb/bbl (imp;beer) 19 = lb/bbl (imp;oil) 21 = g/m³	65
Kinematic viscosity unit (0578)	2112	Integer	Read / Write	**0 = m²/s** (+) 2 = cSt 3 = St	66
Length unit (0551)	2087	Integer	Read / Write	44 = ft 45 = m 47 = in **49 = mm** (+)	66
Date/time format (2812)	2150	Integer	Read / Write	0 = dd.mm.yy hh:mm 1 = mm/dd/yy hh:mm am/pm 2 = dd.mm.yy hh:mm am/pm 3 = mm/dd/yy hh:mm	67

"Measuring point 1" submenu

Navigation: Expert → Sensor → Measuring point 1					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Measuring point configuration (5675–1)	4285	Integer	Read / Write	0 = 1 measuring point - signal path 1 1 = 1 measuring point - 2 signal paths * 2 = 1 measuring point - signal path 2 *	68
Process fluid (2926–1)	5049	Integer	Read / Write	0 = Water 1 = Distilled water 2 = Sea water 4 = Benzene 6 = Ethanol 7 = Ammonia NH3 7 = Glycol 8 = Kerosene 9 = Milk 10 = Methanol 255 = User-specific liquid	69
Medium temperature (3053–1)	36110 to 36111	Float	Read / Write	–200 to 550 °C	69
Sound velocity (2929–1)	5171 to 5172	Float	Read / Write	200 to 3 000 m/s	69
Viscosity (2932–1)	5223 to 5224	Float	Read / Write	1E-10 to 0.01 m^2/s	69
Pipe material (2927–1)	5102	Integer	Read / Write	0 = Stainless steel 1 = Carbon steel 2 = Ductile cast iron 3 = Hastelloy C 6 = Copper 10 = PA 11 = PE 12 = PTFE 13 = PVC 14 = PVDF 15 = LDPE 16 = HDPE 17 = GRP 18 = PP 20 = Pyrex glass 22 = Asbestos cement 104 = 1.4301 (UNS S30400) 116 = 1.4401 (UNS S31600) 147 = 1.4550 (UNS S34700) 255 = Unknown pipe material	70
Pipe sound velocity (2933–1)	5326 to 5327	Float	Read / Write	800.0 to 3 800.0 m/s	70
Pipe dimensions (2943–1)	5114	Integer	Read / Write	0 = Diameter 1 = Pipe circumference	70
Pipe circumference (2934–1)	5334 to 5335	Float	Read / Write	30 to 62 800 mm	71
Pipe outer diameter (2910–1)	4971 to 4972	Float	Read / Write	10 to 5 000 mm	71
Pipe wall thickness (2916–1)	4975 to 4976	Float	Read / Write	Positive floating point number	71
Liner material (2928–1)	5118	Integer	Read / Write	1 = Cement 2 = Rubber 3 = Epoxy resin 251 = None 255 = Unknown liner material	71
Liner sound velocity (2936–1)	5342 to 5343	Float	Read / Write	800.0 to 3 800.0 m/s	72
Liner thickness (2935–1)	5338 to 5339	Float	Read / Write	0 to 100 mm	72

Navigation: Expert → Sensor → Measuring point 1					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Sensor type (2924–1)	4928	Integer	Read / Write	1 = C-030-A * 2 = C-050-A * 3 = C-100-A * 4 = C-100-B * 5 = C-100-C * 6 = C-200-A * 7 = C-200-B * 8 = C-200-C * 9 = C-500-A *	72
Sensor coupling (2957–1)	27037	Integer	Read / Write	0 = Coupling pad 1 = Coupling paste	73
Mounting type (2938–1)	4998	Integer	Read / Write	1 = (1) direct 2 = (2) V-mounting 3 = (3) Z-Mounting 4 = (4) W-mounting 6 = Automatic	73
Cable length (2939–1)	5346 to 5347	Float	Read / Write	0 to 200 000 mm	73
Inlet configuration (3049–1)	21570	Integer	Read / Write	0 = Off 1 = Single elbow 2 = Double elbow 3 = Double elbow 3D 4 = Concentric diameter change	73
Inlet diameter (3054–1)	36730 to 36731	Float	Read / Write	1 to 10 000 mm	74
Transition length (3065–1)	27608 to 27609	Float	Read / Write	0 to 10 000 mm	74
Inlet run (3050–1)	36023 to 36024	Float	Read / Write	0 to 50 000 mm	74
Relative sensor position (2985–1)	5122	Integer	Read	90 = 90° 180 = 180°	75
Result sensor type / mounting type (2946–1)	5187 to 5199	String	Read	e.g. **C-100-A** option / **(2) V-mounting** option	75
Result sensor distance / measuring aid (2947–1)	5203 to 5215	String	Read	e.g. 201.3 mm / B 21	75

* Visibility depends on order options or device settings

"Process parameters" submenu

Navigation: Expert → Sensor → Process parameters					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Flow override (1839)	5503	Integer	Read / Write	0 = Off 1 = On	76
Flow damping (1802)	5510 to 5511	Float	Read / Write	0 to 999.9 s	76

