

Description of Device Parameters

Proline t-mass 500

Modbus RS485

Thermal mass flowmeter

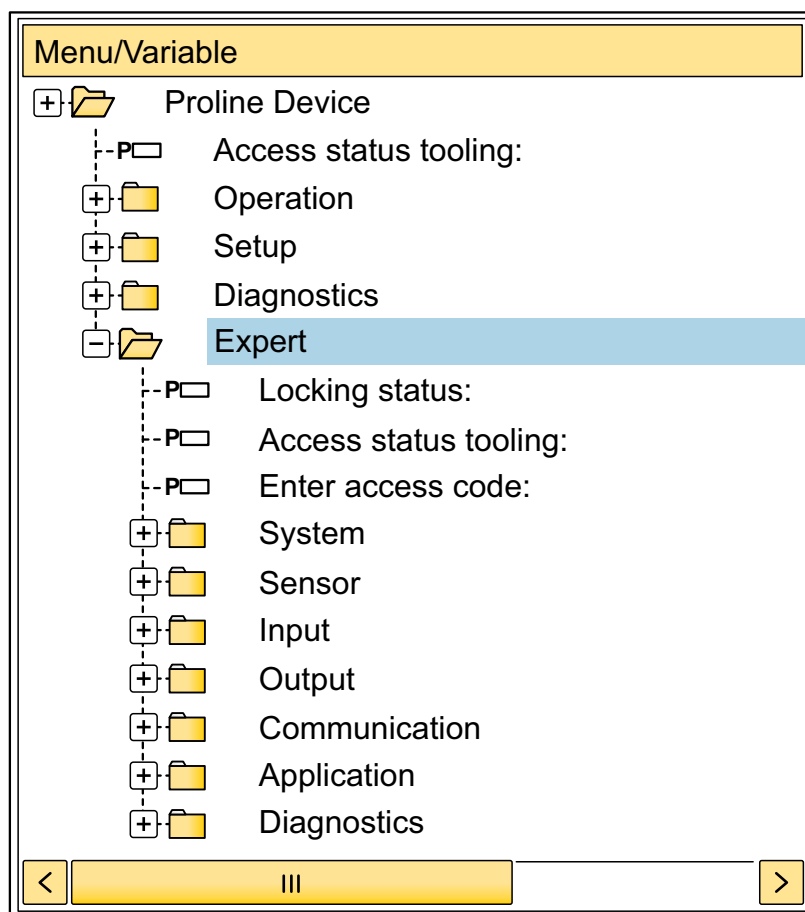


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1 About this document

1.1 Document function

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

It is used to perform tasks that require detailed knowledge of the function of the device:

- Commissioning measurements under difficult conditions
- Optimal adaptation of the measurement to difficult conditions
- Detailed configuration of the communication interface
- Error diagnostics in difficult cases

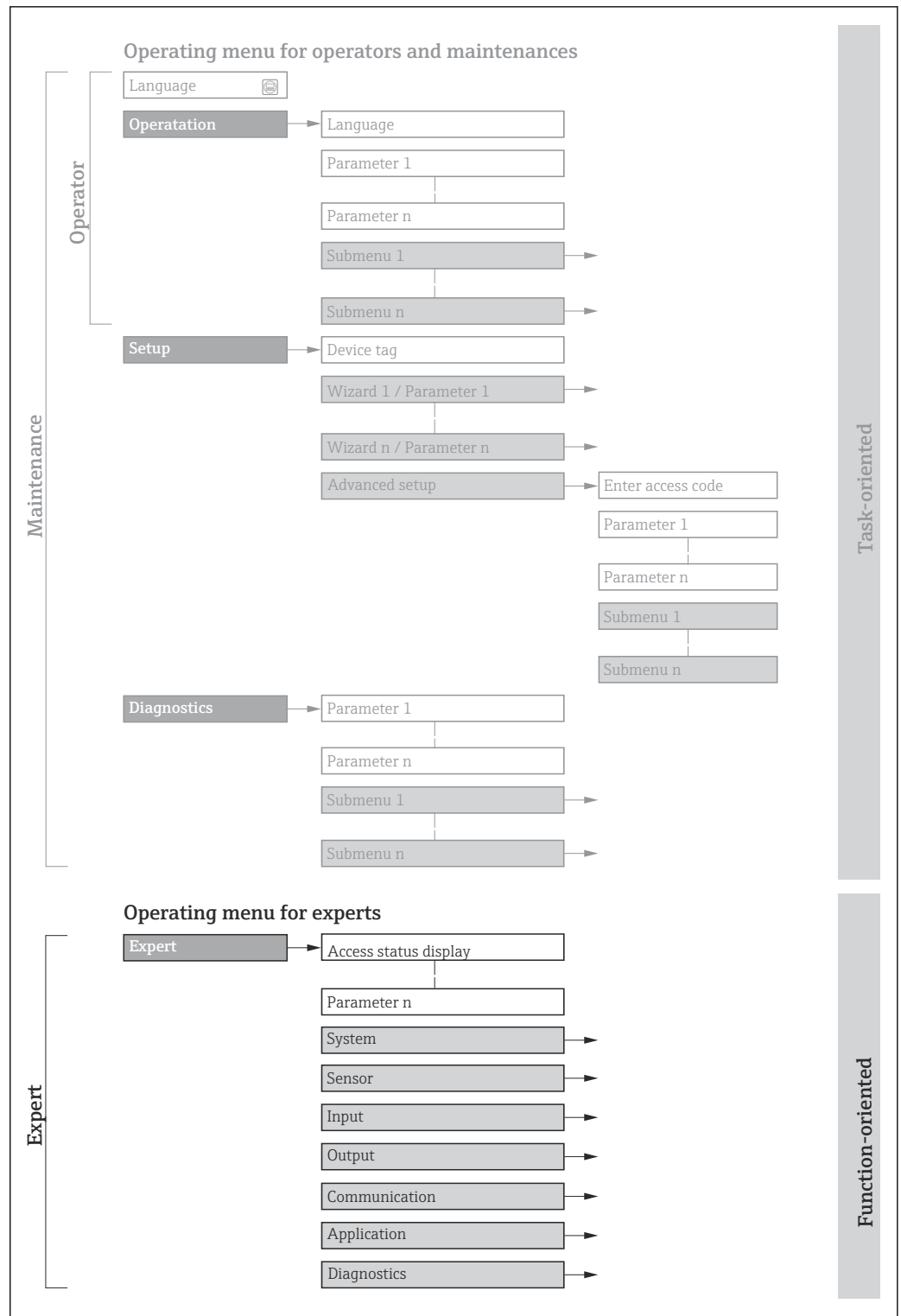
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

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



1 Sample graphic for the schematic layout of the operating menu



Additional information regarding:

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

1.3.2 **Structure of a parameter description**

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

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

1.4 **Symbols used**

1.4.1 **Symbols for certain types of information**

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

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

Measuring device	Documentation code
t-mass F 500	BA01998D
t-mass I 500	BA01999D

1.5.2 Supplementary device-dependent documentation

Special Documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Remote display and operating module DKX001	SD01763D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD02488D
Heartbeat Technology	SD02480D

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		
Direct access (0106)	→	11
Locking status (0004)	→	12
Access status (0005)	→	13
Enter access code (0003)	→	13
▶ System	→	13
▶ Display	→	14
▶ Configuration backup	→	26
▶ Diagnostic handling	→	29
▶ Administration	→	36
▶ Sensor	→	41
▶ Measured values	→	42
▶ System units	→	54
▶ Process parameters	→	64
▶ Measurement mode	→	68
▶ Sensor adjustment	→	87
▶ Zero point adjustment		
▶ External compensation	→	90
▶ In-situ adjustment	→	94
▶ Calibration	→	104
▶ I/O configuration	→	198
I/O module 1 to n terminal numbers (3902-1 to n)	→	198

I/O module 1 to n information (3906-1 to n)	→ 198
I/O module 1 to n type (3901-1 to n)	→ 199
Apply I/O configuration (3907)	→ 199
I/O alteration code (2762)	→ 200
► Input	→ 104
► Current input 1 to n	→ 104
► Status input 1 to n	→ 107
► Output	→ 110
► Current output 1 to n	→ 110
► Pulse/frequency/switch output 1 to n	→ 117
► Relay output 1 to n	→ 134
► Communication	→ 139
► Modbus configuration	→ 139
► Modbus information	→ 144
► Modbus data map	→ 145
► Web server	→ 145
► WLAN settings	
► Application	→ 155
Reset all totalizers (2806)	→ 156
► Totalizer 1 to n	→ 156
► Diagnostics	→ 161
Actual diagnostics (0691)	→ 162
Previous diagnostics (0690)	→ 162
Operating time from restart (0653)	→ 163

Operating time (0652)	→ 163
► Diagnostic list	→ 164
► Event logbook	→ 168
► Device information	→ 169
► Main electronic module + I/O module 1	→ 172
► Sensor electronic module (ISEM)	→ 173
► I/O module 2	→ 174
► I/O module 3	→ 176
► I/O module 4	→ 177
► Display module	→ 179
► Min/max values	→ 180
► Data logging	→ 182
► Heartbeat Technology	
► Simulation	→ 189

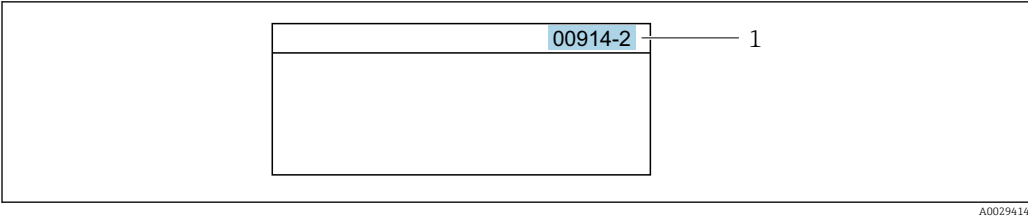
3 Description of Device Parameters

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.

Expert		
Direct access (0106)	→	11
Locking status (0004)	→	12
Access status (0005)	→	13
Enter access code (0003)	→	13
► System	→	13
► Sensor	→	41
► I/O configuration	→	198
► Input	→	104
► Output	→	110
► Communication	→	139
► Application	→	155
► Diagnostics	→	161

Direct access

Navigation	Expert → Direct access (0106)
Description	Use this function to enter the access code to enable direct access to the desired parameter via the local display. A parameter number is assigned to each parameter for this purpose.
User entry	0 to 65 535
Additional information	User entry The direct access code consists of a 5-digit number (at maximum) and the channel number, which identifies the channel of a process variable: e.g. 00914-2. In the navigation view, this appears on the right-hand side in the header of the selected parameter.



1 Direct access code

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

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

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

Selection

Options	Description
None	The access status displayed in the Access status parameter (→ 13) applies . Only appears on local display.
Hardware locked (priority 1)	The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool) .
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.

Access status

Navigation	 Expert → Access status (0005)
Description	Displays the access authorization to the parameters via the local display, Web browser or operating tool.
User interface	▪ Operator ▪ Maintenance
Additional information	<i>Description</i>  Access authorization can be modified via the Enter access code parameter (→  13).  If additional write protection is active, this restricts the current access authorization even further. <i>Display</i>  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

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	→  14
► Configuration backup	→  26
► Diagnostic handling	→  29
► Administration	→  36

3.1.1 "Display" submenu

Navigation  Expert → System → Display

► Display		
Display language (0104)	→ 	15
Format display (0098)	→ 	15
Value 1 display (0107)	→ 	18
0% bargraph value 1 (0123)	→ 	18
100% bargraph value 1 (0125)	→ 	19
Decimal places 1 (0095)	→ 	19
Value 2 display (0108)	→ 	20
Decimal places 2 (0117)	→ 	20
Value 3 display (0110)	→ 	20
0% bargraph value 3 (0124)	→ 	21
100% bargraph value 3 (0126)	→ 	21
Decimal places 3 (0118)	→ 	22
Value 4 display (0109)	→ 	22
Decimal places 4 (0119)	→ 	23
Display interval (0096)	→ 	23
Display damping (0094)	→ 	23
Header (0097)	→ 	24
Header text (0112)	→ 	24
Separator (0101)	→ 	25
Contrast display (0105)	→ 	25
Backlight (0111)	→ 	26

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) ■ العربية (Arabic) * ■ Bahasa Indonesia ■ ภาษาไทย (Thai) * ■ 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

* Visibility depends on order options or device settings

Additional information*Description*

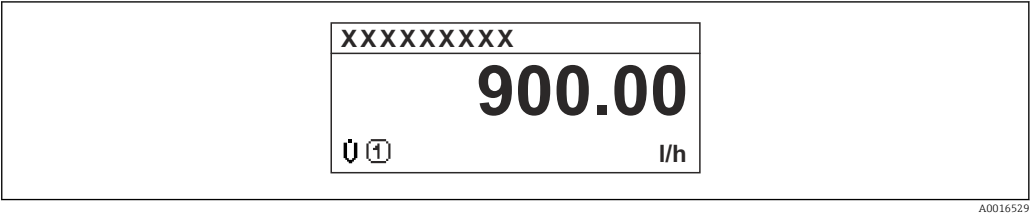
The display format (size, bar graph etc.) and number of measured values displayed simultaneously (1 to 4) can be configured. This setting only applies to normal operation.



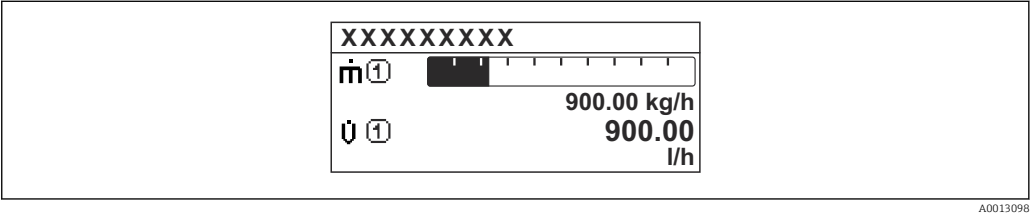
- The **Value 1 display** parameter (→ 18) to **Value 4 display** parameter (→ 22) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured via the **Display interval** parameter (→ 23).

Possible measured values shown on the local display:

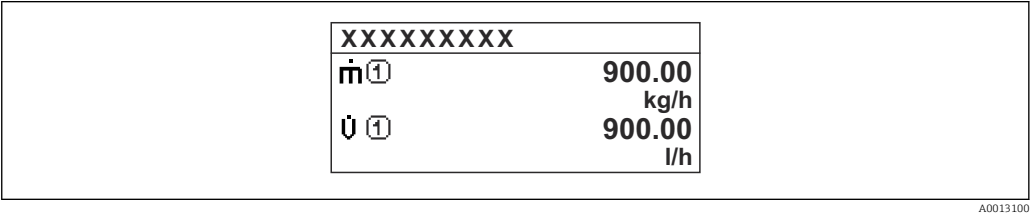
"1 value, max. size" option



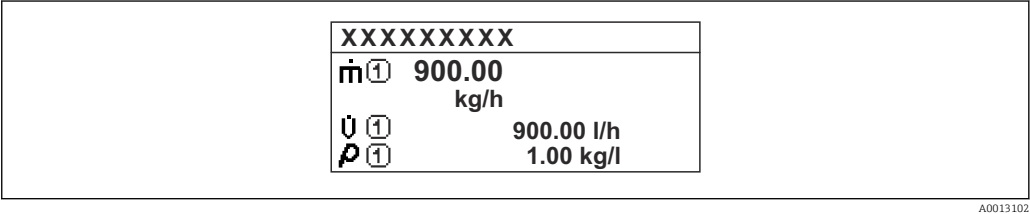
"1 bargraph + 1 value" option



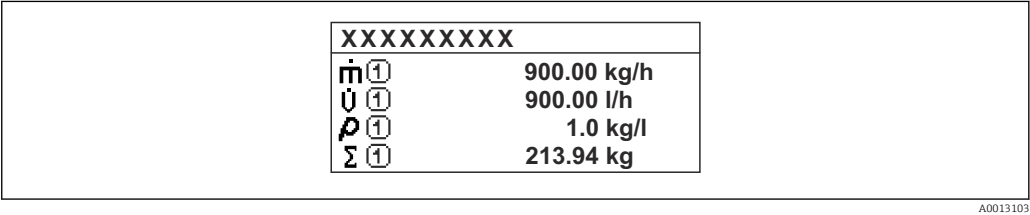
"2 values" option



"1 value large + 2 values" option



"4 values" option



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	■ Temperature ■ Mass flow ■ Corrected volume flow ■ FAD volume flow[*] ■ Volume flow ■ Energy flow[*] ■ Heat flow[*] ■ Density ■ Flow velocity ■ Pressure ■ 2nd temperature delta heat[*] ■ Electronic temperature ■ Totalizer 1 ■ Totalizer 2 ■ Totalizer 3 ■ Current output 1[*] ■ Current output 2[*] ■ Current output 3[*] ■ Current output 4[*]
Additional information	<i>Description</i> If several measured values are displayed at once, the measured value selected here will be the first value to be displayed. The value is only displayed during normal operation.  The Format display parameter (→  15) is used to specify how many measured values are displayed simultaneously and how. <i>Dependency</i>  The unit of the displayed measured value is taken from the System units submenu (→  54).

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

* Visibility depends on order options or device settings

Additional information*Description*

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

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 → 201

Additional information*Description*

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

Decimal places 1**Navigation**

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

Prerequisite

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

Description

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

Selection

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

Additional information*Description*

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

Value 2 display

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

Prerequisite A local display is provided.

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

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

Additional information *Description*

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

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

Dependency

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Decimal places 2

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

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

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

Selection

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

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 1 display parameter (→  18)
Additional information	<i>Description</i> If several measured values are displayed at once, the measured value selected here will be the third value to be displayed. The value is only displayed during normal operation.  The Format display parameter (→  15) is used to specify how many measured values are displayed simultaneously and how. <i>Selection</i>  The unit of the displayed measured value is taken from the System units submenu (→  54).

0% bargraph value 3

Navigation	  Expert → System → Display → 0% bargraph 3 (0124)
Prerequisite	A selection was made in the Value 3 display parameter (→  20).
Description	Use this function to enter the 0% bar graph value to be shown on the display for the measured value 3.
User entry	Signed floating-point number
Additional information	<i>Description</i>  The Format display parameter (→  15) is used to specify that the measured value is to be displayed as a bar graph. <i>User entry</i>  The unit of the displayed measured value is taken from the System units submenu (→  54).

100% bargraph value 3

Navigation	  Expert → System → Display → 100% bargraph 3 (0126)
Prerequisite	A selection was made in the Value 3 display parameter (→  20).
Description	Use this function to enter the 100% bar graph value to be shown on the display for the measured value 3.
User entry	Signed floating-point number

Additional information*Description*

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

User entry

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Decimal places 3**Navigation**

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

Prerequisite

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

Description

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

Selection

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

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 1 display** parameter (→  18)

Additional information*Description*

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

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

Selection

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Decimal places 4

Navigation	 Expert → System → Display → Decimal places 4 (0119)
Prerequisite	A measured value is specified in the Value 4 display parameter (→  22).
Description	Use this function to select the number of decimal places for measured value 4.
Selection	■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx
Additional information	<i>Description</i>  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.

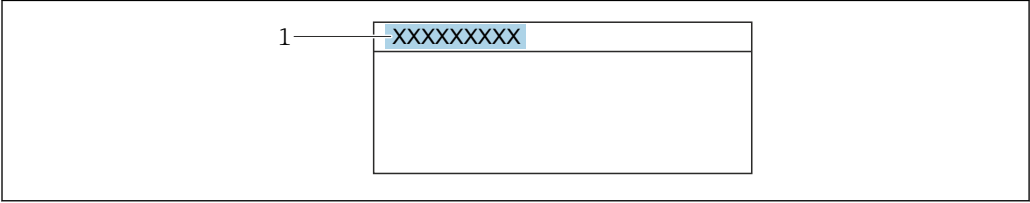
Display interval

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	<i>Description</i> This type of alternating display only occurs automatically if the number of measured values defined exceeds the number of values the selected display format can display simultaneously.  ■ The Value 1 display parameter (→  18) to Value 4 display parameter (→  22) are used to specify which measured values are shown on the local display. ■ The display format of the displayed measured values is specified using the Format display parameter (→  15).

Display damping

Navigation	 Expert → System → Display → Display damping (0094)
Prerequisite	A local display is provided.
Description	Use this function to enter a time constant for the reaction time of the local display to fluctuations in the measured value caused by process conditions.

User entry	0.0 to 999.9 s
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).

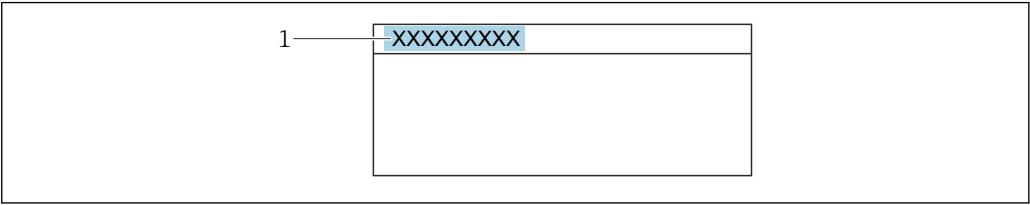
Header 	
Navigation	 Expert → System → Display → Header (0097)
Prerequisite	A local display is provided.
Description	Use this function to select the contents of the header of the local display.
Selection	■ Device tag ■ Free text
Additional information	Description The header text only appears during normal operation.  A0029422 1 Position of the header text on the display Selection ■ Device tag Is defined in the Device tag parameter (→  169). ■ Free text Is defined in the Header text parameter (→  24).

Header text 	
Navigation	 Expert → System → Display → Header text (0112)
Prerequisite	In the Header parameter (→  24), the Free text option is selected.
Description	Use this function to enter a customer-specific text for the header of the local display.

1) proportional transmission behavior with first order delay

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.



