

Description of Device Parameters

Proline Promag 300

PROFINET

Electromagnetic flowmeter

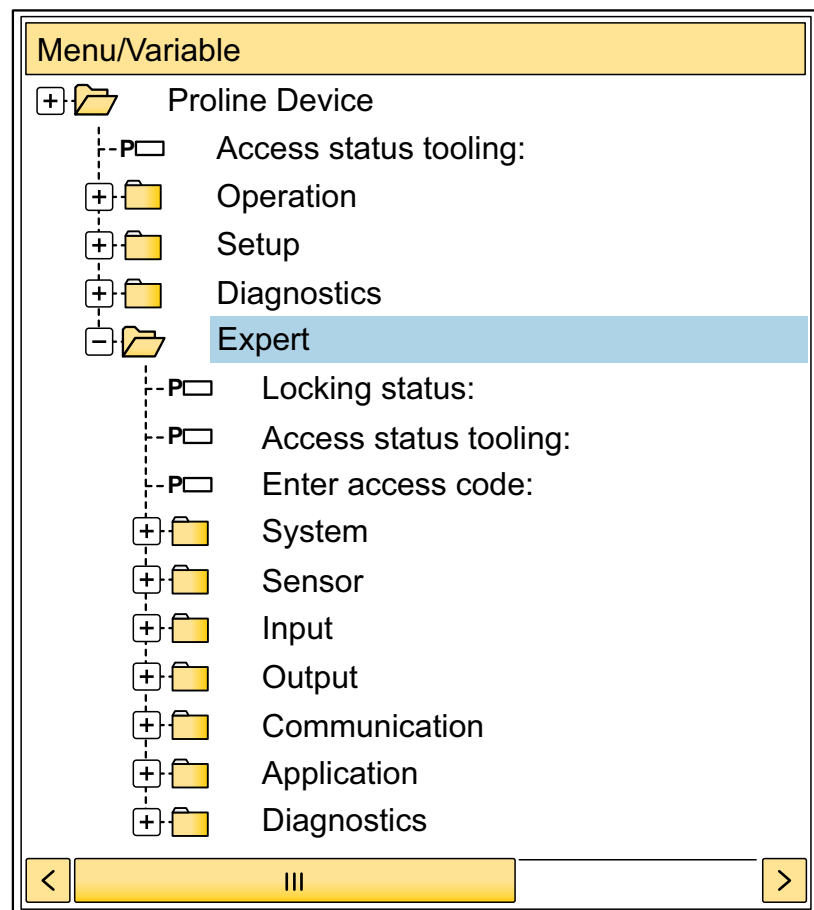


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1 About this document

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

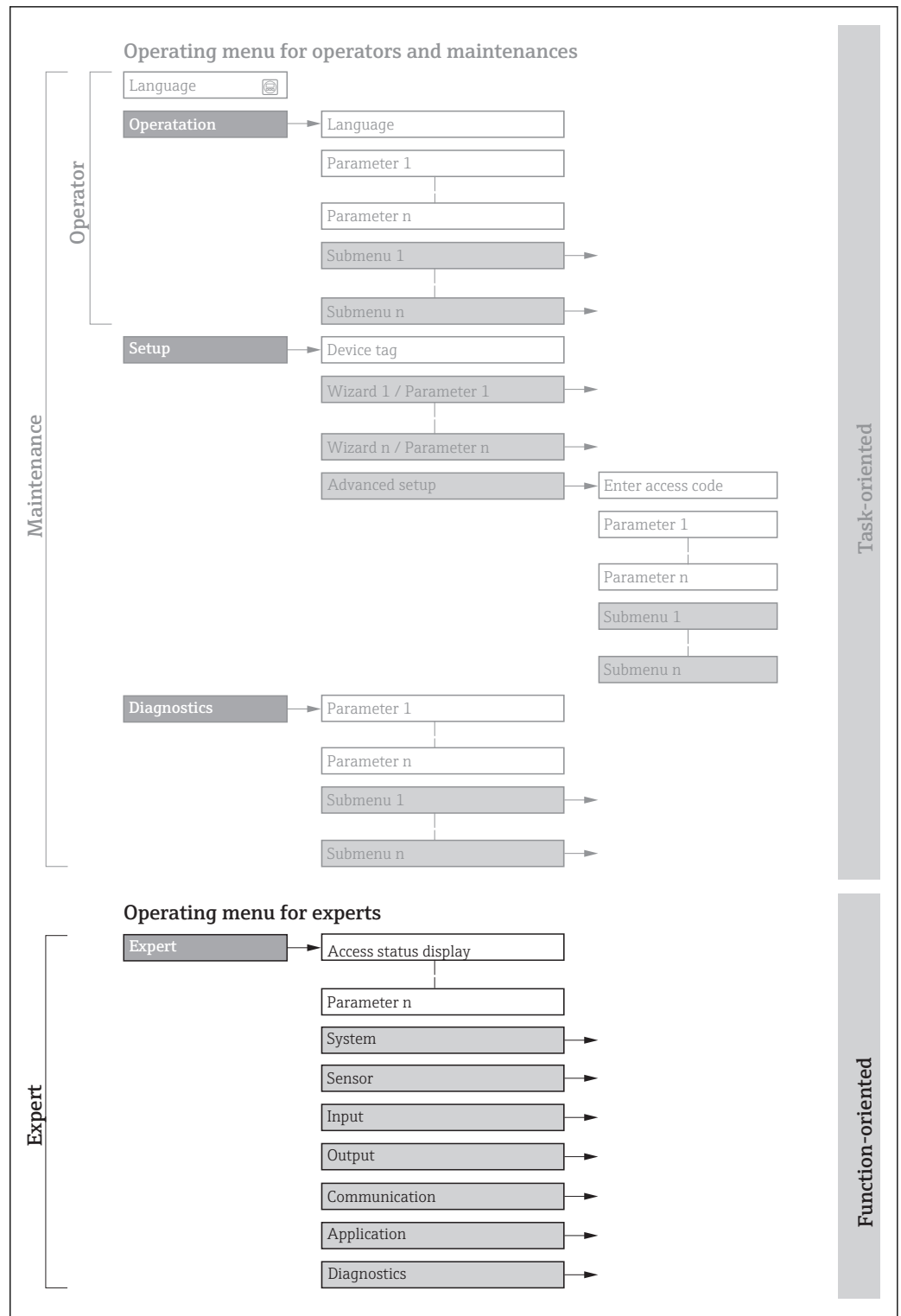
1.2 Target group

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



Detailed information concerning:

- Arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu along with a brief description, see the Operating Instructions for the device → 7
- Operating philosophy of the operating menu: "Operating philosophy" chapter of the Operating Instructions for the device → 7

1.3.2 Structure of a parameter description

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

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

1.4 Symbols used

1.4.1 Symbols for certain types of information

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

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

Measuring device	Documentation code
Promag H 300	BA01718D
Promag P 300	BA01719D

1.5.2 Supplementary device-dependent documentation

Special Documentation

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

Contents	Documentation code
Heartbeat Technology	SD01986D
Web server	SD01977D

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
Ent. access code (0003)	→ 	13
▶ System	→ 	13
▶ Display	→ 	14
▶ Config. backup	→ 	28
▶ Diagn. handling	→ 	31
▶ Administration	→ 	39
▶ Sensor	→ 	44
▶ Measured val.	→ 	44
▶ System units	→ 	54
▶ Process param.	→ 	69
▶ External comp.	→ 	82
▶ Sensor adjustm.	→ 	90
▶ Calibration	→ 	96
▶ I/O config.	→ 	98
I/O 1 to n terminals (3902-1 to n)	→ 	98
I/O 1 to n info (3906-1 to n)	→ 	98
I/O 1 to n type (3901-1 to n)	→ 	99

Apply I/O config (3907)	→ 99
Alteration code (2762)	→ 100
► Input	→ 100
► Current input 1 to n	→ 100
► Status input 1 to n	→ 103
► Output	→ 105
► Curr.output 1 to n	→ 106
► PFS output 1 to n	→ 119
► Relay output 1 to n	→ 139
► Communication	→ 146
► PROFINET config.	→ 146
► PROFINET info	→ 147
► Web server	→ 150
► WLAN settings	→ 153
► Application	→ 165
Reset all tot. (2806)	→ 165
► Totalizer 1 to n	→ 165
► Diagnostics	→ 170
Actual diagnos. (0691)	→ 171
Prev.diagnostics (0690)	→ 171
Time fr. restart (0653)	→ 172
Operating time (0652)	→ 172
► Diagnostic list	→ 173
► Event logbook	→ 177
► Device info	→ 179

► Main elec.+I/O1	→ 183
► Sens. electronic	→ 184
► I/O module 2	→ 186
► I/O module 3	→ 187
► Display module	→ 188
► Min/max val.	→ 197
► Data logging	→ 189
► Heartbeat	→ 208
► Simulation	→ 208

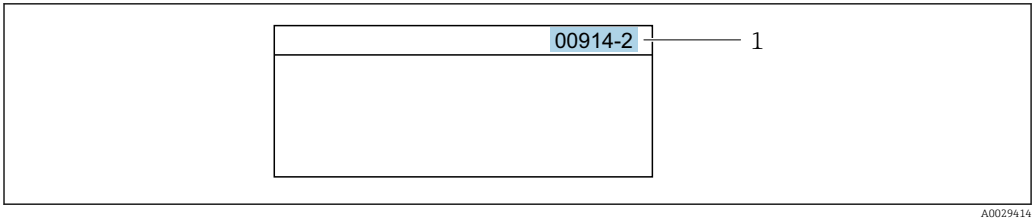
3 Description of device parameters

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
Ent. access code (0003)	→	13
► System	→	13
► Sensor	→	44
► I/O config.	→	98
► Input	→	100
► Output	→	105
► Communication	→	146
► Application	→	165
► Diagnostics	→	170

Direct access

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



1 Direct access code

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

Locking status

Navigation Expert → Locking status (0004)

Description Displays the active write protection.

- User interface**
- Hardware locked
 - Temp. locked

Additional information *User interface*

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

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

Selection

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

Access status	
Navigation	 Expert → Access status (0005)
Description	Displays the access authorization to the parameters via the local display, Web browser or operating tool.
User interface	▪ Operator ▪ Maintenance
Factory setting	Maintenance
Additional information	<i>Description</i>  Access authorization can be modified via the Ent. access code parameter (→  13).  If additional write protection is active, this restricts the current access authorization even further. <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 →  7

Ent. access code	
Navigation	 Expert → Ent. access code (0003)
Description	Use this function to enter the user-specific release code to remove parameter write protection.
User entry	0 to 9999

3.1 "System" submenu

Navigation  Expert → System

► System	
► Display	→  14
► Config. backup	→  28
► Diagn. handling	→  31
► Administration	→  39

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 1 (0123)	→ 	18
100% bargraph 1 (0125)	→ 	19
Decimal places 1 (0095)	→ 	19
Value 2 display (0108)	→ 	20
Decimal places 2 (0117)	→ 	20
Value 3 display (0110)	→ 	21
0% bargraph 3 (0124)	→ 	22
100% bargraph 3 (0126)	→ 	22
Decimal places 3 (0118)	→ 	23
Value 4 display (0109)	→ 	23
Decimal places 4 (0119)	→ 	24
Display interval (0096)	→ 	24
Display damping (0094)	→ 	25
Header (0097)	→ 	25
Header text (0112)	→ 	26
Separator (0101)	→ 	27
Contrast display (0105)	→ 	27
Backlight (0111)	→ 	27

Display language

Navigation	 Expert → System → Display → Display language (0104)
Prerequisite	A local display is provided.
Description	Use this function to select the configured language on the local display.
Selection	■ English ■ Deutsch * ■ Français * ■ Español * ■ Italiano * ■ Nederlands * ■ Portuguesa * ■ Polski ■ русский язык(Ru) * ■ Svenska * ■ Türkçe * ■ 中文 (Chinese) * ■ 日本語 (Japanese) * ■ 한국어 (Korean) * ■ العربية(Ara) * ■ Bahasa Indonesia * ■ ภาษาไทย (Thai) * ■ tiếng Việt (Vit) * ■ čeština (Czech) *
Factory setting	English (alternatively, the ordered language is preset in the device)

Format display

Navigation	 Expert → System → Display → Format display (0098)
Prerequisite	A local display is provided.
Description	Use this function to select how the measured value is shown on the local display.
Selection	■ 1 value, max. ■ Bargr. + 1 value ■ 2 values ■ Val. large+2val. ■ 4 values
Factory setting	1 value, max.

* Visibility depends on order options or device settings

Additional information*Description*

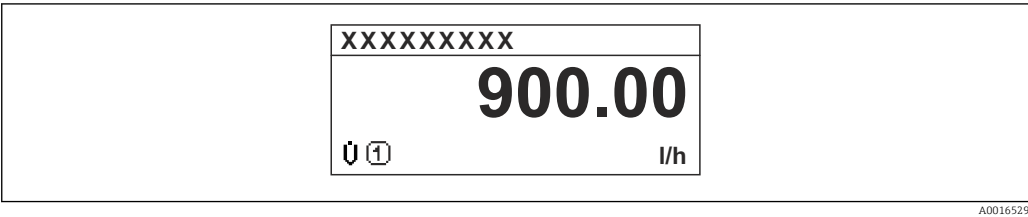
The display format (size, bar graph etc.) and number of measured values displayed simultaneously (1 to 4) can be configured. This setting only applies to normal operation.



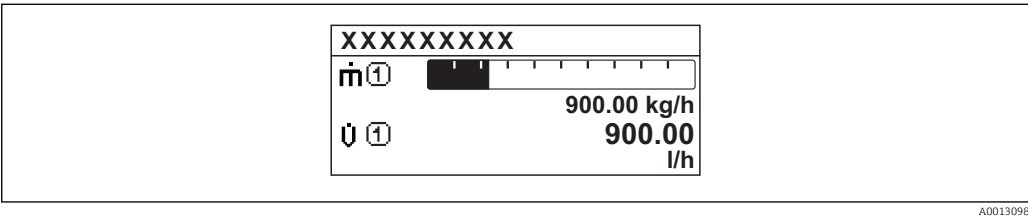
- The **Value 1 display** parameter (→ 18) to **Value 4 display** parameter (→ 23) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display.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

Possible measured values shown on the local display:

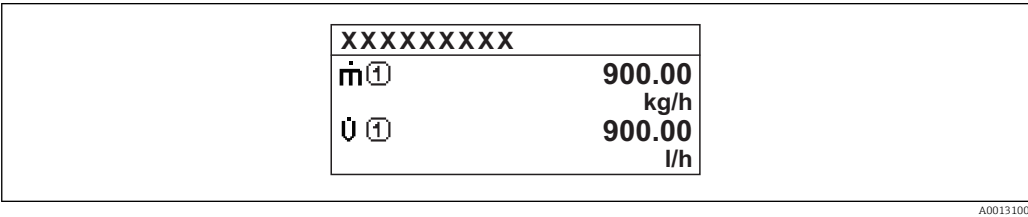
"1 value, max." option



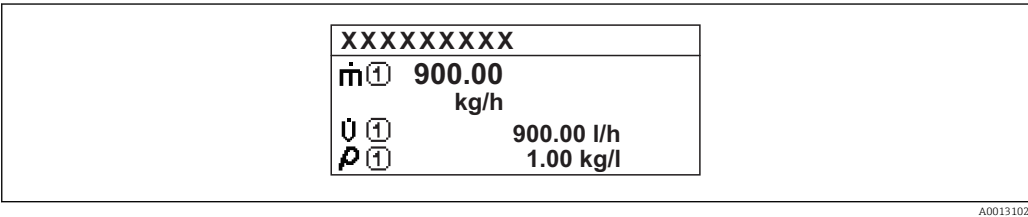
"Bagr. + 1 value" option



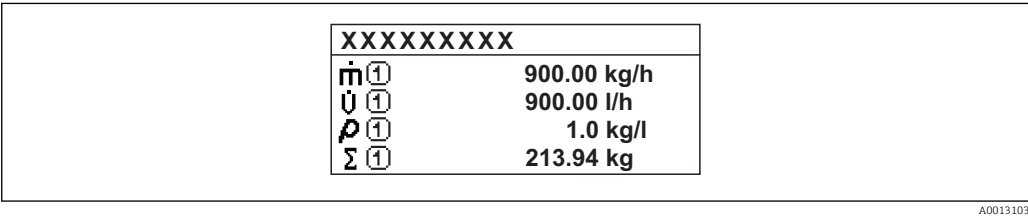
"2 values" option



"Val. large+2val." 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 to be shown on the local display.
Selection	■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity[*] ■ CorrConductivity[*] ■ Totalizer 1 ■ Totalizer 2 ■ Totalizer 3 ■ Curr.output 1 ■ Curr.output 2[*] ■ Curr.output 3[*] ■ Temperature[*] ■ Electronic temp.
Factory setting	Volume flow
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 1 	
Navigation	 Expert → System → Display → 0% bargraph 1 (0123)
Prerequisite	A local display is provided.
Description	Use this function to enter the 0% bar graph value to be shown on the display for the measured value 1.
User entry	Signed floating-point number
Factory setting	Country-specific: ■ 0 l/h ■ 0 gal/min (us)

* 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 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 → 218

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

Factory setting

X.XX

Additional information*Description*

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

Value 2 display**Navigation**

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

Prerequisite

A local display is provided.

Description

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

Selection

- None
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity
- CorrConductivity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1
- Curr.output 2 *
- Curr.output 3 *
- Curr.output 4 *
- Temperature
- Electronic temp.

Factory setting

None

Additional information*Description*

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

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

Dependency

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

* Visibility depends on order options or device settings

Description	Use this function to select the number of decimal places for measured value 2.
Selection	■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx
Factory setting	x.xx
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.

Value 3 display

Navigation	 Expert → System → Display → Value 3 display (0110)
Prerequisite	A local display is provided.
Description	Use this function to select one of the measured values to be shown on the local display.
Selection	■ None ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity ■ CorrConductivity ■ Totalizer 1 ■ Totalizer 2 ■ Totalizer 3 ■ Curr.output 1 ■ Curr.output 2 * ■ Curr.output 3 * ■ Curr.output 4 * ■ Temperature ■ Electronic temp.
Factory setting	None

* Visibility depends on order options or device settings

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 3	
----------------------	---

Navigation	  Expert → System → Display → 0% bargraph 3 (0124)
Prerequisite	A selection was made in the Value 3 display parameter (→  21).
Description	Use this function to enter the 0% bar graph value to be shown on the display for the measured value 3.
User entry	Signed floating-point number
Factory setting	Country-specific: ■ 0 l/h ■ 0 gal/min (us)
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 3	
------------------------	---

Navigation	  Expert → System → Display → 100% bargraph 3 (0126)
Prerequisite	A selection was made in the Value 3 display parameter (→  21).
Description	Use this function to enter the 100% bar graph value to be shown on the display for the measured value 3.
User entry	Signed floating-point number
Factory setting	0

Additional information*Description*

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

User entry

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

Decimal places 3**Navigation**

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

Prerequisite

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

Description

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

Selection

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

Factory setting

x.xx

Additional information*Description*

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

Value 4 display**Navigation**

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

Prerequisite

A local display is provided.

Description

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

Selection

- None
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity
- CorrConductivity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1

- Curr.output 2 *
- Curr.output 3 *
- Curr.output 4 *
- Temperature
- Electronic temp.

Factory setting

None

Additional information*Description*

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



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

Selection

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

Decimal places 4**Navigation**

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

Prerequisite

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

Description

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

Selection

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

Factory setting

x.xx

Additional information*Description*

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

Display interval**Navigation**

Expert → System → Display → Display interval (0096)

Prerequisite

A local display is provided.

* Visibility depends on order options or device settings

Description	Use this function to enter the length of time the measured values are displayed if the values alternate on the display.
User entry	1 to 10 s
Factory setting	5 s
Additional information	<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 (→  23) are used to specify which measured values are shown on the local display. ■ The display format of the displayed measured values is specified using the Format display parameter (→  15).

Display damping

Navigation	  Expert → System → Display → Display damping (0094)
Prerequisite	A local display is provided.
Description	Use this function to enter a time constant for the reaction time of the local display to fluctuations in the measured value caused by process conditions.
User entry	0.0 to 999.9 s
Factory setting	0.0 s
Additional information	<i>User entry</i> 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.