"Low flow cut off" submenu

Navigation: Expert → Sensor → Process parameters → Low flow cut off					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Assign process variable (1837)	5101	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Flow velocity	77
On value low flow cutoff (1805)	5138 to 5139	Float	Read / Write	Positive floating-point number	78
Off value low flow cutoff (1804)	5104 to 5105	Float	Read / Write	0 to 100.0 %	78

"External compensation" submenu

Navigation: Expert → Sensor → External compensation					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
External temperature (3058)	28647 to 28648	Float	Read / Write	−273.15 to 99 999 °C	79
Density source (3048)	21485	Integer	Read / Write	0 = Fixed density 1 = External density * 2 = Calculated value 11 = Current input 1 * 12 = Current input 2 * 13 = Current input 3 *	79
Fixed density (3171)	25234 to 25235	Float	Read / Write	0.01 to 15 000 kg/m³	80
External density (3060)	36025 to 36026	Float	Read / Write	Positive floating-point number	80
Fixed reference density (3178)	27177 to 27178	Float	Read / Write	0.01 to 15 000 kg/m³	80
Linear expansion coefficient (3153)	26402 to 26403	Float	Read / Write	$1.0 \cdot 10^{-6}$ to $2.0 \cdot 10^{-3}$	81
Square expansion coefficient (3172)	36021 to 36022	Float	Read / Write	$1.0 \cdot 10^{-8}$ to $2.0 \cdot 10^{-3}$	81
Reference temperature (3147)	26383 to 26384	Float	Read / Write	−200 to 450 °C	81

* Visibility depends on order options or device settings

"Sensor adjustment" submenu

Navigation: Expert → Sensor → Sensor adjustment					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Installation direction (1809)	5501	Integer	Read / Write	0 = Forward flow 1 = Reverse flow	82

"Process variable adjustment" submenu

Navigation: Expert → Sensor → Sensor adjustment → Process variable adjustment					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Volume flow offset (1831)	5521 to 5522	Float	Read / Write	Signed floating-point number	83
Volume flow factor (1832)	5519 to 5520	Float	Read / Write	Positive floating-point number	83
Mass flow offset (1841)	5525 to 5526	Float	Read / Write	Signed floating-point number	83
Mass flow factor (1846)	5523 to 5524	Float	Read / Write	Positive floating-point number	83
Sound velocity offset (1848)	5529 to 5530	Float	Read / Write	Signed floating-point number	84
Sound velocity factor (1849)	5527 to 5528	Float	Read / Write	Positive floating-point number	84
Temperature offset (1870)	5533 to 5534	Float	Read / Write	Signed floating-point number	84
Temperature factor (1871)	5531 to 5532	Float	Read / Write	Positive floating-point number	85
Density offset (1877)	25324 to 25325	Float	Read / Write	Signed floating-point number	85
Density factor (1878)	25336 to 25337	Float	Read / Write	Positive floating-point number	85

"Calibration" submenu

Navigation: Expert → Sensor → Calibration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Calibration factor (2920)	4559 to 4560	Float	Read	Signed floating-point number	86
Zero point (2921)	4963 to 4964	Float	Read	Signed floating-point number	86
Nominal diameter (2807)	2048 to 2057	String	Read	----------	86

6.3.3 "I/O configuration" submenu

Navigation: Expert → I/O configuration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
I/O module 1 to n terminal numbers (3902–1 to n)	1: 6541 2: 6542 3: 6543 4: 6544	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	87
I/O module 1 to n information (3906–1 to n)	1: 8659 2: 8660 3: 8661 4: 8662	Integer	Read	1 = MODBUS 2 = Configurable 3 = Not configurable 254 = Not plugged 255 = Invalid	87
I/O module 1 to n type (3901–1 to n)	1: 6417 2: 6418 3: 6419 4: 6420	Integer	Read / Write	0 = Off 1 = Current output * 2 = Current input * 3 = Pulse/frequency/switch output * 4 = Double pulse output * 5 = Status input * 6 = Relay output *	88
Apply I/O configuration (3907)	8665	Integer	Read / Write	0 = Yes 1 = No	88
I/O alteration code (2762)	6427	Integer	Read / Write	Positive integer	88

* Visibility depends on order options or device settings

6.3.4 "Input" submenu

"Current input 1 to n" submenu

Navigation: Expert → Input → Current input 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Terminal number (1611–1 to n)	1: 6548 2: 6549 3: 6550	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	89
Signal mode (1610–1 to n)	1: 6424 2: 6425 3: 6426	Integer	Read / Write	0 = Passive 2 = Active *	90
Current span (1605–1 to n)	1: 6147 2: 6148 3: 6149	Integer	Read / Write	0 = 4...20 mA (4... 20.5 mA) 1 = 4...20 mA US (3.9...20.8 mA) **2 = 4...20 mA NAMUR (3.8...20.5 mA)** (+) 3 = 0...20 mA (0... 20.5 mA)	90
0/4 mA value (1606–1 to n)	1: 6111 to 6112 2: 6113 to 6114 3: 6115 to 6116	Float	Read / Write	Signed floating-point number	90