A0029422

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)	→	 26
Last backup (2757)	→	 27
Configuration management (2758)	→	 27
Backup state (2759)	→	 28
Comparison result (2760)	→	 28

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	<i>User interface</i> 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

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.

* Visibility depends on order options or device settings

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 (→  27).

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.

Options	Description
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) →  29

► Diagnostic behavior →  29

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 Electronic temperature too high
- 833 Electronic temperature too low
- 834 Process temperature too high
- 835 Process temperature too low

"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 (→  29).

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 (→  168) (Event list submenu) 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

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

► Diagnostic behavior		
Assign behavior of diagnostic no. 144 (0631)		→  31
Assign behavior of diagnostic no. 302 (0742)		→  31
Assign behavior of diagnostic no. 441 (0657)		→  31
Assign behavior of diagnostic no. 442 (0658)		→  32
Assign behavior of diagnostic no. 443 (0659)		→  32
Assign behavior of diagnostic no. 444 (0740)		→  33
Assign behavior of diagnostic no. 832 (0675)		→  33
Assign behavior of diagnostic no. 833 (0676)		→  33
Assign behavior of diagnostic no. 834 (0677)		→  34
Assign behavior of diagnostic no. 835 (0678)		→  34
Assign behavior of diagnostic no. 842 (0638)		→  34

Assign behavior of diagnostic no. 976 (0629)	→ 35
Assign behavior of diagnostic no. 977 (0627)	→ 35
Assign behavior of diagnostic no. 979 (0630)	→ 35

Assign behavior of diagnostic no. 144 (Sensor drift)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 144 (0631)
Description	Use this function to change the diagnostic behavior of the 144 Sensor drift diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Additional information	Detailed description of the options available for selection: → 30

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 ■ Alarm ■ Warning ■ Logbook entry only
Additional information	Detailed description of the options available for selection: → 30

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*



Detailed description of the options available for selection: → 30

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 Detailed description of the options available for selection: → 30

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*



Detailed description of the options available for selection: → 30

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	Detailed description of the options available for selection: → 30

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



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0675)
Description	Use this function to change the diagnostic behavior of the 832 Electronic temperature too high diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Additional information	Detailed description of the options available for selection: → 30

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



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0676)
Description	Use this function to change the diagnostic behavior of the 833 Electronic temperature too low diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Additional information	<i>Selection</i> Detailed description of the options available for selection: → 30

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



Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0677)
Description	Use this function to change the diagnostic behavior of the 834 Process temperature too high diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Additional information	<i>Selection</i>  Detailed description of the options available for selection: →  30

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



Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0678)
Description	Use this function to change the diagnostic behavior of the 835 Process temperature too low diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Additional information	<i>Selection</i>  Detailed description of the options available for selection: →  30

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	 Detailed description of the options available for selection: →  30

Assign behavior of diagnostic no. 976 (Mass flow out of calibrated range)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 976 (0629)
Description	Use this function to change the diagnostic behavior of the 976 Mass flow out of calibrated range diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Additional information	Detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 977 (Reverse flow detected)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 977 (0627)
Description	Use this function to change the diagnostic behavior of the 977 Reverse flow detected diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Additional information	Detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 979 (Unstable process conditions)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 979 (0630)
Description	Use this function to change the diagnostic behavior of the 979 Unstable process conditions diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Additional information	Detailed description of the options available for selection: → 30

3.1.4 "Administration" submenu

Navigation  Expert → System → Administration

▶ Administration		
▶ Define access code		→  36
▶ Reset access code		
Device reset (0000)		→  39
Transmitter identifier (2765)		→  39
Activate SW option (0029)		→  40
Software option overview (0015)		→  40

"Define access code" wizard

 The **Define access code** wizard (→  36) 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		→  36
Confirm access code		→  37

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 (→  13).

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

User entry

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

Factory setting

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

Confirm 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)

→  38

Reset access code (0024)

→  38

Operating time

Navigation

-  [Diagnostics → Operating time \(0652\)](#)
-  [Expert → Diagnostics → Operating time \(0652\)](#)
-  [Expert → System → Config. backup → Operating time \(0652\)](#)
-  [Expert → System → Administration → Reset acc. code → Operating time \(0652\)](#)
-  [Setup → Advanced setup → Administration → Reset acc. code → Operating time \(0652\)](#)
-  [Setup → Advanced setup → 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.

Reset access code

Navigation

-  [Expert → System → Administration → Reset acc. code → Reset acc. code \(0024\)](#)
-  [Setup → Advanced setup → 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

■ Restore S-DAT backup *

Additional information

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	

* Visibility depends on order options or device settings

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	<i>Description</i>
	If a measuring device was ordered with an additional software option, the activation code is programmed in the device at the factory.
	<i>User entry</i>
	 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. ▶ 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. <i>Example for a software option</i> Order code for "Application package", option EA "Extended HistoROM" <i>Web browser</i>  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^{*}

Second gas

Heartbeat Monitoring^{*}

Heartbeat Verification^{*}

Additional information

Description

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

Extended HistoROM option

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

Heartbeat Verification option and Heartbeat Monitoring option

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

Second gas option

Order code for "Application package", option EV "Second gas group"

3.2 "Sensor" submenu

Navigation

Expert → Sensor

▶ Sensor	
▶ Measured values	→ 42
▶ System units	→ 54
▶ Process parameters	→ 64
▶ Measurement mode	→ 68
▶ Sensor adjustment	→ 87
▶ Zero point adjustment	
▶ External compensation	→ 90
▶ In-situ adjustment	→ 94
▶ Calibration	→ 104

^{*} Visibility depends on order options or device settings

3.2.1 "Measured values" submenu

Navigation  Expert → Sensor → Measured val.

► Measured values		
► Process variables	→ 	42
► System values	→ 	47
► Totalizer	→ 	47
► Input values	→ 	49
► Output values	→ 	50

"Process variables" submenu

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

► Process variables		
Mass flow (1838)	→ 	43
Corrected volume flow (1847)	→ 	43
Volume flow (1850)	→ 	43
FAD volume flow (1851)	→ 	44
Energy flow (1852)	→ 	44
Heat flow (1872)	→ 	44
Temperature (1853)	→ 	45
Density (1854)	→ 	45
Process pressure (17343)	→ 	45
2nd temperature heat flow (17344)	→ 	45
Flow velocity (1857)	→ 	46
Mach number (17302)	→ 	46

Power coefficient fluctuation (12112)	→ 46
Level of flow fluctuation (12113)	→ 47

Mass flow

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

Description Displays the mass flow that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*
 The unit is taken from the **Mass flow unit** parameter (→ 55)

Corrected volume flow

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

Description Displays the corrected volume flow that is currently calculated.

User interface Signed floating-point number

Additional information *Description*
 The corrected volume flow is derived from the measured volume flow corrected to the selected reference conditions.

Dependency
 The unit is taken from the **Corrected volume flow unit** parameter (→ 56)

Volume flow

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

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 (→ 57)

FAD volume flow

Navigation	 Expert → Sensor → Measured val. → Process variab. → FAD volume flow (1851)
Prerequisite	The Air or compressed air option is selected in the Measurement application parameter (→  68) parameter.
Description	Displays the FAD ²⁾ volume flow that is currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the FAD volume flow unit parameter (→  58).

Energy flow

Navigation	 Expert → Sensor → Measured val. → Process variab. → Energy flow (1852)
Prerequisite	The Energy option is selected in the Measurement application parameter (→  68) parameter.
Description	Shows the energy flow currently calculated.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Energy flow unit parameter (→  59)

Heat flow

Navigation	 Expert → Sensor → Measured val. → Process variab. → Heat flow (1872)
Prerequisite	The Energy option is selected in the Measurement application parameter (→  68) parameter.
Description	Shows the heat flow currently calculated.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Energy flow unit parameter (→  59)

2) Free Air Delivery

Temperature

Navigation	 Expert → Sensor → Measured val. → Process variab. → Temperature (1853)
Description	Displays the temperature that is currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  62)

Density

Navigation	 Expert → Sensor → Measured val. → Process variab. → Density (1854)
Description	Shows the density currently calculated.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Density unit parameter (→  61)

Process pressure

Navigation	 Expert → Sensor → Measured val. → Process variab. → Process pressure (17343)
Description	Shows depending on the setting the entered or external process pressure.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Pressure unit parameter (→  62)

2nd temperature heat flow

Navigation	 Expert → Sensor → Measured val. → Process variab. → 2nd temp.heat fl (17344)
Prerequisite	The Energy option is selected in the Measurement application parameter (→  68) parameter.
Description	Displays the 2nd temperature for heat flow calculation. The temperature can be an external value or a fixed, entered value.

User interface Signed floating-point number

Additional information *Dependency*



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

Flow velocity

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

Description Shows the flow velocity currently calculated.

User interface Signed floating-point number

Additional information *Dependency*



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

Mach number

Navigation Expert → Sensor → Measured val. → Process variab. → Mach number (17302)

Description Shows the Mach number currently calculated. For the calculation the density and the pressure are required.

User interface Signed floating-point number

Power coefficient fluctuation

Navigation Expert → Sensor → Measured val. → Process variab. → Powercoeff.fluct (12112)

Description Indicates the standard deviation of the unprocessed sensor signal.

User interface Signed floating-point number

Factory setting 0 to 1

Additional information Unit: normalized value.

Level of flow fluctuation

Navigation	 Expert → Sensor → Measured val. → Process variab. → Fluctuat. level (12113)
Description	Indicates the process stability via peak value determination.
User interface	Signed floating-point number
Factory setting	0 to 1
Additional information	U: normalized value.

"System values" submenu

Navigation  Expert → Sensor → Measured val. → System values

► System values

Electronic temperature (17301) →  47

Electronic temperature

Navigation	 Expert → Sensor → Measured val. → System values → Electronic temp. (17301)
Description	Indication of the current temperature of the electronics.
User interface	Signed floating-point number

"Totalizer" submenu

Navigation  Expert → Sensor → Measured val. → Totalizer

► Totalizer

Totalizer value 1 to n (0911–1 to n) →  48

Totalizer overflow 1 to n (0910–1 to n) →  48

Totalizer value 1 to n 	
Navigation	 Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to n (0911–1 to n)
Description	Displays the current totalizer reading.
User interface	Signed floating-point number
Additional information	<i>Description</i> 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 (→  160). <i>User interface</i>  The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→  157). <i>Example</i> 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 kg ■ Value in Totalizer overflow 1 parameter: $1 \cdot 10^7$ (1 overflow) = 10 000 000 [kg] ■ Current totalizer reading: 11 968 457 kg
Totalizer overflow 1 to n 	

Navigation	 Expert → Sensor → Measured val. → Totalizer → Tot. overflow 1 to n (0910–1 to n)
Description	Displays the current totalizer overflow.
User interface	Integer with sign
Additional information	<i>Description</i> 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 (→  157).

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 kg
- Value in **Totalizer overflow 1** parameter: $2 \cdot 10^7$ (2 overflows) = 20 000 000 [kg]
- Current totalizer reading: 21 968 457 kg

"Input values" submenu

Navigation   Expert → Sensor → Measured val. → Input values

► Input values

► Current input 1 to n

→  49

► Value status input 1 to n

→  50

"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)

→  49

Measured current 1 to n (1604-1 to n)

→  50

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

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
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► Value status input 1 to n

Value status input (1353–1 to n) →  50

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 →  51

► Pulse/frequency/switch output 1 to n →  51

► Relay output 1 to n →  53

"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)

→  51

Measured current 1 to n (0366-1 to n)

→  51

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

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

User interface

0 to 30 mA

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

Navigation

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

► Pulse/frequency/switch output 1 to n

Output frequency 1 to n (0471-1 to n)

→  52

Pulse output 1 to n (0456-1 to n)

→  52

Switch status 1 to n (0461-1 to n)

→  53

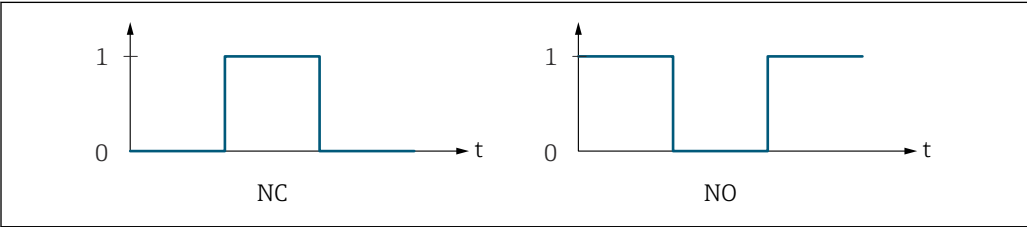
Output frequency 1 to n

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 (→  119), 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 (→  119) parameter.
Description	Displays the pulse frequency currently output.
User interface	Positive floating-point number

Additional information	<i>Description</i> ■ 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 (→  133) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→  122)) 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 (→  119).
Description	Displays the current switch status of the status output.
User interface	■ Open ■ Closed
Additional information	<i>User interface</i> ■ 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) →  53 Switch cycles (0815-1 to n) →  54 Max. switch cycles number (0817-1 to n) →  54	

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

3.2.2 "System units" submenu

Navigation  Expert → Sensor → System units

► System units

Mass flow unit (0554)

→  55

Mass unit (0574)

→  56

Corrected volume flow unit (0558)

→  56

Corrected volume unit (0575)

→  57

Volume flow unit (0553)

→  57

Volume unit (0563)

→  58

FAD volume flow unit (0601)

→  58

FAD volume unit (0591)	→ 59
Energy flow unit (0565)	→ 59
Energy unit (0559)	→ 60
Calorific value unit (0552)	→ 61
Density unit (0555)	→ 61
Temperature unit (0557)	→ 62
Pressure unit (0564)	→ 62
Velocity unit (0566)	→ 63
Length unit (0551)	→ 63
Date/time format (2812)	→ 64

Mass flow unit

Navigation  Expert → Sensor → System units → Mass flow unit (0554)

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

- Selection**
- SI units*
 - g/s
 - g/min
 - g/h
 - g/d
 - kg/s
 - kg/min
 - kg/h
 - kg/d
 - t/s
 - t/min
 - t/h
 - t/d

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

- Factory setting**
- Country-specific:
 - kg/h
 - lb/h

Additional information	Result
	The selected unit applies for: Mass flow parameter (→ ⓘ 43)
	Selection

 For an explanation of the abbreviated units: → ⓘ 203

Mass unit

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

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

Selection	SI units	US units
	■ g	■ lb
	■ kg	■ STon
	■ t	

Factory setting Country-specific:
■ kg
■ lb

Additional information	Selection
	 For an explanation of the abbreviated units: → ⓘ 203

Corrected volume flow unit

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

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

Selection	SI units	US units
	■ NI/s	■ Sft ³ /s
	■ NI/min	■ Sft ³ /min
	■ NI/h	■ Sft ³ /h
	■ NI/d	■ Sft ³ /d
	■ Nm ³ /s	
	■ Nm ³ /min	
	■ Nm ³ /h	
	■ Nm ³ /d	
	■ SI/s	
	■ SI/min	
	■ SI/h	
	■ SI/d	
	■ Sm ³ /s	
	■ Sm ³ /min	
	■ Sm ³ /h	
	■ Sm ³ /d	

Factory setting	Country-specific: ■ Nm³/h ■ Sft³/h
Additional information	<i>Selection</i>  For an explanation of the abbreviated units: →  203

Corrected volume unit

Navigation	  Expert → Sensor → System units → Corr. vol. unit (0575)	
Description	Use this function to select the unit for the corrected volume.	
Selection	<i>SI units</i> ■ NI ■ Nm³ ■ SI ■ Sm³	<i>US units</i> Sft ³
Factory setting	Country-specific: ■ Nm³ ■ Sft³	
Additional information	<i>Selection</i>  For an explanation of the abbreviated units: →  203	

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	<i>SI units</i> ■ m³/s ■ m³/min ■ m³/h ■ m³/d ■ l/s ■ l/min ■ l/h ■ l/d	<i>US units</i> ■ ft³/s ■ ft³/min ■ ft³/h ■ ft³/d
Factory setting	Country-specific: ■ l/h ■ ft³/h	

Volume unit



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

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

Selection

<i>SI units</i>	<i>US units</i>
■ m ³	ft ³
■ l	

Factory setting Country-specific:

- ft³
- m³

Additional information *Selection*

 For an explanation of the abbreviated units: →  203

FAD volume flow unit



Navigation  Expert → Sensor → System units → FAD vol.fl. unit (0601)

Description Use this function to select the unit for the FAD³⁾ volume flow.

Selection

<i>SI units</i>	<i>US units</i>
■ l FAD/s	■ cf FAD/s
■ l FAD/min	■ cf FAD/min
■ l FAD/h	■ cf FAD/h
■ l FAD/d	■ cf FAD/d
■ m ³ FAD/s	
■ m ³ FAD/min	
■ m ³ FAD/h	
■ m ³ FAD/d	

Factory setting Country-specific:

- m³ FAD/h
- cf FAD/min

Additional information *Result*

The selected unit applies for:
FAD volume flow parameter (→  44)

Selection

 For an explanation of the abbreviated units: →  203

3) Free air delivery

FAD volume unit

Navigation	 Expert → Sensor → System units → FAD volume unit (0591)	
Description	Use this function to select the unit for the FAD ⁴⁾ volume.	
Selection	<i>SI units</i> ■ l FAD ■ m³ FAD	<i>US units</i> cf FAD
Factory setting	Country-specific: ■ m³ FAD ■ cf FAD	
Additional information	<i>Selection</i>  For an explanation of the abbreviated units: →  203	

Energy flow unit

Navigation	 Expert → Sensor → System units → Energy flow unit (0565)
Description	Use this function to select the unit for the energy flow.

4) Free air delivery

Selection	<i>SI units</i>		<i>Imperial units</i>	
	■ kW		■ Btu/s	
	■ MW		■ Btu/min	
	■ GW		■ Btu/h	
	■ kJ/s		■ Btu/day	
	■ kJ/min		■ MBtu/s	
	■ kJ/h		■ MBtu/min	
	■ kJ/d		■ MBtu/h	
	■ MJ/s		■ MBtu/d	
	■ MJ/min		■ MMBtu/s	
	■ MJ/h		■ MMBtu/min	
	■ MJ/d		■ MMBtu/h	
	■ GJ/s		■ MMBtu/d	
	■ GJ/min			
	■ GJ/h			
	■ GJ/d			
	■ kcal/s			
	■ kcal/min			
	■ kcal/h			
	■ kcal/d			
	■ Mcal/s			
	■ Mcal/min			
	■ Mcal/h			
	■ Mcal/d			
	■ Gcal/s			
	■ Gcal/min			
	■ Gcal/h			
	■ Gcal/d			

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

Additional information	<i>Selection</i>	
	 For an explanation of the abbreviated units: →  203	

Energy unit	
-------------	---

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

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

Selection	<i>SI units</i>		<i>Imperial units</i>	
	■ kWh		■ Btu	
	■ MWh		■ MBtu	
	■ GWh		■ MMBtu	
	■ kJ			
	■ MJ			
	■ GJ			
	■ kcal			
	■ Mcal			
	■ Gcal			

Factory setting Country-specific:

- kWh
- Btu

Additional information *Selection*

 For an explanation of the abbreviated units: →  203

Calorific value unit

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

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

Selection

<i>SI units</i>	<i>Imperial units</i>
■ kJ/Nm ³	■ Btu/Sm ³
■ kWh/Nm ³	■ MBtu/Sm ³
■ kWh/Sm ³	■ Btu/Sft ³
■ kJ/Sm ³	■ MBtu/Sft ³

Factory setting Country-specific:

- kWh/Nm³
- Btu/Sft³

Additional information

Density unit

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

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

Selection

<i>SI units</i>	<i>US units</i>
■ g/cm ³	lb/ft ³
■ kg/dm ³	
■ kg/l	
■ kg/m ³	

Factory setting Country-specific:

- kg/m³
- lb/ft³

Additional information *Selection*

 For an explanation of the abbreviated units: →  203

Temperature unit



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

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

Selection

<i>SI units</i>	<i>US units</i>
■ °C	■ °F
■ K	■ °R

Factory setting Country-specific:

- °C
- °F

Additional information *Result*

The selected unit applies for:

- **Temperature** parameter (→  45)
- **FAD temperature** parameter
- **Reference combustion temperature** parameter
- **Reference temperature** parameter
- **Maximum value** parameter
- **Minimum value** parameter
- **Maximum value** parameter
- **Minimum value** parameter

Selection

 For an explanation of the abbreviated units: →  203

Pressure unit



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

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

Selection

<i>SI units</i>	<i>US units</i>
■ MPa a	psi a
■ kPa a	
■ bar a	
■ mbar a	

Factory setting Country-specific:

- bar a
- psi a

Additional information*Result*

The unit is taken from:

- **FAD pressure** parameter
- **Reference pressure** parameter

Selection

 For an explanation of the abbreviated units: →  203

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

Length unit**Navigation**

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

Description

Use this function to select the unit of length.

Selection

SI units
 ■ m
 ■ mm

US units
 ■ ft
 ■ in

Factory setting

Country-specific:
 ■ mm
 ■ in

Additional information*Result*

The selected unit applies for:

- **Duct internal height** parameter
- **Insertion depth** parameter
- **Pipe inner diameter** parameter
- **Mounting set height** parameter
- **Pipe wall thickness** parameter
- **Duct internal width** parameter

Selection

 For an explanation of the abbreviated units: →  203

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	<i>Selection</i>  For an explanation of the abbreviated units: →  203

3.2.3 "Process parameters" submenu

Navigation  Expert → Sensor → Process param.