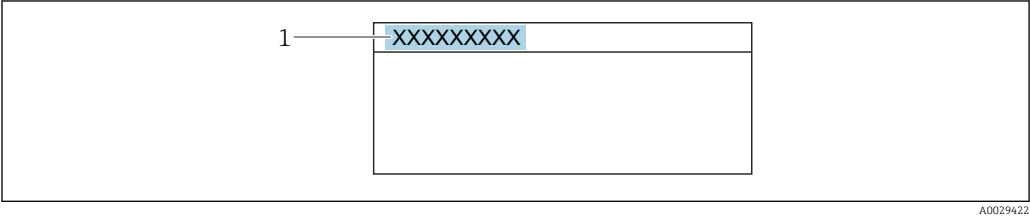
1) proportional transmission behavior with first order delay

- Selection
 - Device tag
 - Free text
- Factory setting

Device tag
- Additional information

Description

The header text only appears during normal operation.



1 Position of the header text on the display

A0029422

- Selection
 - Device tag
 - Is defined in the **Device tag** parameter (→  180).
 - Free text
 - Is defined in the **Header text** parameter (→  26).

Header text

- Navigation

  Expert → System → Display → Header text (0112)
- Prerequisite

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

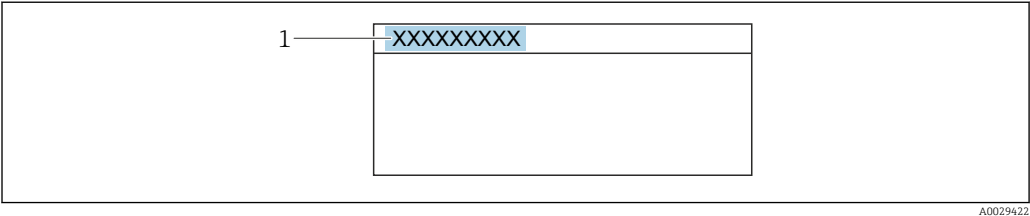
Use this function to enter a customer-specific text for the header of the local display.
- User entry

Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)
- Factory setting

- Additional information

Description

The header text only appears during normal operation.



1 Position of the header text on the display

A0029422

- 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" ■ Order code for "Display; operation", option O "Separate 4-line display, illum.; 10m/30ft cable; touch control"
Description	Use this function to switch the backlight of the local display on and off.
Selection	■ Disable ■ Enable
Factory setting	Enable

3.1.2 "Configuration backup" submenu

Navigation  Expert → System → Config. backup

► Config. backup		
Operating time	→ 	28
Last backup	→ 	28
Config. managem.	→ 	28
Backup state	→ 	29
Compar. result	→ 	30

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)

Config. managem.

Navigation	 Expert → System → Config. backup → Config. managem. (2758)
Description	Use this function to select an action to save the data to the device memory.

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

Factory setting Cancel

Additional information *Selection*

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

HistoROM

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

Backup state

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

Description Displays the status of the data backup process.

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

Factory setting None

Compar. result

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

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

User interface

- Set. identical
- Set. not ident.
- No backup
- Backup corrupt
- Check not done
- Dataset incomp.

Factory setting

Check not done

Additional information*Description*

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

Selection

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

HistoROM

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

3.1.3 "Diagn. handling" submenu

Navigation  Expert → System → Diagn. handling

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

Alarm delay



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

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



The diagnostic message is reset without a time delay.

User entry 0 to 60 s

Factory setting 0 s

Additional information *Result*

This setting affects the following diagnostic messages:

- 170 coil resistance
- 832 Electronic temp.
- 833 Electronic temp.
- 834 Process temp.
- 835 Process temp.

"Diagn. behavior" submenu

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

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

Options	Description
Alarm	The background lighting changes to red.
Warning	
Logbook only	The device continues to measure. The diagnostic message is displayed only in the Event logbook submenu (→  177) (Event list submenu (→  178)) and is not displayed in alternation with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

Diagnostic behavior	Description
Alarm	The device stops measurement. The totalizers assume the defined alarm condition. A diagnostic message is generated.
Warning	The device continues to measure. The measured value output via PROFINET and the totalizers are not affected. A diagnostic message is generated.
Logbook only	The device continues to measure. The diagnostic message is displayed only in the Event logbook submenu (→  177) (Event list submenu (→  178)) and not in alternation with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

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

► Diagn. behavior		
Diagnostic no. 043 (0650)		→  33
Diagnostic no. 302 (0739)		→  33
Diagnostic no. 376 (0645)		→  33
Diagnostic no. 377 (0777)		→  34
Diagnostic no. 441 (0657)		→  34
Diagnostic no. 442 (0658)		→  35
Diagnostic no. 443 (0659)		→  35
Diagnostic no. 444 (0740)		→  35
Diagnostic no. 531 (0741)		→  36
Diagnostic no. 832 (0681)		→  36
Diagnostic no. 833 (0682)		→  37
Diagnostic no. 834 (0700)		→  37
Diagnostic no. 835 (0702)		→  37
Diagnostic no. 937 (0743)		→  38
Diagnostic no. 938 (0642)		→  38

Diagnostic no. 961 (0736)	→  38
Diagnostic no. 962 (0745)	→  39

Diagnostic no. 043 (Sens.short circ.)


Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 043 (0650)
Description	Option for changing the diagnostic behavior of the diagnostic message 043 Sens.short circ..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	 For a detailed description of the options available, see →  31

Diagnostic no. 302 (Verific. active)


Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 302 (0739)
Description	Use this function to change the diagnostic behavior of the diagnostic message 302 Verific. active.
Selection	■ Alarm ■ Warning
Factory setting	Warning
Additional information	 For a detailed description of the options available, see →  31

Diagnostic no. 376 (Sensor electron.)


Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 376 (0645)
Description	Option for changing the diagnostic behavior of the diagnostic message 376 Sensor electron..

Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	 For a detailed description of the options available, see →  31

Diagnostic no. 377 (Sensor electron.)

Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 377 (0777)
Description	Option for changing the diagnostic behavior of the diagnostic message 377 Sensor electron..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	 For a detailed description of the options available, see →  31

Diagnostic no. 441 (Curr.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 diagnostic message 441 Curr.output 1 to n.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	 For a detailed description of the options available, see →  31

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



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 442 (0658)
Prerequisite	The measuring device has a pulse/frequency/switch output.
Description	Use this function to change the diagnostic behavior of the diagnostic message 442 Freq. output 1 to n .
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	For a detailed description of the options available, see → 31

Diagnostic no. 443 (Pulse output 1 to n)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 443 (0659)
Prerequisite	The measuring device has a pulse/frequency/switch output.
Description	Use this function to change the diagnostic behavior of the diagnostic message 443 Pulse output 1 to n .
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	For a detailed description of the options available, see → 31

Diagnostic no. 444 (Current input 1 to n)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 444 (0740)
Prerequisite	The device has one current input.
Description	Use this function to change the diagnostic behavior of the diagnostic message 444 Current input 1 to n .

Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	 For a detailed description of the options available, see →  31

Diagnostic no. 531 (Empty pipe det.)

Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 531 (0741)
Description	Use this function to change the diagnostic behavior of the diagnostic message 531 Empty pipe det..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	 For a detailed description of the options available, see →  31

Diagnostic no. 832 (Electronic temp.)

Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0681)
Description	Use this function to change the diagnostic behavior of the diagnostic message 832 Electronic temp..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Logbook only
Additional information	 For a detailed description of the options available, see →  31

Diagnostic no. 833 (Electronic temp.)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0682)
Description	Use this function to change the diagnostic behavior of the diagnostic message 833 Electronic temp..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Logbook only
Additional information	For a detailed description of the options available, see → 31

Diagnostic no. 834 (Process temp.)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0700)
Description	Use this function to change the diagnostic behavior of the diagnostic message 834 Process temp..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	For a detailed description of the options available, see → 31

Diagnostic no. 835 (Process temp.)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0702)
Description	Use this function to change the diagnostic behavior of the diagnostic message 835 Process temp..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	For a detailed description of the options available, see → 31

Diagnostic no. 937 (EMC interference)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 937 (0743)
Description	Use this function to change the diagnostic behavior of the diagnostic message 937 EMC interference .
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	For a detailed description of the options available, see → 31

Diagnostic no. 938 (EMC interference)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 938 (0642)
Description	Option for changing the diagnostic behavior of the diagnostic message 938 EMC interference .
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Alarm
Additional information	For a detailed description of the options available, see → 31

Diagnostic no. 961



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 961 (0736)
Description	Use this function to change the diagnostic behavior of the diagnostic message 861 Process fluid .
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Alarm
Additional information	For a detailed description of the options available, see → 31

Diagnostic no. 962 (Pipe empty)		
Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 962 (0745)	
Description	Option for changing the diagnostic behavior of the diagnostic message 862 Pipe empty .	
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only	
Factory setting	Warning	
Additional information		For a detailed description of the options available, see → 31

3.1.4 "Administration" submenu

Navigation Expert → System → Administration

► Administration	
► Def. access code	→ 39
► Reset acc. code	→ 41
Device reset	→ 42
Activate SW opt.	→ 42
SW option overv.	→ 43

"Def. access code" wizard

The **Def. access code** wizard (→ 39) is only available when operating via the local display or Web browser.

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

Navigation Expert → System → Administration → Def. access code

► Def. access code	
Def. access code	→ 40
Confirm code	→ 40

Def. access code	
Navigation	 Expert → System → Administration → Def. access code → Def. access code
Description	Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the device configuration against any inadvertent modifications via the local display, Web browser, FieldCare or DeviceCare (via CDI-RJ45 service interface).
User entry	Max. 16-digit character string comprising numbers, letters and special characters
Additional information	<i>Description</i> The write protection affects all parameters in the document marked with the  symbol. On the local display, the  symbol in front of a parameter indicates that the parameter is write-protected. The parameters that cannot be write-accessed are grayed out in the Web browser.  Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the Ent. access code parameter (→  13).  If you lose the access code, please contact your Endress+Hauser sales organization. <i>User entry</i> A message is displayed if the access code is not in the input range. <i>Factory setting</i> If the factory setting is not changed or 0 is defined as the access code, the parameters are not write-protected and the device configuration data can be modified. The user is logged on in the "Maintenance" role.
Confirm code	
Navigation	 Expert → System → Administration → Def. access code → Confirm code
Description	Enter the defined release code a second time to confirm the release code.
User entry	Max. 16-digit character string comprising numbers, letters and special characters

"Reset access code" submenu

Navigation  Expert → System → Administration → Reset acc. code

▶ Reset acc. code

Operating time (0652)

→  41

Reset acc. code (0024)

→  41

Operating time

Navigation	 Expert → System → Administration → Reset acc. code → Operating time (0652)
Description	Use this function to display the length of time the device has been in operation.
User interface	Days (d), hours (h), minutes (m) and seconds (s)
Additional information	<i>User interface</i> The maximum number of days is 9999, which is equivalent to 27 years.

Reset acc. code

Navigation	 Expert → System → Administration → Reset acc. code → Reset acc. code (0024)
Description	Use this function to enter a reset code to reset the user-specific release code to the factory setting.
User entry	Character string comprising numbers, letters and special characters
Factory setting	0x00
Additional information	<i>Description</i>  For a reset code, contact your Endress+Hauser service organization. <i>User entry</i> The reset code can only be entered via: ■ Web browser ■ DeviceCare, FieldCare (via interface CDI RJ45) ■ Fieldbus

Additional parameters in the "Administration" submenu

Device reset

Navigation

Expert → System → Administration → Device reset (0000)

Description

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

Selection

■ Cancel

■ To delivery set.

■ Restart device

■ Rest.S-DATBackup

Factory setting

Cancel

Additional information

Selection

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

Activate SW opt.

Navigation

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

Description

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

User entry

Max. 10-digit string consisting of numbers.

Factory setting

Depends on the software option ordered

Additional information

Description

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

User entry

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

NOTE!

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

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

- ▶ Before you enter a new activation code, make a note of the current activation code .
- ▶ Enter the new activation code provided by Endress+Hauser when the new software option was ordered.
- ▶ Once the activation code has been entered, check if the new software option is displayed in the **SW option overv.** parameter (→  43).
- ↳ The new software option is active if it is displayed.
- ↳ If the new software option is not displayed or all software options have been deleted, the code entered was either incorrect or invalid.
- ▶ If the code entered is incorrect or invalid, enter the old activation code .
- ▶ Have your Endress+Hauser sales organization check the new activation code remembering to specify the serial number or ask for the code again.

Example for a software option

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



The software options currently enabled are displayed in the **SW option overv.** parameter (→  43).

Web browser



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

SW option overv.

Navigation	 Expert → System → Administration → SW option overv. (0015)
Description	Displays all the software options that are enabled in the device.
User interface	■ Extend. HistoROM ■ ECC ■ HBT Monitoring ■ HBT Verification
Additional information	<i>Description</i> Displays all the options that are available if ordered by the customer. <i>"Extend. HistoROM" option</i> Order code for "Application package", option EA "Extended HistoROM" <i>"ECC" option</i> Order code for "Application package", option EC "ECC electrode cleaning" <i>"HBT Verification" option and "HBT Monitoring" option</i> Order code for "Application package", option EB "Heartbeat Verification + Monitoring"

3.2 "Sensor" submenu

Navigation  Expert → Sensor

► Sensor		
► Measured val.	→ 	44
► System units	→ 	54
► Process param.	→ 	69
► External comp.	→ 	82
► Sensor adjustm.	→ 	90
► Calibration	→ 	96

3.2.1 "Measured val." submenu

Navigation  Expert → Sensor → Measured val.

► Measured val.		
► Process variab.	→ 	44
► Totalizer	→ 	47
► Input values	→ 	49
► Output values	→ 	50

"Process variables" submenu

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

► Process variab.		
Volume flow (1838)	→ 	45
Mass flow (1847)	→ 	45
Correct.vol.flow (1851)	→ 	45
Flow velocity (1854)	→ 	46
Conductivity (1850)	→ 	46

CorrConductivity (1853)	→  46
Temperature (1852)	→  46
Density (1857)	→  47

Volume flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → Volume flow (1838)
Description	Displays the volume flow that is currently measured.
User interface	Signed floating-point number
Additional information	

Mass flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → Mass flow (1847)
Description	Displays the mass flow currently calculated.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Mass flow unit parameter (→  57)

Correct.vol.flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → Correct.vol.flow (1851)
Description	Displays the corrected volume flow currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Cor.volflow unit parameter (→  59)

Flow velocity

Navigation	 Expert → Sensor → Measured val. → Process variab. → Flow velocity (1854)
Description	Displays the flow velocity currently calculated.
User interface	Signed floating-point number

Conductivity

Navigation	 Expert → Sensor → Measured val. → Process variab. → Conductivity (1850)
Description	Displays the conductivity currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Conductiv. unit parameter (→  56)

CorrConductivity

Navigation	 Expert → Sensor → Measured val. → Process variab. → CorrConductivity (1853)
Prerequisite	One of the following conditions is met: ■ Order code for "Sensor option", option CI "Medium temperature measurement" - or ■ The temperature is read into the flowmeter from an external device.
Description	Displays the conductivity currently corrected.
User interface	Positive floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Conductiv. unit parameter (→  56)

Temperature

Navigation	 Expert → Sensor → Measured val. → Process variab. → Temperature (1852)
Prerequisite	One of the following conditions is met: ■ Order code for "Sensor option", option CI "Medium temperature measurement" - or ■ The temperature is read into the flowmeter from an external device.

Description	Displays the temperature currently calculated.
User interface	Positive floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  57)

Density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Density (1857)
Description	Displays the current fixed density or density read in from an external device.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Density unit parameter (→  59)

"Totalizer" submenu

Navigation   Expert → Sensor → Measured val. → Totalizer

 Totalizer	
Totalizer val. 1 to n (0911–1 to n)	→  47
Tot. overflow 1 to n (0910–1 to n)	→  48

Totalizer val. 1 to n



Navigation	  Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to n (0911–1 to n)
Prerequisite	A process variable is selected in the Assign variable parameter (→  166) of the Totalizer 1 to n submenu.
Description	Displays the current totalizer reading.
User interface	Signed floating-point number

Additional information*Description*

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

 In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→  169).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Operation mode** parameter (→  167).

 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→  166).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:

- Value in the **Totalizer val. 1** parameter: 1 968 457 m³
- Value in the **Tot. overflow 1** parameter: $1 \cdot 10^7$ (1 overflow) = 10 000 000 [m³]
- Current totalizer reading: 11 968 457 m³

Tot. overflow 1 to n**Navigation**

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

Prerequisite

A process variable is selected in the **Assign variable** parameter (→  166) of the **Totalizer 1 to n** submenu.

Description

Displays the current totalizer overflow.

User interface

Integer with sign

Additional information*Description*

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

User interface

 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→  166).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:

- Value in the **Totalizer val. 1** parameter: 1 968 457 m³
- Value in the **Tot. overflow 1** parameter: $2 \cdot 10^7$ (2 overflows) = 20 000 000 [m³]
- Current totalizer reading: 21 968 457 m³

"Input values" submenu

Navigation  Expert → Sensor → Measured val. → Input values

► Input values

► Current input 1 to n

→  49

► Val.stat.inp. 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 val. 1 to n (1603-1 to n)

→  49

Measur. curr. 1 to n (1604-1 to n)

→  49

Measured val. 1 to n

Navigation	 Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measured val. 1 to n (1603-1 to n)
Description	Displays the current input value.
User interface	Signed floating-point number

Measur. curr. 1 to n

Navigation	 Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measur. curr. 1 to n (1604-1 to n)
Description	Displays the current value of the current input.
User interface	0 to 22.5 mA

"Value status input 1 to n" submenu

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

► Val.stat.inp. 1 to n

Val.stat.inp. (1353-1 to n) →  50

Val.stat.inp.

- Navigation  Expert → Sensor → Measured val. → Input values → Val.stat.inp. 1 to n → Val.stat.inp. (1353-1 to n)
- Description Displays the current input signal level.
- User interface
 - High
 - Low

"Output values" submenu

Navigation  Expert → Sensor → Measured val. → Output values

► Output values

► Value curr.out 1 to n →  50

► PFS 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 curr.out 1 to n

Output curr. 1 to n (0361-1 to n) →  51

Measur. curr. 1 to n (0366-1 to n) →  51

Output curr. 1 to n

Navigation	 Expert → Sensor → Measured val. → Output values → Value curr.out 1 to n → Output curr. 1 to n (0361-1 to n)
Description	Displays the current value currently calculated for the current output.
User interface	0 to 22.5 mA

Measur. curr. 1 to n

Navigation	 Expert → Sensor → Measured val. → Output values → Value curr.out 1 to n → Measur. curr. 1 to n (0366-1 to n)
Description	Use this function to display the actual measured value of the output current.
User interface	0 to 30 mA

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

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

► PFS output 1 to n		
Output freq. 1 to n (0471-1 to n)	→	 51
Pulse output 1 to n (0456-1 to n)	→	 52
Switch status 1 to n (0461-1 to n)	→	 52

Output freq. 1 to n

Navigation	 Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Output freq. 1 to n (0471-1 to n)
Prerequisite	In the Operating mode parameter (→  121), the Frequency option is selected.
Description	Displays the actual value of the output frequency which is currently measured.
User interface	0.0 to 12 500.0 Hz

Pulse output 1 to n

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

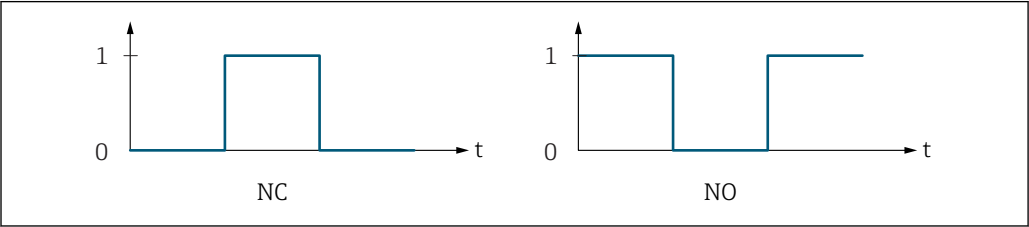
Prerequisite In the **Operating mode** parameter (→  121), the **Pulse** option is selected.

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

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



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

The output behavior can be reversed via the **Invert outp.sig.** parameter (→  139) i.e. the transistor does not conduct for the duration of the pulse.

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

Switch status 1 to n

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

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

Description Displays the current switch status of the status output.

User interface

- Open
- Closed

Additional information

User interface

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

"Relay output 1 to n" submenu

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

► Relay output 1 to n

Switch status (0801–1 to n)

→  53

Switch cycles (0815–1 to n)

→  53

Max. cycles no. (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. cycles no.