Navigation: Expert → Input → Current input 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
20 mA value (1607–1 to n)	1: 6119 to 6120 2: 6121 to 6122 3: 6123 to 6124	Float	Read / Write	Signed floating-point number	91
Failure mode (1601–1 to n)	1: 6159 2: 6160 3: 6161	Integer	Read / Write	1 = Last valid value 2 = Alarm 6 = Defined value	91
Failure value (1602–1 to n)	1: 6163 to 6164 2: 6165 to 6166 3: 6167 to 6168	Float	Read / Write	Signed floating-point number	91

* Visibility depends on order options or device settings

"Status input 1 to n" submenu

Navigation: Expert → Input → Status input 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Terminal number (1358–1 to n)	1: 6554 2: 6555 3: 6556	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	92
Assign status input (1352–1 to n)	1: 2506 2: 4687 3: 4688	Integer	Read / Write	0 = Off 1 = Flow override 2 = Reset all totalizers 3 = Reset totalizer 1 4 = Reset totalizer 2 5 = Reset totalizer 3	92
Value status input (1353–1 to n)	1: 2746 2: 4699 3: 4700	Integer	Read	0 = Low 1 = High	93
Active level (1351–1 to n)	1: 2530 2: 4690 3: 4691	Integer	Read / Write	0 = Low 1 = High	93
Response time status input (1354–1 to n)	1: 3404 to 3405 2: 5753 to 5754 3: 5755 to 5756	Float	Read / Write	5 to 200 ms	93

6.3.5 "Output" submenu

"Current output 1 to n" submenu

Navigation: Expert → Output → Current output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Terminal number (0379–1 to n)	1: 6545 2: 6546 3: 6547	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	95
Signal mode (0377–1 to n)	1: 6421 2: 6422 3: 6423	Integer	Read / Write	0 = Passive * 2 = Active *	95

Navigation: Expert → Output → Current output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 📄**
Process variable current output (0359–1 to n)	1: 5927 2: 5928 3: 5929	Integer	Read / Write	0 = Off * 1 = Mass flow 2 = Volume flow 3 = Flow velocity 4 = Sound velocity 8 = Temperature * 14 = Density * 15 = Signal strength * 16 = Signal to noise ratio * 17 = Turbulence * 20 = Acceptance rate * 39 = Electronics temperature	95
Current range output (0353–1 to n)	1: 5923 2: 5924 3: 5925	Integer	Read / Write	0 = 4...20 mA (4... 20.5 mA) 1 = 4...20 mA US (3.9...20.8 mA) 2 = 4...20 mA NAMUR (3.8...20.5 mA) 3 = 0...20 mA (0... 20.5 mA) 4 = Fixed value	96
Fixed current (0365–1 to n)	1: 5987 to 5988 2: 5989 to 5990 3: 5991 to 5992	Float	Read / Write	0 to 22.5 mA	97
Lower range value output (0367–1 to n)	1: 6195 to 6196 2: 6197 to 6198 3: 6199 to 6200	Float	Read / Write	Signed floating-point number	97
Upper range value output (0372–1 to n)	1: 5915 to 5916 2: 5917 to 5918 3: 5919 to 5920	Float	Read / Write	Signed floating-point number	99
Measuring mode current output (0351–1 to n)	1: 5899 2: 5900 3: 5901	Integer	Read / Write	0 = Forward flow 2 = Reverse flow compensation 13 = Forward/Reverse flow *	100
Damping current output (0363–1 to n)	1: 5903 to 5904 2: 5905 to 5906 3: 5907 to 5908	Float	Read / Write	0.0 to 999.9 s	105
Failure behavior current output (0364–1 to n)	1: 5911 2: 5912 3: 5913	Integer	Read / Write	0 = Min. 1 = Max. 4 = Actual value 5 = Last valid value 6 = Fixed value	106
Failure current (0352–1 to n)	1: 5979 to 5980 2: 5981 to 5982 3: 5983 to 5984	Float	Read / Write	0 to 22.5 mA	108
Output current 1 to n (0361–1 to n)	1: 5931 to 5932 2: 5933 to 5934 3: 5935 to 5936	Float	Read	3.59 to 22.5 mA	108
Measured current 1 to n (0366–1 to n)	1: 5779 to 5780 2: 5781 to 5782 3: 5783 to 5784	Float	Read	0 to 30 mA	108