► Process parameters		
Flow override (1839)	→	 64
Flow damping (1802)	→	 65
Temperature damping (1822)	→	 65
Sensitivity (17032)	→	 66
► Low flow cut off	→	 66

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	<i>Description</i> Flow override is active ■ The 453 Flow override diagnostic message is output. ■ Output values ■ Temperature: continues to be output ■ Totalizers 1-3: stop being totalized  The Flow override option can also be activated in the Status input submenu: Assign status input parameter (→  108).
-------------------------------	---

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
Additional information	<i>Description</i>  The damping is performed by a PT1 element ⁵⁾. <i>User entry</i> ■ Value = 0: no damping ■ Value > 0: damping is increased  Damping is switched off if 0 is entered (factory setting). <i>Result</i>  The damping affects the following variables of the device: ■ Outputs →  110 ■ Low flow cut off →  66 ■ Totalizers →  156

Temperature damping

Navigation	  Expert → Sensor → Process param. → Temp. damping (1822)
Description	Use this function to enter a time constant for the damping (PT1 element) of the temperature measured value.
User entry	0 to 999.9 s

5) Proportional behavior with first-order lag

Additional information

Description

 The damping is performed by a PT1 element ⁶⁾.

User entry

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

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

Sensitivity



Navigation

  Expert → Sensor → Process param. → Sensitivity (17032)

Description

Enter the threshold value for process stability. The higher the value, the better disturbances are detected.

User entry

1 to 9

"Low flow cut off" submenu

Navigation

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

► Low flow cut off

Assign process variable (1837)

On value low flow cutoff (1805)

Off value low flow cutoff (1804)

→  66

→  67

→  67

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.

6) Proportional behavior with first-order lag

- Selection**
- Off
 - Mass flow
 - Volume flow
 - Corrected volume flow
 - FAD volume flow^{*}

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 (→ 66).
- 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 → 67.
- User entry** Positive floating-point number
- Factory setting** Depends on country and nominal diameter → 201
- Additional information** *Dependency*
 The unit depends on the process variable selected in the **Assign process variable** parameter (→ 66).

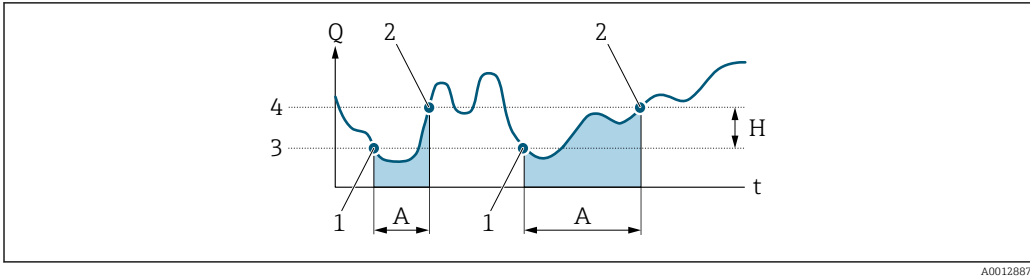
Off value low flow cutoff



- Navigation** Expert → Sensor → Process param. → Low flow cut off → Off value (1804)
- Prerequisite** A process variable is selected in the **Assign process variable** parameter (→ 66).
- 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 → 67.
- User entry** 0 to 100.0 %

^{*} Visibility depends on order options or device settings

Additional information Example



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

3.2.4 "Measurement mode" submenu

Navigation Expert → Sensor → Measurement mode

► Measurement mode

Measurement application (17350)

→ 68

Calorific value type (3101)

→ 69

Active gas (17001)

→ 69

► Gas

→ 69

► Second gas

→ 77

► Reference conditions

→ 84

Measurement application

Navigation Expert → Sensor → Measurement mode → Measur. appl. (17350)

Description Select measurement application.

- Selection
- Air or compressed air
 - Gas or gas mixture
 - Energy

Calorific value type		
Navigation	  Expert → Sensor → Measurement mode → Calorif.val.type (3101)	
Prerequisite	The Energy option is selected in the Measurement application parameter (→  68) parameter.	
Description	Select calculation based on gross calorific value or net calorific value.	
Selection	■ Gross calorific value mass ■ Net calorific value mass	

Active gas	
Navigation	  Expert → Sensor → Measurement mode → Active gas (17001)
Prerequisite	Second gas option application package is available.
Description	Select the gas that the device is currently using for the measurement.
Selection	■ Gas ■ Second gas

"Gas" submenu

Navigation   Expert → Sensor → Measurement mode → Gas

► Gas

Select gas type

→  70

Gas

→  71

Special gas name

→  71

Gas composition

→  71

Mol% Air

→  72

Mol% Ar

→  72

Mol% C2H4

→  72

Mol% C2H6

→  73

Mol% C3H8	→  73
Mol% CH4	→  73
Mol% Cl2	→  73
Mol% CO	→  73
Mol% CO2	→  74
Mol% H2	→  74
Mol% H2O	→  74
Mol% H2S	→  74
Mol% HCl	→  74
Mol% He	→  75
Mol% i-C4H10	→  75
Mol% Kr	→  75
Mol% N2	→  75
Mol% Ne	→  75
Mol% NH3	→  76
Mol% O2	→  76
Mol% O3	→  76
Mol% Xe	→  76

Select gas type

Navigation

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

Description

Select measured gas type.

- Selection
- Single gas
 - Gas mixture
 - Special gas^{*}

^{*} Visibility depends on order options or device settings

Gas 	
Navigation	  Expert → Sensor → Measurement mode → Gas → Gas (3151)
Prerequisite	The Single gas option is selected in the Select gas type parameter parameter.
Description	Select measured gas.
Selection	■ Air ■ Ammonia NH₃ ■ Argon Ar ■ Butane C₄H₁₀ ■ Carbon dioxide CO₂ ■ Carbon monoxide CO ■ Chlorine Cl₂ ■ Ethane C₂H₆ ■ Ethylene C₂H₄ ■ Helium He ■ Hydrogen H₂ ■ Hydrogen chloride HCl ■ Hydrogen sulfide H₂S ■ Krypton Kr ■ Methane CH₄ ■ Neon Ne ■ Nitrogen N₂ ■ Oxygen O₂ ■ Ozone O₃ ■ Propane C₃H₈ ■ Xenon Xe
Special gas name 	
Navigation	  Expert → Sensor → Measurement mode → Gas → Special gas name (3177)
Prerequisite	Special gas option application package is available.
Description	Shows the description of the gas ordered by the customer, e.g. gas name or gas composition.
User interface	-
Factory setting	-
Gas composition 	
Navigation	  Expert → Sensor → Measurement mode → Gas → Gas composition (3110)
Prerequisite	The Gas mixture option is selected in the Select gas type parameter parameter.

Description Select measured gas mixture.

- Selection**
- Air
 - Hydrogen H2
 - Helium He
 - Neon Ne
 - Argon Ar
 - Krypton Kr
 - Xenon Xe
 - Nitrogen N2
 - Oxygen O2
 - Chlorine Cl2
 - Ammonia NH3
 - Carbon monoxide CO
 - Carbon dioxide CO2
 - Hydrogen sulfide H2S
 - Hydrogen chloride HCl
 - Methane CH4
 - Propane C3H8
 - Ethane C2H6
 - Butane C4H10
 - Ethylene C2H4
 - Water
 - Ozone O3

Mol% Air 

Navigation   Expert → Sensor → Measurement mode → Gas → Mol% Air (3170)

Description Air

User entry 0 to 100 %

Mol% Ar 

Navigation   Expert → Sensor → Measurement mode → Gas → Mol% Ar (3112)

Description Ar = Argon

User entry 0 to 100 %

Mol% C2H4 

Navigation   Expert → Sensor → Measurement mode → Gas → Mol% C2H4 (3114)

Description C₂H₄ = ethylene

User entry 0 to 100 %

Mol% C₂H₆



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% C₂H₆ (3115)

Description C₂H₆ = ethane

User entry 0 to 100 %

Mol% C₃H₈



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% C₃H₈ (3116)

Description C₃H₈ = propane

User entry 0 to 100 %

Mol% CH₄



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% CH₄ (3117)

Description CH₄ = methane

User entry 0 to 100 %

Mol% Cl₂



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% Cl₂ (3118)

Description Cl₂ = chlorine

User entry 0 to 100 %

Mol% CO



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% CO (3119)

Description CO = carbon monoxide

User entry 0 to 100 %

Mol% CO₂



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% CO₂ (3120)

Description CO₂ = carbon dioxide

User entry 0 to 100 %

Mol% H₂



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% H₂ (3121)

Description H₂ = hydrogen

User entry 0 to 100 %

Mol% H₂O



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% H₂O (3122)

Description H₂O = water

User entry 0 to 20 %

Mol% H₂S



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% H₂S (3123)

Description H₂S = hydrogen sulfide

User entry 0 to 100 %

Mol% HCl



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% HCl (3124)

Description HCl = hydrogen chloride

User entry 0 to 100 %

Mol% He



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% He (3125)

Description He = helium

User entry 0 to 100 %

Mol% i-C₄H₁₀



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% i-C₄H₁₀ (3126)

Description i-C₄H₁₀ = isobutane

User entry 0 to 100 %

Mol% Kr



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% Kr (3128)

Description Kr = krypton

User entry 0 to 100 %

Mol% N₂



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% N₂ (3129)

Description N₂ = nitrogen

User entry 0 to 100 %

Mol% Ne



Navigation  Expert → Sensor → Measurement mode → Gas → Mol% Ne (3137)

Description Ne = neon

User entry 0 to 100 %

Mol% NH3



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% NH3 (3138)

Description NH₃ = ammonia

User entry 0 to 100 %

Mol% O2



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% O2 (3139)

Description O₂ = oxygen

User entry 0 to 100 %

Mol% O3



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% O3 (3174)

Prerequisite Mixture only possible with O2.

- O3: 65 to 100 %
- O2: 0 to 35 %

Description Enter amount of substance for the gas mixture.

User entry 65 to 100 %

Mol% Xe



Navigation   Expert → Sensor → Measurement mode → Gas → Mol% Xe (3142)

Description Xe = xenon

User entry 0 to 100 %

"Second gas" submenu

Navigation   Expert → Sensor → Measurement mode → Second gas → Special gas name (3177)

► Second gas		
Select gas type	→ 	78
Gas	→ 	78
Special gas name	→ 	79
Gas composition	→ 	79
Mol% Air	→ 	80
Mol% Ar	→ 	80
Mol% C2H4	→ 	80
Mol% C2H6	→ 	80
Mol% C3H8	→ 	80
Mol% CH4	→ 	81
Mol% Cl2	→ 	81
Mol% CO	→ 	81
Mol% CO2	→ 	81
Mol% H2	→ 	81
Mol% H2O	→ 	82
Mol% H2S	→ 	82
Mol% HCl	→ 	82
Mol% He	→ 	82
Mol% i-C4H10	→ 	82
Mol% Kr	→ 	83
Mol% N2	→ 	83
Mol% Ne	→ 	83

Mol% NH3	→ 83
Mol% O2	→ 83
Mol% O3	→ 84
Mol% Xe	→ 84

Select gas type

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

Description Select measured gas type.

- Selection
- Single gas
 - Gas mixture
 - Special gas*

Gas

Navigation Expert → Sensor → Measurement mode → Second gas → Gas (3151)

Prerequisite The **Single gas** option is selected in the **Select gas type** parameter parameter.

Description Select measured gas.

- Selection
- Air
 - Ammonia NH3
 - Argon Ar
 - Butane C4H10
 - Carbon dioxide CO2
 - Carbon monoxide CO
 - Chlorine Cl2
 - Ethane C2H6
 - Ethylene C2H4
 - Helium He
 - Hydrogen H2
 - Hydrogen chloride HCl
 - Hydrogen sulfide H2S
 - Krypton Kr
 - Methane CH4
 - Neon Ne
 - Nitrogen N2
 - Oxygen O2

* Visibility depends on order options or device settings

- Ozone O₃
- Propane C₃H₈
- Xenon Xe

Special gas name

Navigation	 Expert → Sensor → Measurement mode → Second gas → Special gas name (3177)
Prerequisite	Special gas option application package is available.
Description	Shows the description of the gas ordered by the customer, e.g. gas name or gas composition.
User interface	-
Factory setting	-

Gas composition

Navigation	 Expert → Sensor → Measurement mode → Second gas → Gas composition (3110)
Prerequisite	The Gas mixture option is selected in the Select gas type parameter parameter.
Description	Select measured gas mixture.
Selection	■ Air ■ Hydrogen H₂ ■ Helium He ■ Neon Ne ■ Argon Ar ■ Krypton Kr ■ Xenon Xe ■ Nitrogen N₂ ■ Oxygen O₂ ■ Chlorine Cl₂ ■ Ammonia NH₃ ■ Carbon monoxide CO ■ Carbon dioxide CO₂ ■ Hydrogen sulfide H₂S ■ Hydrogen chloride HCl ■ Methane CH₄ ■ Propane C₃H₈ ■ Ethane C₂H₆ ■ Butane C₄H₁₀ ■ Ethylene C₂H₄ ■ Water ■ Ozone O₃

Mol% Air		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% Air (3170)	
Description	Air	
User entry	0 to 100 %	
Mol% Ar		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% Ar (3112)	
Description	Ar = Argon	
User entry	0 to 100 %	
Mol% C2H4		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% C2H4 (3114)	
Description	C ₂ H ₄ = ethylene	
User entry	0 to 100 %	
Mol% C2H6		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% C2H6 (3115)	
Description	C ₂ H ₆ = ethane	
User entry	0 to 100 %	
Mol% C3H8		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% C3H8 (3116)	
Description	C ₃ H ₈ = propane	
User entry	0 to 100 %	

Mol% CH₄



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% CH₄ (3117)

Description CH₄ = methane

User entry 0 to 100 %

Mol% Cl₂



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% Cl₂ (3118)

Description Cl₂ = chlorine

User entry 0 to 100 %

Mol% CO



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% CO (3119)

Description CO = carbon monoxide

User entry 0 to 100 %

Mol% CO₂



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% CO₂ (3120)

Description CO₂ = carbon dioxide

User entry 0 to 100 %

Mol% H₂



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% H₂ (3121)

Description H₂ = hydrogen

User entry 0 to 100 %

Mol% H2O		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% H2O (3122)	
Description	H ₂ O = water	
User entry	0 to 20 %	
Mol% H2S		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% H2S (3123)	
Description	H ₂ S = hydrogen sulfide	
User entry	0 to 100 %	
Mol% HCl		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% HCl (3124)	
Description	HCl = hydrogen chloride	
User entry	0 to 100 %	
Mol% He		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% He (3125)	
Description	He = helium	
User entry	0 to 100 %	
Mol% i-C4H10		
Navigation	  Expert → Sensor → Measurement mode → Second gas → Mol% i-C4H10 (3126)	
Description	i-C ₄ H ₁₀ = isobutane	
User entry	0 to 100 %	

Mol% Kr



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% Kr (3128)

Description Kr = krypton

User entry 0 to 100 %

Mol% N2



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% N2 (3129)

Description N₂ = nitrogen

User entry 0 to 100 %

Mol% Ne



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% Ne (3137)

Description Ne = neon

User entry 0 to 100 %

Mol% NH3



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% NH3 (3138)

Description NH₃ = ammonia

User entry 0 to 100 %

Mol% O2



Navigation  Expert → Sensor → Measurement mode → Second gas → Mol% O2 (3139)

Description O₂ = oxygen

User entry 0 to 100 %

Mol% O3

Navigation	 Expert → Sensor → Measurement mode → Second gas → Mol% O3 (3174)
Prerequisite	Mixture only possible with O2. ■ O3: 65 to 100 % ■ O2: 0 to 35 %
Description	Enter amount of substance for the gas mixture.
User entry	65 to 100 %

Mol% Xe

Navigation	 Expert → Sensor → Measurement mode → Second gas → Mol% Xe (3142)
Description	Xe = xenon
User entry	0 to 100 %

"Reference conditions" submenu

Navigation  Expert → Sensor → Measurement mode → Ref. conditions

▶ Reference conditions

Reference conditions (3155)

→  85

Reference pressure (3146)

→  85

Reference temperature (3147)

→  85

FAD conditions (3173)

→  85

FAD pressure (3175)

→  86

FAD temperature (3176)

→  86

Reference combustion temperature (3165)

Reference combustion temperature (3143)

→  86

Reference conditions

Navigation	  Expert → Sensor → Measurement mode → Ref. conditions → Ref. conditions (3155)
Description	Select reference conditions for calculation of the corrected volume flow.
Selection	■ 1013.25 mbara, 0 °C ■ 1013.25 mbara, 15 °C ■ 1013.25 mbara, 20 °C ■ 1013.25 mbara, 25 °C ■ 1000 mbara, 0 °C ■ 1000 mbara, 15 °C ■ 1000 mbara, 20 °C ■ 1000 mbara, 25 °C ■ 14.696 psia, 59 °F ■ 14.696 psia, 60 °F ■ User-defined

Reference pressure

Navigation	  Expert → Sensor → Measurement mode → Ref. conditions → Ref. pressure (3146)
Prerequisite	The Others option is selected in the Reference conditions parameter (→  85).
Description	Select reference conditions for the corrected volume flow.
User entry	0 to 250 bar a

Reference temperature

Navigation	  Expert → Sensor → Measurement mode → Ref. conditions → Ref. temperature (3147)
Prerequisite	The Others option is selected in the Reference conditions parameter (→  85).
Description	Select reference conditions for the corrected volume flow.
User entry	–200 to 450 °C

FAD conditions

Navigation	  Expert → Sensor → Measurement mode → Ref. conditions → FAD conditions (3173)
Prerequisite	The Air or compressed air option is selected in the Measurement application parameter (→  68) parameter.

Description Select reference conditions for the calculation of the FAD density (FAD = free air delivery).

Selection

- 1000 mbara, 20 °C
- 14.504 psia, 68 °F
- User-defined

FAD pressure

Navigation   Expert → Sensor → Measurement mode → Ref. conditions → FAD pressure (3175)

Prerequisite

- The **Air or compressed air** option is selected in the **Measurement application** parameter (→  68) parameter.
- The **User-defined** option is selected in the **FAD conditions** parameter parameter.

Description Enter reference pressure for the calculation of the FAD density (FAD = free air delivery).

User entry 0 to 250 bar a

FAD temperature

Navigation   Expert → Sensor → Measurement mode → Ref. conditions → FAD temperature (3176)

Prerequisite

- The **Air or compressed air** option is selected in the **Measurement application** parameter (→  68) parameter.
- The **User-defined** option is selected in the **FAD conditions** parameter parameter.

Description Enter reference temperature for the calculation of the FAD density (FAD = free air delivery).

User entry -200 to 450 °C

Reference combustion temperature

Navigation   Expert → Sensor → Measurement mode → Ref. conditions → Ref. comb. temp. (3143)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→  68) parameter.

Description Enter reference combustion temperature to calculate the natural gas energy value.

User entry -200 to 450 °C

3.2.5 "Sensor adjustment" submenu

Navigation   Expert → Sensor → Sensor adjustm.

► Sensor adjustment		
Installation direction (1809)	→ 	87
Installation factor (17333)	→ 	87
Pipe shape (17339)	→ 	88
Pipe inner diameter (17009)	→ 	88
Duct height (17010)	→ 	88
Duct width (17011)	→ 	88
Pipe wall thickness (17340)	→ 	89
Mounting set height (17336)	→ 	89
Insertion depth (17335)	→ 	89

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 device.

Installation factor

Navigation	  Expert → Sensor → Sensor adjustm. → Install. factor (17333)
Description	Enter factor to compensate the mounting-related measurement error.
User entry	0.01 to 100.0

Pipe shape

Navigation	  Expert → Sensor → Sensor adjustm. → Pipe shape (17339)
Prerequisite	Only available with t-mass I.
Description	Select the shape of the pipe.
Selection	■ Circular ■ Rectangular

Pipe inner diameter

Navigation	  Expert → Sensor → Sensor adjustm. → Pipe inner diam. (17009)
Prerequisite	Only available with t-mass I.
Description	Enter the internal diameter of a circular pipe.
User entry	0.050 to 5 m

Duct height

Navigation	  Expert → Sensor → Sensor adjustm. → Duct height (17010)
Prerequisite	Only available with t-mass I.
Description	Enter inner duct height. Duct height and sensor shaft are parallel.
User entry	0.050 to 5 m

Duct width

Navigation	  Expert → Sensor → Sensor adjustm. → Duct width (17011)
Prerequisite	Only available with t-mass I.
Description	Enter inner duct width. The duct width is vertical to the sensor shaft.
User entry	0.050 to 5 m

Pipe wall thickness

Navigation	  Expert → Sensor → Sensor adjustm. → Wall thickness (17340)
Description	Enter the pipe wall thickness.
User entry	0 to 1 m

Mounting set height

Navigation	  Expert → Sensor → Sensor adjustm. → Mounting set ht. (17336)
Description	Enter mounting set height.
User entry	0 to 1 m

Insertion depth

Navigation	  Expert → Sensor → Sensor adjustm. → Insertion depth (17335)
Description	Shows calculated insertion depth of the sensor.
User interface	Positive floating-point number

3.2.6 "Zero point adjustment" submenu

Navigation  Expert → Sensor → Zero point adj.

► Zero point adjustment

Zero point (17012)

Zero point adjustment control (17013) →  90

Zeropoint adjust state (17014) →  90

Progress (2808) →  90

Zero point adjustment control

Navigation	Expert → Sensor → Zero point adj. → Zero point adj. (17013)
Description	Start zero point adjustment.
Selection	■ Cancel ■ Start

Zeropoint adjust state

Navigation	Expert → Sensor → Zero point adj. → Zero adj. state (17014)
User interface	■ Busy ■ Zero point adjust failure ■ Ok

Progress

Navigation	Diagnostics → HBT → Perform.verific. → Progress (2808) Expert → Diagnostics → HBT → Perform.verific. → Progress (2808) Expert → Sensor → Sensor adjustm. → Zero point adj. → Progress (2808) Expert → Sensor → Zero point adj. → Progress (2808)	
Description	The progress of the process is indicated.	
User interface	0 to 100 %	

3.2.7 "External compensation" submenu

Navigation Expert → Sensor → External comp.