Navigation	 Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Max. cycles no. (0817–1 to n)
Description	Displays the maximum number of guaranteed switch cycles.
User interface	Positive integer

3.2.2 "System units" submenu

Navigation  Expert → Sensor → System units

► System units

Volume flow unit (0553)

→  54

Volume unit (0563)

→  56

Conductiv. unit (0582)

→  56

Temperature unit (0557)

→  57

Mass flow unit (0554)

→  57

Mass unit (0574)

→  58

Density unit (0555)

→  59

Cor.volflow unit (0558)

→  59

Corr. vol. unit (0575)

→  60

Date/time format (2812)

→  61

Volume flow unit

Navigation	 Expert → Sensor → System units → Volume flow unit (0553)
Description	Use this function to select the unit for the volume flow.

Selection*SI units*

- cm³/s
- cm³/min
- cm³/h
- cm³/d
- dm³/s
- dm³/min
- dm³/h
- dm³/d
- m³/s
- m³/min
- m³/h
- m³/d
- ml/s
- ml/min
- ml/h
- ml/d
- l/s
- l/min
- l/h
- l/d
- hl/s
- hl/min
- hl/h
- hl/d
- Ml/s
- Ml/min
- Ml/h
- Ml/d

US units

- af/s
- af/min
- af/h
- af/d
- ft³/s
- ft³/min
- ft³/h
- ft³/d
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)
- gal/s (us)
- gal/min (us)
- gal/h (us)
- gal/d (us)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)
- Mgal/s (us)
- Mgal/min (us)
- Mgal/h (us)
- Mgal/d (us)
- bbl/s (us;liq.)
- bbl/min (us;liq.)
- bbl/h (us;liq.)
- bbl/d (us;liq.)
- bbl/s (us;beer)
- bbl/min (us;beer)
- bbl/h (us;beer)
- bbl/d (us;beer)
- bbl/s (us;oil)
- bbl/min (us;oil)
- bbl/h (us;oil)
- bbl/d (us;oil)
- bbl/s (us;tank)
- bbl/min (us;tank)
- bbl/h (us;tank)
- bbl/d (us;tank)

Imperial units

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

Factory setting

Country-specific:

- l/h
- gal/min (us)

Additional information*Result*

The selected unit applies for:

Volume flow parameter (→  45)*Selection* For an explanation of the abbreviated units: →  223

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>	<i>Imperial units</i>
■ cm ³	■ af	■ gal (imp)
■ dm ³	■ ft ³	■ Mgal (imp)
■ m ³	■ fl oz (us)	■ bbl (imp;beer)
■ ml	■ gal (us)	■ bbl (imp;oil)
■ l	■ kgal (us)	
■ hl	■ Mgal (us)	
■ Ml Mega	■ bbl (us;oil)	
	■ bbl (us;liq.)	
	■ bbl (us;beer)	
	■ bbl (us;tank)	

Factory setting Country-specific:
 ■ m³
 ■ gal (us)

Additional information *Selection*
 For an explanation of the abbreviated units: →  223

Conductiv. unit

Navigation  Expert → Sensor → System units → Conductiv. unit (0582)

Prerequisite The **On** option is selected in the **Conduct. measur.** parameter (→  73) parameter.

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

Selection

SI units

- nS/cm
- µS/cm
- µS/m
- µS/mm
- mS/m
- mS/cm
- S/cm
- S/m
- kS/m
- MS/m

Factory setting µS/cm

Additional information*Effect*

The selected unit applies for:

- **Conductivity** parameter (→  46)
- **CorrConductivity** parameter (→  46)

Selection

 For an explanation of the abbreviated units: →  223

Temperature unit**Navigation**

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

Description

Use this function to select the unit for the temperature.

Selection*SI units*

- °C
- K

US units

- °F
- °R

Factory setting

Country-specific:

- °C
- °F

Additional information*Result*

The selected unit applies for:

- **Temperature** parameter (→  46)
- **Maximum value** parameter (→  198)
- **Minimum value** parameter (→  198)
- **External temp.** parameter (→  88)
- **Maximum value** parameter (→  199)
- **Minimum value** parameter (→  199)
- **FailSafeValExtT** parameter (→  89)

Selection

 For an explanation of the abbreviated units: →  223

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	<i>SI units</i>	<i>US units</i>
	■ g/s	■ oz/s
	■ g/min	■ oz/min
	■ g/h	■ oz/h
	■ g/d	■ oz/d
	■ kg/s	■ lb/s
	■ kg/min	■ lb/min
	■ kg/h	■ lb/h
	■ kg/d	■ lb/d
	■ t/s	■ STon/s
	■ t/min	■ STon/min
	■ t/h	■ STon/h
■ t/d	■ STon/d	

Factory setting	Country-specific:
	■ kg/h ■ lb/min

Additional information	<i>Result</i>
	The selected unit applies for: Mass flow parameter (→ ⓘ 45)
	<i>Selection</i>

 For an explanation of the abbreviated units: → ⓘ 223

Mass unit

Navigation	  Expert → Sensor → System units → Mass unit (0574)	
Description	Use this function to select the unit for the mass.	
Selection	<i>SI units</i>	<i>US units</i>
	■ g ■ kg ■ t	■ oz ■ lb ■ STon
Factory setting	Country-specific: ■ kg ■ lb	
Additional information	<i>Selection</i>  For an explanation of the abbreviated units: →  223	

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

Use this function to select the unit for the density.

Selection*SI units*

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

US units

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

Imperial units

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

Factory setting

Country-specific:

- kg/l
- lb/ft³

Additional information*Result*

The selected unit applies for:

- **External density** parameter (→  84)
- **Fixed density** parameter (→  83)

Selection

- SD = specific density

The specific density is the ratio of the medium density to the water density at a water temperature of +4 °C (+39 °F), +15 °C (+59 °F), +20 °C (+68 °F).

- SG = specific gravity

The specific gravity is the ratio of the medium density to the water density at a water temperature of +4 °C (+39 °F), +15 °C (+59 °F), +20 °C (+68 °F).

For an explanation of the abbreviated units: →  223**Cor.volflow unit****Navigation** Expert → Sensor → System units → Cor.volflow unit (0558)**Description**

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

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ Nl/s ■ Nl/min ■ Nl/h ■ Nl/d ■ Nm^3/s ■ Nm^3/min ■ Nm^3/h ■ Nm^3/d ■ Sm^3/s ■ Sm^3/min ■ Sm^3/h ■ Sm^3/d	■ Sft^3/s ■ Sft^3/min ■ Sft^3/h ■ Sft^3/d ■ Sgal/s (us) ■ Sgal/min (us) ■ Sgal/h (us) ■ Sgal/d (us) ■ Sbbl/s (us;liq.) ■ $\text{Sbbl/min (us;liq.)}$ ■ Sbbl/h (us;liq.) ■ Sbbl/d (us;liq.)	■ Sgal/s (imp) ■ Sgal/min (imp) ■ Sgal/h (imp) ■ Sgal/d (imp)

Factory setting	Country-specific: ■ Nl/h ■ Sft^3/h
-----------------	--

Additional information	<i>Result</i> The selected unit applies for: Correct.vol.flow parameter (→  45) <i>Selection</i>  For an explanation of the abbreviated units: →  223
------------------------	---

Corr. vol. unit



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

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

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ Nl ■ Nm^3 ■ Sm^3	■ Sft^3 ■ Sgal (us) ■ Sbbl (us;liq.)	■ Sgal (imp)

Factory setting	Country-specific: ■ Nm^3 ■ Sft^3
-----------------	---

Additional information	<i>Selection</i>  For an explanation of the abbreviated units: →  223
------------------------	--

Date/time format 	
Navigation	  Expert → Sensor → System units → Date/time format (2812)
Description	Use this function to select the desired time format for calibration history.
Selection	■ dd.mm.yy hh:mm ■ dd.mm.yy am/pm ■ mm/dd/yy hh:mm ■ mm/dd/yy am/pm
Factory setting	dd.mm.yy hh:mm
Additional information	<i>Selection</i>  For an explanation of the abbreviated units: →  223

"User-spec. units" submenu

Navigation   Expert → Sensor → System units → User-spec. units

► User-spec. units		
Volume text (0567)	→	 62
Volume offset (0569)	→	 63
Volume factor (0568)	→	 63
Mass text (0560)	→	 63
Mass offset (0562)	→	 64
Mass factor (0561)	→	 64
Corr. vol. text (0592)	→	 64
Corr vol. offset (0602)	→	 65
Cor.vol. factor (0590)	→	 65
Density text (0570)	→	 65
Density offset (0571)	→	 66
Density factor (0572)	→	 66

Spec. enth. text (0585)	→ 66
Spec. enth. off. (0584)	→ 67
Spec. enth. fac. (0583)	→ 67
Energy text (0600)	→ 67
Energy offset (0599)	→ 68
Energy factor (0586)	→ 68
Pressure text (0581)	→ 68
Pressure offset (0580)	→ 69
Pressure factor (0579)	→ 69

Volume text

Navigation	Expert → Sensor → System units → User-spec. units → Volume text (0567)
Description	Use this function to enter a text for the user-specific unit of volume and volume flow. The corresponding time units (s, min, h, d) for volume flow are generated automatically.
User entry	Max. 10 characters such as letters, numbers or special characters (@, %, /)
Factory setting	User vol.
Additional information	Result The defined unit is shown as an option in the choose list of the following parameters: ■ Volume flow unit parameter (→ 54) ■ Volume unit parameter (→ 56) Example If the text GLAS is entered, the choose list of the Volume flow unit parameter (→ 54) shows the following options: ■ GLAS/s ■ GLAS/min ■ GLAS/h ■ GLAS/d

Volume offset

Navigation	 Expert → Sensor → System units → User-spec. units → Volume offset (0569)
Description	Use this function to enter the offset for adapting the user-specific volume unit and volume flow unit (without time).
User entry	Signed floating-point number
Factory setting	0
Additional information	<i>Description</i>  Value in user-specific unit = (factor × value in base unit) + offset

Volume factor

Navigation	 Expert → Sensor → System units → User-spec. units → Volume factor (0568)
Description	Use this function to enter a quantity factor (without time) for the user-specific volume and volume flow unit.
User entry	Signed floating-point number
Factory setting	1.0

Mass text

Navigation	 Expert → Sensor → System units → User-spec. units → Mass text (0560)
Description	Use this function to enter a text for the user-specific unit of mass and mass flow. The corresponding time units (s, min, h, d) for mass flow are generated automatically.
User entry	Max. 10 characters such as letters, numbers or special characters (@, %, /)
Factory setting	User mass

Additional information*Result*

The defined unit is shown as an option in the choose list of the following parameters:

- **Mass flow unit** parameter (→  57)
- **Mass unit** parameter (→  58)

Example

If the text GLAS is entered, the following options are displayed in the picklist for the **Mass flow unit** parameter (→  57):

- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

Mass offset**Navigation**

  Expert → Sensor → System units → User-spec. units → Mass offset (0562)

Description

Use this function to enter the offset for adapting the user-specific mass unit and mass flow unit (without time).

User entry

Signed floating-point number

Factory setting

0

Additional information*Description*

Value in user-specific unit = (factor × value in base unit) + offset

Mass factor**Navigation**

  Expert → Sensor → System units → User-spec. units → Mass factor (0561)

Description

Use this function to enter a quantity factor (without time) for the user-specific mass and mass flow unit.

User entry

Signed floating-point number

Factory setting

1.0

Corr. vol. text**Navigation**

  Expert → Sensor → System units → User-spec. units → Corr. vol. text (0592)

Description

Use this function to enter a text for the user-specific unit of the corrected volume and corrected volume flow. The corresponding time units (s, min, h, d) for mass flow are generated automatically.

User entry	Max. 10 characters such as letters, numbers or special characters (@, %, /)
Factory setting	UserCrVol.
Additional information	<i>Result</i>  The defined unit is shown as an option in the choose list of the following parameters: ▪ Cor.volflow unit parameter (→  59) ▪ Corr. vol. unit parameter (→  60) <i>Example</i> If the text GLAS is entered, the choose list of the Cor.volflow unit parameter (→  59) shows the following options: ▪ GLAS/s ▪ GLAS/min ▪ GLAS/h ▪ GLAS/d

Corr vol. offset

Navigation	  Expert → Sensor → System units → User-spec. units → Corr vol. offset (0602)
Description	Use this function to enter the offset for adapting the user-specific corrected volume unit and corrected volume flow unit (without time).  Value in user-specific unit = (factor × value in base unit) + offset
User entry	Signed floating-point number
Factory setting	0

Cor.vol. factor

Navigation	  Expert → Sensor → System units → User-spec. units → Cor.vol. factor (0590)
Description	Use this function to enter a quantity factor (without time) for the user-specific corrected volume unit and corrected volume flow unit.
User entry	Signed floating-point number
Factory setting	1.0

Density text

Navigation	  Expert → Sensor → System units → User-spec. units → Density text (0570)
Description	Use this function to enter a text or the user-specific unit of density.

User entry	Max. 10 characters such as letters, numbers or special characters (@, %, /)
Factory setting	User dens.
Additional information	<i>Result</i>  The defined unit is shown as an option in the choose list of the Density unit parameter (→  59). <i>Example</i> Enter text “CE_L” for centners per liter

Density offset

Navigation	  Expert → Sensor → System units → User-spec. units → Density offset (0571)
Description	Use this function to enter the zero point shift for the user-specific density unit.  Value in user-specific unit = (factor × value in base unit) + offset
User entry	Signed floating-point number
Factory setting	0

Density factor

Navigation	  Expert → Sensor → System units → User-spec. units → Density factor (0572)
Description	Use this function to enter a quantity factor for the user-specific density unit.
User entry	Signed floating-point number
Factory setting	1.0

Spec. enth. text

Navigation	  Expert → Sensor → System units → User-spec. units → Spec. enth. text (0585)
User entry	Max. 10 characters such as letters, numbers or special characters (@, %, /)
Factory setting	User enth.

Additional information	Result
	<i>Example</i> If the text CAL is entered, the choose list of the Cal. value unit parameter shows the following options: ■ CAL/Nm3 ■ CAL/m3 ■ CAL/ft3 ■ CAL/Sft3
Spec. enth. off. 	
Navigation	 Expert → Sensor → System units → User-spec. units → Spec. enth. off. (0584)
Description	Use this function to enter the offset for adapting the user-specific calorific value unit (without volume).
User entry	Signed floating-point number
Factory setting	0
Spec. enth. fac. 	
Navigation	 Expert → Sensor → System units → User-spec. units → Spec. enth. fac. (0583)
Description	Use this function to enter a quantity factor (without volume) for the user-specific calorific value unit.
User entry	Signed floating-point number
Factory setting	1.0
Additional information	<i>Example</i> 1 W × min = 60 J → 0.166 W × min = 1 J → user entry: 0.0166
Energy text 	
Navigation	 Expert → Sensor → System units → User-spec. units → Energy text (0600)
Description	Use this function to enter a text for the user-specific energy unit.
User entry	Max. 10 characters such as letters, numbers or special characters (@, %, /)
Factory setting	User en.

Additional information*Result*

The defined unit is shown as an option in the choose list of the following parameters:

- **Energy unit** parameter
- **Energy flow unit** parameter

Example

If the text W is entered, the choose list of the **Energy flow unit** parameter shows the following options:

- W/s
- W/min
- W/h
- W/d

Energy offset**Navigation**

Expert → Sensor → System units → User-spec. units → Energy offset (0599)

Description

Use this function to enter the offset for adapting the user-specific energy unit (without time).

User entry

Signed floating-point number

Factory setting

0

Energy factor**Navigation**

Expert → Sensor → System units → User-spec. units → Energy factor (0586)

Description

Use this function to enter a quantity factor for the user-specific energy unit.

User entry

Signed floating-point number

Factory setting

1.0

Pressure text**Navigation**

Expert → Sensor → System units → User-spec. units → Pressure text (0581)

Description

Use this function to enter a text for the user-specific pressure unit.

User entry

Max. 10 characters such as letters, numbers or special characters (@, %, /)

Factory setting

User pres.

Additional information		Result
		 The defined unit is shown as an option in the choose list of the Pressure unit parameter.
Pressure offset		
Navigation	 Expert → Sensor → System units → User-spec. units → Pressure offset (0580)	
Description	Use this function to enter the offset for adapting the user-specific pressure unit.	
User entry	Signed floating-point number	
Factory setting	0	
Pressure factor		
Navigation	 Expert → Sensor → System units → User-spec. units → Pressure factor (0579)	
Description	Use this function to enter a quantity factor for the user-specific pressure unit.	
User entry	Signed floating-point number	
Factory setting	1.0	
Additional information		Example
		1 Dyn/cm ² = 0.1 Pa → 10 Dyn/cm ² = 1 Pa → user entry: 10

3.2.3 "Process param." submenu

Navigation  Expert → Sensor → Process param.

► Process param.

Filter options (6710)

→  70

Flow damping (6661)

→  72

Flow override (1839)

→  72

Conduct. measur. (6514)

→  73

Conduct. damping (1803)

→  73

Cond. temp.coeff (1891)	→ 74
Temp. damping (1886)	→ 73
Ref.density (1885)	→ 74
► Low flow cut off	→ 75
► Empty pipe det.	→ 78
► ECC	→ 80

Filter options



Navigation	Expert → Sensor → Process param. → Filter options (6710)
Description	Use this function to select a filter option.
Selection	■ Adaptive ■ Adaptive CIP on ■ Dynamic ■ Dynamic CIP on ■ Binomial ■ Binomial CIP on
Factory setting	Binomial
Additional information	<i>Description</i> The user can choose from a range of filter combinations which can optimize the measurement result depending on the application. Each change in the filter setting affects

the output signal of the measuring device. The response time of the output signal increases as the filter depth increases.

Selection

- **Adaptive**
 - Strong flow damping with a short output signal response time.
 - Some time is needed before a stable output signal can be generated.
 - Not suitable for pulsating flow as the average flow can be different here.
- **Dynamic**
 - Average flow damping with a delayed output signal response time.
 - The average flow is displayed correctly over a measuring interval determined over a long period.
- **Binomial**
 - Weak flow damping with a short output signal response time.
 - The average flow is displayed correctly over a measuring interval determined over a long period.
- **CIP**
 - This filter is also available for the **Adaptive** and **Dynamic** filter options.
 - If the CIP filter has detected a change in the medium (abrupt increase in the noise level, e.g. quickly changing medium conductivity values during CIP cleaning), flow damping is greatly increased and the raw value (before flow damping) is limited by the mean value (delimiter). This eliminates extremely high measured errors (up to several 100 m/s).
 - If the CIP filter is enabled, the response time of the entire measuring system increases and the output signal is delayed accordingly.

Examples

Possible applications for the filters

Application	Adaptive	Adaptive CIP	Dynamic	Dynamic CIP	Binomial	Binomial CP
Pulsating flow (flow is negative intermittently)	---	---	++	--	++	
Flow changes frequently (flow is dynamic)	-	--	++	-	++	
Clear signal, quick control loop (< 1 s)	--	--	+ ¹⁾		++	
Poor signal, slow control loop (response time of a few seconds)	++	-	--	---	---	
Permanently bad signal	++	--	-	---	-	
Short and severe signal distortion after a while		++		++		
Replacement of a Promag 50/53: system damping Promag 100 = 0.5 * Promag 50/53					+++	
Replacement of a Promag 10: system damping Promag 100 = Promag 10 + 2			+++			
For a stable flow signal (no other requirements)	+++					

1) Flow damping value < 6

Flow damping		
Navigation	  Expert → Sensor → Process param. → Flow damping (6661)	
Description	Use this function to enter flow damping. Reduction of the variability of the flow measured value (in relation to interference). For this purpose, the depth of the flow filter is adjusted: when the filter setting increases, the reaction time of the device also increases.	
User entry	0 to 15	
Factory setting	4	
Additional information	<i>User entry</i> ▪ Value = 0: no damping ▪ Value > 0: damping is increased  ▪ 0 is a weak damping and 15 a strong one. ▪ A damping of 0 is not recommended, as the measuring signal is then so noisy that it is almost impossible to carry out a measurement. ▪ The damping depends on the measuring period and the filter type selected. ▪ An increase or decrease in the damping depends on the application. <i>Effect</i>  The damping affects the following variables of the device: ▪ Outputs →  105 ▪ Low flow cut off →  75 ▪ Totalizers →  165	
Flow override		
Navigation	  Expert → Sensor → Process param. → Flow override (1839)	
Description	Use this function to select whether to interrupt the evaluation of measured values. This is useful for the cleaning processes of a pipeline, for example.	
Selection	▪ Off ▪ On	
Factory setting	Off	
Additional information	<i>Description</i> Flow override is active ▪ The diagnostic message diagnostic message  C453 Flow override is displayed. ▪ Output values – Temperature: proceeding output – Totalizers 1-3: Stop being totalized  Positive zero return can also be enabled via the Status input: Assign stat.inp. parameter (→  104).	