* Visibility depends on order options or device settings

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

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Terminal number (0492–1 to n)	1: 6551 2: 6552 3: 6553	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	110
Signal mode (0490–1 to n)	1: 6235 2: 6236 3: 6237	Integer	Read / Write	0 = Passive 2 = Active * 3 = Passive NAMUR	110
Operating mode (0469–1 to n)	1: 4479 2: 4480 3: 9907	Integer	Read / Write	0 = Pulse 1 = Switch 53 = Frequency	111
Assign pulse output 1 to n (0460–1 to n)	1: 2461 2: 2462 3: 4685	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow	113
Pulse scaling (0455–1 to n)	1: 3034 to 3035 2: 3036 to 3037 3: 4714 to 4715	Float	Read / Write	Positive floating point number	113
Pulse width (0452–1 to n)	1: 2836 to 2837 2: 2838 to 2839 3: 4702 to 4703	Float	Read / Write	0.05 to 2 000 ms	113
Measuring mode (0457–1 to n)	1: 2394 2: 2395 3: 4683	Integer	Read / Write	0 = Forward flow 1 = Reverse flow 2 = Reverse flow compensation 13 = Forward/Reverse flow	114
Failure mode (0480–1 to n)	1: 2948 2: 2949 3: 4708	Integer	Read / Write	0 = Actual value 1 = No pulses	115
Pulse output 1 to n (0456–1 to n)	1: 3082 to 3083 2: 3084 to 3085 3: 4718 to 4719	Float	Read	Positive floating-point number	116
Assign frequency output (0478–1 to n)	1: 2614 2: 2615 3: 9915	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Flow velocity 4 = Sound velocity 8 = Temperature * 14 = Density * 15 = Signal strength * 16 = Signal to noise ratio * 17 = Turbulence * 20 = Acceptance rate * 24 = Test point 1 * 25 = Test point 2 * 39 = Electronics temperature	117
Minimum frequency value (0453–1 to n)	1: 3526 to 3527 2: 3528 to 3529 3: 5767 to 5768	Float	Read / Write	0.0 to 10 000.0 Hz	117
Maximum frequency value (0454–1 to n)	1: 2996 to 2997 2: 2998 to 2999 3: 4710 to 4711	Float	Read / Write	0.0 to 10 000.0 Hz	118
Measuring value at minimum frequency (0476–1 to n)	1: 5887 to 5888 2: 5889 to 5890 3: 5891 to 5892	Float	Read / Write	Signed floating-point number	118
Measuring value at maximum frequency (0475–1 to n)	1: 3514 to 3515 2: 3516 to 3517 3: 5759 to 5760	Float	Read / Write	Signed floating-point number	118

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Measuring mode (0479–1 to n)	1: 2922 2: 2923 3: 4706	Integer	Read / Write	0 = Forward flow 2 = Reverse flow compensation 13 = Forward/Reverse flow	119
Damping output 1 to n (0477–1 to n)	1: 3522 to 3523 2: 3524 to 3525 3: 5763 to 5764	Float	Read / Write	0 to 999.9 s	120
Response time (0491–1 to n)	1: 5875 to 5876 2: 5877 to 5878 3: 5879 to 5880	Float	Read	Positive floating-point number	121
Failure mode (0451–1 to n)	1: 2367 2: 2368 3: 4681	Integer	Read / Write	0 = Actual value 1 = 0 Hz 2 = Defined value	122
Failure frequency (0474–1 to n)	1: 3510 to 3511 2: 3512 to 3513 3: 9908 to 9909	Float	Read / Write	0.0 to 12 500.0 Hz	123
Output frequency 1 to n (0471–1 to n)	1: 3462 to 3463 2: 3464 to 3465 3: 9910 to 9911	Float	Read	0.0 to 12 500.0 Hz	123
Switch output function (0481–1 to n)	1: 3022 2: 3023 3: 9914	Integer	Read / Write	0 = Off 1 = On 2 = Diagnostic behavior 3 = Flow direction check 4 = Limit 5 = Status	123
Assign diagnostic behavior (0482–1 to n)	1: 3096 2: 3097 3: 9913	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	124
Assign limit (0483–1 to n)	1: 3184 2: 3185 3: 4722	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Flow velocity 4 = Sound velocity 5 = Totalizer 1 6 = Totalizer 2 7 = Totalizer 3 8 = Temperature * 14 = Density * 15 = Signal strength * 16 = Signal to noise ratio * 17 = Turbulence * 20 = Acceptance rate * 39 = Electronics temperature	125
Switch-on value (0466–1 to n)	1: 3242 to 3243 2: 3244 to 3245 3: 4728 to 4729	Float	Read / Write	Signed floating-point number	127
Switch-off value (0464–1 to n)	1: 3234 to 3235 2: 3236 to 3237 3: 4724 to 4725	Float	Read / Write	Signed floating-point number	127
Assign flow direction check (0484–1 to n)	1: 3363 2: 3364 3: 4732	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Flow velocity	128
Assign status (0485–1 to n)	1: 3374 2: 3375 3: 4734	Integer	Read / Write	0 = Off 1 = Low flow cut off	128
Switch-on delay (0467–1 to n)	1: 6247 to 6248 2: 6249 to 6250 3: 6251 to 6252	Float	Read / Write	0.0 to 100.0 s	128

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Switch-off delay (0465–1 to n)	1: 6239 to 6240 2: 6241 to 6242 3: 6243 to 6244	Float	Read / Write	0.0 to 100.0 s	129
Failure mode (0486–1 to n)	1: 3384 2: 3385 3: 9912	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	129
Switch status 1 to n (0461–1 to n)	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed	129
Invert output signal (0470–1 to n)	1: 2583 2: 2584 3: 9916	Integer	Read / Write	0 = Yes 1 = No	130