► External compensation

Pressure compensation (17326)

→ 91

Pressure (17325)

→ 91

External pressure (17341)

→ 91

Input type 2nd temperature heat flow (17327)

→ 92

Delta heat calculation (17006)	→ 92
2nd temperature heat flow (17328)	→ 92
External 2nd temperature heat flow (17342)	→ 93
Gas compensation (17003)	→ 93
Gas component (17005)	→ 93
Mol% (17007)	→ 94

Pressure compensation

Navigation	  Expert → Sensor → External comp. → Pressure compen. (17326)
Description	Select pressure compensation type.
Selection	■ Fixed value ■ External value * ■ Current input 1 * ■ Current input 2 * ■ Current input 3 *

Pressure

Navigation	  Expert → Sensor → External comp. → Pressure (17325)
Description	Enter fixed value for the process pressure.
User entry	0.1 to 40 bar a

External pressure

Navigation	  Expert → Sensor → External comp. → External press. (17341)
Description	Shows the external process pressure value.
User entry	0.1 to 40 bar a

* Visibility depends on order options or device settings

Input type 2nd temperature heat flow

Navigation	 Expert → Sensor → External comp. → Input 2nd temp. (17327)
Prerequisite	The Energy option is selected in the Measurement application parameter (→  68) parameter.
Description	Select input type for the 2nd temperature for the heat flow calculation.
Selection	■ Off ■ Fixed value ■ External value * ■ Current input 1 * ■ Current input 2 * ■ Current input 3 *

Delta heat calculation

Navigation	 Expert → Sensor → External comp. → Delta heat calc. (17006)
Prerequisite	The Energy option is selected in the Measurement application parameter (→  68) parameter.
Description	Select the position of the measuring device in relation to the external temperature sensor.
Selection	■ Off ■ Upstream ■ Downstream

2nd temperature heat flow

Navigation	 Expert → Sensor → External comp. → 2nd temp.heat fl (17328)
Prerequisite	The Energy option is selected in the Measurement application parameter (→  68) parameter.
Description	Enter fixed value for the 2nd temperature for the heat flow calculation.
User entry	233.15 to 453.15 °C
Factory setting	293.15 °C

* Visibility depends on order options or device settings

External 2nd temperature heat flow

Navigation	  Expert → Sensor → External comp. → Ext. 2nd temp. (17342)
Prerequisite	The Energy option is selected in the Measurement application parameter (→  68) parameter.
Description	Shows the value for the external 2nd temperature for heat flow calculation.
User entry	Signed floating-point number

Gas compensation

Navigation	  Expert → Sensor → External comp. → Gas compensation (17003)
Description	Select the input type for gas compensation. The selected gas component is measured by an external gas analyzer.
Selection	■ Off ■ External value * ■ Current input 1 * ■ Current input 2 * ■ Current input 3 *

Gas component

Navigation	  Expert → Sensor → External comp. → Gas component (17005)
Description	Select the gas component that is measured by an external gas analyzer.
Selection	■ Air ■ Oxygen O2 ■ Ozone O3 ■ Nitrogen N2 ■ Methane CH4 ■ Hydrogen H2 ■ Helium He ■ Hydrogen chloride HCl ■ Hydrogen sulfide H2S ■ Ethylene C2H4 ■ Carbon dioxide CO2 ■ Carbon monoxide CO ■ Chlorine Cl2 ■ Butane C4H10 ■ Propane C3H8 ■ Ethane C2H6

* Visibility depends on order options or device settings

- Argon Ar
- Ammonia NH3
- Water

Mol%

Navigation	 Expert → Sensor → External comp. → Mol% (17007)
Description	Enter amount of substance for the gas mixture.
User entry	0 to 100 %

3.2.8 "In-situ adjustment" submenu

Navigation  Expert → Sensor → In-situ adjust.

► In-situ adjustment		
Activate in-situ adjustment (17360)	→	 95
Input type reference value (17351)	→	 95
Delete values (17355)	→	 95
Confirm (17356)	→	 96
Select flow reference (17354)	→	 96
Stability check (17366)	→	 96
Actual flow value (17365)	→	 96
External reference value (17352)	→	 97
Reference value (17353)	→	 97
Apply value (17364)	→	 97
Status (17367)	→	 97
Description 1 (17359)	→	 97
Description 2 (17358)	→	 98
Description 3 (17357)	→	 98

Description 4 (17002)	→ 98
► Adjustment values in use	→ 98

Activate in-situ adjustment

Navigation	  Expert → Sensor → In-situ adjust. → In-situ adjustm. (17360)
Description	Activate the in-situ adjustment. The points stored by the user are used for the in-situ adjustment.
Selection	■ No ■ Yes

Input type reference value

Navigation	  Expert → Sensor → In-situ adjust. → Input ref. value (17351)
Description	Select input type for the reference value.
Selection	■ Off ■ Manual ■ Current input 1 * ■ Current input 2 * ■ Current input 3 * ■ External value *

Delete values

Navigation	  Expert → Sensor → In-situ adjust. → Delete values (17355)
Description	Delete previous adjustment values and descriptions.
Selection	■ No ■ Yes

* Visibility depends on order options or device settings

Confirm

Navigation   Expert → Sensor → In-situ adjust. → Confirm (17356)

Description Confirm deletion.

Selection

- No
- Yes

Select flow reference

Navigation   Expert → Sensor → In-situ adjust. → Select flow ref. (17354)

Description Select process variable. This process variable is used as reference value for the in situ adjustment.

Selection

- Mass flow
- Corrected volume flow
- FAD volume flow^{*}
- Volume flow

Stability check

Navigation   Expert → Sensor → In-situ adjust. → Stability check (17366)

Description Activate stability check. New adjustment value is only accepted when the measurement is stable.

Selection

- No
- Yes

Actual flow value

Navigation   Expert → Sensor → In-situ adjust. → Act. flow value (17365)

Description Shows the actual flow in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface -2 000 to 2 000 %

* Visibility depends on order options or device settings

External reference value

Navigation	  Expert → Sensor → In-situ adjust. → Ext. ref. value (17352)
Description	Shows the external reference value for the in situ adjustment.
User entry	Signed floating-point number

Reference value

Navigation	  Expert → Sensor → In-situ adjust. → Reference value (17353)
Description	Enter fixed value as reference value used for the in situ adjustment.
User entry	Signed floating-point number

Apply value

Navigation	  Expert → Sensor → In-situ adjust. → Apply value (17364)
Description	Apply the actual value.
Selection	■ No ■ Yes

Status

Navigation	  Expert → Sensor → In-situ adjust. → Status (17367)
Description	Shows the validity of the actual reference value.
User interface	■ Passed ■ Replaced ■ Unstable ■ Invalid

Description 1

Navigation	  Expert → Sensor → In-situ adjust. → Description 1 (17359)
Description	Description for in-situ adjustment: e.g. facility, operator, date.

User entry -

Factory setting -

Description 2

Navigation  Expert → Sensor → In-situ adjust. → Description 2 (17358)

Description Description for in-situ adjustment: e.g. facility, operator, date.

User entry -

Factory setting -

Description 3

Navigation  Expert → Sensor → In-situ adjust. → Description 3 (17357)

Description Description for in-situ adjustment: e.g. facility, operator, date.

User entry -

Factory setting -

Description 4

Navigation  Expert → Sensor → In-situ adjust. → Description 4 (17002)

Description Description for in-situ adjustment: e.g. facility, operator, date.

User entry -

Factory setting -

"Adjustment values in use" submenu

Navigation  Expert → Sensor → In-situ adjust. → Values in use

► Adjustment values in use

Gas description 1/2 (17361)

→  99

Gas description 2/2 (17362)	→  100
Flow value 1 (17368)	→  100
Flow value 2 (17369)	→  100
Flow value 3 (17370)	→  100
Flow value 4 (17371)	→  101
Flow value 5 (17372)	→  101
Flow value 6 (17373)	→  101
Flow value 7 (17374)	→  101
Flow value 8 (17375)	→  101
Flow value 9 (17376)	→  102
Flow value 10 (17377)	→  102
Flow value 11 (17378)	→  102
Flow value 12 (17379)	→  102
Flow value 13 (17380)	→  103
Flow value 14 (17381)	→  103
Flow value 15 (17382)	→  103
Flow value 16 (17383)	→  103

Gas description 1/2

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Gas descrip. 1/2 (17361)
Description	Shows the 1st part of the description of the set gas used in the in-situ adjustment.
User interface	-
Factory setting	-

Gas description 2/2

Navigation	 Expert → Sensor → In-situ adjust. → Values in use → Gas descrip. 2/2 (17362)
Description	Shows the 2nd part of the description of the set gas used in the in-situ adjustment.
User interface	-
Factory setting	-

Flow value 1

Navigation	 Expert → Sensor → In-situ adjust. → Values in use → Flow value 1 (17368)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	-2 000 to 2 000 %

Flow value 2

Navigation	 Expert → Sensor → In-situ adjust. → Values in use → Flow value 2 (17369)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	-2 000 to 2 000 %

Flow value 3

Navigation	 Expert → Sensor → In-situ adjust. → Values in use → Flow value 3 (17370)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	-2 000 to 2 000 %

Flow value 4

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 4 (17371)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	-2 000 to 2 000 %

Flow value 5

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 5 (17372)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	-2 000 to 2 000 %

Flow value 6

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 6 (17373)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	-2 000 to 2 000 %

Flow value 7

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 7 (17374)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	-2 000 to 2 000 %

Flow value 8

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 8 (17375)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface	-2 000 to 2 000 %
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Flow value 9

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 9 (17376)
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Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
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User interface	-2 000 to 2 000 %
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Flow value 10

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 10 (17377)
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Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
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User interface	-2 000 to 2 000 %
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Flow value 11

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 11 (17378)
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Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
--------------------	--

User interface	-2 000 to 2 000 %
-----------------------	-------------------

Flow value 12

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 12 (17379)
-------------------	---

Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
--------------------	--

User interface	-2 000 to 2 000 %
-----------------------	-------------------

Flow value 13

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 13 (17380)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	–2 000 to 2 000 %

Flow value 14

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 14 (17381)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	–2 000 to 2 000 %

Flow value 15

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 15 (17382)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	–2 000 to 2 000 %

Flow value 16

Navigation	  Expert → Sensor → In-situ adjust. → Values in use → Flow value 16 (17383)
Description	Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.
User interface	–2 000 to 2 000 %

3.2.9 "Calibration" submenu

Navigation  Expert → Sensor → Calibration

► Calibration

Nominal diameter (2807)

→  104

Nominal diameter

Navigation	 Expert → Sensor → Calibration → Nominal diameter (2807)
Prerequisite	Only available with t-mass F.
Description	Displays the nominal diameter of the sensor.
User interface	DNxx / x"
Factory setting	Depends on the size of the sensor
Additional information	Description

 The value is also specified on the sensor nameplate.

3.3 "Input" submenu

Navigation  Expert → Input

► Input

► Current input 1 to n

→  104

► Status input 1 to n

→  107

3.3.1 "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)

→  105

Signal mode (1610-1 to n)

→  105

Current span (1605-1 to n)	→  106
0/4 mA value (1606-1 to n)	→  106
20 mA value (1607-1 to n)	→  106
Failure mode (1601-1 to n)	→  107
Failure value (1602-1 to n)	→  107

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) ■ 20-21 (I/O 4) *
Additional information	<i>"Not used" option</i> The current input module does not use any terminal numbers.

Signal mode



Navigation	  Expert → Input → Current input 1 to n → Signal mode (1610-1 to n)
Prerequisite	The measuring device is not approved for use in the hazardous area with type of protection Ex-i.
Description	Use this function to select the signal mode for the current input.
Selection	■ Passive ■ Active *
Factory setting	Active

* Visibility depends on order options or device settings

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	<i>Examples</i>  Sample values for the current range: Current span parameter (→  112)

0/4 mA value

Navigation	  Expert → Input → Current input 1 to n → 0/4 mA value (1606-1 to n)
Description	Enter 4 mA value.
User entry	Signed floating-point number
Additional information	<i>Current input behavior</i> The current input behaves differently depending on the settings configured in the following parameters: ■ Current span (→  106) ■ Failure mode (→  107) <i>Configuration examples</i>  Pay attention to the configuration examples for 4 mA value parameter (→  113).

20 mA value

Navigation	  Expert → Input → Current input 1 to n → 20 mA value (1607-1 to n)
Description	Enter 20 mA value.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter

Additional information	<i>Configuration examples</i>  Pay attention to the configuration examples for 4 mA value parameter (→  113).
-------------------------------	---

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 (→  106).
Selection	■ Alarm ■ Last valid value ■ Defined value
Additional information	<i>Options</i> ■ 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 (→  107)).

Failure value	
----------------------	---

Navigation	  Expert → Input → Current input 1 to n → Failure value (1602–1 to n)
Prerequisite	In the Failure mode parameter (→  107), 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

3.3.2 "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)	→  108
Assign status input (1352–1 to n)	→  108

Value status input (1353-1 to n)	→ 109
Active level (1351-1 to n)	→ 109
Response time status input (1354-1 to n)	→ 109

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) ■ 20-21 (I/O 4) *
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 ■ Gas group * ■ Zero point adjustment

* Visibility depends on order options or device settings

Additional information	<i>Selection</i> ■ 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 (→  64) is activated.  Note on the Flow override (→  64): ■ The Flow override (→  64) 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

3.4 "Output" submenu

Navigation  Expert → Output

► Output

► Current output 1 to n

→  110

► Pulse/frequency/switch output 1 to n

→  117

► Relay output 1 to n

→  134

3.4.1 "Current output 1 to n" submenu

Navigation  Expert → Output → Curr.output 1 to n

► Current output 1 to n

Terminal number

→  111

Signal mode

→  111

Assign current output 1 to n

→  111

Current span

→  112

Fixed current

→  113

0/4 mA value

→  113

20 mA value

→  114

Damping output 1 to n

→  115

Failure mode

→  115

Failure current

→  116

Output current 1 to n

→  116

Measured current 1 to n

→  117

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) ■ 20-21 (I/O 4) *
Additional information	<i>"Not used" option</i> 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
Assign current output 1 to n 	
Navigation	  Expert → Output → Curr.output 1 to n → Assign curr. 1 to n (0359–1 to n)
Description	Use this function to select a process variable for the current output.
Selection	■ Off * ■ Temperature ■ Mass flow ■ Corrected volume flow ■ FAD volume flow * ■ Volume flow ■ Energy flow * ■ Heat flow * ■ Density ■ Flow velocity ■ Pressure ■ 2nd temperature delta heat * ■ Electronic temperature

* Visibility depends on order options or device settings

Current span

Navigation

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

Description

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

- Selection
- 4...20 mA NAMUR (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 current

- Factory setting
- Country-specific:

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

Additional information

Description

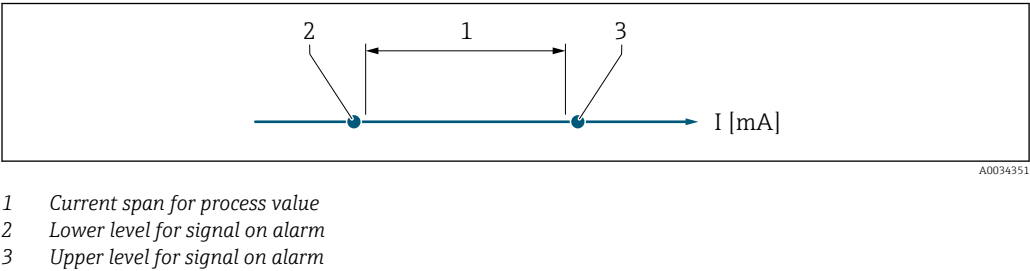
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 115).
- The measuring range is specified via the **0/4 mA value** parameter (→ 113) and **20 mA value** parameter (→ 114).

"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 113).

Example

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



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

Fixed current

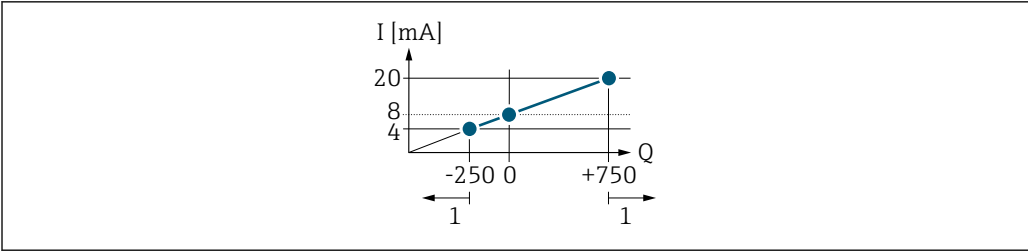


Navigation	Expert → Output → Curr.output 1 to n → Fixed current (0365-1 to n)
Prerequisite	The Fixed current option is selected in the Current span parameter (→ 112).
Description	Use this function to enter a constant current value for the current output.
User entry	0 to 22.5 mA
Factory setting	22.5 mA

0/4 mA value



Navigation	Expert → Output → Curr.output 1 to n → 0/4 mA value (0367-1 to n)
Prerequisite	In the Current span parameter (→ 112), 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
Additional information	<i>Description</i> Positive and negative values are permitted depending on the process variable assigned in the Assign current output parameter (→ 111). 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 (→ 114). <i>Dependency</i> The unit depends on the process variable selected in the Assign current output parameter (→ 111). <i>Current output behavior</i> The current output behaves differently depending on the settings configured in the following parameters: ■ Current span (→ 112) ■ Failure mode (→ 115) <i>Configuration examples</i> A configuration example and its effect on the current output is explained in the following section. Configuration example In theForward flow ■ 0/4 mA value parameter (→ 113) = not equal to zero flow (e.g. -250 kg/h) ■ 20 mA value parameter (→ 114) = not equal to zero flow (e.g. +750 kg/h) ■ Calculated current value = 8 mA at zero flow



A0013757

Q Flow
I Current
1 Measuring range is exceeded or undershot

20 mA value



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

Prerequisite In the **Current span** parameter (→ 112), 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→ 201

Additional information *Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 111). 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 (→ 113).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 111).

Example

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

Configuration examples

Observe the configuration examples for the **0/4 mA value** parameter (→ 113).

Damping output 1 to n 	
Navigation	  Expert → Output → Curr.output 1 to n → Damping out. 1 to n (0363–1 to n)
Prerequisite	A process variable is selected in the Assign current output parameter (→  111) and one of the following options is selected in the Current span parameter (→  112): ■ 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	<i>User entry</i> Use this function to enter a time constant (PT1 element ⁷⁾) 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 mode 	
Navigation	  Expert → Output → Curr.output 1 to n → Failure mode (0364–1 to n)
Prerequisite	A process variable is selected in the Assign current output parameter (→  111) and one of the following options is selected in the Current span parameter (→  112): ■ 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 ■ Defined value

7) proportional transmission behavior with first order delay

Additional information*Description*

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

"Min." option

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



The signal on alarm level is defined via the **Current span** parameter (→ 112).

"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 (→ 112).

"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 (→ 116).

Failure current**Navigation**

Expert → Output → Curr.output 1 to n → Failure current (0352–1 to n)

Prerequisite

The **Defined value** option is selected in the **Failure mode** parameter (→ 115).

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	Use this function to display the actual measured value of the output current.
User interface	0 to 30 mA

3.4.2 "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	→ 	118
Signal mode	→ 	119
Operating mode	→ 	119
Assign pulse output 1 to n	→ 	120
Pulse scaling	→ 	121
Pulse width	→ 	121
Failure mode	→ 	122
Pulse output 1 to n	→ 	123
Assign frequency output	→ 	123
Minimum frequency value	→ 	124
Maximum frequency value	→ 	124
Measuring value at minimum frequency	→ 	124
Measuring value at maximum frequency	→ 	125
Damping output 1 to n	→ 	125
Response time	→ 	126

Failure mode	→  126
Failure frequency	→  127
Output frequency 1 to n	→  127
Switch output function	→  127
Assign diagnostic behavior	→  128
Assign limit	→  128
Switch-on value	→  130
Switch-off value	→  131
Assign status	→  131
Switch-on delay	→  132
Switch-off delay	→  132
Failure mode	→  132
Switch status 1 to n	→  133
Invert output signal	→  133

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) ■ 20-21 (I/O 4) *
Additional information	"Not used" option The pulse/frequency/switch output module does not use any terminal numbers.