Conduct. damping



Navigation	Expert → Sensor → Process param. → Conduct. damping (1803)
Prerequisite	In the Conduct. measur. parameter (→ 73), the On option is selected.
Description	Use this function to enter a time constant for conductivity damping (PT1 element).
User entry	0 to 999.9 s
Factory setting	0 s
Additional information	<i>Description</i> The damping is performed by a PT1 element ²⁾. <i>User entry</i> ■ Value = 0: no damping ■ Value > 0: damping is increased Damping is switched off if 0 is entered (factory setting).

Temp. damping



Navigation	Expert → Sensor → Process param. → Temp. damping (1886)
Prerequisite	One of the following conditions is met: ■ Order code for "Sensor option", option CI "Medium temperature measurement" or ■ The temperature is read into the flowmeter from an external device.
Description	Use this function to enter the time constant for temperature damping.
User entry	0 to 999.9 s
Factory setting	0 s

Conduct. measur.



Navigation	Expert → Sensor → Process param. → Conduct. measur. (6514)
Prerequisite	The On option is selected in the Conduct. measur. parameter (→ 73) parameter.
Description	Use this function to enable and disable conductivity measurement.

2) Proportional behavior with first-order lag

Selection	■ Off ■ On
Factory setting	Off
Additional information	<i>Description</i>  For conductivity measurement to work, the medium must have a minimum conductivity of 5 µS/cm.

Cond. temp.coeff



Navigation	 Expert → Sensor → Process param. → Cond. temp.coeff (1891)
Prerequisite	One of the following conditions is met: ■ Order code for "Sensor option", option CI "Medium temperature measurement" - or ■ The temperature is read into the flowmeter from an external device.
Description	Use this function to enter the temperature coefficient for the conductivity.
User entry	Signed floating-point number
Factory setting	2.1 %/K

Ref.density



Navigation	 Expert → Sensor → Process param. → Ref.density (1885)
Description	Use this function to enter a fixed value for the reference density.
User entry	Positive floating-point number
Factory setting	Country-specific: ■ 1 kg/l ■ 1 lb/ft³
Additional information	<i>Dependency</i>  The unit is taken from the Density unit parameter (→  59)

"Low flow cut off" submenu

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

► Low flow cut off

Assign variable (1837)

→  75

On value (1805)

→  75

Off value (1804)

→  76

Pres. shock sup. (1806)

→  76

Assign variable

Navigation	 Expert → Sensor → Process param. → Low flow cut off → Assign variable (1837)
Description	Use this function to select the process variable for low flow cutoff detection.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow
Factory setting	Volume flow

On value

Navigation	 Expert → Sensor → Process param. → Low flow cut off → On value (1805)
Prerequisite	One of the following options is selected in the Assign variable parameter (→  75): ■ Volume flow ■ Mass flow
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 →  76.
User entry	Positive floating-point number
Factory setting	Depends on country and nominal diameter →  219
Additional information	Dependency  The unit depends on the process variable selected in the Assign variable parameter (→  75).

Off value



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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→  75):

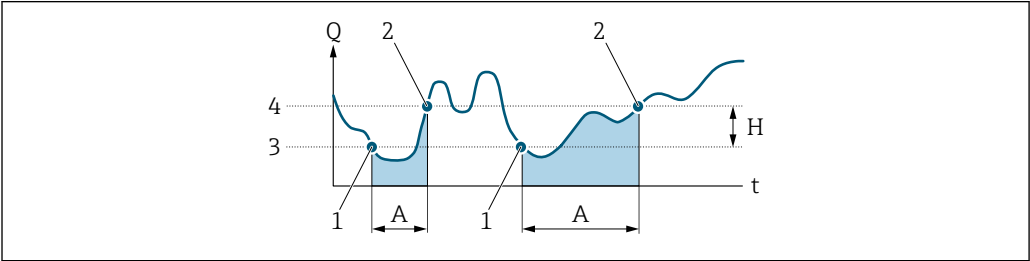
- Volume flow
- Mass flow
- Correct.vol.flow

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→  75.

User entry 0 to 100.0 %

Factory setting 50 %

Additional information *Example*



A0012887

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

Pres. shock sup.



Navigation  Expert → Sensor → Process param. → Low flow cut off → Pres. shock sup. (1806)

Prerequisite One of the following options is selected in the **Assign variable** parameter (→  75):

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

Description Use this function to enter the time interval for signal suppression (= active pressure shock suppression).

User entry 0 to 100 s

Factory setting 0 s

Additional information*Description***Pressure shock suppression is enabled**

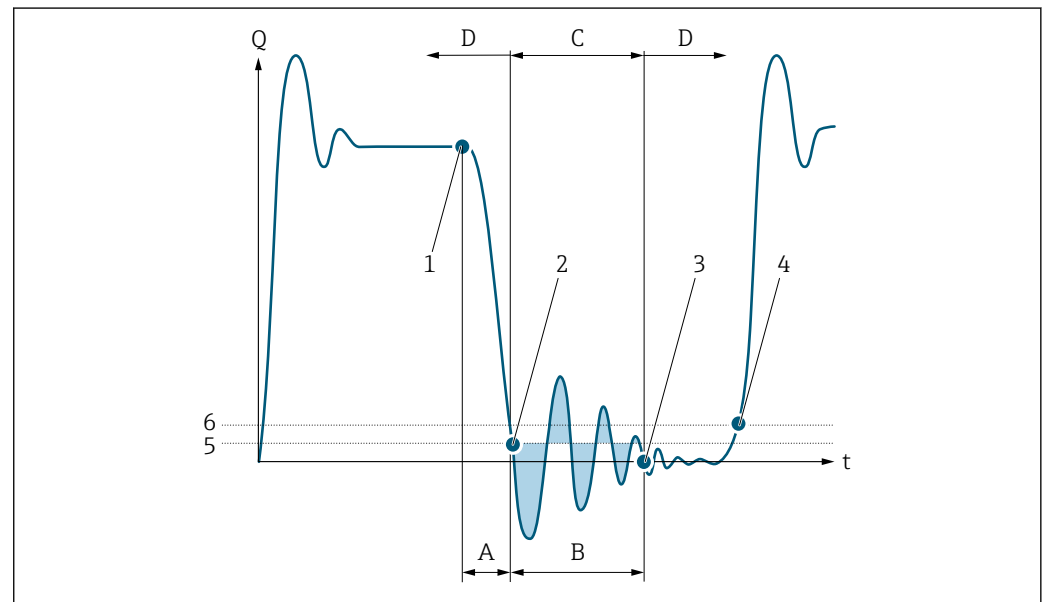
- Prerequisite:
Flow rate < on-value of low flow cut off
- Output values
 - Flow displayed: 0
 - Totalizer: the totalizers are pegged at the last correct value

Pressure shock suppression is disabled

- Prerequisite: the time interval set in this function has elapsed.
- If the flow also exceeds the switch-off value for low flow cut off, the device starts processing the current flow value again and displays it.

Example

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



A0012888

- Q* Flow
- t* Time
- A* Drip
- B* Pressure shock
- C* Pressure shock suppression active as specified by the time entered
- D* Pressure shock suppression inactive
- 1* Valve closes
- 2* Flow falls below the on-value of the low flow cut off: pressure shock suppression is activated
- 3* The time entered has elapsed: pressure shock suppression is deactivated
- 4* The actual flow value is now displayed and output
- 5* On value for low flow cut off
- 6* Off value for low flow cut off

"Empty pipe det." submenu

Navigation  Expert → Sensor → Process param. → Empty pipe det.

► Empty pipe det.

Empty pipe det. (1860)

→  78

Switch point EPD (6562)

→  78

Response time (1859)

→  79

New adjustment (6560)

→  79

Progress (6571)

→  79

Empty pipe value (6527)

→  80

Full pipe value (6548)

→  80

Meas. value EPD (6559)

→  80

Empty pipe det.

Navigation	 Expert → Sensor → Process param. → Empty pipe det. → Empty pipe det. (1860)
Description	Use this function to switch empty pipe detection on and off.
Selection	■ Off ■ On
Factory setting	Off

Switch point EPD

Navigation	 Expert → Sensor → Process param. → Empty pipe det. → Switch point EPD (6562)
Prerequisite	The On option is selected in the Empty pipe det. parameter (→  78).
Description	Use this function to enter the percentage threshold value of the resistance in relation to the adjustment values.
User entry	0 to 100 %
Factory setting	10 %

Response time



Navigation	 Expert → Sensor → Process param. → Empty pipe det. → Response time (1859)
Prerequisite	In the Empty pipe det. parameter (→  78), the On option is selected.
Description	Use this function to enter the minimum length of time (debouncing time) the signal must be present for the diagnostic message △S862 Pipe empty to be triggered if the measuring pipe is empty or partially full.
User entry	0 to 100 s
Factory setting	1 s

New adjustment



Navigation	 Expert → Sensor → Process param. → Empty pipe det. → New adjustment (6560)
Prerequisite	The On option is selected in the Empty pipe det. parameter (→  78).
Description	For selecting whether to perform an empty pipe or full pipe adjustment.
Selection	■ Cancel ■ Empty pipe adj. ■ Full pipe adjust
Factory setting	Cancel

Progress

Navigation	 Expert → Sensor → Process param. → Empty pipe det. → Progress (6571)
Prerequisite	The On option is selected in the Empty pipe det. parameter (→  78).
Description	Use this function to view the progress.
User interface	■ Ok ■ Busy ■ Not ok

Empty pipe value

Navigation	 Expert → Sensor → Process param. → Empty pipe det. → Empty pipe value (6527)
Prerequisite	■ In the Empty pipe det. parameter (→  78), the On option is selected. ■ Adjustment value > full pipe value.
Description	Displays the adjustment value when the measuring pipe is empty.
User interface	Positive floating-point number

Full pipe value

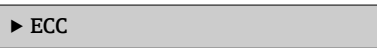
Navigation	 Expert → Sensor → Process param. → Empty pipe det. → Full pipe value (6548)
Prerequisite	■ In the Empty pipe det. parameter (→  78), the On option is selected. ■ Adjustment value < empty pipe value.
Description	Displays the adjustment value when the measuring pipe is full.
User interface	Positive floating-point number

Meas. value EPD

Navigation	 Expert → Sensor → Process param. → Empty pipe det. → Meas. value EPD (6559)
Prerequisite	In the Empty pipe det. parameter (→  78), the On option is selected.
Description	Displays the current measured value.
User interface	Positive floating-point number

"ECC" submenu

Navigation  Expert → Sensor → Process param. → ECC

		
ECC (6528)	→	 81
ECC duration (6555)	→	 81
ECC recov. time (6556)	→	 81

ECC clean. cycle (6557)	→ 82
ECC Polarity (6631)	→ 82

ECC

Navigation Expert → Sensor → Process param. → ECC → ECC (6528)

Prerequisite For the following order code:
"Application package", option **EC** "ECC electrode cleaning"

Description Use this function to enable and disable cyclic electrode cleaning.

Selection

- Off
- On

Factory setting Off

ECC duration

Navigation Expert → Sensor → Process param. → ECC → ECC duration (6555)

Prerequisite For the following order code:
"Application package", option **EC** "ECC electrode cleaning"

Description Use this function to enter the duration of electrode cleaning in seconds.

User entry 0.01 to 30 s

Factory setting 2 s

ECC recov. time

Navigation Expert → Sensor → Process param. → ECC → ECC recov. time (6556)

Prerequisite For the following order code:
"Application package", option **EC** "ECC electrode cleaning"

Description Use this function to enter the recovery time after electrode cleaning to prevent signal output interference. The current output values are frozen in the meanwhile.

User entry 1 to 600 s

Factory setting 60 s

ECC clean. cycle

Navigation	 Expert → Sensor → Process param. → ECC → ECC clean. cycle (6557)
Prerequisite	For the following order code: "Application package", option EC "ECC electrode cleaning"
Description	Use this function to enter the pause duration until the next electrode cleaning.
User entry	0.5 to 168 h
Factory setting	0.5 h

ECC Polarity

Navigation	 Expert → Sensor → Process param. → ECC → ECC Polarity (6631)
Prerequisite	For the following order code: "Application package", option EC "ECC electrode cleaning"
Description	Displays the polarity of the electrode cleaning circuit.
User interface	■ Positive ■ Negative
Factory setting	Depends on the electrode material: ■ Platinum: Negative option ■ Tantalum, Alloy C22, stainless steel: Positive option

3.2.4 "External comp." submenu

Navigation  Expert → Sensor → External comp.

► External comp.

Density source (6615)

→  83

Fixed density (6623)

→  83

External density (6630)

→  84

FailSaTypRefDens (2081)

→  84

FailSaValRefDens (2082)

→  85

Linear exp coeff (1817)	→ 85
Square exp coeff (1818)	→ 86
Ref. density (1892)	→ 86
Temp. source (6712)	→ 87
External temp. (6673)	→ 88
FailSafeTypExtT (2075)	→ 88
FailSafeValExtT (2076)	→ 89
Ref. temperature (1816)	→ 89

Density source



Navigation	Expert → Sensor → External comp. → Density source (6615)
Description	Use this function to select the density source.
Selection	■ Fixed density ■ External density ■ Current input 1 * ■ Current input 2 * ■ Current input 3 * ■ Calculated value
Factory setting	Fixed density
Additional information	<i>Selection</i> Use this function to select the type of density compensation. When selecting the External density option, the density value of the cyclical PROFINET communication is used. In addition, the "External density" compensation value must be incorporated into the analog output module. Additional information: Operating Instructions, "Cyclical data transmission" section

Fixed density



Navigation	Expert → Sensor → External comp. → Fixed density (6623)
Prerequisite	The Fixed density option is selected in the Density source parameter (→ 83).

* Visibility depends on order options or device settings

Description	Use this function to enter a fixed value for the density.
User entry	Positive floating-point number
Factory setting	Country-specific: ■ 1 000 kg/l ■ 1 000 lb/ft³
Additional information	<i>Dependency</i>  The unit is taken from the Density unit parameter (→  59)

External density

Navigation	  Expert → Sensor → External comp. → External density (6630)
Prerequisite	The External density option is selected in the Density source parameter (→  83).
Description	Displays the density read in from the external device.
User entry	Positive floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Density unit parameter (→  59)

FailSaTypRefDens

Navigation	  Expert → Sensor → External comp. → FailSaTypRefDens (2081)
Description	Use this function to select the failsafe mode for the external reference density value.
Selection	■ Fail-safe value ■ Fallback value ■ Off
Factory setting	Off

Additional information	<i>Description</i> If the status of the input or simulation value is BAD, the failsafe mode defined here is used. <i>Selection</i> ■ Fail-safe value A substitute value is used. The substitute value is defined in the FailSaValRefDens parameter (→ 85). ■ Fallback value The last valid value is used. ■ Off The invalid value continues to be used.
FailSaValRefDens 	
Navigation	  Expert → Sensor → External comp. → FailSaValRefDens (2082)
Prerequisite	The Fail-safe value option is selected in the FailSaTypRefDens parameter (→ 84).
Description	Use this function to enter a fixed density value that is used for the external density in the event of a device alarm.
User entry	Signed floating-point number
Factory setting	0 kg/l
Additional information	<i>Description</i> In the event of a device alarm, the density value is displayed as an output value in the Density parameter (→ 46).
Linear exp coeff 	
Navigation	  Expert → Sensor → External comp. → Linear exp coeff (1817)
Prerequisite	The Calculated value option is selected in the Density source parameter (→ 83)
Description	Use this function to enter a linear, fluid-specific expansion coefficient for calculating the reference density.
User interface	Signed floating-point number
Factory setting	$-2.0295 \cdot 10^{-04} \text{ 1/K}$

Square exp coeff



Navigation

Expert → Sensor → External comp. → Square exp coeff (1818)

Prerequisite

The **Calculated value** option is selected in the **Density source** parameter (→ 83) parameter.

Description

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

User interface

Signed floating-point number

Factory setting

$-3.8436 \cdot 10^{-06} \text{ 1/K}^2$

Ref. density



Navigation

Expert → Sensor → External comp. → Ref. density (1892)

Prerequisite

The **Calculated value** option is selected in the **Density source** parameter (→ 83) parameter.

Description

Displays the reference density.

User interface

Positive floating-point number

Additional information

Description

The reference density is required for density calculation.

Deviation of the process temperature from the reference temperature:

$\Delta T = T - T_{\text{ref}}$

ΔT : Deviation

T : Process temperature

T_{ref} : Ref. temperature (→ 89)

Temperature-compensated density:

$\rho_{\text{comp}} = \rho_{\text{ref}}(1 + \alpha \Delta T + \beta \Delta T^2)$

ρ_{comp} : Calculated density

ρ_{ref} : Reference density

ΔT : Deviation of the process temperature from the reference temperature

α : Linear exp coeff (→ 85)

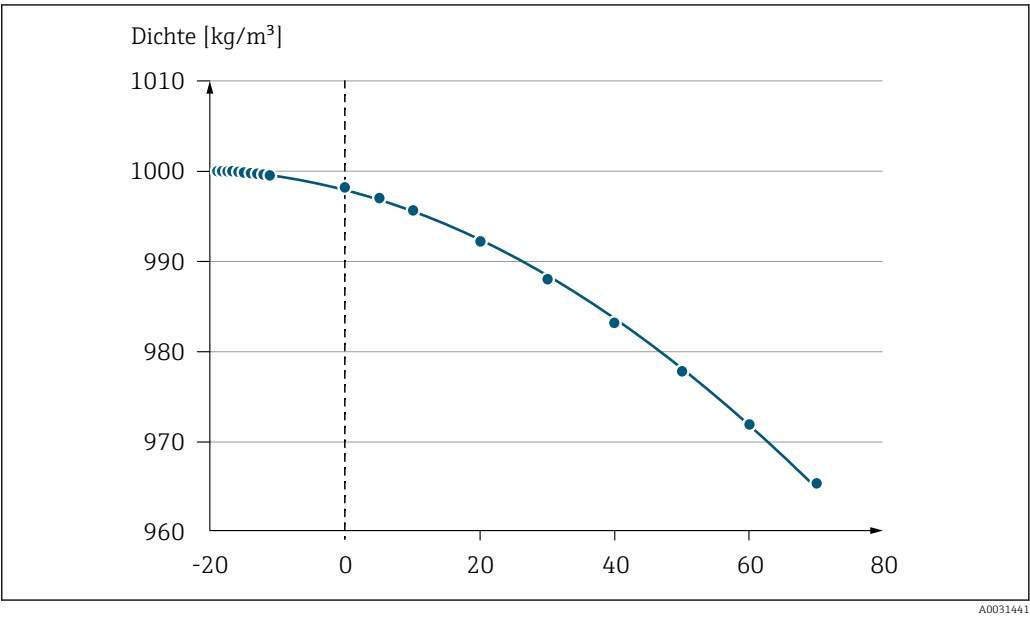
β : Square exp coeff (→ 86)

Example for water (factory setting)

For a reference temperature of $T_{\text{ref}} = 20 \text{ °C}$

A quadratic fit of a number of density values results in the following coefficients:

- $\alpha = -2.0295 \cdot 10^{-4} \text{ 1/K}$
- $\beta = -3.8436 \cdot 10^{-6} \text{ 1/K}^2$
- $\rho_{\text{ref}} = 997.82 \text{ kg/m}^3$



2 Quadratic fit

Dependency

The unit is taken from the **Density unit** parameter (→ 59)

Temp. source

Navigation

Expert → Sensor → External comp. → Temp. source (6712)

Description

Use this function to select the temperature source.

Selection

- Int.temp. sensor
- Off
- External value
- Current input 1 *
- Current input 2 *
- Current input 3 *

Factory setting

Off

Additional information

Selection

Use this function to select the type of temperature compensation. When selecting the **External value** option, the temperature value of the cyclical PROFINET communication is

* Visibility depends on order options or device settings

used. In addition, the "External temperature" compensation value must be incorporated into the analog output module.



For additional information, see the Operating Instructions, "Cyclical data transmission" section

External temp.