* Visibility depends on order options or device settings

"Relay output 1 to n" submenu

Navigation: Expert → Output → Relay output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Terminal number (0812–1 to n)	1: 8278 2: 8279 3: 8280	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	131
Relay output function (0804–1 to n)	1: 2488 2: 2489 3: 9876	Integer	Read / Write	1 = Open 2 = Diagnostic behavior 3 = Flow direction check 4 = Limit 5 = Digital Output 6 = Closed	132
Assign flow direction check (0808–1 to n)	1: 8251 2: 8252 3: 8253	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Flow velocity	132
Assign limit (0807–1 to n)	1: 8248 2: 8249 3: 8250	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Flow velocity 4 = Sound velocity 5 = Totalizer 1 6 = Totalizer 2 7 = Totalizer 3 8 = Temperature * 14 = Density * 15 = Signal strength * 16 = Signal to noise ratio * 17 = Turbulence * 20 = Acceptance rate * 39 = Electronics temperature	133
Assign diagnostic behavior (0806–1 to n)	1: 8245 2: 8246 3: 8247	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	133
Assign status (0805–1 to n)	1: 8272 2: 8273 3: 8274	Integer	Read / Write	0 = Off 1 = Low flow cut off	134
Switch-off value (0809–1 to n)	1: 8260 to 8261 2: 8262 to 8263 3: 8264 to 8265	Float	Read / Write	Signed floating-point number	134

Navigation: Expert → Output → Relay output 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Switch-off delay (0813–1 to n)	1: 8254 to 8255 2: 8256 to 8257 3: 8258 to 8259	Float	Read / Write	0.0 to 100.0 s	135
Switch-on value (0810–1 to n)	1: 8233 to 8234 2: 8235 to 8236 3: 8237 to 8238	Float	Read / Write	Signed floating-point number	135
Switch-on delay (0814–1 to n)	1: 8266 to 8267 2: 8268 to 8269 3: 8270 to 8271	Float	Read / Write	0.0 to 100.0 s	136
Failure mode (0811–1 to n)	1: 8242 2: 8243 3: 8244	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	136
Switch status (0801–1 to n)	1: 3518 2: 3519 3: 9875	Integer	Read	1 = Open 6 = Closed	136
Powerless relay status (0816–1 to n)	1: 7009 2: 7010 3: 7011	Integer	Read / Write	1 = Open 6 = Closed	137

* Visibility depends on order options or device settings

"Double pulse output" submenu

Navigation: Expert → Output → Double pulse output					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Master terminal number (0981)	5838	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	138
Slave terminal number (0990)	5845	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	138
Signal mode (0991)	5949	Integer	Read / Write	0 = Passive 2 = Active * 3 = Passive NAMUR	138
Assign pulse output 1 (0982–1)	5993	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow	139
Value per pulse (0983)	7495 to 7496	Float	Read / Write	Signed floating-point number	139
Pulse width (0986)	6998 to 6999	Float	Read / Write	0.5 to 2 000 ms	139
Phase shift (0992)	6089	Integer	Read / Write	0 = 90° 1 = 180°	139
Measuring mode (0984)	6001	Integer	Read / Write	0 = Forward flow 1 = Reverse flow 2 = Reverse flow compensation 13 = Forward/Reverse flow	140
Failure mode (0985)	6009	Integer	Read / Write	0 = Actual value 1 = No pulses	141
Pulse output (0987)	7041 to 7042	Float	Read	Positive floating-point number	141
Invert output signal (0993)	6101	Integer	Read / Write	0 = Yes 1 = No	142

* Visibility depends on order options or device settings

6.3.6 "Communication" submenu

"Modbus configuration" submenu

Navigation: Expert → Communication → Modbus configuration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Bus address (7112)	4910	Integer	Read / Write	1 to 247	143
Baudrate (7111)	4912	Integer	Read / Write	0 = 1200 BAUD 1 = 2400 BAUD 2 = 4800 BAUD 3 = 9600 BAUD 4 = 19200 BAUD 5 = 38400 BAUD 6 = 57600 BAUD 7 = 115200 BAUD	143
Data transfer mode (7115)	4913	Integer	Read / Write	0 = RTU 1 = ASCII	144
Parity (7122)	4914	Integer	Read / Write	0 = Even 1 = Odd 2 = None / 2 stop bits 3 = None / 1 stop bit	144
Byte order (7113)	4915	Integer	Read / Write	0 = 0-1-2-3 1 = 3-2-1-0 2 = 2-3-0-1 3 = 1-0-3-2	144
Telegram delay (7146)	4916 to 4917	Float	Read / Write	0 to 100 ms	146
Failure mode (7116)	4920	Integer	Read / Write	1 = Last valid value 255 = NaN value	146
Bus termination (7155)	5774	Integer	Read	0 = Off 1 = On	146
Fieldbus writing access (7156)	6807	Integer	Read / Write	0 = Read + write 1 = Read only	147