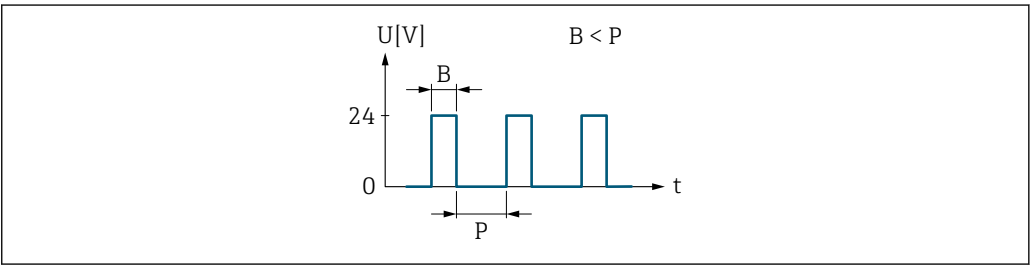
* Visibility depends on order options or device settings

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

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	<i>"Pulse" option</i> Quantity-dependent pulse with configurable 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



A0026883

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

B Pulse width entered

P Pauses between the individual pulses

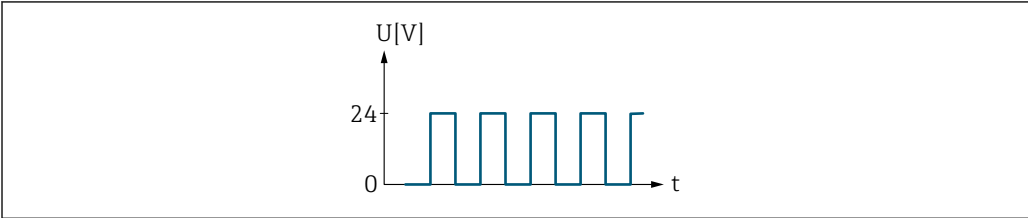
"Frequency" option

Flow-proportional frequency output with 1:1 on/off ratio

* Visibility depends on order options or device settings

Example

- Flow rate approx. 100 g/s
- Max. frequency 10 kHz
- Flow rate at max. frequency 1000 g/s
- Output frequency approx. 1 000 Hz



A0026886

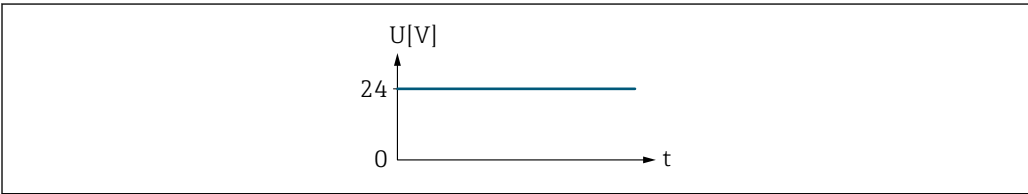
3 Flow-proportional frequency output

"Switch" option

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

Example

Alarm response without alarm

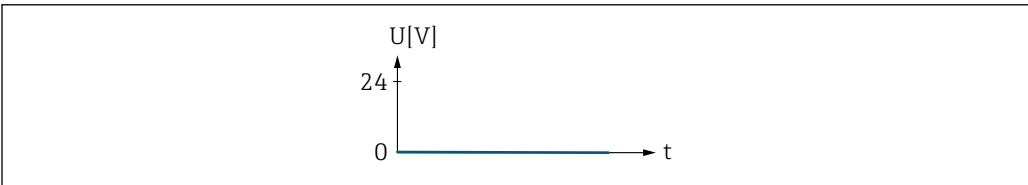


A0026884

4 No alarm, high level

Example

Alarm response in case of alarm



A0026885

5 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 (→ 119) parameter.

Description

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

Selection

- Off
- Mass flow
- Corrected volume flow

- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *

Pulse scaling



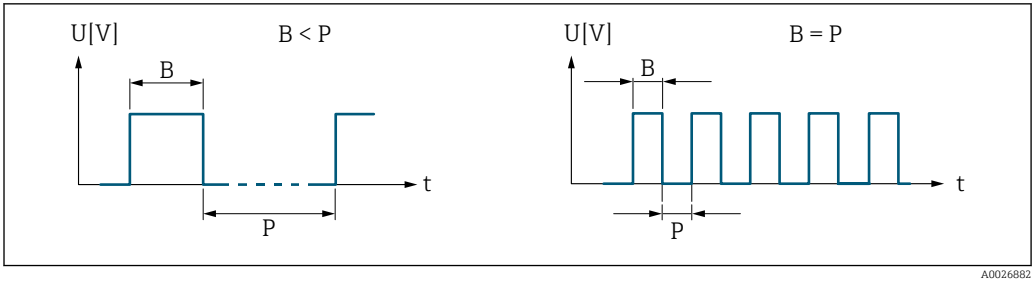
Navigation	Expert → Output → PFS output 1 to n → Pulse scaling (0455-1 to n)
Prerequisite	The Pulse option is selected in the Operating mode parameter (→ 119) and a process variable is selected in the Assign pulse output parameter (→ 120).
Description	Use this function to enter the value for the measured value that a pulse is equivalent to.
User entry	Positive floating point number
Factory setting	Depends on country and nominal diameter
Additional information	<i>User entry</i> 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 (→ 119) and a process variable is selected in the Assign pulse output parameter (→ 120).
Description	Use this function to enter the duration of the output pulse.
User entry	0.05 to 2 000 ms
Additional information	<i>Description</i> ■ Define how long a pulse is (duration). ■ The maximum pulse rate is defined by $f_{\max} = 1 / (2 \times \text{pulse width})$. ■ The interval between two pulses lasts at least as long as the set pulse width. ■ The maximum flow is defined by $Q_{\max} = f_{\max} \times \text{pulse value}$. ■ If the flow exceeds these limit values, the measuring device displays the 443 Pulse output 1 to n diagnostic message.

* Visibility depends on order options or device settings



B Pulse width entered
P Pauses between the individual pulses

Example

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

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 (→ 119) and a process variable is selected in the **Assign pulse output** parameter (→ 120).

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

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.

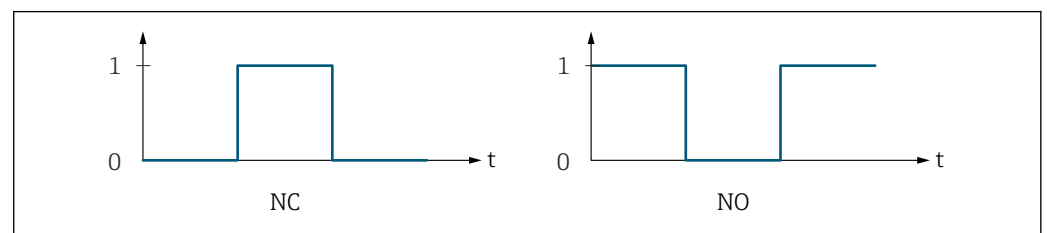
Pulse output 1 to n

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 (→  119) 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 (→  133) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→  122)) 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 (→  119).
Description	Use this function to select the process variable for the frequency output.
Selection	■ Off ■ Temperature ■ Mass flow ■ Corrected volume flow ■ FAD volume flow[*] ■ Volume flow[*] ■ Energy flow[*] ■ Heat flow[*] ■ Density

* Visibility depends on order options or device settings

- Flow velocity
- Pressure
- 2nd temperature delta heat *
- Electronic temperature

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 (→ 119) and a process variable is selected in the Assign frequency output parameter (→ 123).
Description	Use this function to enter the minimum frequency.
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 (→ 119) and a process variable is selected in the Assign frequency output parameter (→ 123).
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 (→ 119) and a process variable is selected in the Assign frequency output parameter (→ 123).
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	<i>Dependency</i> The entry depends on the process variable selected in the Assign frequency output parameter (→ 123).

* Visibility depends on order options or device settings

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 (→  119) and a process variable is selected in the Assign frequency output parameter (→  123).
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	<i>Description</i> Use this function to enter the maximum measured value at the maximum frequency. The selected process variable is output as a proportional frequency. <i>Dependency</i>  The entry depends on the process variable selected in the Assign frequency output parameter (→  123).
Damping output 1 to n 	
Navigation	  Expert → Output → PFS output 1 to n → Damping out. 1 to n (0477–1 to n)
Description	Use this function to enter a time constant for the reaction time of the output signal to fluctuations in the measured value.
User entry	0 to 999.9 s
Additional information	<i>User entry</i> Use this function to enter a time constant (PT1 element⁸⁾) 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.

8) proportional transmission behavior with first order delay

Response time	
Navigation	 Expert → Output → PFS output 1 to n → Response time (0491-1 to n)
Description	Displays the response time. This specifies how quickly the pulse/frequency/switch output reaches the measured value change of 63 % of 100 % of the measured value change.
User interface	Positive floating-point number
Additional information	<i>Description</i>  The response time is made up of the time specified for the following dampings: ▪ Damping of pulse/frequency/switch output →  115 and ▪ Depending on the measured variable assigned to the output. Flow 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 (→  119) and a process variable is selected in the Assign frequency output parameter (→  123).
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	<i>Selection</i> ▪ 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 (→  127) 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 (→  119) and a process variable is selected in the Assign frequency output parameter (→  123).
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 (→  119), 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 (→  119) parameter.
Description	Use this function to select a function for the switch output.
Selection	■ Off ■ On ■ Diagnostic behavior ■ Limit ■ Flow direction check * ■ Status

* Visibility depends on order options or device settings

Additional information	<i>Selection</i> ■ 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 (→ 119), the Switch option is selected. ■ In the Switch output function parameter (→ 127), 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	<i>Description</i> If no diagnostic event is pending, the switch output is closed and conductive. <i>Selection</i> ■ 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 (→ 119). ■ The Limit option is selected in the Switch output function parameter (→ 127).

Description

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

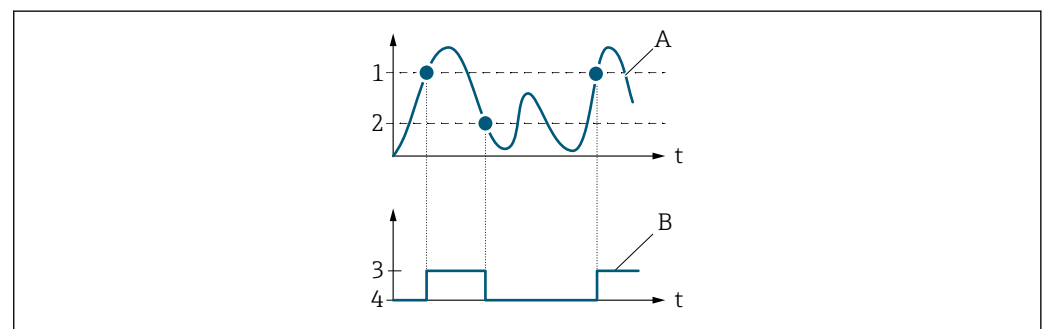
Selection

- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity
- 2nd temperature delta heat *
- Electronic temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3

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



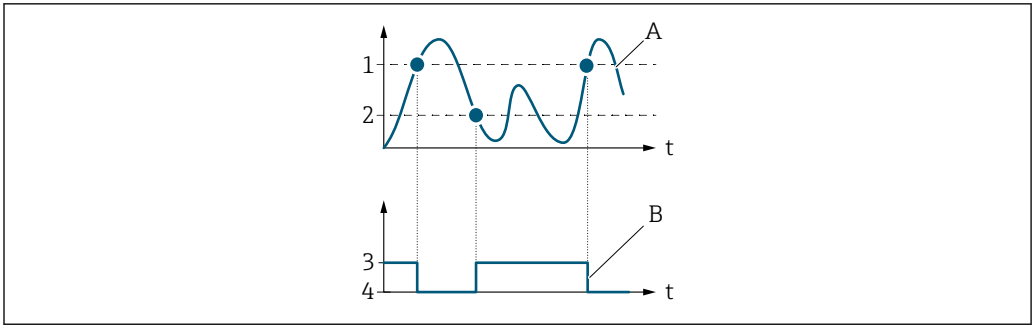
A0026891

- 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

* Visibility depends on order options or device settings

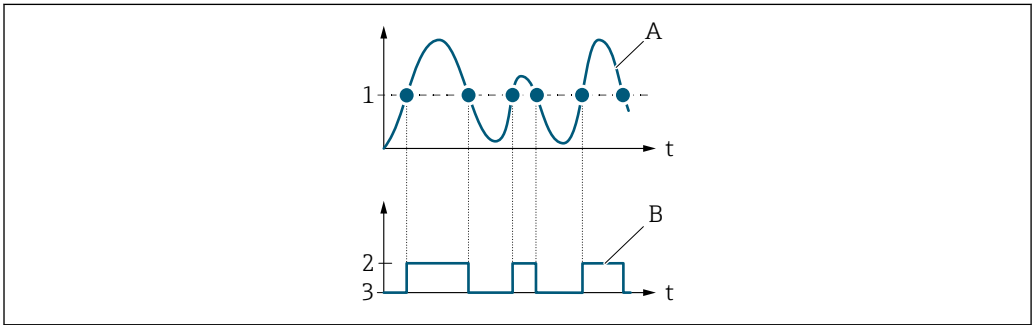


A0026892

- 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 (→ 📖 119) parameter.
- The **Limit** option is selected in the **Switch output function** parameter (→ 📖 127) parameter.

Description

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

User entry

Signed floating-point number

Factory setting

Depends on country and nominal diameter

Additional information	<i>Description</i> 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. <i>Dependency</i>  The unit depends on the process variable selected in the Assign limit parameter (→  128).
Switch-off value 	
Navigation	  Expert → Output → PFS output 1 to n → Switch-off value (0464–1 to n)
Prerequisite	▪ The Switch option is selected in the Operating mode parameter (→  119). ▪ The Limit option is selected in the Switch output function parameter (→  127).
Description	Use this function to enter the measured value for the switch-off point.
User entry	Signed floating-point number
Additional information	<i>Description</i> 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. <i>Dependency</i>  The unit depends on the process variable selected in the Assign limit parameter (→  128).
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 (→  119). ▪ The Status option is selected in the Switch output function parameter (→  127).
Description	Use this function to select a device status for the switch output.
Selection	▪ Off ▪ Low flow cut off
Additional information	<i>Options</i> 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 (→  119). ■ The Limit option is selected in the Switch output function parameter (→  127).
Description	Use this function to enter a delay time for switching on the switch output.
User entry	0.0 to 100.0 s

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 (→  119). ■ The Limit option is selected in the Switch output function parameter (→  127).
Description	Use this function to enter a delay time for switching off the switch output.
User entry	0.0 to 100.0 s

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	<i>Options</i> ■ 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.

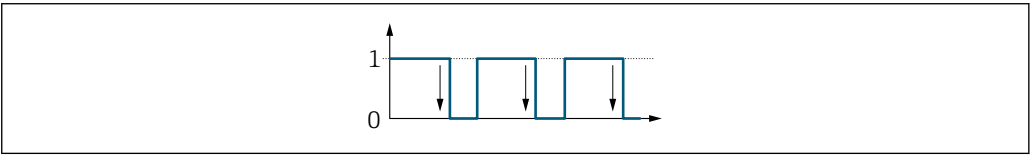
Switch status 1 to n

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 (→  119).
Description	Displays the current switch status of the status output.
User interface	■ Open ■ Closed
Additional information	<i>User interface</i> ■ Open The switch output is not conductive. ■ Closed The switch output is conductive.

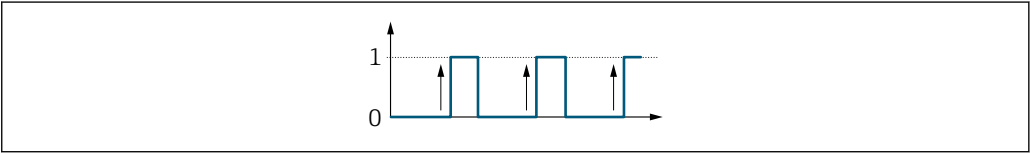
Invert output signal



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	<i>Selection</i> No option (passive - negative)



Yes option (passive - positive)



3.4.3 "Relay output 1 to n" submenu

Navigation  Expert → Output → Relay output 1 to n

► Relay output 1 to n		
Terminal number (0812-1 to n)	→	 134
Relay output function (0804-1 to n)	→	 135
Assign limit (0807-1 to n)	→	 135
Assign diagnostic behavior (0806-1 to n)	→	 136
Assign status (0805-1 to n)	→	 136
Switch-off value (0809-1 to n)	→	 136
Switch-off delay (0813-1 to n)	→	 137
Switch-on value (0810-1 to n)	→	 137
Switch-on delay (0814-1 to n)	→	 138
Failure mode (0811-1 to n)	→	 138
Switch status (0801-1 to n)	→	 138
Powerless relay status (0816-1 to n)	→	 139

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)
- 20-21 (I/O 4)

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	<i>Selection</i> ■ 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 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 (→ 135).
Description	Use this function to select a process variable for the limit value function.
Selection	■ Temperature ■ Mass flow ■ Corrected volume flow ■ FAD volume flow * ■ Volume flow ■ Energy flow * ■ Heat flow * ■ Density ■ Flow velocity ■ 2nd temperature delta heat * ■ Electronic temperature

* Visibility depends on order options or device settings

- Totalizer 1
- Totalizer 2
- Totalizer 3

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 (→  135), 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
Additional information	<i>Description</i>  If no diagnostic event is pending, the relay output is closed and conductive. <i>Selection</i> ■ 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 (→  135), 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 (→  135), the Limit option is selected.

Description	Use this function to enter the measured value for the switch-off point.
User entry	Signed floating-point number
Additional information	<i>Description</i> 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. <i>Dependency</i>  The unit is dependent on the process variable selected in the Assign limit parameter (→  135).
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 (→  135), the Limit option is selected.
Description	Use this function to enter a delay time for switching off the switch output.
User entry	0.0 to 100.0 s

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 (→  135) parameter.
Description	Use this function to enter the measured value for the switch-on point.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter
Additional information	<i>Description</i> 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. <i>Dependency</i>  The unit is dependent on the process variable selected in the Assign limit parameter (→  135).

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 (→  135), the Limit option is selected.
Description	Use this function to enter a delay time for switching on the switch output.
User entry	0.0 to 100.0 s

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	<i>Selection</i> ■ 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	<i>User interface</i> ■ 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 "Communication" submenu

Navigation Expert → Communication

► Communication	
► Modbus configuration	→ 139
► Modbus information	→ 144
► Modbus data map	→ 145
► Web server	→ 145
► WLAN settings	→ 149

3.5.1 "Modbus configuration" submenu

Navigation Expert → Communication → Modbus config.

► Modbus configuration	
Bus address (7112)	→ 140
Baudrate (7111)	→ 140
Data transfer mode (7115)	→ 140
Parity (7122)	→ 141

Byte order (7113)	→ 141
Telegram delay (7146)	→ 143
Failure mode (7116)	→ 143
Bus termination (7155)	→ 143
Fieldbus writing access (7156)	→ 144

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	<i>Options</i> ■ 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	<i>Options</i> 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	<i>Description</i> 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 (→  141) 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 (→  141).

The bytes are transmitted depending on the selection in the **Byte order** parameter (→  141):

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 (MMMMMMMM)	Byte 1 (MMMMMMMM)
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*Options*

- NaN value
The device outputs the NaN value ⁹⁾.
- 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.

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

9) Not a Number

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	<i>Description</i> 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. <i>Selection</i> ■ Read + write The parameters are read and write parameters. ■ Read only ■ The parameters are read only parameters.

3.5.2 "Modbus information" submenu

Navigation  Expert → Communication → Modbus info

► Modbus information

Device ID (7153)

→  144

Device revision (7154)

→  145

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

3.5.3 "Modbus data map" submenu

Navigation  Expert → Communication → Modbus data map

► Modbus data map

Scan list register 0 to 15 (7114) →  145

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

3.5.4 "Web server" submenu

Navigation  Expert → Communication → Web server

► Web server

Web server language (7221) →  146

MAC address (7214) →  146

DHCP client (7212) →  147

IP address (7209) →  147

Subnet mask (7211)	→ 147
Default gateway (7210)	→ 148
Web server functionality (7222)	→ 148
Login page (7273)	→ 148

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)
- العربية (Arabic) *
- Bahasa Indonesia
- ภาษาไทย (Thai) *
- tiếng Việt (Vietnamese)
- čeština (Czech)

MAC address

Navigation

 Expert → Communication → Web server → MAC Address (7214)

Description

Displays the MAC ¹⁰⁾ 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.

* Visibility depends on order options or device settings

10) Media Access Control

Additional information	<i>Example</i> 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	<i>Result</i> If the DHCP client functionality of the Web server is activated, the IP address (→ 147), Subnet mask (→ 147) and Default gateway (→ 148) are set automatically. - Identification is via the MAC address of the measuring device. ■ The IP address (→ 147) in the IP address parameter (→ 147) is ignored as long as the DHCP client parameter (→ 147) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ 147) in the parameter of the same name is only used if the DHCP client parameter (→ 147) 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)

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 (→  148).
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	<i>Description</i>  Once disabled, the Web server functionality can only be re-enabled via or the operating tool FieldCare. <i>Selection</i> <table><tr><th>Option</th><th>Description</th></tr><tr><td>Off</td><td> ■ The web server is completely disabled. ■ Port 80 is locked. </td></tr><tr><td>On</td><td> ■ 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. </td></tr></table>	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.
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

3.5.5 "WLAN settings" submenu

Navigation   Expert → Communication → WLAN settings

► WLAN settings		
WLAN (2702)	→ 	150
WLAN mode (2717)	→ 	150
SSID name (2714)	→ 	150
Network security (2705)	→ 	150
Security identification (2718)	→ 	151
User name (2715)	→ 	151
WLAN password (2716)	→ 	152
WLAN IP address (2711)	→ 	152
WLAN MAC address (2703)	→ 	152
WLAN subnet mask (2709)	→ 	153
WLAN MAC address (2703)	→ 	152
WLAN passphrase (2706)	→ 	153
WLAN MAC address (2703)	→ 	152
Assign SSID name (2708)	→ 	153
SSID name (2707)	→ 	154
2.4 GHz WLAN channel (2704)	→ 	154
Select antenna (2713)	→ 	154
Connection state (2722)	→ 	154
Received signal strength (2721)	→ 	155
WLAN IP address (2711)	→ 	152
Gateway IP address (2719)	→ 	155
IP address domain name server (2720)	→ 	155

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)
-  Setup → Advanced setup → WLAN settings → WLAN mode (2717)
-  Setup → Advanced setup → 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)
-  Setup → Advanced setup → WLAN settings → SSID name (2714)
-  Setup → Advanced setup → 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	<i>Selection</i> ■ 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)  Setup → Advanced setup → WLAN settings → Sec. identific. (2718)  Setup → Advanced setup → 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)  Setup → Advanced setup → WLAN settings → User name (2715)  Setup → Advanced setup → 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)

 Setup → Advanced setup → WLAN settings → WLAN password (2716)

 Setup → Advanced setup → 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)

 Setup → Advanced setup → WLAN settings → WLAN IP address (2711)

 Setup → Advanced setup → 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)

  Setup → Advanced setup → WLAN settings → WLAN MAC address (2703)

Description Displays the MAC ¹¹⁾ 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

11) Media Access Control

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)

WLAN passphrase



Navigation	  Expert → Communication → WLAN settings → WLAN passphrase (2706)  Setup → Advanced setup → WLAN settings → WLAN passphrase (2706)  Setup → Advanced setup → WLAN settings → WLAN passphrase (2706)
Prerequisite	The WPA2-PSK option is selected in the Security type parameter (→  150).
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)  Setup → Advanced setup → WLAN settings → Assign SSID name (2708)  Setup → Advanced setup → WLAN settings → Assign SSID name (2708)
Description	Use this function to select which name is used for the SSID ¹²⁾ .
Selection	■ Device tag ■ User-defined
Additional information	<i>Selection</i> ■ Device tag The device tag name is used as the SSID. ■ User-defined A user-defined name is used as the SSID.