Navigation	Expert → Sensor → External comp. → External temp. (6673)
Prerequisite	The External value option is selected in the Temp. source parameter (→ 87).
Description	Displays the temperature read in from the external device.
User entry	Floating point number with sign
Additional information	<i>Dependency</i> The unit is taken from the Temperature unit parameter (→ 57)

FailSafeTypExtT

Navigation	Expert → Sensor → External comp. → FailSafeTypExtT (2075)
Description	Use this function to select the failsafe mode for the external temperature value.
Selection	■ Fail-safe value ■ Fallback value ■ Off
Factory setting	Off
Additional information	<i>Description</i> If the status of the input or simulation value is BAD, the failsafe mode defined here is used. <i>Selection</i> ■ Fail-safe value A substitute value is used. The substitute value is defined in the FailSafeValExtT parameter (→ 89). ■ Fallback value The last valid value is used. ■ Off The invalid value continues to be used.

FailSafeValExtT

Navigation	Expert → Sensor → External comp. → FailSafeValExtT (2076)
Prerequisite	The Fail-safe value option is selected in the FailSafeTypExtT parameter (→ 88).
Description	Use this function to enter a fixed temperature value that is used for the external pressure in the event of a device alarm.
User entry	Signed floating-point number
Factory setting	0 °C
Additional information	<i>Description</i> In the event of a device alarm, the temperature value is displayed as an output value in the Temperature parameter (→ 46).

Ref. temperature

Navigation	Expert → Sensor → External comp. → Ref. temperature (1816)
Prerequisite	The Fixed density option or External density option are selected in the Density source parameter (→ 83).
Description	Use this function to enter a reference temperature for calculating the reference density.
User interface	-273.15 to 99 999 °C
Factory setting	Country-specific: ■ +20 °C ■ +68 °F
Additional information	<i>Dependency</i> The unit is taken from the Temperature unit parameter (→ 57)

Reference density calculation

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

A0023403

- ρ_N : reference density
- ρ : fluid density currently measured
- t : fluid temperature currently measured
- t_N : reference temperature at which the reference density is calculated (e.g. 20 °C)
- Δt : $t - t_N$
- α : linear expansion coefficient of the fluid, unit = [1/K]; K = Kelvin
- β : square expansion coefficient of the fluid, unit = [1/K²]

3.2.5 "Sensor adjustment" submenu

Navigation   Expert → Sensor → Sensor adjustm.

► Sensor adjustm.		
Install. direct. (1809)	→ 	90
Integration time (6533)	→ 	90
Measuring period (6536)	→ 	90
► Variable adjust	→ 	91

Install. direct.

Navigation	  Expert → Sensor → Sensor adjustm. → Install. direct. (1809)
Description	Use this function to change the sign of the medium flow direction.
Selection	■ In arrow direct. ■ Against arrow
Factory setting	In arrow direct.
Additional information	Description  Before changing the sign: ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor nameplate.

Integration time

Navigation	  Expert → Sensor → Sensor adjustm. → Integration time (6533)
Description	Display the duration of an integration cycle.
User interface	1 to 65 ms

Measuring period

Navigation	  Expert → Sensor → Sensor adjustm. → Measuring period (6536)
Description	Display the time of a full measuring period.

User interface 0 to 1 000 ms

"Variable adjust" submenu

Navigation   Expert → Sensor → Sensor adjustm. → Variable adjust

▶ Variable adjust		
Vol. flow offset (1831)	→ 	91
Vol. flow factor (1832)	→ 	92
Mass flow offset (1841)	→ 	92
Mass flow factor (1846)	→ 	92
Conduct. offset (1848)	→ 	93
Conduct. factor (1849)	→ 	93
Corr. vol offset (1866)	→ 	93
Corr. vol factor (1867)	→ 	94
Temp. offset (1868)	→ 	94
Temp. factor (1869)	→ 	95
Corr.cond.offset (1870)	→ 	95
Corr.cond.factor (1871)	→ 	95
Flow vel. offset (1879)	→ 	96
Flow vel. factor (1880)	→ 	96

Vol. flow offset 

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

Description Use this function to enter the zero point shift for the volume flow trim. The volume flow unit on which the shift is based is m³/s.

User entry Signed floating-point number

Factory setting 0 m³/s

Additional information *Description*

 Corrected value = (factor × value) + offset

Vol. flow factor

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

 Corrected value = (factor × value) + offset

Mass flow offset

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

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

User entry Signed floating-point number

Factory setting 0 kg/s

Additional information *Description*

 Corrected value = (factor × value) + offset

Mass flow factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information*Description*

Corrected value = (factor × value) + offset

Conduct. offset**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. offset (1848)

PrerequisiteThe **On** option is selected in the **Conduct. measur.** parameter (→ 73) parameter.**Description**

Use this function to enter the zero point shift for the conductivity trim. The conductivity unit on which the shift is based is S/m.

User entry

Signed floating-point number

Factory setting

0 S/m

Additional information*Description*

Corrected value = (factor × value) + offset

Conduct. factor**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. factor (1849)

PrerequisiteThe **On** option is selected in the **Conduct. measur.** parameter (→ 73) parameter.**Description**

Use this function to enter a quantity factor for the conductivity. This multiplication factor is applied over the conductivity range.

User entry

Positive floating-point number

Factory setting

1

Additional information*Description*

Corrected value = (factor × value) + offset

Corr. vol offset**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol offset (1866)

DescriptionUse this function to enter the zero point shift for the corrected volume flow trim. The corrected volume flow unit on which the shift is based is 1 Nm³/s.**User entry**

Signed floating-point number

Factory setting 0 Nm³/s

Additional information *Description*



Corrected value = (factor × value) + offset

Corr. vol factor



Navigation

Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol factor (1867)

Description

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

User entry

Positive floating-point number

Factory setting

1

Additional information *Description*



Corrected value = (factor × value) + offset

Temp. offset



Navigation

Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. offset (1868)

Prerequisite

One of the following conditions is met:

- Order code for "Sensor option", option **CI** "Medium temperature measurement" or
- The temperature is read into the flowmeter from an external device.

Description

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

User entry

Signed floating-point number

Factory setting

0 K

Additional information *Description*



Corrected value = (factor × value) + offset

Temp. factor

Navigation  Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. factor (1869)

Prerequisite One of the following conditions is met:

- Order code for "Sensor option", option **CI** "Medium temperature measurement" or
- The temperature is read into the flowmeter from an external device.

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*
 Corrected value = (factor × value) + offset

Corr.cond.offset

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

Prerequisite The **On** option is selected in the **Conduct. measur.** parameter (→  73) parameter.

Description Use this function to enter the zero point shift to trim the corrected conductivity. The conductivity unit on which the shift is based is µS/cm.

User entry Signed floating-point number

Factory setting 0 S/m

Additional information *Description*
 Corrected value = (factor × value) + offset

Corr.cond.factor

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

Prerequisite The **On** option is selected in the **Conduct. measur.** parameter (→  73) parameter.

Description Use this function to enter a quantity factor for the corrected conductivity. In each case, this factor refers to the conductivity in µS/cm.

User entry Positive floating-point number

Factory setting	1
Additional information	<i>Description</i>  Corrected value = (factor × value) + offset

Flow vel. offset

Navigation	  Expert → Sensor → Sensor adjustm. → Variable adjust → Flow vel. offset (1879)
Description	Use this function to enter the zero point shift for the flow velocity trim. The flow velocity unit on which the shift is based is m/s.
User entry	Signed floating-point number
Factory setting	0 m/s
Additional information	<i>Description</i>  Corrected value = (factor × value) + offset

Flow vel. factor

Navigation	  Expert → Sensor → Sensor adjustm. → Variable adjust → Flow vel. factor (1880)
Description	Use this function to enter a quantity factor (without time) for the flow velocity. This multiplication factor is applied over the flow velocity range.
User entry	Positive floating-point number
Factory setting	1
Additional information	<i>Description</i>  Corrected value = (factor × value) + offset

3.2.6 "Calibration" submenu

Navigation  Expert → Sensor → Calibration

► Calibration

Nominal diameter (2807)

→  97

Cal. factor (6522)	→ 97
Zero point (6546)	→ 97
Cond. cal. fact. (6718)	→ 98

Nominal diameter

Navigation	 Expert → Sensor → Calibration → Nominal diameter (2807)
Description	Displays the nominal diameter of the sensor.
User interface	DNxx / x"
Factory setting	Depends on the size of the sensor
Additional information	<i>Description</i>  The value is also specified on the sensor nameplate.

Cal. factor

Navigation	 Expert → Sensor → Calibration → Cal. factor (6522)
Description	Displays the current calibration factor for the sensor.
User interface	Positive floating-point number
Factory setting	Depends on nominal diameter and calibration.

Zero point

Navigation	 Expert → Sensor → Calibration → Zero point (6546)
Description	This function shows the zero point correction value for the sensor.
User interface	Signed floating-point number
Factory setting	Depends on nominal diameter and calibration

Cond. cal. fact.

Navigation	 Expert → Sensor → Calibration → Cond. cal. fact. (6718)
Prerequisite	The On option is selected in the Conduct. measur. parameter (→  73) parameter.
Description	Displays the calibration factor for the conductivity measurement.
User interface	0.01 to 10 000

3.3 "I/O configuration" submenu

Navigation  Expert → I/O config.

► I/O config.

I/O 1 to n terminals (3902–1 to n)

→  98

I/O 1 to n info (3906–1 to n)

→  98

I/O 1 to n type (3901–1 to n)

→  99

Apply I/O config (3907)

→  99

Alteration code (2762)

→  100

I/O 1 to n terminals

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

I/O 1 to n info

Navigation	 Expert → I/O config. → I/O 1 to n info (3906–1 to n)
Description	Displays information about the plugged in I/O module.

User interface	■ Not plugged ■ Invalid ■ Not configurable ■ Configurable ■ PROFINET
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>"Fieldbus" option</i> The I/O module is configured for the fieldbus.

I/O 1 to n type



Navigation	Expert → I/O config. → I/O 1 to n type (3901–1 to n)
Prerequisite	For the following order code: "Output; input 2", option D "Configurable I/O initial setting off"
Description	Use this function to select the I/O module type for the configuration of the I/O module.
Selection	■ Off ■ Curr.output * ■ Current input * ■ Status input * ■ PFS output *
Factory setting	Off

Apply I/O config



Navigation	Expert → I/O config. → Apply I/O config (3907)
Description	Use this function to activate the newly configured I/O module type.
Selection	■ No ■ Yes

* Visibility depends on order options or device settings

Factory setting No

Alteration code

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

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

User entry Positive integer

Factory setting 0

Additional information *Description*
The I/O configuration is changed in the **I/O type** parameter (→  99).

3.4 "Input" submenu

Navigation  Expert → Input

▶ Input

▶ Current input 1 to n

→  100

▶ Status input 1 to n

→  103

3.4.1 "Current input 1 to n" submenu

Navigation  Expert → Input → Current input 1 to n

▶ Current input 1 to n

Terminal no. (1611–1 to n)

→  101

Signal mode (1610–1 to n)

→  101

Current span (1605–1 to n)

→  101

0/4 mA value (1606–1 to n)

→  102

20 mA value (1607–1 to n)

→  102

Failure mode (1601-1 to n)	→  103
Failure value (1602-1 to n)	→  103

Terminal no.

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

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

User interface

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

Additional information *"Not used" option*
The current input module does not use any terminal numbers.

Signal mode

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

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

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

Selection

- Passive
- Active

Factory setting Active

Current span

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

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

Selection

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

Factory setting

Country-specific:

- 4...20 mA NAMUR
- 4...20 mA US

Additional information *Examples*

 Sample values for the current range: **Current span** parameter (→  107)

0/4 mA value

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Current input behavior*

The current input behaves differently depending on the settings configured in the following parameters:

- Current span (→  101)
- Failure mode (→  103)

Configuration examples

 Pay attention to the configuration examples for **4 mA value** parameter (→  109).

20 mA value

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

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Configuration examples*

 Pay attention to the configuration examples for **4 mA value** parameter (→  109).

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 (→  101).	
Selection	■ Alarm ■ Last valid value ■ Defined value	
Factory setting	Alarm	
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 (→  103)).	
Failure value		

Navigation	  Expert → Input → Current input 1 to n → Failure value (1602–1 to n)
Prerequisite	In the Failure mode parameter (→  103), the Defined value option is selected.
Description	Use this function to enter the value that the device uses if it does not receive an input signal from the external device, or if the input signal is invalid.
User entry	Signed floating-point number
Factory setting	0

3.4.2 "Status input 1 to n" submenu

Navigation   Expert → Input → Status input 1 to n

► Status input 1 to n

Terminal no. (1358–1 to n)

Assign stat.inp. (1352–1 to n)

Val.stat.inp. (1353–1 to n)

→  104

→  104

→  105

Active level (1351-1 to n)	→ 105
Response time (1354-1 to n)	→ 105

Terminal no.

Navigation	  Expert → Input → Status input 1 to n → Terminal no. (1358-1 to n)
Description	Displays the terminal numbers used by the status input module.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3)
Additional information	<i>"Not used" option</i> The status input module does not use any terminal numbers.

Assign stat.inp.



Navigation	  Expert → Input → Status input 1 to n → Assign stat.inp. (1352-1 to n)
Description	Use this function to select the function for the status input.
Selection	■ Off ■ Reset totaliz. 1 ■ Reset totaliz. 2 ■ Reset totaliz. 3 ■ Reset all tot. ■ Flow override
Factory setting	Off
Additional information	<i>Selection</i> ■ Off The status input is switched off. ■ Reset totaliz. 1...3 The individual totalizers are reset. ■ Reset all tot. All totalizers are reset. ■ Flow override The Flow override (→ 72) is activated.  Note on the Flow override (→ 72): ■ The Flow override (→ 72) is enabled as long as the level is at the status input (continuous signal). ■ All other assignments react to a change in level (pulse) at the status input.

Val.stat.inp.	
Navigation	 Expert → Input → Status input 1 to n → Val.stat.inp. (1353–1 to n)
Description	Displays the current input signal level.
User interface	■ High ■ Low
Active level	
Navigation	 Expert → Input → Status input 1 to n → Active level (1351–1 to n)
Description	Use this function to determine the input signal level at which the assigned function is activated.
Selection	■ High ■ Low
Factory setting	High
Response time	
Navigation	 Expert → Input → Status input 1 to n → Response time (1354–1 to n)
Description	Use this function to enter the minimum time period for which the input signal level must be present before the selected function is activated.
User entry	5 to 200 ms
Factory setting	50 ms

3.5 "Output" submenu

Navigation  Expert → Output

► Output

► Curr.output 1 to n

→  106

► PFS output 1 to n

→  119

► Relay output 1 to n

→  139

3.5.1 "Current output 1 to n" submenu

Navigation  Expert → Output → Curr.output 1 to n

► Curr.output 1 to n		
Terminal no. (0379-1 to n)	→ 	106
Signal mode (0377-1 to n)	→ 	107
Assign curr. 1 to n (0359-1 to n)	→ 	107
Current span (0353-1 to n)	→ 	107
Fixed current (0365-1 to n)	→ 	108
0/4 mA value (0367-1 to n)	→ 	109
20 mA value (0372-1 to n)	→ 	110
Measuring mode (0351-1 to n)	→ 	111
Damping out. 1 to n (0363-1 to n)	→ 	115
Response time (0378-1 to n)	→ 	116
Failure mode (0364-1 to n)	→ 	117
Failure current (0352-1 to n)	→ 	118
Output curr. 1 to n (0361-1 to n)	→ 	118
Measur. curr. 1 to n (0366-1 to n)	→ 	119

Terminal no.

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

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

User interface

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

Additional information

"Not used" option

The current output module does not use any terminal numbers.

Signal mode



Navigation	 Expert → Output → Curr.output 1 to n → Signal mode (0377–1 to n)
Description	Use this function to select the signal mode for the current output.
Selection	■ Passive ■ Active
Factory setting	Active

Assign curr. 1 to n



Navigation	 Expert → Output → Curr.output 1 to n → Assign curr. 1 to n (0359–1 to n)
Description	Use this function to select a process variable for the current output.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity * ■ CorrConductivity * ■ Temperature * ■ Electronic temp.
Factory setting	Volume flow

Current span



Navigation	 Expert → Output → Curr.output 1 to n → Current span (0353–1 to n)
Description	Use this function to select the current range for the process value output and the upper and lower level for signal on alarm.
Selection	■ 4...20 mA NAMUR ■ 4...20 mA US ■ 4...20 mA ■ 0...20 mA ■ Fixed current
Factory setting	Country-specific: ■ 4...20 mA NAMUR ■ 4...20 mA US

* Visibility depends on order options or device settings

Additional information

Description

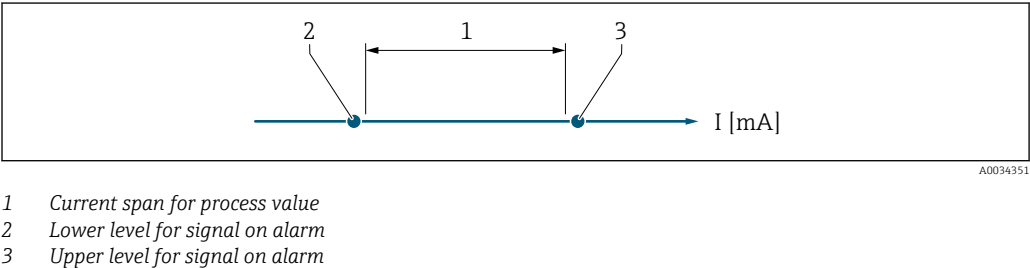
- 
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→  117).
 - If the measured value is outside the measuring range, the diagnostic message **△S441 Curr.output 1 to n** is displayed.
 - The measuring range is specified via the **0/4 mA value** parameter (→  109) and **20 mA value** parameter (→  110).

"Fixed current" option

The current value is set via the **Fixed current** parameter (→  108).

Example

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



Selection

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

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

Fixed current

Navigation

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

Prerequisite

The **Fixed current** option is selected in the **Current span** parameter (→  107).

Description

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

User entry

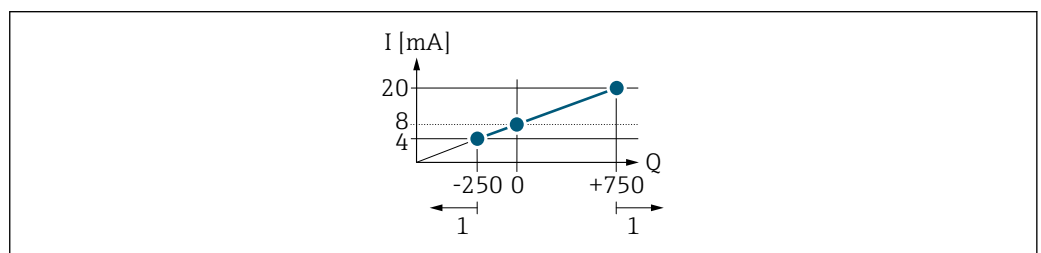
0 to 22.5 mA

Factory setting

22.5 mA

0/4 mA value 🔒

Navigation	🔍📄 Expert → Output → Curr.output 1 to n → 0/4 mA value (0367-1 to n)
Prerequisite	One of the following options is selected in the Current span parameter (→ 📄 107): ■ 4...20 mA NAMUR ■ 4...20 mA US ■ 4...20 mA ■ 0...20 mA
Description	Use this function to enter a value for the 0/4 mA current.
User entry	Signed floating-point number
Factory setting	Country-specific: ■ 0 l/h ■ 0 gal/min (us)
Additional information	<i>Description</i> Positive and negative values are permitted depending on the process variable assigned in the Assign curr. parameter (→ 📄 107). 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 (→ 📄 110). <i>Dependency</i> i The unit depends on the process variable selected in the Assign curr. parameter (→ 📄 107). <i>Current output behavior</i> The current output behaves differently depending on the settings configured in the following parameters: ■ Current span (→ 📄 107) ■ Failure mode (→ 📄 117) <i>Configuration examples</i> Some examples of parameter settings and their effect on the current output are given in the following section. Configuration example A Measuring mode with Forward flow option ■ 0/4 mA value parameter (→ 📄 109) = not equal to zero flow (e.g. -250 m³/h) ■ 20 mA value parameter (→ 📄 110) = not equal to zero flow (e.g. +750 m³/h) ■ Calculated current value = 8 mA at zero flow

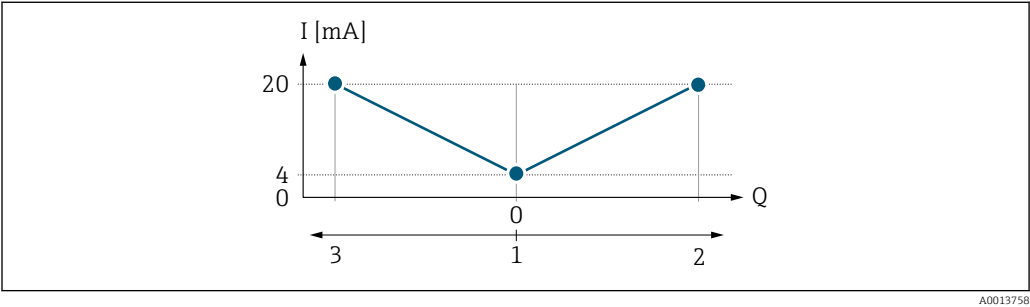


A0013757

Q Flow
I Current
1 Measuring range is exceeded or undershot

The operational range of the measuring device is defined by the values entered for the **0/4 mA value** parameter (→  109) and **20 mA value** parameter (→  110). If the effective flow exceeds or falls below this operational range, the diagnostic message **△S441 Curr.output 1 to n** is displayed.