"Modbus information" submenu

Navigation: Expert → Communication → Modbus information					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Device ID (7153)	2547	Integer	Read	4-digit hexadecimal number	148
Device revision (7154)	4481	Integer	Read	4-digit hexadecimal number	148

"Modbus data map" submenu

Navigation: Expert → Communication → Modbus data map					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Scan list register 0 to 15 (7114)	0: 5001 1: 5002 2: 5003 3: 5004 4: 5005 5: 5006 6: 5007 7: 5008 8: 5009 9: 5010 10: 5011 11: 5012 12: 5013 13: 5014 14: 5015 15: 5016	Integer	Read / Write	1 to 65 535	148

"Web server" submenu

Navigation: Expert → Communication → Web server					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Web server language (7221)	4219	Integer	Read / Write	0 = English 1 = Deutsch 2 = Français 3 = Español 4 = Italiano 5 = Nederlands 8 = Svenska 10 = Bahasa Indonesia 11 = 日本語 (Japanese) 12 = Portuguesa 13 = Polski 14 = русский язык (Russian) 15 = čeština (Czech) 16 = 中文 (Chinese) 18 = Türkçe 19 = tiếng Việt (Vietnamese) 20 = 한국어 (Korean)	149
MAC address (7214)	4210 to 4218	String	Read	Unique 12-digit character string comprising letters and numbers	150
DHCP client (7212)	21781	Integer	Read / Write	0 = Off 1 = On	150
IP address (7209)	4155 to 4162	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	150
Subnet mask (7211)	4163 to 4170	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	151
Default gateway (7210)	4171 to 4178	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	151
Web server functionality (7222)	4220	Integer	Read / Write	0 = Off 1 = On 2 = HTML Off	151
Login page (7273)	5802	Integer	Read / Write	0 = Without header 1 = With header	151

"WLAN settings" wizard

Navigation: Expert → Communication → WLAN settings					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
WLAN (2702)	6178	Integer	Read / Write	0 = Disable 1 = Enable	153
WLAN mode (2717)	28777	Integer	Read / Write	0 = WLAN access point 1 = WLAN Client	153
SSID name (2714)	28940 to 28955	String	Read / Write	–	153
Network security (2705)	6206	Integer	Read / Write	0 = Unsecured 1 = WPA2-PSK 2 = EAP-PEAP with MSCHAPv2 * 3 = EAP-TLS * 4 = EAP-PEAP MSCHAPv2 no server authentic. *	154
Security identification (2718)	28817	Integer	Read	1 = Trusted issuer certificate 2 = Device certificate 4 = Device private key	154
User name (2715)	28956 to 28971	String	Read / Write	–	154
WLAN password (2716)	28972 to 28987	String	Read / Write	–	155
WLAN IP address (2711)	8643 to 8650	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	155
WLAN MAC address (2703)	8602 to 8610	String	Read	Unique 12-digit character string comprising letters and numbers	155
WLAN subnet mask (2709)	8651 to 8658	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	155
WLAN MAC address (2703)	8602 to 8610	String	Read	Unique 12-digit character string comprising letters and numbers	155
WLAN passphrase (2706)	8611 to 8626	String	Read / Write	8 to 32-digit character string comprising numbers, letters and special characters (without spaces)	156
WLAN MAC address (2703)	8602 to 8610	String	Read	Unique 12-digit character string comprising letters and numbers	155
Assign SSID name (2708)	6218	Integer	Read / Write	0 = Device tag 1 = User-defined	156
SSID name (2707)	8627 to 8642	String	Read / Write	Max. 32-digit character string comprising numbers, letters and special characters	156
2.4 GHz WLAN channel (2704)	6182	Integer	Read / Write	1 to 11	157
Select antenna (2713)	6102	Integer	Read / Write	0 = External antenna 1 = Internal antenna	157
Connection state (2722)	29221	Integer	Read	0 = Not connected 1 = Connected	157
Received signal strength (2721)	28818	Integer	Read	0 = Low 1 = High 2 = Medium	157
WLAN IP address (2711)	8643 to 8650	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	155
Gateway IP address (2719)	29227 to 29234	String	Read	Character string comprising numbers, letters and special characters (#15)	158
IP address domain name server (2720)	29283 to 29290	String	Read	Character string comprising numbers, letters and special characters (#15)	158

* Visibility depends on order options or device settings

6.3.7 "Application" submenu

Navigation: Expert → Application					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Reset all totalizers (2806)	2609	Integer	Read / Write	0 = Cancel 1 = Reset + totalize	158