¹²⁾ Service Set Identifier

SSID name 	
Navigation	  Expert → Communication → WLAN settings → SSID name (2707)
Prerequisite	▪ The User-defined option is selected in the Assign SSID name parameter (→  153). ▪ The WLAN access point option is selected in the WLAN mode parameter (→  150).
Description	Use this function to enter a user-defined SSID name.
User entry	Max. 32-digit character string comprising numbers, letters and special characters
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	<i>Description</i>  ▪ 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)  Setup → Advanced setup → WLAN settings → Connection state (2722)  Setup → Advanced setup → 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)
	 Setup → Advanced setup → WLAN settings → Rec.sig.strength (2721)
	 Setup → Advanced setup → 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)

3.6 "Application" submenu

Navigation   Expert → Application

 Application	
Reset all totalizers (2806)	→  156
 Totalizer 1 to n	→  156

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

3.6.1 "Totalizer 1 to n" submenu

Navigation   Expert → Application → Totalizer 1 to n

► Totalizer 1 to n

Assign process variable (0914-1 to n)

→  156

Unit totalizer 1 to n (0915-1 to n)

→  157

Totalizer operation mode (0908-1 to n)

→  158

Control Totalizer 1 to n (0912-1 to n)

→  159

Preset value 1 to n (0913-1 to n)

→  159

Failure mode (0901-1 to n)

→  160

Assign gas (0906-1 to n)

→  160

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
 - Mass flow
 - Corrected volume flow
 - FAD volume flow *
 - Volume flow
 - Energy flow *
 - Heat 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 (→ 156) 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 (→ 156) of the **Totalizer 1 to n** submenu.

Description Use this function to select the process variable unit for the Totalizer 1 to n (→ 156).

- Selection**
- | <i>SI units</i> | <i>US units</i> |
|-----------------|-----------------|
| ■ g * | ■ oz * |
| ■ kg * | ■ lb * |
| ■ t * | ■ STon * |

* Visibility depends on order options or device settings

or

- | <i>SI units</i> | <i>US units</i> |
|--------------------|----------------------|
| ■ m ³ * | ■ ft ³ * |
| ■ l * | ■ Mft ³ * |

* Visibility depends on order options or device settings

or

- | <i>SI units</i> | <i>US units</i> |
|---------------------|----------------------|
| ■ Nl * | ■ Sft ³ * |
| ■ Nm ³ * | |
| ■ Sl * | |
| ■ Sm ³ * | |

* Visibility depends on order options or device settings

* Visibility depends on order options or device settings

or

- SI units*
- m³ FAD *
 - l FAD *

- US units*
- cf FAD *

* Visibility depends on order options or device settings

or

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

- Imperial units*
- Btu *
 - MBtu *
 - MMBtu *

* Visibility depends on order options or device settings

or

- Other units*
- None *

* Visibility depends on order options or device settings

Additional information

Description

 The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→  54).

Selection

The selection is dependent on the process variable selected in the **Assign process variable** parameter (→  156).

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 (→  156) 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

Additional information*Selection*

- Net flow total
Flow values in the forward and reverse flow direction are totalized and balanced against one another. Net flow is registered in the flow direction.
- Forward 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 (→  156) 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 (→  156) 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

Additional information*User entry*

 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→  157).

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 (→  156) 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

Additional information*Description*

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

Selection

- Stop
The totalizer is stopped in the event of a device alarm.
- Actual value
The totalizer continues to count based on the actual measured value; the device alarm is ignored.
- Last valid value
The totalizer continues to count based on the last valid measured value before the device alarm occurred.

Assign gas (Only with order code for "Application package", option EV "Second gas group")**Navigation**

  Expert → Application → Totalizer 1 to n → Assign gas (0906–1 to n)

Description

Select the gas that the totalizer uses. This gas is only totalized when it is currently active ('Active gas' parameter).

Selection

- Both gases
- Gas
- Second gas

Factory setting

- **Both gases** option (only with order code for "Application package", option EV "Second gas group")
- Gas

3.7 "Diagnostics" submenu

Navigation  Expert → Diagnostics

► Diagnostics		
Actual diagnostics (0691)	→ 	162
Previous diagnostics (0690)	→ 	162
Operating time from restart (0653)	→ 	163
Operating time (0652)	→ 	163
► Diagnostic list	→ 	164
► Event logbook	→ 	168
► Device information	→ 	169
► Main electronic module + I/O module 1	→ 	172
► Sensor electronic module (ISEM)	→ 	173
► I/O module 2	→ 	174
► I/O module 3	→ 	176
► I/O module 4	→ 	177
► Display module	→ 	179
► Min/max values	→ 	180
► Data logging	→ 	182
► Heartbeat Technology		
► 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	<i>Display</i>  Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→  164).  Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key. <i>Example</i> For the display format:  F271 Main electronic 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	<i>Display</i>  The diagnostic message can be viewed via the Actual diagnostics parameter (→  162). <i>Example</i> 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 key.

Example

For the display format:

⊗F271 Main electronic 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 (→ 162).

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.

3.7.1 "Diagnostic list" submenu

Navigation

 Expert → Diagnostics → Diagnostic list

► Diagnostic list

Diagnostics 1 (0692)

→  164

Diagnostics 2 (0693)

→  165

Diagnostics 3 (0694)

→  166

Diagnostics 4 (0695)

→  166

Diagnostics 5 (0696)

→  167

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  key.

Examples

For the display format:

■  F271 Main electronic 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 (→ 164).

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 key.

Examples

For the display format:

- F271 Main electronic 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 (→ 165).

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	<i>Display</i>  Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key. <i>Examples</i> For the display format: ■  F271 Main electronic 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	<i>Display</i>  The diagnostic message can be viewed via the Diagnostics 3 parameter (→  166). <i>Example</i> 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 key.

Examples

For the display format:

- F271 Main electronic 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 (→ 166).

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 key.

Examples

For the display format:

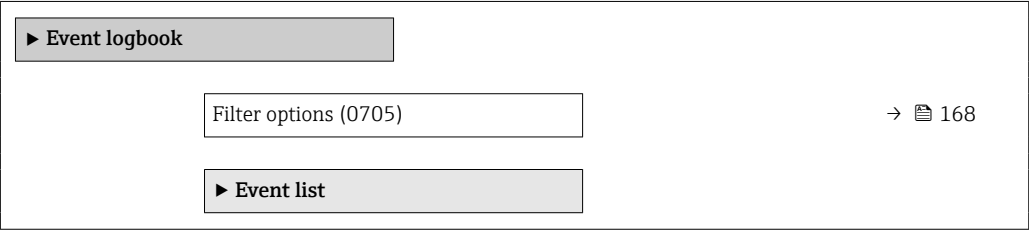
- F271 Main electronic failure
- F276 I/O module failure

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 (→  167). Example For the display format: 24d12h13m00s

3.7.2 "Event logbook" submenu

Navigation  Expert → Diagnostics → Event logbook



Filter options

Navigation	 Expert → Diagnostics → Event logbook → Filter options (0705)
Description	Use this function to select the category whose event messages are displayed in the event list of the local display.
Selection	■ All ■ Failure (F) ■ Function check (C) ■ Out of specification (S) ■ Maintenance required (M) ■ Information (I)

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

3.7.3 "Device information" submenu

Navigation

  Expert → Diagnostics → Device info

► Device information

Device tag

Serial number

Firmware version

Device name

Order code

Extended order code 1

Extended order code 2

Extended order code 3

ENP version

→  169

→  170

→  170

→  171

→  171

→  171

→  171

→  172

→  172

Device tag

Navigation

  Expert → Diagnostics → Device info → Device tag (0011)

Description

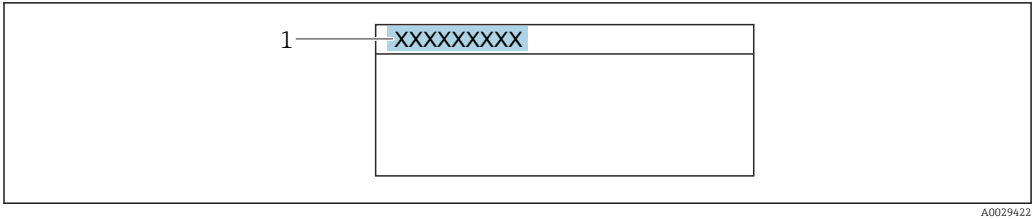
Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

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	Character string comprising numbers, letters and special characters (#16)
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	<i>Description</i> 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	<i>Description</i> 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.
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 (→  171)

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 (→  171)

ENP version

Navigation	  Expert → Diagnostics → Device info → ENP version (0012)
Description	Displays the version of the electronic nameplate.
User interface	Character string
Additional information	<i>Description</i> This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.

3.7.4 "Main electronic module + I/O module 1" submenu

Navigation   Expert → Diagnostics → Main elec.+I/O1

► Main electronic module + I/O module 1

Software revision

Build no. software

Bootloader revision

→  173

→  173

→  173

Software revision

Navigation	  Expert → Diagnostics → Main elec.+I/O1 → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. 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

3.7.5 "Sensor electronic module (ISEM)" submenu

Navigation   Expert → Diagnostics → Sens. electronic

► Sensor electronic module (ISEM)

Software revision (0072)

Build no. software (0079)

Bootloader revision (0073)

→  174

→  174

→  174

Software revision

Navigation	  Expert → Diagnostics → Sens. electronic → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. software

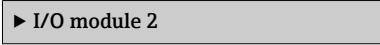
Navigation	  Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)
Description	Use this function to display the software build number of the module.
User interface	Positive integer

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

3.7.6 "I/O module 2" submenu

Navigation   Expert → Diagnostics → I/O module 2

		
I/O module 2 terminal numbers (3902-2)	→	 175
Software revision (0072)	→	 175
Build no. software (0079)	→	 175
Bootloader revision (0073)	→	 175

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) ■ 20-21 (I/O 4) *

Software revision

Navigation	  Expert → Diagnostics → Display module → Software rev. (0072)   Expert → Diagnostics → I/O module → Software rev. (0072)   Expert → Diagnostics → Sens. electronic → Software rev. (0072)   Expert → Diagnostics → Main elec.+I/O1 → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. software

Navigation	  Expert → Diagnostics → I/O module → Build no. softw. (0079)
Description	Use this function to display the software build number of the module.
User interface	Positive integer

Bootloader revision

Navigation	  Expert → Diagnostics → I/O module → Bootloader rev. (0073)
Description	Use this function to display the bootloader revision of the software.
User interface	Positive integer

* Visibility depends on order options or device settings

3.7.7 "I/O module 3" submenu

Navigation  Expert → Diagnostics → I/O module 3

► I/O module 3

I/O module 3 terminal numbers
(3902-3)

→  176

Software revision (0072)

→  176

Build no. software (0079)

→  177

Bootloader revision (0073)

→  177

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) ■ 20-21 (I/O 4) *

Software revision

Navigation	 Expert → Diagnostics → Display module → Software rev. (0072)  Expert → Diagnostics → I/O module → Software rev. (0072)  Expert → Diagnostics → Sens. electronic → Software rev. (0072)  Expert → Diagnostics → Main elec.+I/O1 → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer

* Visibility depends on order options or device settings

Build no. software

Navigation	  Expert → Diagnostics → Display module → Build no. softw. (0079)
	  Expert → Diagnostics → I/O module → Build no. softw. (0079)
	  Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)
	  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 → Display module → Bootloader rev. (0073)
	  Expert → Diagnostics → I/O module → Bootloader rev. (0073)
	  Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)
	  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

3.7.8 "I/O module 4" submenu

Navigation   Expert → Diagnostics → I/O module 4

► I/O module 4		
I/O module 4 terminal numbers (3902–4)	→ 	178
Software revision (0072)	→ 	178
Build no. software (0079)	→ 	178
Bootloader revision (0073)	→ 	178

I/O module 4 terminal numbers

Navigation	  Expert → Diagnostics → I/O module 4 → I/O 4 terminals (3902–4)
Description	Displays the terminal numbers used by the I/O module.
User interface	■ Not used ■ 26-27 (I/O 1) ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4) *

Software revision

Navigation	  Expert → Diagnostics → I/O module → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. software

Navigation	  Expert → Diagnostics → Display module → Build no. softw. (0079)
	  Expert → Diagnostics → I/O module → Build no. softw. (0079)
	  Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)
	  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 → Display module → Bootloader rev. (0073)
	  Expert → Diagnostics → I/O module → Bootloader rev. (0073)
	  Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)
	  Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)
Description	Use this function to display the bootloader revision of the software.

* Visibility depends on order options or device settings

User interface Positive integer

3.7.9 "Display module" submenu

Navigation   Expert → Diagnostics → Display module

► Display module

Software revision (0072)

Build no. software (0079)

Bootloader revision (0073)

→  179

→  179

→  179

Software revision

Navigation   Expert → Diagnostics → Display module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. 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

3.7.10 "Min/max values" submenu

Navigation  Expert → Diagnostics → Min/max val.

► Min/max values		
Reset min/max values	→ 	180
► Main electronic temperature	→ 	180
► Medium temperature	→ 	181

Reset min/max values

Navigation	 Expert → Diagnostics → Min/max val. → Reset min/max (17015)
Description	Select measured variable whose minimum value and maximum value are to be reset.
Selection	■ Main electronic temperature (→  180) ■ Medium temperature (→  181)

"Main electronic temperature" submenu

Navigation  Expert → Diagnostics → Min/max val. → Main elect.temp.

► Main electronic temperature		
Maximum value (17321)	→ 	180
Minimum value (17322)	→ 	181

Maximum value

Navigation	 Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (17321)
Description	Shows the highest previously measured temperature for the main electronic module in the transmitter.
User interface	Signed floating-point number

Minimum value	
Navigation	  Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (17322)
Description	Shows the lowest previously measured temperature for the main electronic module in the transmitter.
User interface	Signed floating-point number

"Medium temperature" submenu

Navigation   Expert → Diagnostics → Min/max val. → Medium temp.

► Medium temperature

Maximum value (17324)

→  181

Minimum value (17323)

→  181

Maximum value	
Navigation	  Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (17324)
Description	Shows the highest previously measured medium temperature.
User interface	Signed floating-point number

Minimum value	
Navigation	  Expert → Diagnostics → Min/max val. → Medium temp. → Minimum value (17323)
Description	Shows the lowest previously measured medium temperature.
User interface	Signed floating-point number

3.7.11 "Data logging" submenu

Navigation  Expert → Diagnostics → Data logging

► Data logging		
Assign channel 1 (0851)	→ 	182
Assign channel 2 (0852)	→ 	183
Assign channel 3 (0853)	→ 	184
Assign channel 4 (0854)	→ 	184
Logging interval (0856)	→ 	184
Clear logging data (0855)	→ 	185
Data logging (0860)	→ 	185
Logging delay (0859)	→ 	186
Data logging control (0857)	→ 	186
Data logging status (0858)	→ 	186
Entire logging duration (0861)	→ 	187
► Display channel 1	→ 	187
► Display channel 2	→ 	188
► Display channel 3	→ 	188
► Display channel 4	→ 	189

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 (→  40).

Description Use this function to select a process variable for the data logging channel.

- Selection**
- Off
 - Temperature
 - Mass flow
 - Corrected volume flow
 - FAD volume flow *
 - Volume flow
 - Energy flow *
 - Heat flow *
 - Density
 - Flow velocity
 - Pressure
 - 2nd temperature delta heat *
 - Electronic temperature
 - Current output 1 *
 - Current output 2 *
 - Current output 3 *
 - Current output 4 *

Additional information *Description*

A total of 1000 measured values can be logged. This means:

- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

Once the maximum number of data points is reached, the oldest data points in the data log are cyclically overwritten in such a way that the last 1000, 500, 333 or 250 measured values are always in the log (ring memory principle).



The log contents are cleared if the option selected is changed.

Assign channel 2



Navigation Expert → Diagnostics → Data logging → Assign chan. 2 (0852)

Prerequisite The **Extended HistoROM** application package is available.



The software options currently enabled are displayed in the **Software option overview** parameter (→ 40).

Description Options for the assignment of a process variable to the data logging channel.

Selection Picklist, see **Assign channel 1** parameter (→ 182)

* Visibility depends on order options or device settings

Assign channel 3 	
Navigation	 Diagnostics → Data logging → Assign chan. 3 (0853)  Diagnostics → Data logging → Assign chan. 3 (0853)   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 (→  40).
Description	Options for the assignment of a process variable to the data logging channel.
Selection	Picklist, see Assign channel 1 parameter (→  182)
Assign channel 4 	
Navigation	 Diagnostics → Data logging → Assign chan. 4 (0854)  Diagnostics → Data logging → Assign chan. 4 (0854)   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 (→  40).
Description	Options for the assignment of a process variable to the data logging channel.
Selection	Picklist, see 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 (→  40).
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	<i>Description</i> 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. <i>Example</i> If 1 logging channel is used: ■ $T_{\log} = 1000 \times 1 \text{ s} = 1\,000 \text{ s} \approx 15 \text{ min}$ ■ $T_{\log} = 1000 \times 10 \text{ s} = 10\,000 \text{ s} \approx 3 \text{ h}$ ■ $T_{\log} = 1000 \times 80 \text{ s} = 80\,000 \text{ s} \approx 1 \text{ d}$ ■ $T_{\log} = 1000 \times 3\,600 \text{ s} = 3\,600\,000 \text{ s} \approx 41 \text{ d}$
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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 (→  40).
Description	Use this function to clear the entire logging data.
Selection	■ Cancel ■ Clear data
Additional information	<i>Selection</i> ■ 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	<i>Selection</i> ■ 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 (→  185), 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	<i>Description</i> Once measured value logging has been started with the Data logging control parameter (→  186), 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 (→  185), the Not overwriting option is selected.
Description	Use this function to start and stop measured value logging.
Selection	■ None ■ Delete + start ■ Stop
Additional information	<i>Selection</i> ■ 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 (→  185), the Not overwriting option is selected.

Description	Displays the measured value logging status.
User interface	■ Done ■ Delay active ■ Active ■ Stopped
Additional information	<i>Selection</i> ■ 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 (→  185), 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

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 (→  40).
Description	Displays the measured value trend for the logging channel in the form of a chart.

Additional information

Description

- x-axis: depending on the number of channels selected displays 250 to 1000 measured values of a process variable.
- y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.

"Display channel 2" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 2

► Display channel 2

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

3.7.12 "Heartbeat" submenu

 For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring** refer to the Special Documentation for the device →  7

Navigation

  Expert → Diagnostics → Heartbeat

► Heartbeat Technology

3.7.13 "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) →  192

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)	→ 193
Value current output 1 to n (0355-1 to n)	→ 193
Frequency output simulation 1 to n (0472-1 to n)	→ 193
Frequency value 1 to n (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)	→ 196
Device alarm simulation (0654)	→ 197
Diagnostic event category (0738)	→ 197
Diagnostic event simulation (0737)	→ 197

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 ■ Temperature ■ Mass flow ■ Corrected volume flow ■ FAD volume flow[*]

^{*} Visibility depends on order options or device settings

- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity

Additional information*Description*

The simulation value of the process variable selected is defined in the **Process variable value** parameter (→ 191).

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 (→ 54).

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.

* Visibility depends on order options or device settings

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	<i>Description</i>  The desired simulation value is defined in the Input signal level parameter (→  192). <i>Selection</i> ■ 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	<i>Description</i>  The desired simulation value is defined in the Value current output 1 to n parameter. <i>Selection</i> ■ 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 output 1 to n 	
Navigation	  Expert → Diagnostics → Simulation → Value curr.out 1 to n (0355–1 to n)
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	<i>Dependency</i> The input range is dependent on the option selected in the Current span parameter (→  112).
Frequency output simulation 1 to n 	
Navigation	  Expert → Diagnostics → Simulation → FreqOutputSim 1 to n (0472–1 to n)
Prerequisite	In the Operating mode parameter (→  119), 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	<i>Description</i>  The desired simulation value is defined in the Frequency value 1 to n parameter. <i>Selection</i> ■ Off Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Frequency simulation is active.

Frequency value 1 to n



Navigation	  Expert → Diagnostics → Simulation → Freq value 1 to n (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 (→  119), 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	<i>Description</i>  The desired simulation value is defined in the Pulse value 1 to n parameter. <i>Selection</i> ■ 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 (→  121). ■ 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 (→  119), 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	<i>Description</i>  The desired simulation value is defined in the Switch status 1 to n parameter. <i>Selection</i> ■ Off Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Switch simulation is active.

Switch status 1 to n



Navigation

Expert → Diagnostics → Simulation → Switch status 1 to n (0463–1 to n)

Description

Use this function to select a switch value for the simulation. In this way, users can verify the correct adjustment of the switch output and the correct function of downstream switching units.

Selection

- Open
- Closed

Additional information

Selection

- Open
Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
Switch simulation is active.

Relay 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	<i>Selection</i> ■ 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.

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	<i>Description</i> 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 (→ 197).
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 (→  197).

3.8 "I/O configuration" submenu

Navigation

 Expert → I/O config.

► I/O configuration

I/O module 1 to n terminal numbers
(3902–1 to n)

→  198

I/O module 1 to n information
(3906–1 to n)

→  198

I/O module 1 to n type (3901–1 to n)

→  199

Apply I/O configuration (3907)

→  199

I/O alteration code (2762)

→  200

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)
- 20-21 (I/O 4) *

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.