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



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

The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **0/4 mA value** parameter (→  109) and **20 mA value** parameter (→  110) must have the same sign. The value for the **20 mA value** parameter (→  110) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→  110) (e.g. forward flow).

Configuration example C
Measuring mode with **Rev. flow comp.** option
If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s → 111.

20 mA value

Navigation	  Expert → Output → Curr.output 1 to n → 20 mA value (0372-1 to n)
Prerequisite	One of the following options is selected in the Current span parameter (→  107): ■ 4...20 mA NAMUR ■ 4...20 mA US ■ 4...20 mA ■ 0...20 mA
Description	Use this function to enter a value for the 20 mA current.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter→  218
Additional information	<i>Description</i> Positive and negative values are permitted depending on the process variable assigned in the Assign curr. parameter (→  107). 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 (→  109).

Dependency

 The unit depends on the process variable selected in the **Assign curr.** parameter (→  107).

Example

- Value assigned to 0/4 mA = -250 m³/h
- Value assigned to 20 mA = +750 m³/h
- Calculated current value = 8 mA (at zero flow)

If the **Forward/Reverse** option is selected in the **Measuring mode** parameter (→  111), different signs cannot be entered for the values of the **0/4 mA value** parameter (→  109) and **20 mA value** parameter (→  110). The diagnostic message **△S441 Curr.output 1 to n** is displayed.

Configuration examples

 Observe the configuration examples for the **0/4 mA value** parameter (→  109).

Measuring mode

Navigation

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

Prerequisite

One of the following options is selected in the **Assign curr.** parameter (→  107):

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity *
- CorrConductivity *
- Temperature *
- Electronic temp.

One of the following options is selected in the **Current span** parameter (→  107):

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

Description

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

Selection

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

Factory setting

Forward flow

* Visibility depends on order options or device settings

Additional information*Description*

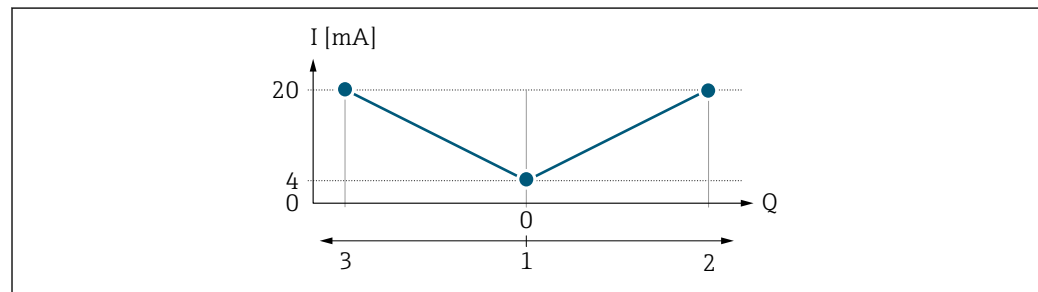
 The process variable that is assigned to the current output via the **Assign curr.** parameter (→  107) is displayed below the parameter.

"Forward flow" option

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

The flow components outside the scaled measuring range are taken into account for signal output as follows:

- Both values are defined such that they are not equal to zero flow e.g.:
 - 0/4 mA current value = $-5 \text{ m}^3/\text{h}$
 - 20 mA current value = $10 \text{ m}^3/\text{h}$
- If the effective flow exceeds or falls below this measuring range, the diagnostic message **△S441 Curr.output 1 to n** is displayed.

"Forward/Reverse" option

A0013758

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

- The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **0/4 mA value** parameter (→  109) and **20 mA value** parameter (→  110) must have the same sign.
- The value for the **20 mA value** parameter (→  110) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→  110) (e.g. forward flow).

"Rev. flow comp." option

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

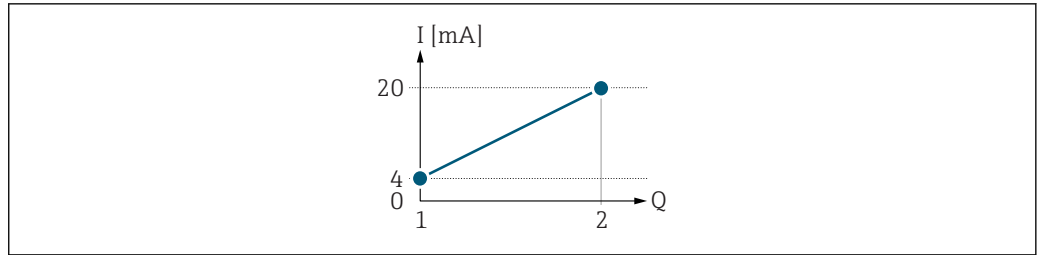
If buffering cannot be processed within approx. 60 s, the diagnostic message **△S441 Curr.output 1 to n** is displayed.

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

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

*Examples of how the current output behaves***Example 1**

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



A0028084

3 Measuring range

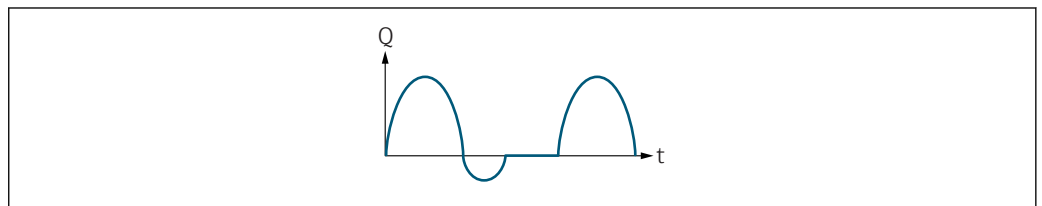
I Current

Q Flow

1 Lower range value (value assigned to 0/4 mA current)

2 Upper range value (value assigned to 20 mA current)

With the following flow response:



A0028091

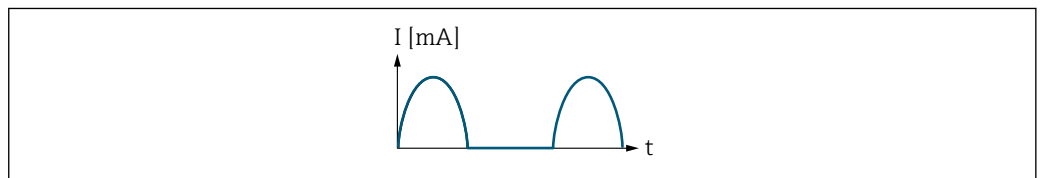
4 Flow response

Q Flow

t Time

With **Forward flow** option

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



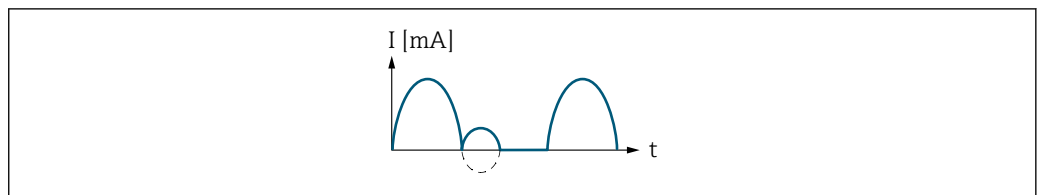
A0028092

I Current

t Time

With **Forward/Reverse** option

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



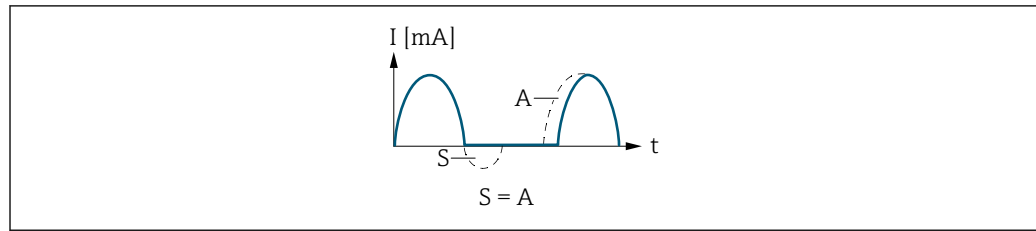
A0028093

I Current

t Time

With **Rev. flow comp.** option

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

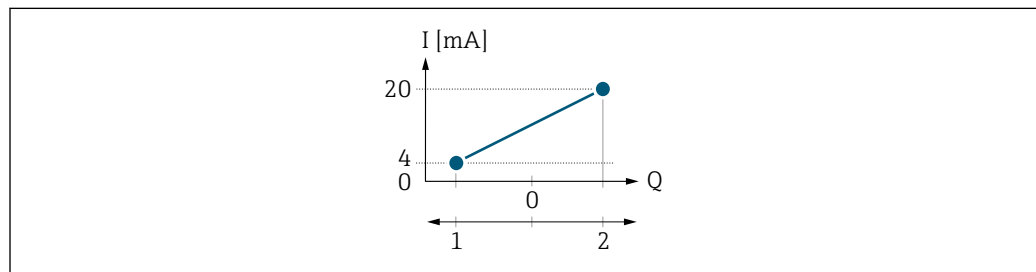


A0028094

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

Example 2

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

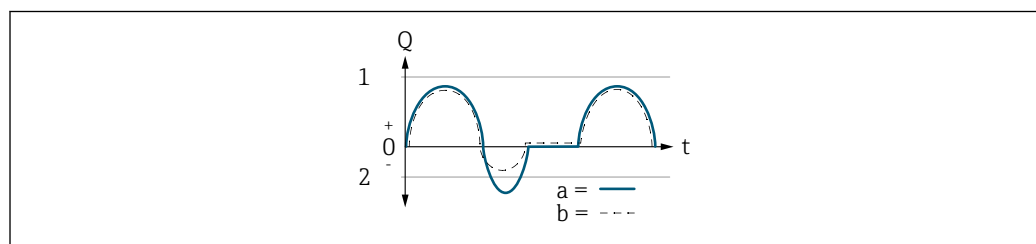


A0028095

5 Measuring range

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

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

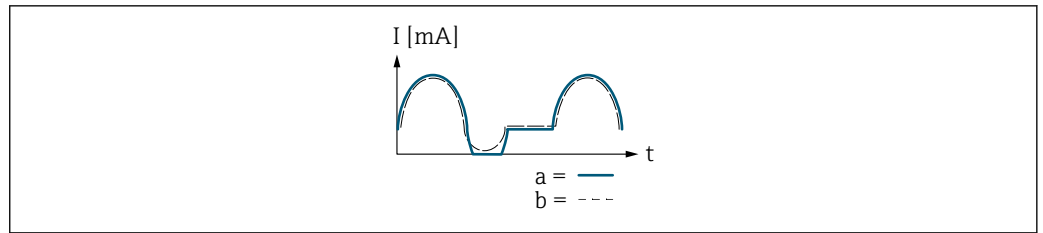


A0028098

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

With **Forward flow** option

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



A0028100

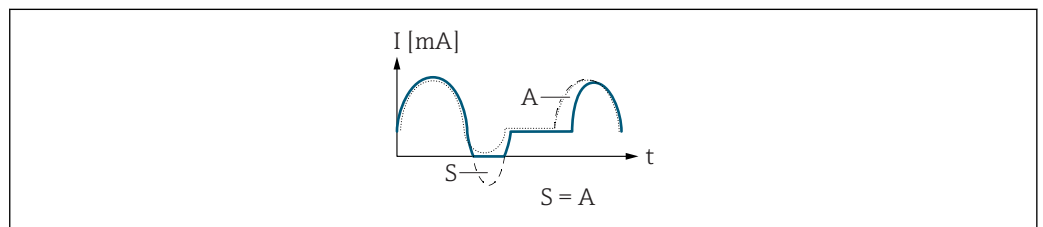
I Current
 t Time

With **Forward/Reverse** option

This option is not possible in this case as the values for the **0/4 mA value** parameter (→ 109) and **20 mA value** parameter (→ 110) have different signs.

With **Rev. flow comp.** option

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



A0028101

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

Damping out. 1 to n



Navigation

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

Prerequisite

One of the following options is selected in the **Assign curr.** parameter (→ 107):

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity*
- CorrConductivity*
- Temperature*
- Electronic temp.

One of the following options is selected in the **Current span** parameter (→ 107):

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

* Visibility depends on order options or device settings

Description	Use this function to enter a time constant for the reaction time of the current output signal to fluctuations in the measured value caused by process conditions.
User entry	0.0 to 999.9 s
Factory setting	1.0 s
Additional information	<i>Entry</i> Use this function to enter a time constant (PT1 element ³⁾) for current output damping: ■ If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables. ■ On the other hand, the current output reacts more slowly if a high time constant is entered.  Damping is switched off if 0 is entered (factory setting).

Response time

Navigation	 Expert → Output → Curr.output 1 to n → Response time (0378-1 to n)
Prerequisite	One of the following options is selected in the Assign curr. parameter (→  107): ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity [*] ■ CorrConductivity [*] ■ Temperature [*] ■ Electronic temp. One of the following options is selected in the Current span parameter (→  107): ■ 4...20 mA NAMUR ■ 4...20 mA US ■ 4...20 mA ■ 0...20 mA
Description	Displays the response time. This specifies how quickly the current output reaches the measured value change of 63 % of 100 % of the measured value change.
User interface	Positive floating-point number
Additional information	<i>Description</i>  The response time is made up of the time specified for the following dampings: ■ Current output damping →  115 and ■ Depending on the measured variable assigned to the output. Flow damping

³⁾ proportional transmission behavior with first order delay
^{*} Visibility depends on order options or device settings

Failure mode	
Navigation	Expert → Output → Curr.output 1 to n → Failure mode (0364-1 to n)
Prerequisite	One of the following options is selected in the Assign curr. parameter (→ 107): ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity * ■ CorrConductivity * ■ Temperature * ■ Electronic temp. One of the following options is selected in the Current span parameter (→ 107): ■ 4...20 mA NAMUR ■ 4...20 mA US ■ 4...20 mA ■ 0...20 mA
Description	Use this function to select the value of the current output in the event of a device alarm.
Selection	■ Min. ■ Max. ■ Last valid value ■ Actual value ■ Defined value
Factory setting	Max.

* Visibility depends on order options or device settings

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 (→ 107).

"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 (→ 107).

"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 (→ 118).

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 (→ 117).

Description

Use this function to enter a fixed value that the current output adopts in the event of a device alarm.

User entry

0 to 22.5 mA

Factory setting

22.5 mA

Output curr. 1 to n**Navigation**

Expert → Output → Curr.output 1 to n → Output curr. 1 to n (0361–1 to n)

Description

Displays the current value currently calculated for the current output.

User interface

3.59 to 22.5 mA

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

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

Navigation  Expert → Output → PFS output 1 to n

► PFS output 1 to n	
Terminal no. (0492-1 to n)	→  120
Signal mode (0490-1 to n)	→  121
Operating mode (0469-1 to n)	→  121
Assign pulse 1 to n (0460-1 to n)	→  123
Value per pulse (0455-1 to n)	→  123
Pulse width (0452-1 to n)	→  124
Measuring mode (0457-1 to n)	→  124
Failure mode (0480-1 to n)	→  125
Pulse output 1 to n (0456-1 to n)	→  126
Assign freq. (0478-1 to n)	→  127
Min. freq. value (0453-1 to n)	→  127
Max. freq. value (0454-1 to n)	→  128
Val. at min.freq (0476-1 to n)	→  128
Val. at max.freq (0475-1 to n)	→  129
Measuring mode (0479-1 to n)	→  129
Damping out. 1 to n (0477-1 to n)	→  130

Response time (0491-1 to n)	→  131
Failure mode (0451-1 to n)	→  131
Failure freq. (0474-1 to n)	→  132
Output freq. 1 to n (0471-1 to n)	→  132
Switch out funct (0481-1 to n)	→  133
Assign diag. beh (0482-1 to n)	→  133
Assign limit (0483-1 to n)	→  134
Switch-on value (0466-1 to n)	→  136
Switch-off value (0464-1 to n)	→  136
Assign dir.check (0484-1 to n)	→  137
Assign status (0485-1 to n)	→  137
Switch-on delay (0467-1 to n)	→  137
Switch-off delay (0465-1 to n)	→  138
Failure mode (0486-1 to n)	→  138
Switch status 1 to n (0461-1 to n)	→  138
Invert outp.sig. (0470-1 to n)	→  139

Terminal no.

Navigation	  Expert → Output → PFS output 1 to n → Terminal no. (0492-1 to n)
Description	Displays the terminal numbers used by the pulse/frequency/switch output module.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3)
Additional information	"Not used" option The pulse/frequency/switch output module does not use any terminal numbers.

Signal mode

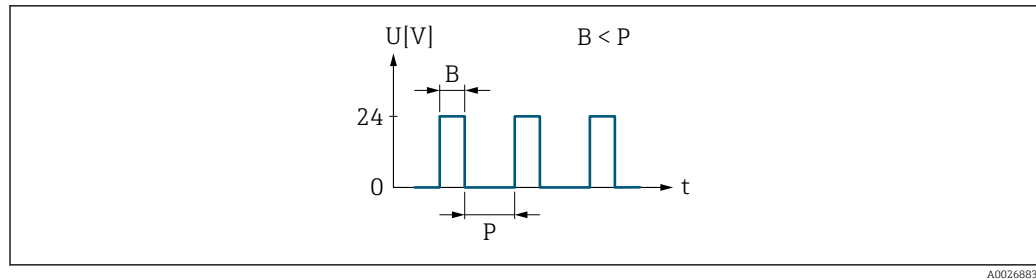


Navigation	Expert → Output → PFS output 1 to n → Signal mode (0490–1 to n)
Description	Use this function to select the signal mode for the pulse/frequency/switch output.
Selection	■ Passive ■ Active
Factory setting	Passive

Operating mode



Navigation	Expert → Output → PFS output 1 to n → Operating mode (0469–1 to n)
Description	Use this function to select the operating mode of the output as a pulse, frequency or switch output.
Selection	■ Pulse ■ Frequency ■ Switch
Factory setting	Pulse
Additional information	<i>"Pulse" option</i> Quantity-dependent pulse with configurable pulse width ■ Whenever a specific mass, volume or corrected volume is reached (pulse value), a pulse is output, the duration of which was set previously (pulse width). ■ The pulses are never shorter than the set duration. Example ■ Flow rate approx. 100 g/s ■ Pulse value 0.1 g ■ Pulse width 0.05 ms ■ Pulse rate 1 000 Impuls/s



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

B Pulse width entered

P Pauses between the individual pulses

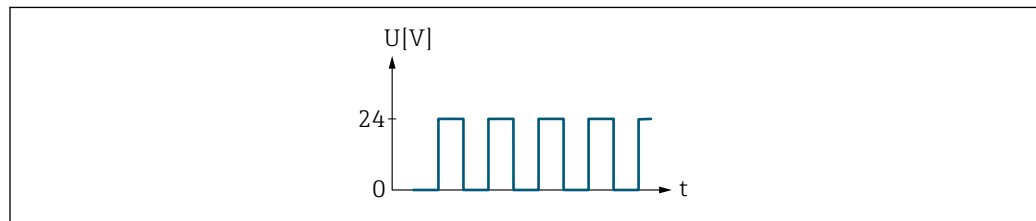
"Frequency" option

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

An output frequency is output that is proportional to the value of a process variable, such as volume flow, mass flow, corrected volume flow, flow velocity, conductivity, corrected conductivity, temperature or electronic temperature.