"Totalizer 1 to n" submenu

Navigation: Expert → Application → Totalizer 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Assign process variable (0914–1 to n)	1: 2601 2: 2801 3: 3001	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow	159
Unit totalizer 1 to n (0915–1 to n)	1: 4604 2: 4605 3: 4606	Integer	Read / Write	0 = cm^3 * 1 = dm^3 * 2 = m^3 * 3 = ml * 4 = l * 5 = hl * 6 = Ml Mega * 8 = af * 9 = ft^3 * 10 = fl oz (us) * 11 = gal (us) * 12 = Mgal (us) * 13 = bbl (us;liq.) * 14 = bbl (us;beer) * 15 = bbl (us;oil) * 16 = bbl (us;tank) * 17 = gal (imp) * 18 = Mgal (imp) * 19 = bbl (imp;beer) * 20 = bbl (imp;oil) * 22 = kgal (us) * 23 = Mft^3 * 50 = g * 51 = kg * 52 = t * 53 = oz * 54 = lb * 55 = STon * 251 = None *	160
Totalizer operation mode (0908–1 to n)	1: 2605 2: 2805 3: 3005	Integer	Read / Write	0 = Net flow total 1 = Forward flow total 2 = Reverse flow total	161
Control Totalizer 1 to n (0912–1 to n)	1: 2608 2: 2808 3: 3008	Integer	Read / Write	0 = Totalize 1 = Reset + hold 2 = Preset + hold 3 = Reset + totalize 3 = Hold 4 = Preset + totalize	161
Preset value 1 to n (0913–1 to n)	1: 2590 to 2591 2: 2592 to 2593 3: 2594 to 2595	Float	Read / Write	Signed floating-point number	162
Failure mode (0901–1 to n)	1: 2606 2: 2806 3: 3006	Integer	Read / Write	0 = Stop 1 = Actual value 2 = Last valid value	162

* Visibility depends on order options or device settings

6.3.8 "Diagnostics" submenu

Navigation: Expert → Diagnostics					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Actual diagnostics (0691)	2732	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	164
Previous diagnostics (0690)	2734	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	165
Operating time from restart (0653)	2624	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	166
Operating time (0652)	--	String	Read		

"Diagnostic list" submenu

Navigation: Expert → Diagnostics → Diagnostic list					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Diagnostics 1 (0692)	2736	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	166
Diagnostics 2 (0693)	2738	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	167
Diagnostics 3 (0694)	2740	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	168
Diagnostics 4 (0695)	2742	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	169
Diagnostics 5 (0696)	2744	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	170

"Event logbook" submenu

Navigation: Expert → Diagnostics → Event logbook					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Filter options (0705)	4596	Integer	Read / Write	0 = Failure (F) 4 = Maintenance required (M) 8 = Function check (C) 12 = Out of specification (S) 16 = Information (I) 255 = All	171

"Event list" submenu

"Device information" submenu

Navigation: Expert → Diagnostics → Device information					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Device tag (0011)	2026 to 2041	String	Read	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).	173
Serial number (0009)	7003 to 7008	String	Read	Max. 11-digit character string comprising letters and numbers.	173
Firmware version (0010)	7277 to 7280	String	Read	Character string in the format xx.yy.zz	174
Device name (0020)	7238 to 7245	String	Read	Prosonic Flow 500	174

Navigation: Expert → Diagnostics → Device information					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
Order code (0008)	2058 to 2067	String	Read	Character string composed of letters, numbers and certain punctuation marks (e.g. /).	174
Extended order code 1 (0023)	2212 to 2221	String	Read	Character string	175
Extended order code 2 (0021)	2222 to 2231	String	Read	Character string	175
Extended order code 3 (0022)	2232 to 2241	String	Read	Character string	175
ENP version (0012)	4003 to 4010	String	Read	Character string	175

"Main electronic module + I/O module 1" submenu

Navigation: Expert → Diagnostics → Main electronic module + I/O module 1					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
Firmware version (0072)	7039	Integer	Read	Positive integer	176
Build no. software (0079)	2326	Integer	Read	Positive integer	176
Bootloader revision (0073)	2264	Integer	Read	Positive integer	176

"Sensor electronic module (ISEM)" submenu

Navigation: Expert → Diagnostics → Sensor electronic module (ISEM)					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
Firmware version (0072)	7039	Integer	Read	Positive integer	177
Build no. software (0079)	2326	Integer	Read	Positive integer	177
Bootloader revision (0073)	2264	Integer	Read	Positive integer	177

"I/O module 2" submenu

Navigation: Expert → Diagnostics → I/O module 2					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
I/O module 2 terminal numbers (3902–2)	6542	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	178
Firmware version (0072)	7039	Integer	Read	Positive integer	178
Build no. software (0079)	2326	Integer	Read	Positive integer	178
Bootloader revision (0073)	2264	Integer	Read	Positive integer	179

"I/O module 3" submenu

Navigation: Expert → Diagnostics → I/O module 3					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
I/O module 3 terminal numbers (3902–3)	6543	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	179
Firmware version (0072)	7039	Integer	Read	Positive integer	179

Navigation: Expert → Diagnostics → I/O module 3					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Build no. software (0079)	2326	Integer	Read	Positive integer	180
Bootloader revision (0073)	2264	Integer	Read	Positive integer	180

"Display module" submenu

Navigation: Expert → Diagnostics → Display module					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Firmware version (0072)	7039	Integer	Read	Positive integer	180
Build no. software (0079)	2326	Integer	Read	Positive integer	181
Bootloader revision (0073)	2264	Integer	Read	Positive integer	181