* Visibility depends on order options or device settings

User interface	■ Not plugged ■ Invalid ■ Not configurable ■ Configurable ■ MODBUS
Additional information	<i>"Not plugged" option</i> The I/O module is not plugged in. <i>"Invalid" option</i> The I/O module is not plugged correctly. <i>"Not configurable" option</i> The I/O module is not configurable. <i>"Configurable" option</i> The I/O module is configurable. <i>"MODBUS" option</i> 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 * ■ 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.

* Visibility depends on order options or device settings

- 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 (→  199).

4 Country-specific factory settings

4.1 SI units



Not valid for USA and Canada.

4.1.1 System units

Volume flow	m ³ /h option
Volume	m ³ option
Mass flow	kg/h option
Mass	kg option
Corrected volume flow	Nm ³ /h option
Corrected volume	Nm ³ option
FAD volume flow	m ³ FAD/h option
FAD volume	m ³ FAD option
Density	kg/m ³ option
Reference density	kg/Nm ³
Temperature	°C option
Length	mm option
Pressure	bar a option

4.1.2 Full scale values

The full scale values depend on the medium type, nominal diameter and rectifier.



The factory settings apply to the following parameters:

- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

4.1.3 Output current span

Current output 1 to n	4 to 20 mA NAMUR
-----------------------	------------------

4.1.4 On value low flow cut off



The switch-on point depends on the type of medium and the nominal diameter.

4.2 US units



Only valid for USA and Canada.

4.2.1 System units

Volume flow	ft ³ /h option
Volume	ft ³ option
Mass flow	lb/h option

Mass	lb option
Corrected volume flow	Sft ³ /min option
Corrected volume	Sft ³ option
FAD volume flow	ft ³ FAD/h
FAD volume	ft ³ FAD
Density	lb/ft ³ option
Reference density	lb/Sft ³
Temperature	°F option
Length	in option
Pressure	psi a option

4.2.2 Full scale values

The full scale values depend on the medium type, nominal diameter and rectifier.

-  The factory settings apply to the following parameters:
- 20 mA value (full scale value of the current output)
 - 100% bar graph value 1

4.2.3 Output current span

Current output 1 to n	4 to 20 mA US
-----------------------	---------------

4.2.4 On value low flow cut off

-  The switch-on point depends on the type of medium and the nominal diameter.

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Density	g/cm ³	Gram/volume unit
	kg/l, kg/dm ³ , kg/m ³	Kilogram/volume unit
Pressure	kPa a, MPa a	Kilopascal, megapascal (absolute)
	bar	Bar
	mbar a	Millibar (absolute)
FAD volume	l FAD, m ³ FAD	FAD liter, FAD cubic meter
FAD volume flow	l FAD/s, l FAD/min, l FAD/h, l FAD/d	FAD liter/time unit
	m ³ FAD/s, m ³ FAD/min, m ³ FAD/h, m ³ FAD/d	FAD cubic meter/time unit
Length	mm, m	Millimeter, meter
Mass	g, kg, t	Gram, kilogram, metric ton
Mass flow	g/s, g/min, g/h, g/d	Gram/time unit
	kg/s, kg/min, kg/h, kg/d	Kilogram/time unit
	t/s, t/min, t/h, t/d	Metric ton/time unit
Corrected volume	Nl, Nm ³ , Sl, Sm ³	Normal liter, normal cubic meter, standard liter, standard cubic meter
Corrected volume flow	Nl/s, Nl/min, Nl/h, Nl/d	Normal liter/time unit
	Nm ³ /s, Nm ³ /min, Nm ³ /h, Nm ³ /d	Normal cubic meter/time unit
	Sl/s, Sl/min, Sl/h, Sl/d	Standard liter/time unit
	Sm ³ /s, Sm ³ /min, Sm ³ /h, Sm ³ /d	Standard cubic meter/time unit
Temperature	°C, K	Celsius, Kelvin
Volume	m ³	Cubic meters
Volume flow	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
Time	s, m, h, d, y	Second, minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Density	lb/ft ³	Pound/cubic foot
FAD volume	ft ³ FAD	FAD cubic foot
FAD volume flow	cf FAD/s, cf FAD/min, cf FAD/h, cf FAD/d	FAD cubic foot/time unit
FAD volume flow	ft ³ FAD/s, ft ³ FAD/min, ft ³ FAD/h, ft ³ FAD/d,	FAD cubic foot/time unit
Length	in, ft	Inch, foot
Mass	lb, ton	Pound, standard ton
lb/s, lb/min, lb/h, lb/d	Pound/time unit	

Process variable	Units	Explanation
STon/s, STon/min, STon/h, STon/d	Standard ton/time unit	
Mass flow	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	ton/s, ton/min, ton/h, ton/d	Standard ton/time unit
Corrected volume	Sft ³	Standard cubic foot
Corrected volume flow	Sft ³ /s, Sft ³ /min, Sft ³ /h, Sft ³ /d	Standard cubic foot/time unit
Temperature	°F, °R	Fahrenheit, Rankine
Volume	ft ³	Cubic foot
Volume flow	ft ³ /s, ft ³ /min, ft ³ /h, ft ³ /d	Cubic foot/time unit
Time	s, m, h, d, y	Second, 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 ⁽⁺⁾  - 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	
Direct access	→ 208
Locking status	→ 208
Access status	→ 208
Enter access code	→ 208
▶ System	→ 209
▶ Display	→ 209
▶ Configuration backup	→ 210
▶ Diagnostic handling	→ 211
▶ Administration	→ 212
▶ Sensor	→ 213
▶ Measured values	→ 213
▶ System units	→ 215
▶ Process parameters	→ 218
▶ Measurement mode	→ 218
▶ External compensation	→ 219
▶ Sensor adjustment	→ 219
▶ Calibration	→ 220

► I/O configuration	→  221
I/O module 1 to n terminal numbers	→  221
I/O module 1 to n information	→  221
I/O module 1 to n type	→  221
Apply I/O configuration	→  221
Alteration code	→  221
► Input	→  221
► Current input 1 to n	→  221
► Status input 1 to n	→  222
► Output	→  222
► Current output 1 to n	→  222
► Pulse/frequency/switch output 1 to n	→  223
► Relay output 1 to n	→  226
► Double pulse output	→  227
► Communication	→  227
► Modbus configuration	→  227
► Modbus information	→  228
► Modbus data map	→  228
► WLAN settings	→  228
► Application	→  229
Reset all totalizers	→  229
► Totalizer 1 to n	→  229
► Diagnostics	→  230
Actual diagnostics	→  230

Previous diagnostics	→  230
Operating time from restart	→  230
Operating time	→  230
▶ Diagnostic list	→  230
▶ Event logbook	→  230
▶ Device information	→  231
▶ Main electronic module + I/O module 1	→  231
▶ Sensor electronic module (ISEM)	→  231
▶ I/O module 2	→  231
▶ I/O module 3	→  232
▶ I/O module 4	→  232
▶ Display module	→  232
▶ Data logging	→  233
▶ Simulation	→  233

6.3 Register information

Navigation: Expert					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Direct access	3878	Integer	Read / Write	0 to 65 535	11
Locking status	4918	Integer	Read	256 = Hardware locked 512 = Temporarily locked	12
Access status	2178	Integer	Read	0 = Operator 1 = Maintenance	13
Enter access code	2177	Integer	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	13

6.3.1 "System" submenu

"Display" submenu

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Display language	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) 17 = ภาษาไทย (Thai) * 18 = Türkçe 19 = tiếng Việt (Vietnamese) 20 = 한국어 (Korean) 21 = العربية (Arabic) *	15
Format display	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	15
Value 1 display	3963	Integer	Read / Write	3 = Corrected volume flow 4 = Density 7 = Temperature 9 = Volume flow 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 37 = Flow velocity 38 = Energy flow * 39 = Electronic temperature 66 = Pressure 73 = FAD volume flow * 121 = Current output 1 * 122 = Current output 2 * 123 = Current output 3 * 124 = Current output 4 * 150 = Heat flow * 151 = 2nd temperature delta heat *	18
0% bargraph value 1	4136 to 4137	Float	Read / Write	Signed floating-point number	18
100% bargraph value 1	4142 to 4143	Float	Read / Write	Signed floating-point number	19
Decimal places 1	3365	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	19
Value 2 display	3964	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  18)	20
Decimal places 2	4049	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 3 display	3966	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  18)	20
0% bargraph value 3	4138 to 4139	Float	Read / Write	Signed floating-point number	21
100% bargraph value 3	4140 to 4141	Float	Read / Write	Signed floating-point number	21
Decimal places 3	4050	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	22
Value 4 display	3965	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  18)	22
Decimal places 4	4051	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	23
Display interval	3604 to 3605	Float	Read / Write	1 to 10 s	23
Display damping	3554 to 3555	Float	Read / Write	0.0 to 999.9 s	23
Header	3624	Integer	Read / Write	0 = Device tag 1 = Free text	24
Header text	3968 to 3973	String	Read / Write	Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)	24
Separator	3671	Integer	Read / Write	▪ . (point) ▪ , (comma)	25
Contrast display	3674 to 3675	Float	Read / Write	20 to 80 %	25
Backlight	3967	Integer	Read / Write	0 = Disable 1 = Enable	26

* 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	2631	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	26
Last backup	6430	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	27
Configuration management	5500	Integer	Read / Write	0 = Cancel 1 = Execute backup 2 = Restore * 4 = Clear backup data 5 = Compare *	27

Navigation: Expert → System → Configuration backup					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Backup state	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	28
Comparison result	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	28

* 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	6808 to 6809	Float	Read / Write	0 to 60 s	29

"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. 302	6484	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	31
Assign behavior of diagnostic no. 125	--	Integer	Read / Write		
Assign behavior of diagnostic no. 124	--	Integer	Read / Write		
Assign behavior of diagnostic no. 160	--	Integer	Read / Write		
Assign behavior of diagnostic no. 954	--	Integer	Read / Write		
Assign behavior of diagnostic no. 953	--	Integer	Read / Write		
Assign behavior of diagnostic no. 441	4742	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	31
Assign behavior of diagnostic no. 442	4919	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	32
Assign behavior of diagnostic no. 443	5000	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	32
Assign behavior of diagnostic no. 840	--	Integer	Read / Write		

Navigation: Expert → System → Diagnostic handling → Diagnostic behavior					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign behavior of diagnostic no. 444	5120	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	33
Assign behavior of diagnostic no. 452	--	Integer	Read / Write		
Assign behavior of diagnostic no. 543	--	Integer	Read / Write		
Assign behavior of diagnostic no. 881	--	Integer	Read / Write		
Assign behavior of diagnostic no. 832	6440	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	33
Assign behavior of diagnostic no. 833	6439	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	33
Assign behavior of diagnostic no. 834	6438	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	34
Assign behavior of diagnostic no. 835	6437	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	34
Assign behavior of diagnostic no. 842	9661	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	34
Assign behavior of diagnostic no. 930	--	Integer	Read / Write		
Assign behavior of diagnostic no. 931	--	Integer	Read / Write		

"Administration" submenu

Navigation: Expert → System → Administration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Device reset	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 25 = Restore S-DAT backup *	39
Activate SW option	2795	Integer	Read / Write	Max. 10-digit string consisting of numbers.	40
Software option overview	2902	Integer	Read	1 = Extended HistoROM * 4 = Second gas 16384 = Heartbeat Monitoring * 32768 = Heartbeat Verification *	40

* Visibility depends on order options or device settings

"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	36
Confirm access code	8685 to 8692	String	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	37

"Reset access code" submenu

Navigation: Expert → System → Administration → Reset access code					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Operating time	--	String	Read		
Reset access code	--	String	Read / Write		

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	2007 to 2008	Float	Read	Signed floating-point number	43
Mass flow	2009 to 2010	Float	Read	Signed floating-point number	43
Sound velocity	2013 to 2014	Float	Read	Signed floating-point number	43
Pressure	2093 to 2094	Float	Read	Signed floating-point number	44
Energy flow	2011 to 2012	Float	Read	Signed floating-point number	44
Flow velocity	2015 to 2016	Float	Read	Signed floating-point number	44
Temperature	2017 to 2018	Float	Read	Signed floating-point number	45
Wobbe index	2019 to 2020	Float	Read	Signed floating-point number	45
Corrected volume flow	2083 to 2084	Float	Read	Signed floating-point number	46
Dry methane in %	--	Float	Read		
Molar mass	--	Float	Read		
Density	--	Float	Read		
Dynamic viscosity	--	Float	Read		
Calorific value	--	Float	Read		

"System values" submenu

Navigation: Expert → Sensor → Measured values → System values					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Signal strength	--	Float	Read		
Asymmetry	--	Float	Read		

Navigation: Expert → Sensor → Measured values → System values					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Signal to noise ratio	--	Float	Read		
Turbulence	--	Float	Read		

"Totalizer" submenu

Navigation: Expert → Sensor → Measured values → Totalizer					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Totalizer value 1 to n	1: 2610 to 2611 2: 2810 to 2811 3: 3010 to 3011	Float	Read	Signed floating-point number	48
Totalizer overflow 1 to n	1: 2612 to 2613 2: 2812 to 2813 3: 3012 to 3013	Float	Read	Integer with sign	48

*"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	1: 6151 to 6152 2: 6153 to 6154 3: 6155 to 6156	Float	Read	Signed floating-point number	49
Measured current 1 to n	1: 6131 to 6132 2: 6133 to 6134 3: 6135 to 6136	Float	Read	0 to 22.5 mA	50

"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	1: 2746 2: 4699 3: 4700	Integer	Read	0 = Low 1 = High	50

*"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	1: 5931 to 5932 2: 5933 to 5934 3: 5935 to 5936	Float	Read	0 to 22.5 mA	51
Measured current 1 to n	1: 5779 to 5780 2: 5781 to 5782 3: 5783 to 5784	Float	Read	0 to 30 mA	51

"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	1: 3462 to 3463 2: 3464 to 3465 3: 9910 to 9911	Float	Read	0.0 to 12 500.0 Hz	52
Pulse output 1 to n	1: 3082 to 3083 2: 3084 to 3085 3: 4718 to 4719	Float	Read	Positive floating-point number	52
Switch status 1 to n	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed	53

"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	1: 3518 2: 3519 3: 9875	Integer	Read	1 = Open 6 = Closed	53
Switch cycles	1: 7625 2: 7627 3: 7629	Integer	Read	Positive integer	54
Max. switch cycles number	1: 21919 2: 21921 3: 21923	Integer	Read	Positive integer	54

"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	--	Float	Read		

"System units" submenu

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Volume flow unit	2103	Integer	Read / Write	8 = m ³ /s 9 = m ³ /min 10 = m ³ /h 11 = m ³ /d 16 = l/s 17 = l/min 18 = l/h (+) 19 = l/d 36 = ft ³ /s 37 = ft ³ /min 38 = ft ³ /h 39 = ft ³ /d	57
Volume unit	2104	Integer	Read / Write	2 = m ³ 4 = l 9 = ft³ (+)	58

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Corrected volume unit	2106	Integer	Read / Write	100 = NI 101 = Nm³ (+) 102 = Sm ³ 103 = Sft ³ 104 = SI	57
Corrected volume flow unit	2105	Integer	Read / Write	0 = NI/s 1 = NI/min 2 = NI/h 3 = NI/d 4 = Nm ³ /s 5 = Nm ³ /min 6 = Nm³/h (+) 7 = Nm ³ /d 8 = Sm ³ /s 9 = Sm ³ /min 10 = Sm ³ /h 11 = Sm ³ /d 12 = Sft ³ /s 13 = Sft ³ /min 14 = Sft ³ /h 15 = Sft ³ /d 40 = SI/s 41 = SI/min 42 = SI/h 43 = SI/d	56
Mass flow unit	2101	Integer	Read / Write	0 = g/s 1 = g/min 2 = g/h 3 = g/d 4 = kg/s 5 = kg/min 6 = kg/h (+) 7 = kg/d 8 = t/s 9 = t/min 10 = t/h 11 = t/d 16 = lb/s 17 = lb/min 18 = lb/h 19 = lb/d 20 = STon/s 21 = STon/min 22 = STon/h 23 = STon/d	55
Mass unit	2102	Integer	Read / Write	50 = g 51 = kg (+) 52 = t 54 = lb 55 = STon	56
Temperature unit	2109	Integer	Read / Write	0 = °C (+) 1 = K 2 = °F 3 = °R	62
Pressure unit	2130	Integer	Read / Write	1 = psi a 5 = kPa a 6 = MPa a 7 = bar a (+) 8 = mbar a	62

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Energy unit	5809	Integer	Read / Write	128 = kWh⁽⁺⁾ 129 = GWh 130 = MWh 162 = Mcal 163 = kJ 164 = MJ 165 = Btu 167 = GJ 170 = Gcal 171 = kcal 172 = MBtu 173 = MMBtu	60
Energy flow unit	5786	Integer	Read / Write	0 = MW 1 = kJ/s 2 = kJ/min 3 = kJ/h 4 = kJ/d 5 = MJ/s 6 = MJ/min 7 = MJ/d 8 = Mcal/s 9 = Mcal/min 10 = Mcal/d 11 = kcal/s 12 = kcal/min 13 = kcal/h 14 = kcal/d 15 = MBtu/s 16 = MBtu/min 17 = MBtu/h 18 = MBtu/d 19 = MMBtu/s 20 = MMBtu/min 21 = MMBtu/h 22 = MMBtu/d 24 = GJ/s 25 = GJ/min 26 = GJ/h 27 = GJ/d 28 = Gcal/s 29 = Gcal/min 30 = Gcal/h 31 = Gcal/d 32 = Btu/s 33 = Btu/min 34 = Btu/day 127 = kW⁽⁺⁾ 140 = Mcal/h 141 = MJ/h 142 = Btu/h 144 = GW	59
Length unit	2087	Integer	Read / Write	44 = ft 45 = m 47 = in 49 = mm⁽⁺⁾	63
Velocity unit	2600	Integer	Read / Write	20 = ft/s 21 = m/s⁽⁺⁾	63
Density unit	2107	Integer	Read / Write	0 = g/cm ³ 2 = kg/dm ³ 3 = kg/l 4 = kg/m³⁽⁺⁾ 11 = lb/ft ³	61
Kinematic viscosity unit	--	Integer	Read / Write		

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Dynamic viscosity unit	--	Integer	Read / Write		
Calorific value unit	5785	Integer	Read / Write	0 = kJ/Nm ³ 1 = kWh/Nm³ (*) 2 = kWh/Sm ³ 3 = kJ/Sm ³ 4 = Btu/Sm ³ 5 = MBtu/Sm ³ 6 = MBtu/Sft ³ 7 = Btu/Sft ³	61
Specific enthalpy	--	Integer	Read / Write		
Specific heat capacity unit	--	Integer	Read / Write		
Date/time format	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	64

"Process parameters" submenu

Navigation: Expert → Sensor → Process parameters					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Flow override	5503	Integer	Read / Write	0 = Off 1 = On	64
Flow damping	5510 to 5511	Float	Read / Write	0 to 999.9 s	65
Damping gas properties	--	Float	Read / Write		
Temperature damping	--	Float	Read / Write		
Pressure damping	--	Float	Read / Write		

"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	5101	Integer	Read / Write	0 = Off 3 = Corrected volume flow 9 = Volume flow 11 = Mass flow 73 = FAD volume flow *	66
On value low flow cutoff	5138 to 5139	Float	Read / Write	Positive floating-point number	67
Off value low flow cutoff	5104 to 5105	Float	Read / Write	0 to 100.0 %	67

* Visibility depends on order options or device settings

"Measurement mode" submenu

Navigation: Expert → Sensor → Measurement mode					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Select gas type	--	Integer	Read / Write		
Density calculation	--	Integer	Read / Write		
Enthalpy calculation	--	Integer	Read / Write		
Reference conditions	--	Integer	Read / Write		

Navigation: Expert → Sensor → Measurement mode					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Reference pressure	--	Float	Read / Write		
Reference temperature	--	Float	Read / Write		
Reference combustion temperature	--	Integer	Read / Write		

"Medium properties" submenu

Navigation: Expert → Sensor → Measurement mode → Medium properties					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Calorific value type	--	Integer	Read / Write		
Input humidity	--	Integer	Read / Write		
Humidity type	--	Integer	Read / Write		
Reference density	--	Float	Read / Write		
Reference gross calorific value	--	Float	Read / Write		
Reference Z-factor	--	Float	Read / Write		
Relative density	--	Float	Read / Write		
Specific heat capacity	--	Float	Read / Write		
Specific heat capacity	--	Float	Read / Write		
Calorific value	--	Float	Read / Write		
Z-factor	--	Float	Read / Write		
Dynamic viscosity	--	Float	Read / Write		
Additional gas component	--	Integer	Read / Write		
Standard volume flow type	--	Integer	Read / Write		

"External compensation" submenu

Navigation: Expert → Sensor → External compensation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Fixed density	--	Float	Read / Write		

"Sensor adjustment" submenu

Navigation: Expert → Sensor → Sensor adjustment					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Installation direction	5501	Integer	Read / Write	0 = Forward flow 1 = Reverse flow	87
Reference pressure	--	Float	Read / Write		
Pressure cell adjustment	--	Integer	Read / Write		
Pressure cell offset value	--	Float	Read		

"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	--	Float	Read / Write		
Volume flow factor	--	Float	Read / Write		
Mass flow offset	--	Float	Read / Write		
Mass flow factor	--	Float	Read / Write		
Sound velocity offset	--	Float	Read / Write		
Sound velocity factor	--	Float	Read / Write		
Energy flow offset	--	Float	Read / Write		
Energy flow factor	--	Float	Read / Write		
Temperature factor	--	Float	Read / Write		
Temperature offset	--	Float	Read / Write		
Wobbe index factor	--	Float	Read / Write		
Wobbe index offset	--	Float	Read / Write		
Corrected volume flow offset	--	Float	Read / Write		
Corrected volume flow factor	--	Float	Read / Write		
Pressure offset	--	Float	Read / Write		
Pressure factor	--	Float	Read / Write		
Methane fraction offset	--	Float	Read / Write		
Methane fraction factor	--	Float	Read / Write		
Molar mass offset	--	Float	Read / Write		
Molar mass factor	--	Float	Read / Write		
Density offset	--	Float	Read / Write		
Density factor	--	Float	Read / Write		
Dynamic viscosity offset	--	Float	Read / Write		
Dynamic viscosity factor	--	Float	Read / Write		
Calorific value offset	--	Float	Read / Write		
Calorific value factor	--	Float	Read / Write		