Example

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



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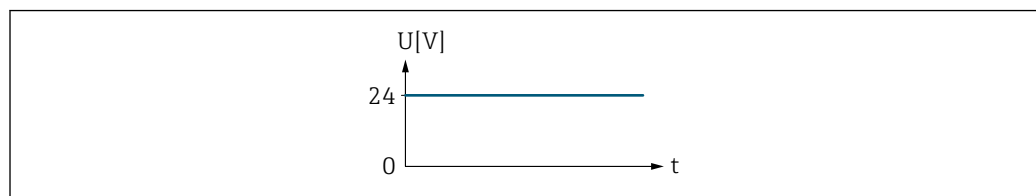
7 Flow-proportional frequency output

"Switch" option

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

Example

Alarm response without alarm

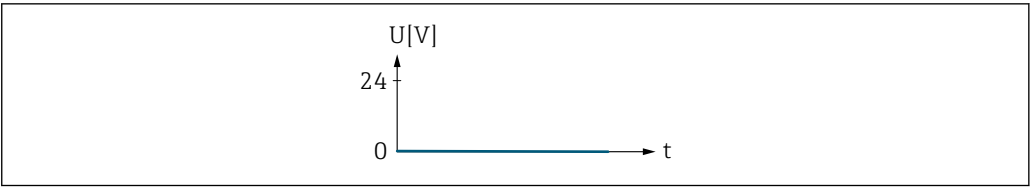


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8 No alarm, high level

Example

Alarm response in case of alarm



A0026885

9 Alarm, low level

Assign pulse 1 to n

Navigation	 Expert → Output → PFS output 1 to n → Assign pulse 1 to n (0460–1 to n)
Prerequisite	The Pulse option is selected in the Operating mode parameter (→  121).
Description	Use this function to select the process variable for the pulse output.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow
Factory setting	Off

Value per pulse

Navigation	 Expert → Output → PFS output 1 to n → Value per pulse (0455–1 to n)
Prerequisite	In the Operating mode parameter (→  121), the Pulse option is selected, and one of the following options is selected in the Assign pulse parameter (→  123): ■ Mass flow ■ Volume flow ■ Correct.vol.flow
Description	Use this function to enter the value for the measured value that a pulse is equivalent to.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter →  219
Additional information	Entry Weighting of the pulse output with a quantity. The lower the pulse value, the ■ better the resolution. ■ the higher the frequency of the pulse response.

Pulse width



Navigation

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

Prerequisite

In the **Operating mode** parameter (→ 121), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→ 123):

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

Description

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

User entry

0.05 to 2 000 ms

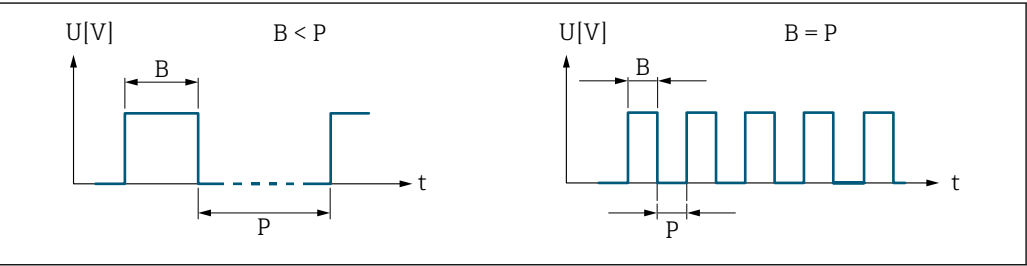
Factory setting

100 ms

Additional information

Description

- Define how long a pulse is (duration).
- The maximum pulse rate is defined by $f_{\max} = 1 / (2 \times \text{pulse width})$.
- 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 diagnostic message **△S443 Pulse output 1 to n**.



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B Pulse width entered
P Pauses between the individual pulses

Example

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

Measuring mode



Navigation

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

Prerequisite

In the **Operating mode** parameter (→ 121) the **Pulse** option is selected and in the **Assign pulse** parameter (→ 123) one of the following options is selected:

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

Description	Use this function to select the measuring mode for the pulse output.
Selection	■ Forward flow ■ Forward/Reverse ■ Reverse flow ■ Rev. flow comp.
Factory setting	Forward flow
Additional information	<i>Selection</i> ■ Forward flow Positive flow is output, negative flow is not output. ■ Forward/Reverse Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow. ■ Reverse flow Negative flow is output, positive flow is not output. ■ Rev. flow comp. The flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.  For a detailed description of the options available, see the Measuring mode parameter (→  111) <i>Examples</i>  For a detailed description of the configuration examples, see the Measuring mode parameter (→  111)

Failure mode

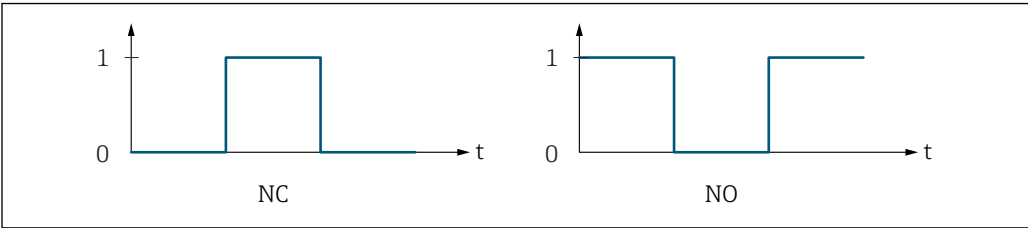


Navigation	  Expert → Output → PFS output 1 to n → Failure mode (0480–1 to n)
Prerequisite	In the Operating mode parameter (→  121), the Pulse option is selected, and one of the following options is selected in the Assign pulse parameter (→  123): ■ Mass flow ■ Volume flow ■ Correct.vol.flow
Description	Use this function to select the failure mode of the pulse output in the event of a device alarm.
Selection	■ Actual value ■ No pulses
Factory setting	No pulses

Additional information	<i>Description</i> The dictates of safety render it advisable to ensure that the pulse output shows a predefined behavior in the event of a device alarm. <i>Selection</i> ■ 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.
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Pulse output 1 to n

Navigation	Expert → Output → PFS output 1 to n → Pulse output 1 to n (0456-1 to n)
Prerequisite	In the Operating mode parameter (→ 121), the Pulse option is selected.
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.



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

The output behavior can be reversed via the **Invert outp.sig.** parameter (→ 139) i.e. the transistor does not conduct for the duration of the pulse.

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

Assign freq. 	
Navigation	  Expert → Output → PFS output 1 to n → Assign freq. (0478–1 to n)
Prerequisite	The Frequency option is selected in the Operating mode parameter (→  121).
Description	Use this function to select the process variable for the frequency output.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity[*] ■ CorrConductivity[*] ■ Temperature[*] ■ Electronic temp.
Factory setting	Off
Min. freq. value 	
Navigation	  Expert → Output → PFS output 1 to n → Min. freq. value (0453–1 to n)
Prerequisite	One of the following options is selected in the Assign curr. parameter (→  107): ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity[*] ■ CorrConductivity[*] ■ Temperature[*] ■ Electronic temp.
Description	Use this function to enter the start value frequency.
User entry	0.0 to 10 000.0 Hz
Factory setting	0.0 Hz

* Visibility depends on order options or device settings

Max. freq. value

Navigation	Expert → Output → PFS output 1 to n → Max. freq. value (0454–1 to n)
Prerequisite	One of the following options is selected in the Assign curr. parameter (→ 107): ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity[*] ■ CorrConductivity[*] ■ Temperature[*] ■ Electronic temp.
Description	Use this function to enter the end value frequency.
User entry	0.0 to 10 000.0 Hz
Factory setting	10 000.0 Hz

Val. at min.freq

Navigation	Expert → Output → PFS output 1 to n → Val. at min.freq (0476–1 to n)
Prerequisite	One of the following options is selected in the Assign curr. parameter (→ 107): ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity[*] ■ CorrConductivity[*] ■ Temperature[*] ■ Electronic temp.
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 freq. parameter (→ 127).

* Visibility depends on order options or device settings

Val. at max.freq

**Navigation** Expert → Output → PFS output 1 to n → Val. at max.freq (0475–1 to n)**Prerequisite**One of the following options is selected in the **Assign curr.** parameter (→  107):

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity *
- CorrConductivity *
- Temperature *
- Electronic temp.

Description

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

User entry

Signed floating-point number

Factory setting

Depends on country and nominal diameter

Additional information*Description*

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

DependencyThe entry depends on the process variable selected in the **Assign freq.** parameter (→  127).

Measuring mode

**Navigation** Expert → Output → PFS output 1 to n → Measuring mode (0479–1 to n)**Prerequisite**One of the following options is selected in the **Assign curr.** parameter (→  107):

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity *
- CorrConductivity *
- Temperature *
- Electronic temp.

Description

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

Selection

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

Factory setting

Forward flow

* Visibility depends on order options or device settings

Additional information*Selection*

For a detailed description of the options available, see the **Measuring mode** parameter (→ 111)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 111)

Damping out. 1 to n**Navigation**

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

Prerequisite

One of the following options is selected in the **Assign curr.** parameter (→ 107):

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity^{*}
- CorrConductivity^{*}
- Temperature^{*}
- Electronic temp.

Description

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

User entry

0 to 999.9 s

Factory setting

0.0 s

Additional information*User entry*

Use this function to enter a time constant (PT1 element⁴⁾) for frequency output damping:

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



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

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

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

Response time

Navigation	 Expert → Output → PFS output 1 to n → Response time (0491-1 to n)
Prerequisite	One of the following options is selected in the Assign curr. parameter (→  107): ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity * ■ CorrConductivity * ■ Temperature * ■ Electronic temp.
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	One of the following options is selected in the Assign curr. parameter (→  107): ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity * ■ CorrConductivity * ■ Temperature * ■ Electronic temp.
Description	Use this function to select the failure mode of the frequency output in the event of a device alarm.
Selection	■ Actual value ■ Defined value ■ 0 Hz
Factory setting	0 Hz

* Visibility depends on order options or device settings

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 freq. (→  132) 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.
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Failure freq.	
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Navigation	  Expert → Output → PFS output 1 to n → Failure freq. (0474–1 to n)
Prerequisite	One of the following options is selected in the Assign curr. parameter (→  107): ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity[*] ■ CorrConductivity[*] ■ Temperature[*] ■ Electronic temp.
Description	Use this function to enter the value for the frequency output in the event of a device alarm in order to bypass the alarm.
User entry	0.0 to 12 500.0 Hz
Factory setting	0.0 Hz

Output freq. 1 to n	
Navigation	  Expert → Output → PFS output 1 to n → Output freq. 1 to n (0471–1 to n)
Prerequisite	In the Operating mode parameter (→  121), the Frequency option is selected.
Description	Displays the actual value of the output frequency which is currently measured.
User interface	0.0 to 12 500.0 Hz

* Visibility depends on order options or device settings

Switch out funct 	
Navigation	  Expert → Output → PFS output 1 to n → Switch out funct (0481–1 to n)
Prerequisite	The Switch option is selected in the Operating mode parameter (→  121).
Description	Use this function to select a function for the switch output.
Selection	■ Off ■ On ■ Diag. behavior ■ Limit ■ Fl. direct.check ■ Status
Factory setting	Off
Additional information	<i>Selection</i> ■ Off The switch output is permanently switched off (open, non-conductive). ■ On The switch output is permanently switched on (closed, conductive). ■ Diag. behavior Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level. ■ Limit Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level. ■ Fl. direct.check Indicates the flow direction (forward or reverse flow). ■ Status Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.
Assign diag. beh 	
Navigation	  Expert → Output → PFS output 1 to n → Assign diag. beh (0482–1 to n)
Prerequisite	■ In the Operating mode parameter (→  121), the Switch option is selected. ■ In the Switch out funct parameter (→  133), the Diag. behavior option is selected.
Description	Use this function to select the diagnostic event category that is displayed for the switch output.
Selection	■ Alarm ■ Alarm or warning ■ Warning
Factory setting	Alarm

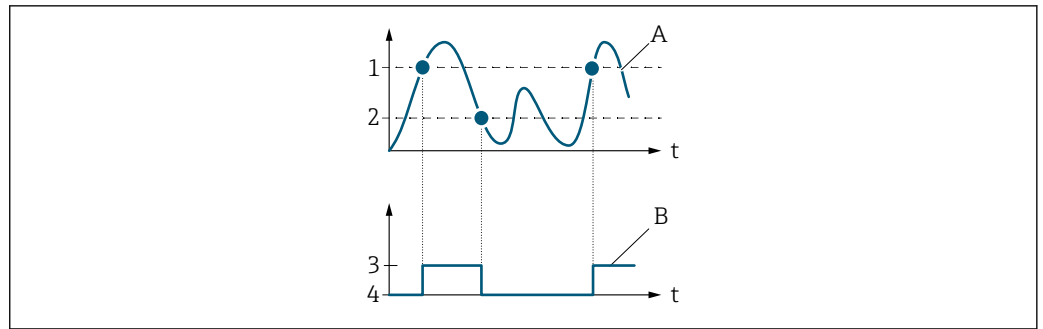
Additional information	<i>Description</i>  If no diagnostic event is pending, the switch output is closed and conductive. <i>Selection</i> ■ Alarm The switch output signals only diagnostic events in the alarm category. ■ Alarm or warning The switch output signals diagnostic events in the alarm and warning category. ■ Warning The switch output signals only diagnostic events in the warning category.
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Assign limit

Navigation	 Expert → Output → PFS output 1 to n → Assign limit (0483-1 to n)
Prerequisite	■ The Switch option is selected in the Operating mode parameter (→  121). ■ The Limit option is selected in the Switch out funct parameter (→  133).
Description	Use this function to select a process variable for the limit function.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity[*] ■ CorrConductivity[*] ■ Totalizer 1 ■ Totalizer 2 ■ Totalizer 3 ■ Temperature[*] ■ Electronic temp.
Factory setting	Volume flow

Additional information	<i>Description</i> Behavior of status output when Switch-on value > Switch-off value: ■ Process variable > Switch-on value: transistor is conductive ■ Process variable < Switch-off value: transistor is non-conductive
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* Visibility depends on order options or device settings

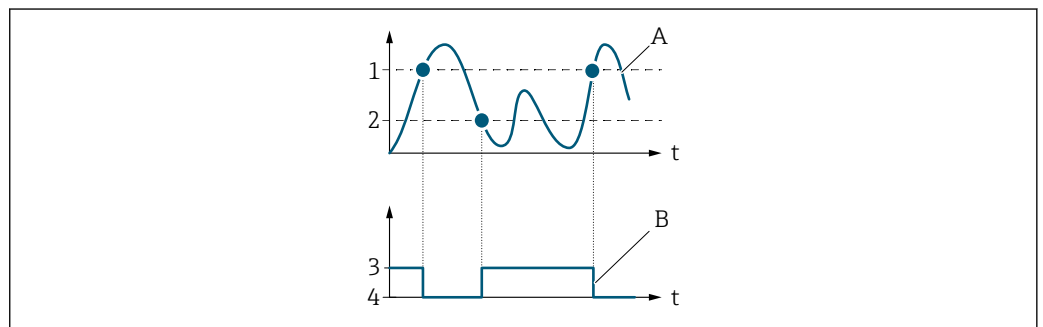


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- 1 Switch-on value
- 2 Switch-off value
- 3 Conductive
- 4 Non-conductive
- A Process variable
- B Status output

Behavior of status output when Switch-on value < Switch-off value:

- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive

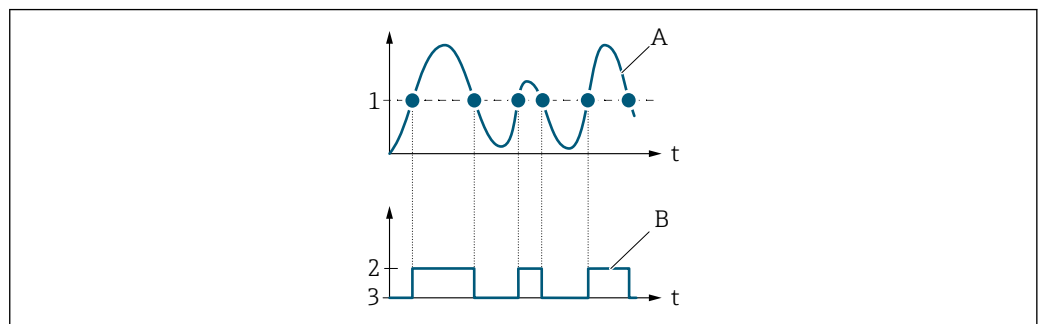


A0026892

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

Behavior of status output when Switch-on value = Switch-off value:

- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive



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	■ In the Operating mode parameter (→  121), the Switch option is selected. ■ In the Switch out funct parameter (→  133), the Limit option is selected.
Description	Use this function to enter the measured value for the switch-on point.
User entry	Signed floating-point number
Factory setting	Country-specific: ■ 0 l/h ■ 0 gal/min (us)
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 (→  134).
Switch-off value 	
Navigation	 Expert → Output → PFS output 1 to n → Switch-off value (0464–1 to n)
Prerequisite	■ In the Operating mode parameter (→  121), the Switch option is selected. ■ In the Switch out funct parameter (→  133), the Limit option is selected.
Description	Use this function to enter the measured value for the switch-off point.
User entry	Signed floating-point number
Factory setting	Country-specific: ■ 0 l/h ■ 0 gal/min (us)
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 (→  134).

Assign dir.check 	
Navigation	  Expert → Output → PFS output 1 to n → Assign dir.check (0484-1 to n)
Prerequisite	■ The Switch option is selected in the Operating mode parameter (→  121). ■ The Fl. direct.check option is selected in the Switch out funct parameter (→  133).
Description	Use this function to select a process variable for monitoring the flow direction.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow
Factory setting	Volume flow
Assign status 	
Navigation	  Expert → Output → PFS output 1 to n → Assign status (0485-1 to n)
Prerequisite	■ The Switch option is selected in the Operating mode parameter (→  121). ■ The Status option is selected in the Switch out funct parameter (→  133).
Description	Use this function to select a device status for the switch output.
Selection	■ Empty pipe det. ■ Low flow cut off ■ Digital outp. 1 ■ Digital outp. 2 ■ Digital outp. 3
Factory setting	Empty pipe det.
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 (→  121). ■ The Limit option is selected in the Switch out funct parameter (→  133).
Description	Use this function to enter a delay time for switching on the switch output.
User entry	0.0 to 100.0 s

Factory setting 0.0 s

Switch-off delay

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

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→  121).
- The **Limit** option is selected in the **Switch out funct** parameter (→  133).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Failure mode

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

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

Selection

- Actual status
- Open
- Closed

Factory setting Open

Additional information *Options*

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

Switch status 1 to n

Navigation   Expert → Output → PFS output 1 to n → Switch status 1 to n (0461–1 to n)

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

Description Displays the current switch status of the status output.

User interface

- Open
- Closed

Additional information

User interface

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

Invert outp.sig.

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

Description

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

Selection

- No
- Yes

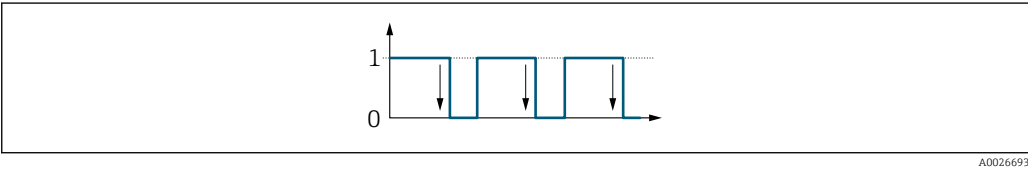
Factory setting

No

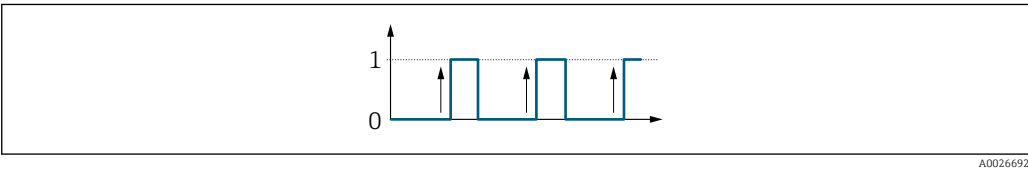
Additional information

Selection

No option (passive - negative)



Yes option (passive - positive)



3.5.3 "Relay output 1 to n" submenu

Navigation  Expert → Output → Relay output 1 to n

► Relay output 1 to n

Terminal no.