"Data logging" submenu

Navigation: Expert → Diagnostics → Data logging					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Assign channel 1 (0851)	2445	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Flow velocity 4 = Sound velocity 8 = Temperature * 14 = Density * 15 = Signal strength * 16 = Signal to noise ratio * 17 = Turbulence * 20 = Acceptance rate * 39 = Electronics temperature 121 = Current output 1 * 122 = Current output 2 * 123 = Current output 3 * 124 = Current output 4 *	182
Assign channel 2 (0852)	2446	Integer	Read / Write	For the picklist, see the **Assign channel 1** parameter (→ 🗎 182)	183
Assign channel 3 (0853)	2548	Integer	Read / Write	For the picklist, see the **Assign channel 1** parameter (→ 🗎 182)	183
Assign channel 4 (0854)	4286	Integer	Read / Write	For the picklist, see the **Assign channel 1** parameter (→ 🗎 182)	183
Logging interval (0856)	4288 to 4289	Float	Read / Write	0.1 to 3 600.0 s	183
Clear logging data (0855)	4287	Integer	Read / Write	0 = Cancel 2 = Clear data	184
Data logging (0860)	5950	Integer	Read / Write	0 = Overwriting 1 = Not overwriting	184
Logging delay (0859)	5938	Integer	Read / Write	0 to 999 h	185
Data logging control (0857)	5930	Integer	Read / Write	0 = None 1 = Stop 2 = Delete + start	185
Data logging status (0858)	5937	Integer	Read	0 = Done 1 = Stopped 2 = Active 3 = Delay active	186
Entire logging duration (0861)	2827 to 2828	Float	Read	Positive floating-point number	186

* Visibility depends on order options or device settings

"Display channel 1" submenu

"Display channel 2" submenu

"Display channel 3" submenu

"Display channel 4" submenu

"Heartbeat Technology" submenu

"Simulation" submenu

Navigation: Expert → Diagnostics → Simulation					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Assign simulation process variable (1810)	6813	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Flow velocity 4 = Sound velocity 8 = Temperature * 14 = Density *	190
Process variable value (1811)	6814 to 6815	Float	Read / Write	Depends on the process variable selected	191
Current input 1 to n simulation (1608–1 to n)	1: 6127 2: 6128 3: 6129	Integer	Read / Write	0 = Off 1 = On	191
Value current input 1 to n (1609–1 to n)	1: 6139 to 6140 2: 6141 to 6142 3: 6143 to 6144	Float	Read / Write	0 to 22.5 mA	191
Status input simulation 1 to n (1355–1 to n)	1: 2620 2: 4693 3: 4694	Integer	Read / Write	0 = Off 1 = On	192
Input signal level 1 to n (1356–1 to n)	1: 2638 2: 4696 3: 4697	Integer	Read / Write	0 = Low 1 = High	192
Current output 1 to n simulation (0354–1 to n)	1: 5939 2: 5940 3: 5941	Integer	Read / Write	0 = Off 1 = On	192
Current output value (0355)	5995 to 5996	Float	Read / Write	3.59 to 22.5 mA	193
Frequency output 1 to n simulation (0472–1 to n)	1: 6203 2: 6204 3: 6205	Integer	Read / Write	0 = Off 1 = On	193
Frequency output 1 to n value (0473–1 to n)	1: 6207 to 6208 2: 6209 to 6210 3: 6211 to 6212	Float	Read / Write	0.0 to 12 500.0 Hz	194
Pulse output simulation 1 to n (0458–1 to n)	1: 6215 2: 6216 3: 6217	Integer	Read / Write	0 = Off 1 = Down-counting value 2 = Fixed value	194
Pulse value 1 to n (0459–1 to n)	1: 6219 2: 6220 3: 6221	Integer	Read / Write	0 to 65 535	195
Switch output simulation 1 to n (0462–1 to n)	1: 6223 2: 6224 3: 6225	Integer	Read / Write	0 = Off 1 = On	195
Switch status 1 to n (0463–1 to n)	1: 6227 2: 6228 3: 6229	Integer	Read / Write	1 = Open 6 = Closed	196

Navigation: Expert → Diagnostics → Simulation					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🗎**
Relay output 1 to n simulation (0802–1 to n)	1: 7523 2: 7524 3: 7525	Integer	Read / Write	0 = Off 1 = On	196
Switch status 1 to n (0803–1 to n)	1: 8239 2: 8240 3: 8241	Integer	Read / Write	1 = Open 6 = Closed	197
Pulse output simulation (0988)	5957	Integer	Read / Write	0 = Off 1 = Down-counting value 2 = Fixed value	197
Pulse value (0989)	5973	Integer	Read / Write	0 to 65 535	198
Device alarm simulation (0654)	6812	Integer	Read / Write	0 = Off 1 = On	198
Diagnostic event category (0738)	4261	Integer	Read / Write	0 = Sensor 1 = Electronics 2 = Configuration 3 = Process	199
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