"Calibration" submenu

Navigation: Expert → Sensor → Calibration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Calibration factor	--	Float	Read		
Zero point	--	Float	Read		
Nominal diameter	2048 to 2057	String	Read	DNxx / x"	104

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	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) 4 = 20-21 (I/O 4) *	198
I/O module 1 to n information	1: 8659 2: 8660 3: 8661 4: 8662	Integer	Read	1 = MODBUS 2 = Configurable 3 = Not configurable 254 = Not plugged 255 = Invalid	198
I/O module 1 to n type	1: 6417 2: 6418 3: 6419 4: 6420	Integer	Read / Write	0 = Off 1 = Current output * 2 = Current input * 3 = Pulse/frequency/switch output * 5 = Status input * 6 = Relay output *	199
Apply I/O configuration	8665	Integer	Read / Write	0 = Yes 1 = No	199
Alteration code	6427	Integer	Read / Write	Positive integer	200

* 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	1: 6548 2: 6549 3: 6550	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3) 4 = 20-21 (I/O 4) *	105
Signal mode	1: 6424 2: 6425 3: 6426	Integer	Read / Write	0 = Passive 2 = Active *	105
Current span	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)	106
0/4 mA value	1: 6111 to 6112 2: 6113 to 6114 3: 6115 to 6116	Float	Read / Write	Signed floating-point number	106
20 mA value	1: 6119 to 6120 2: 6121 to 6122 3: 6123 to 6124	Float	Read / Write	Signed floating-point number	106
Failure mode	1: 6159 2: 6160 3: 6161	Integer	Read / Write	1 = Last valid value 2 = Alarm 6 = Defined value	107
Failure value	1: 6163 to 6164 2: 6165 to 6166 3: 6167 to 6168	Float	Read / Write	Signed floating-point number	107

* 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	1: 6554 2: 6555 3: 6556	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3) 4 = 20-21 (I/O 4) *	108
Assign status input	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 10 = Zero point adjustment 11 = Gas group *	108
Value status input	1: 2746 2: 4699 3: 4700	Integer	Read	0 = Low 1 = High	109
Active level	1: 2530 2: 4690 3: 4691	Integer	Read / Write	0 = Low 1 = High	109
Response time status input	1: 3404 to 3405 2: 5753 to 5754 3: 5755 to 5756	Float	Read / Write	5 to 200 ms	109

* Visibility depends on order options or device settings

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	1: 6545 2: 6546 3: 6547	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3) 4 = 20-21 (I/O 4) *	111
Signal mode	1: 6421 2: 6422 3: 6423	Integer	Read / Write	0 = Passive * 2 = Active *	111
Assign current output 1 to n	1: 5927 2: 5928 3: 5929	Integer	Read / Write	0 = Off * 3 = Corrected volume flow 4 = Density 7 = Temperature 9 = Volume flow 11 = Mass flow 37 = Flow velocity * 38 = Energy flow 39 = Electronic temperature 66 = Pressure 73 = FAD volume flow * 150 = Heat flow * 151 = 2nd temperature delta heat *	111
Current span	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 current	112

Navigation: Expert → Output → Current output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Fixed current	1: 5987 to 5988 2: 5989 to 5990 3: 5991 to 5992	Float	Read / Write	0 to 22.5 mA	113
0/4 mA value	1: 6195 to 6196 2: 6197 to 6198 3: 6199 to 6200	Float	Read / Write	Signed floating-point number	113
20 mA value	1: 5915 to 5916 2: 5917 to 5918 3: 5919 to 5920	Float	Read / Write	Signed floating-point number	114
Measuring mode	--	Integer	Read / Write		
Damping output 1 to n	1: 5903 to 5904 2: 5905 to 5906 3: 5907 to 5908	Float	Read / Write	0.0 to 999.9 s	115
Response time	--	Float	Read		
Failure mode	1: 5911 2: 5912 3: 5913	Integer	Read / Write	0 = Min. 1 = Max. 4 = Actual value 5 = Last valid value 6 = Defined value	115
Failure current	1: 5979 to 5980 2: 5981 to 5982 3: 5983 to 5984	Float	Read / Write	0 to 22.5 mA	116
Output current 1 to n	1: 5931 to 5932 2: 5933 to 5934 3: 5935 to 5936	Float	Read	3.59 to 22.5 mA	116
Measured current 1 to n	1: 5779 to 5780 2: 5781 to 5782 3: 5783 to 5784	Float	Read	0 to 30 mA	117

* 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	1: 6551 2: 6552 3: 6553	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3) 4 = 20-21 (I/O 4) *	118
Signal mode	1: 6235 2: 6236 3: 6237	Integer	Read / Write	0 = Passive 2 = Active * 3 = Passive NAMUR	119
Operating mode	1: 4479 2: 4480 3: 9907	Integer	Read / Write	0 = Pulse 1 = Switch 53 = Frequency	119
Assign pulse output 1 to n	1: 2461 2: 2462 3: 4685	Integer	Read / Write	0 = Off 3 = Corrected volume flow 9 = Volume flow 11 = Mass flow 38 = Energy flow * 73 = FAD volume flow * 150 = Heat flow *	120
Pulse scaling	1: 3034 to 3035 2: 3036 to 3037 3: 4714 to 4715	Float	Read / Write	Positive floating point number	121

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Pulse width	1: 2836 to 2837 2: 2838 to 2839 3: 4702 to 4703	Float	Read / Write	0.05 to 2 000 ms	121
Measuring mode	--	Integer	Read / Write		
Failure mode	1: 2948 2: 2949 3: 4708	Integer	Read / Write	0 = Actual value 1 = No pulses	122
Pulse output 1 to n	1: 3082 to 3083 2: 3084 to 3085 3: 4718 to 4719	Float	Read	Positive floating-point number	123
Assign frequency output	1: 2614 2: 2615 3: 9915	Integer	Read / Write	0 = Off 3 = Corrected volume flow 4 = Density 7 = Temperature 9 = Volume flow 11 = Mass flow 37 = Flow velocity 38 = Energy flow * 39 = Electronic temperature 66 = Pressure 73 = FAD volume flow * 150 = Heat flow * 151 = 2nd temperature delta heat *	123
Minimum frequency value	1: 3526 to 3527 2: 3528 to 3529 3: 5767 to 5768	Float	Read / Write	0.0 to 10 000.0 Hz	124
Maximum frequency value	1: 2996 to 2997 2: 2998 to 2999 3: 4710 to 4711	Float	Read / Write	0.0 to 10 000.0 Hz	124
Measuring value at minimum frequency	1: 5887 to 5888 2: 5889 to 5890 3: 5891 to 5892	Float	Read / Write	Signed floating-point number	124
Measuring value at maximum frequency	1: 3514 to 3515 2: 3516 to 3517 3: 5759 to 5760	Float	Read / Write	Signed floating-point number	125
Measuring mode	--	Integer	Read / Write		
Damping output 1 to n	1: 3522 to 3523 2: 3524 to 3525 3: 5763 to 5764	Float	Read / Write	0 to 999.9 s	125
Response time	1: 5875 to 5876 2: 5877 to 5878 3: 5879 to 5880	Float	Read	Positive floating-point number	126
Failure mode	1: 2367 2: 2368 3: 4681	Integer	Read / Write	0 = Actual value 1 = 0 Hz 2 = Defined value	126
Failure frequency	1: 3510 to 3511 2: 3512 to 3513 3: 9908 to 9909	Float	Read / Write	0.0 to 12 500.0 Hz	127
Output frequency 1 to n	1: 3462 to 3463 2: 3464 to 3465 3: 9910 to 9911	Float	Read	0.0 to 12 500.0 Hz	127
Switch output function	1: 3022 2: 3023 3: 9914	Integer	Read / Write	0 = Off 0 = Flow direction check * 1 = On 2 = Diagnostic behavior 4 = Limit 5 = Status	127

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign diagnostic behavior	1: 3096 2: 3097 3: 9913	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	128
Assign limit	1: 3184 2: 3185 3: 4722	Integer	Read / Write	3 = Corrected volume flow 4 = Density 7 = Temperature 9 = Volume flow 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 37 = Flow velocity [*] 38 = Energy flow [*] 39 = Electronic temperature 73 = FAD volume flow [*] 150 = Heat flow [*] 151 = 2nd temperature delta heat [*]	128
Switch-on value	1: 3242 to 3243 2: 3244 to 3245 3: 4728 to 4729	Float	Read / Write	Signed floating-point number	130
Switch-off value	1: 3234 to 3235 2: 3236 to 3237 3: 4724 to 4725	Float	Read / Write	Signed floating-point number	131
Assign flow direction check	--	Integer	Read / Write		
Assign status	1: 3374 2: 3375 3: 4734	Integer	Read / Write	0 = Off 2 = Low flow cut off	131
Switch-on delay	1: 6247 to 6248 2: 6249 to 6250 3: 6251 to 6252	Float	Read / Write	0.0 to 100.0 s	132
Switch-off delay	1: 6239 to 6240 2: 6241 to 6242 3: 6243 to 6244	Float	Read / Write	0.0 to 100.0 s	132
Failure mode	1: 3384 2: 3385 3: 9912	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	132
Switch status 1 to n	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed	133
Invert output signal	1: 2583 2: 2584 3: 9916	Integer	Read / Write	0 = Yes 1 = No	133

* 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	1: 8278 2: 8279 3: 8280	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3) 4 = 20-21 (I/O 4)	134
Relay output function	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	135
Assign flow direction check	--	Integer	Read / Write		
Assign limit	1: 8248 2: 8249 3: 8250	Integer	Read / Write	3 = Corrected volume flow 4 = Density 7 = Temperature 9 = Volume flow 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 37 = Flow velocity [*] 38 = Energy flow [*] 39 = Electronic temperature 73 = FAD volume flow [*] 150 = Heat flow [*] 151 = 2nd temperature delta heat [*]	135
Assign diagnostic behavior	1: 8245 2: 8246 3: 8247	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	136
Assign status	1: 8272 2: 8273 3: 8274	Integer	Read / Write	0 = Off 2 = Low flow cut off	136
Switch-off value	1: 8260 to 8261 2: 8262 to 8263 3: 8264 to 8265	Float	Read / Write	Signed floating-point number	136
Switch-off delay	1: 8254 to 8255 2: 8256 to 8257 3: 8258 to 8259	Float	Read / Write	0.0 to 100.0 s	137
Switch-on value	1: 8233 to 8234 2: 8235 to 8236 3: 8237 to 8238	Float	Read / Write	Signed floating-point number	137
Switch-on delay	1: 8266 to 8267 2: 8268 to 8269 3: 8270 to 8271	Float	Read / Write	0.0 to 100.0 s	138
Failure mode	1: 8242 2: 8243 3: 8244	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	138
Switch status	1: 3518 2: 3519 3: 9875	Integer	Read	1 = Open 6 = Closed	138
Powerless relay status	1: 7009 2: 7010 3: 7011	Integer	Read / Write	1 = Open 6 = Closed	139

* 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	--	Integer	Read		
Slave terminal number	--	Integer	Read		
Signal mode	--	Integer	Read / Write		
Assign pulse output 1	--	Integer	Read / Write		
Value per pulse	--	Float	Read / Write		
Pulse width	--	Float	Read / Write		
Phase shift	--	Integer	Read / Write		
Measuring mode	--	Integer	Read / Write		
Failure mode	--	Integer	Read / Write		
Pulse output	--	Float	Read		
Invert output signal	--	Integer	Read / Write		

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	4910	Integer	Read / Write	1 to 247	140
Baudrate	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	140
Data transfer mode	4913	Integer	Read / Write	0 = RTU 1 = ASCII	140
Parity	4914	Integer	Read / Write	0 = Even 1 = Odd 2 = None / 2 stop bits 3 = None / 1 stop bit	141
Byte order	4915	Integer	Read / Write	0 = 0-1-2-3 1 = 3-2-1-0 2 = 2-3-0-1 3 = 1-0-3-2	141
Telegram delay	4916 to 4917	Float	Read / Write	0 to 100 ms	143
Failure mode	4920	Integer	Read / Write	1 = Last valid value 255 = NaN value	143
Bus termination	5774	Integer	Read	0 = Off 1 = On	143
Fieldbus writing access	6807	Integer	Read / Write	0 = Read + write 1 = Read only	144

"Modbus information" submenu

Navigation: Expert → Communication → Modbus information					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Device ID	2547	Integer	Read	4-digit hexadecimal number	144
Device revision	4481	Integer	Read	4-digit hexadecimal number	145

"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	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	145

"WLAN settings" wizard

Navigation: Expert → Communication → WLAN settings					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
WLAN	--	Integer	Read / Write		
WLAN mode	--	Integer	Read / Write		
SSID name	--	String	Read / Write		
Network security	--	Integer	Read / Write		
Security identification	--	Integer	Read		
User name	--	String	Read / Write		
WLAN password	--	String	Read / Write		
WLAN IP address	--	String	Read / Write		
WLAN MAC address	--	String	Read		
WLAN subnet mask	--	String	Read / Write		
WLAN MAC address	--	String	Read		
WLAN passphrase	--	String	Read / Write		
Assign SSID name	--	Integer	Read / Write		
SSID name	--	String	Read / Write		
2.4 GHz WLAN channel	--	Integer	Read / Write		
Select antenna	--	Integer	Read / Write		
Connection state	--	Integer	Read		
Received signal strength	--	Integer	Read		
WLAN IP address	--	String	Read / Write		

Navigation: Expert → Communication → WLAN settings					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Gateway IP address	--	String	Read		
IP address domain name server	--	String	Read		

6.3.7 "Application" submenu

Navigation: Expert → Application					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Reset all totalizers	2609	Integer	Read / Write	0 = Cancel 1 = Reset + totalize	156

"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	1: 2601 2: 2801 3: 3001	Integer	Read / Write	0 = Off 3 = Corrected volume flow 9 = Volume flow 11 = Mass flow 38 = Energy flow * 73 = FAD volume flow * 150 = Heat flow *	156
Unit totalizer 1 to n	1: 4604 2: 4605 3: 4606	Integer	Read / Write	2 = m ³ * 4 = l * 9 = ft ³ * 23 = Mft ³ * 41 = l FAD * 50 = g * 51 = kg * 52 = t * 53 = oz * 54 = lb * 55 = STon * 100 = NI * 101 = Nm ³ * 102 = Sm ³ * 103 = Sft ³ * 104 = Sl * 112 = cf FAD * 128 = kWh * 129 = GWh * 130 = MWh * 162 = Mcal * 163 = kJ * 164 = MJ * 165 = Btu * 166 = m ³ FAD * 167 = GJ * 170 = Gcal * 171 = kcal * 172 = MBtu * 173 = MMBtu * 251 = None *	157
Totalizer operation mode	1: 2605 2: 2805 3: 3005	Integer	Read / Write	0 = Net flow total 1 = Forward flow total 2 = Reverse flow total	158

Navigation: Expert → Application → Totalizer 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Control Totalizer 1 to n	1: 2608 2: 2808 3: 3008	Integer	Read / Write	0 = Totalize 1 = Reset + totalize 2 = Preset + hold 3 = Reset + hold 4 = Preset + totalize 5 = Hold	159
Preset value 1 to n	1: 2590 to 2591 2: 2592 to 2593 3: 2594 to 2595	Float	Read / Write	Signed floating-point number	159
Failure mode	1: 2606 2: 2806 3: 3006	Integer	Read / Write	0 = Stop 1 = Actual value 2 = Last valid value	160

* 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	2732	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	162
Previous diagnostics	2734	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	162
Operating time from restart	2624	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	163
Operating time	--	String	Read		

"Diagnostic list" submenu

Navigation: Expert → Diagnostics → Diagnostic list					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Diagnostics 1	2736	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	164
Diagnostics 2	2738	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	165
Diagnostics 3	2740	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	166
Diagnostics 4	2742	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	166
Diagnostics 5	2744	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	167

"Event logbook" submenu

Navigation: Expert → Diagnostics → Event logbook					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Filter options	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	168

*"Event list" submenu***"Device information" submenu**

Navigation: Expert → Diagnostics → Device information					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Device tag	2026 to 2041	String	Read	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).	169
Serial number	7003 to 7008	String	Read	Max. 11-digit character string comprising letters and numbers.	170
Firmware version	7277 to 7280	String	Read	Character string in the format xx.yy.zz	170
Device name	7238 to 7245	String	Read	Character string comprising numbers, letters and special characters (#16)	171
Order code	2058 to 2067	String	Read	Character string composed of letters, numbers and certain punctuation marks (e.g. /).	171
Extended order code 1	2212 to 2221	String	Read	Character string	171
Extended order code 2	2222 to 2231	String	Read	Character string	171
Extended order code 3	2232 to 2241	String	Read	Character string	172
ENP version	4003 to 4010	String	Read	Character string	172

"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	→ 
Software revision	7039	Integer	Read	Positive integer	173
Build no. software	2326	Integer	Read	Positive integer	173
Bootloader revision	2264	Integer	Read	Positive integer	173

"Sensor electronic module (ISEM)" submenu

Navigation: Expert → Diagnostics → Sensor electronic module (ISEM)					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Software revision	7039	Integer	Read	Positive integer	174
Build no. software	2326	Integer	Read	Positive integer	174
Bootloader revision	2264	Integer	Read	Positive integer	174

"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	6542	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3) 4 = 20-21 (I/O 4) *	175
Software revision	7039	Integer	Read	Positive integer	175

Navigation: Expert → Diagnostics → I/O module 2					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Build no. software	2326	Integer	Read	Positive integer	175
Bootloader revision	2264	Integer	Read	Positive integer	175

* Visibility depends on order options or device settings

"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	6543	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3) 4 = 20-21 (I/O 4) *	176
Software revision	7039	Integer	Read	Positive integer	176
Build no. software	2326	Integer	Read	Positive integer	177
Bootloader revision	2264	Integer	Read	Positive integer	177

* Visibility depends on order options or device settings

"I/O module 4" submenu

Navigation: Expert → Diagnostics → I/O module 4					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
I/O module 4 terminal numbers	6544	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3) 4 = 20-21 (I/O 4) *	178
Software revision	7039	Integer	Read	Positive integer	178
Build no. software	2326	Integer	Read	Positive integer	178
Bootloader revision	2264	Integer	Read	Positive integer	178

* Visibility depends on order options or device settings

"Display module" submenu

Navigation: Expert → Diagnostics → Display module					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Software revision	7039	Integer	Read	Positive integer	179
Build no. software	2326	Integer	Read	Positive integer	179
Bootloader revision	2264	Integer	Read	Positive integer	179

"Data logging" submenu

Navigation: Expert → Diagnostics → Data logging					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign channel 1	2445	Integer	Read / Write	0 = Off 0 = Energy flow * 3 = Corrected volume flow 4 = Density 7 = Temperature 9 = Volume flow 11 = Mass flow 37 = Flow velocity 39 = Electronic temperature 66 = Pressure 73 = FAD volume flow * 121 = Current output 1 * 122 = Current output 2 * 123 = Current output 3 * 124 = Current output 4 * 150 = Heat flow * 151 = 2nd temperature delta heat *	182
Assign channel 2	2446	Integer	Read / Write	Picklist, see Assign channel 1 parameter (→  182)	183
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Assign channel 4	4286	Integer	Read / Write	Picklist, see Assign channel 1 parameter (→  182)	184
Logging interval	4288 to 4289	Float	Read / Write	0.1 to 3 600.0 s	184
Clear logging data	4287	Integer	Read / Write	0 = Cancel 2 = Clear data	185
Data logging	5950	Integer	Read / Write	0 = Overwriting 1 = Not overwriting	185
Logging delay	5938	Integer	Read / Write	0 to 999 h	186
Data logging control	5930	Integer	Read / Write	0 = None 1 = Stop 2 = Delete + start	186
Data logging status	5937	Integer	Read	0 = Done 1 = Stopped 2 = Active 3 = Delay active	186
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* Visibility depends on order options or device settings

"Simulation" submenu

Navigation: Expert → Diagnostics → Simulation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign simulation process variable	6813	Integer	Read / Write	0 = Off 3 = Corrected volume flow 4 = Density 7 = Temperature 9 = Volume flow 11 = Mass flow 37 = Flow velocity 38 = Energy flow 73 = FAD volume flow * 150 = Heat flow *	190
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Navigation: Expert → Diagnostics → Simulation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Status input simulation	2620	Integer	Read / Write	0 = Off 1 = On	192
Input signal level	2638	Integer	Read / Write	0 = Low 1 = High	192
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Value current input 1 to n	1: 6139 to 6140 2: 6141 to 6142 3: 6143 to 6144	Float	Read / Write	0 to 22.5 mA	192
Current output 1 to n simulation	1: 5939 2: 5940 3: 5941	Integer	Read / Write	0 = Off 1 = On	193
Value current output 1 to n	1: 5995 to 5996 2: 5997 to 5998 3: 5999 to 6000	Float	Read / Write	3.59 to 22.5 mA	193
Frequency output simulation 1 to n	1: 6203 2: 6204 3: 6205	Integer	Read / Write	0 = Off 1 = On	193
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Pulse output simulation 1 to n	1: 6215 2: 6216 3: 6217	Integer	Read / Write	0 = Off 1 = Down-counting value 2 = Fixed value	194
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Switch status 1 to n	1: 6227 2: 6228 3: 6229	Integer	Read / Write	1 = Open 6 = Closed	196
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Device alarm simulation	6812	Integer	Read / Write	0 = Off 1 = On	197
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* Visibility depends on order options or device settings

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