→  140

Relay outp.func.

→  140

Assign dir.check	→ 141
Assign limit	→ 141
Assign diag. beh	→ 142
Assign status	→ 142
Switch-off value	→ 143
Switch-off delay	→ 143
Switch-on value	→ 144
Switch-on delay	→ 144
Failure mode	→ 144
Switch status	→ 145
Powerless relay	→ 145

Terminal no.

Navigation	Expert → Output → Relay output 1 to n → Terminal no. (0812-1 to n)
Description	Displays the terminal numbers used by the relay output module.
User interface	- Not used 24-25 (I/O 2) 22-23 (I/O 3)
Additional information	"Not used" option The relay output module does not use any terminal numbers.

Relay outp.func.



Navigation	Expert → Output → Relay output 1 to n → Relay outp.func. (0804-1 to n)
Description	Use this function to select an output function for the relay output.
Selection	- Closed - Open - Diag. behavior

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

Assign dir.check



Navigation	Expert → Output → Relay output 1 to n → Assign dir.check (0808–1 to n)
Prerequisite	In the Relay outp.func. parameter (→ 140), the Fl. direct.check option is selected.
Description	Use this function to select a process variable for monitoring the flow direction.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow
Factory setting	Volume flow

Assign limit



Navigation	Expert → Output → Relay output 1 to n → Assign limit (0807–1 to n)
Prerequisite	In the Relay outp.func. parameter (→ 140), the Limit option is selected.
Description	Use this function to select a process variable for the limit value function.
Selection	■ Off ■ Volume flow ■ Mass flow

- Correct.vol.flow
- Flow velocity
- Conductivity*
- CorrConductivity*
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Temperature*
- Electronic temp.

Factory setting Volume flow

Assign diag. beh

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

Prerequisite In the **Relay outp.func.** parameter (→  140), the **Diag. behavior** option is selected.

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

- Selection
- Alarm
 - Alarm or warning
 - Warning

Factory setting Alarm

Additional information *Description*
 If no diagnostic event is pending, the relay output is closed and conductive.

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

Assign status

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

Prerequisite In the **Relay outp.func.** parameter (→  140), the **Digital Output** option is selected.

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

* Visibility depends on order options or device settings

Selection	■ Partial pipe det ■ Low flow cut off ■ Digital outp. 1 ■ Digital outp. 2 ■ Digital outp. 3
------------------	---

Factory setting	Partial pipe det
------------------------	------------------

Switch-off value

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

Prerequisite	In the Relay outp.func. parameter (→  140), the Limit option is selected.
---------------------	--

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

User entry	Signed floating-point number
-------------------	------------------------------

Factory setting	Country-specific: ■ 0 l/h ■ 0 gal(us)/min
------------------------	--

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 (→  141).
-------------------------------	---

Switch-off delay

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

Prerequisite	In the Relay outp.func. parameter (→  140), the Limit option is selected.
---------------------	--

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

User entry	0.0 to 100.0 s
-------------------	----------------

Factory setting	0.0 s
------------------------	-------

Switch-on value 	
Navigation	  Expert → Output → Relay output 1 to n → Switch-on value (0810–1 to n)
Prerequisite	In the Relay outp.func. parameter (→  140), the Limit option is selected.
Description	Use this function to enter the measured value for the switch-on point.
User entry	Signed floating-point number
Factory setting	Country-specific: ■ 0 l/h ■ 0 gal(us)/min
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 (→  141).
Switch-on delay 	
Navigation	  Expert → Output → Relay output 1 to n → Switch-on delay (0814–1 to n)
Prerequisite	In the Relay outp.func. parameter (→  140), the Limit option is selected.
Description	Use this function to enter a delay time for switching on the switch output.
User entry	0.0 to 100.0 s
Factory setting	0.0 s
Failure mode 	
Navigation	  Expert → Output → Relay output 1 to n → Failure mode (0811–1 to n)
Description	Use this function to select the failure mode of the relay output in the event of a device alarm.
Selection	■ Actual status ■ Open ■ Closed
Factory setting	Open

Additional information	<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



Navigation	 Expert → Output → Relay output 1 to n → Powerless relay (0816–1 to n)
Description	Use this function to select the quiescent state for the relay output.
Selection	■ Open ■ Closed
Factory setting	Open
Additional information	<i>Selection</i> ■ Open The relay output is not conductive. ■ Closed The relay output is conductive.

3.6 "Communication" submenu

Navigation  Expert → Communication

► Communication

► PROFINET config.

► PROFINET info

► Web server

► WLAN settings

→  146

→  147

→  150

→  153

3.6.1 "PROFINET config." submenu

Navigation  Expert → Communication → PROFINET config.

► PROFINET config.

Name of station (2071)

Man. spec. diag. (2084)

→  146

→  147

Name of station	
Navigation	 Expert → Communication → PROFINET config. → Name of station (2071)
Description	Displays a unique name for the measuring point so it can be identified quickly within the plant.
User entry	Max. 240 characters such as lower-case letters or numbers
Factory setting	eh-promag300-xxxxx
Additional information	Description
	The device tag corresponds to the device name ("Name Of Station" of PROFINET specification) The device name can be adjusted via DIP switch or the automation system.
	Factory setting
Structure of the device tag:	
eh-promag300-xxxxx	
– eh: Endress+Hauser	
– promag: Instrument family	
– 300: Transmitter	
– xxxxx: Serial number of the device	

Man. spec. diag.**Navigation** Expert → Communication → PROFINET config. → Man. spec. diag. (2084)**Description**

Use this function to enable the transfer of manufacturer-specific diagnostic events.

Selection

- Not active
- Active

Factory setting

Active

Additional information*Description*

- Active
In addition to the PROFINET standard alarms, active manufacturing-specific diagnostic events are also transferred to the automation system. The diagnostic number and the error text of the respective diagnostic event are displayed.
- Not active
Only the PROFINET standard alarms are transferred to the automation system.

Selection

This selection affects PROFINET communication only.

Diagnostic events are displayed in the DTM or web server regardless of the selection made in this parameter. The PROFINET standard alarms (diagnosis and process) for the stack are also unaffected by the selected made.

3.6.2 "PROFINET info" submenu*Navigation* Expert → Communication → PROFINET info

► PROFINET info	
Device type (2083)	→  148
Device ID (2073)	→  148
Device revision (2072)	→  148
AR state (2088)	→  148
MRP role (2085)	→  149
State MRP port 1 (2086)	→  149
State MRP port 2 (2087)	→  149

Device type

Navigation	 Expert → Communication → PROFINET info → Device type (2083)
Description	Displays the device type (device type code).
User interface	Max. 16 characters, such as letters, numbers or special characters (e.g. @, %, /).
Factory setting	Promag 300

Device ID

Navigation	 Expert → Communication → PROFINET info → Device ID (2073)
Description	Use this function to display the device ID.
User interface	0 to 65 535

Device revision

Navigation	 Expert → Communication → PROFINET info → Device revision (2072)
Description	Use this function to display the device revision.
User interface	0 to 65 535
Additional information	<i>Description</i> The device revision enables the correct assignment of device drivers to the device.

AR state

Navigation	 Expert → Communication → PROFINET info → AR state (2088)
Description	Displays whether an active AR (Application Relation) connection has been established.
User interface	■ Active ■ Not active
Factory setting	Not active

MRP role

Navigation	 Expert → Communication → PROFINET info → MRP role (2085)
Description	Displays the current status of the MRP (Media Redundancy Protocol) role. When a connection is established, an MRP role is assigned to the measuring device if MRP was enabled in the controller.
User interface	■ MRP deactivated ■ Client activated ■ Manager active
Factory setting	MRP deactivated

State MRP port 1

Navigation	 Expert → Communication → PROFINET info → State MRP port 1 (2086)
Description	Displays the status of MRP port 1 if an MRP connection has been established.
User interface	■ Port deactivated ■ Port blocking ■ Port forwarding
Factory setting	Port deactivated
Additional information	<i>Selection</i> ■ Port forwarding The ring is closed. ■ Port blocking The ring is open.

State MRP port 2

Navigation	 Expert → Communication → PROFINET info → State MRP port 2 (2087)
Description	Displays the status of MRP port 2 if an MRP connection has been established.
User interface	■ Port deactivated ■ Port blocking ■ Port forwarding
Factory setting	Port deactivated

- Additional information
- Selection
- Port forwarding

The ring is closed.

■ Port blocking

The ring is open.

3.6.3 "Web server" submenu

Navigation  Expert → Communication → Web server

► Web server

Webserv.language (7221)

→  150

MAC Address (7214)

→  151

IP address (7209)

→  152

Subnet mask (7211)

→  152

Default gateway (7210)

→  152

Webserver funct. (7222)

→  152

Login page (7273)

→  153

Webserv.language

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

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

- Selection
- English

■ Deutsch *

■ Français *

■ Español *

■ Italiano *

■ Nederlands *

■ Portuguesa *

■ Polski *

■ русский язык(Ru) *

■ Svenska *

■ Türkçe *

■ 中文 (Chinese) *

* Visibility depends on order options or device settings

- 日本語 (Japanese) *
- 한국어 (Korean) *
- Bahasa Indonesia *
- tiếng Việt (Vit) *
- čeština (Czech) *

Factory setting English

MAC Address

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

Description Displays the MAC ⁵⁾ address of the measuring device.

User interface Unique 12-digit character string comprising letters and numbers

Factory setting Each measuring device is given an individual address.

Additional information *Example*
For the display format
00:07:05:10:01:5F

DHCP client



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

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

Selection

- Off
- On

Factory setting Off

Additional information *Result*
If the DHCP client functionality of the Web server is activated, the IP address (→  152), Subnet mask (→  152) and Default gateway (→  152) are set automatically.

 Identification is via the MAC address of the measuring device.

* Visibility depends on order options or device settings

5) Media Access Control

IP address



Navigation  Expert → Communication → Web server → IP address (7209)

Description Displays the IP address of the device's web server.

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

Factory setting 0.0.0.0

Subnet mask

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

Description Displays the subnet mask.

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

Factory setting 0.0.0.0

Default gateway

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

Description Displays the default gateway.

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

Factory setting 0.0.0.0

Webserver funct.



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

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

Selection
■ Off
■ On

Factory setting On

Additional information

Description

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

Selection

Option	Description
Off	■ The web server is completely disabled. ■ Port 80 is locked.
HTML Off	The HTML version of the web server is not available.
On	■ The complete functionality of the web server is available. ■ JavaScript is used. ■ The password is transferred in an encrypted state. ■ Any change to the password is also transferred in an encrypted state.

Login page



Navigation

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

Description

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

Selection

- Without header
- With header

Factory setting

With header

3.6.4 "WLAN settings" submenu

Navigation

 Expert → Communication → WLAN settings

► WLAN settings		
WLAN (2702)	→ 	154
WLAN mode (2717)	→ 	154
SSID name (2714)	→ 	155
Network security (2705)	→ 	155
Sec. identific. (2718)	→ 	155
User name (2715)	→ 	156
WLAN password (2716)	→ 	156

WLAN IP address (2711)	→ 156
WLAN MAC address (2703)	→ 156
WLAN subnet mask (2709)	→ 157
WLAN MAC address (2703)	→ 156
WLAN passphrase (2706)	→ 157
Assign SSID name (2708)	→ 157
SSID name (2707)	→ 158
WLAN channel (2704)	→ 158
Select antenna (2713)	→ 158
Connection state (2722)	→ 159
Rec.sig.strength (2721)	→ 159
WLAN IP address (2711)	→ 156
Gateway IP addr. (2719)	→ 159
IP address DNS (2720)	→ 159

WLAN

Navigation	Expert → Communication → WLAN settings → WLAN (2702)
Description	Use this function to enable and disable the WLAN connection.
Selection	Disable Enable
Factory setting	Enable

WLAN mode

Navigation	Expert → Communication → WLAN settings → WLAN mode (2717)
Description	Use this function to select the WLAN mode.

Selection

- Access point
- WLAN Client

Factory setting Access point

SSID name



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

Prerequisite The client is activated.

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

User entry –

Factory setting –

Network security



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

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

Selection

- Unsecured
- WPA2-PSK
- EAP-PEAP MSCHAP2
- EAP-PEAP NoAuth.
- EAP-TLS

Factory setting WPA2-PSK

Additional information *Selection*

- Unsecured
Access the WLAN connection without identification.
- WPA2-PSK
Access the WLAN connection with a network key.

Sec. identific.

Navigation Expert → Communication → WLAN settings → Sec. identific. (2718)

Description Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).

User interface	■ Root certificate ■ Device certific. ■ Dev. private key
-----------------------	--

User name	
------------------	---

Navigation	  Expert → Communication → WLAN settings → User name (2715)
-------------------	---

Description	Use this function to enter the user name.
--------------------	---

User entry	–
-------------------	---

Factory setting	–
------------------------	---

WLAN password	
----------------------	---

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

Description	Use this function to enter the WLAN password.
--------------------	---

User entry	–
-------------------	---

Factory setting	–
------------------------	---

WLAN IP address	
------------------------	---

Navigation	  Expert → Communication → WLAN settings → WLAN IP address (2711)
-------------------	---

Description	Use this function to enter the IP address of the measuring device's WLAN connection.
--------------------	--

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

Factory setting	192.168.1.212
------------------------	---------------

WLAN MAC address	
-------------------------	--

Navigation	  Expert → Communication → WLAN settings → WLAN MAC address (2703)
-------------------	--

	 Expert → Communication → WLAN settings → WLAN MAC address (2703)
--	--

Description	Displays the MAC ⁶⁾ address of the measuring device.
--------------------	---

6) Media Access Control

User interface Unique 12-digit character string comprising letters and numbers

Factory setting Each measuring device is given an individual address.

Additional information *Example*
For the display format
00:07:05:10:01:5F

WLAN subnet mask



Navigation Expert → Communication → WLAN settings → WLAN subnet mask (2709)

Description Use this function to enter the subnet mask.

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

Factory setting 255.255.255.0

WLAN passphrase



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

Prerequisite The **WPA2-PSK** option is selected in the **Security type** parameter (→ 155).

Description Use this function to enter the network key.

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

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

Assign SSID name



Navigation Expert → Communication → WLAN settings → Assign SSID name (2708)

Description Use this function to select which name is used for the SSID ⁷⁾.

Selection

- Device tag
- User-defined

Factory setting User-defined

7) Service Set Identifier

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.
SSID name 	
Navigation	  Expert → Communication → WLAN settings → SSID name (2707)
Prerequisite	■ The User-defined option is selected in the Assign SSID name parameter (→  157). ■ The Access point option is selected in the WLAN mode parameter (→  154).
Description	Use this function to enter a user-defined SSID name.
User entry	Max. 32-digit character string comprising numbers, letters and special characters
Factory setting	EH_device designation_last 7 digits of the serial number (e.g. EH_Promag_300_A802000)
WLAN channel 	
Navigation	  Expert → Communication → WLAN settings → WLAN channel (2704)
Description	Use this function to enter the WLAN channel.
User entry	1 to 11
Factory setting	6
Additional information	<i>Description</i>  It is only necessary to enter a WLAN channel if multiple WLAN devices are in use. ■ If just one measuring device is in use, it is recommended to keep the factory setting.
Select antenna 	
Navigation	  Expert → Communication → WLAN settings → Select antenna (2713)
Description	Use this function to select whether the external or internal antenna is used for reception.
Selection	■ External antenna ■ Internal antenna
Factory setting	Internal antenna

Connection state

Navigation	 Expert → Communication → WLAN settings → Connection state (2722)
Description	The connection status is displayed.
User interface	■ Connected ■ Not connected
Factory setting	Not connected

Rec.sig.strength

Navigation	  Expert → Communication → WLAN settings → Rec.sig.strength (2721)
Description	Displays the signal strength received.
User interface	■ Low ■ Medium ■ High
Factory setting	High

Gateway IP addr.

Navigation	  Expert → Communication → WLAN settings → Gateway IP addr. (2719)
Description	Use this function to enter the IP address of the gateway.
Factory setting	192.168.1.212

IP address DNS

Navigation	 Expert → Communication → WLAN settings → IP address DNS (2720)  Expert → Communication → WLAN settings → IP address DNS (2720)
Description	Use this function to enter the IP address of the domain name server.
Factory setting	192.168.1.212

3.6.5 "Diag. config." submenu

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

Assign a category to the particular diagnostic event:

Category	Meaning
Failure (F)	A device error is present. The measured value is no longer valid.
Funct. check (C)	The device is in service mode (e.g. during a simulation).
Out of spec. (S)	The device is being operated: – Outside its technical specification limits (e.g. outside the process temperature range) – Outside of the configuration carried out by the user (e.g. maximum flow in parameter 20 mA value)
Mainten. req. (M)	Maintenance is required. The measured value is still valid.
No effect (N)	Has no effect on the condensed status ¹⁾ .

1) Condensed status according to NAMUR recommendation NE107

Navigation   Expert → Communication → Diag. config.

► Diag. config.

Event category 004 (0238)

→  161

Event category 441 (0210)

→  161

Event category 442 (0230)

→  161

Event category 443 (0231)

→  162

Event category 531 (0262)

→  162

Event category 832 (0218)

→  162

Event category 833 (0225)

→  163

Event category 834 (0227)

→  163

Event category 835 (0229)

→  164

Event category 862 (0214)

→  164

Event category 937 (0260)

→  164

Event category 004 (Sensor)



Navigation	Expert → Communication → Diag. config. → Event category 004 (0238)
Description	Use this option to select a category for the diagnostic message 004 Sensor .
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	For a detailed description of the event categories available for selection: → 160

Event category 441 (Curr.output 1 to n)



Navigation	Expert → Communication → Diag. config. → Event category 441 (0210)
Description	Use this function to select a category for the diagnostic message 441 Curr.output 1 to n .
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	For a detailed description of the event categories available for selection: → 160

Event category 442 (Freq. output 1 to n)



Navigation	Expert → Communication → Diag. config. → Event category 442 (0230)
Prerequisite	The pulse/frequency/switch output is available.
Description	Use this function to select a category for the diagnostic message 442 Freq. output 1 to n .
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)

Additional information  For a detailed description of the event categories available for selection: →  160

Event category 443 (Pulse output 1 to n)



Navigation	 Expert → Communication → Diag. config. → Event category 443 (0231)
Prerequisite	The pulse/frequency/switch output is available.
Description	Use this function to select a category for the diagnostic message 443 Pulse output 1 to n .
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	 For a detailed description of the event categories available for selection: →  160

Event category 531 (Empty pipe det.)



Navigation	 Expert → Communication → Diag. config. → Event category 531 (0262)
Description	Use this option to select a category for the diagnostic message 531 Empty pipe det..
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	 For a detailed description of the event categories available for selection: →  160

Event category 832 (Electronic temp.)



Navigation	 Expert → Communication → Diag. config. → Event category 832 (0218)
Description	Use this function to select a category for the diagnostic message 832 Electronic temp..

Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	<i>Selection</i>  For a detailed description of the event categories available for selection: →  160

Event category 833 (Electronic temp.)



Navigation	 Expert → Communication → Diag. config. → Event category 833 (0225)
Description	Use this option to select a category for the diagnostic message 833 Electronic temp..
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	<i>Selection</i>  For a detailed description of the event categories available for selection: →  160

Event category 834 (Process temp.)



Navigation	 Expert → Communication → Diag. config. → Event category 834 (0227)
Description	Use this option to select a category for the diagnostic message 834 Process temp..
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	<i>Selection</i>  For a detailed description of the event categories available for selection: →  160

Event category 835 (Process temp.)



Navigation	 Expert → Communication → Diag. config. → Event category 835 (0229)
Description	Use this option to select a category for the diagnostic message 835 Process temp..
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	<i>Selection</i>  For a detailed description of the event categories available for selection: →  160

Event category 862 (Pipe empty)



Navigation	 Expert → Communication → Diag. config. → Event category 862 (0214)
Description	Use this option to select a category for the diagnostic message 862 Pipe empty.
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)
Additional information	 For a detailed description of the event categories available for selection: →  160

Event category 937 (EMC interference)



Navigation	  Expert → Communication → Diag. config. → Event category 937 (0260)
Description	Use this option to select a category for the diagnostic message 937 EMC interference.
Selection	■ Failure (F) ■ Funct. check (C) ■ Out of spec. (S) ■ Mainten. req.(M) ■ No effect (N)
Factory setting	Out of spec. (S)

Additional information

 For a detailed description of the event categories available for selection: →  160

3.7 "Application" submenu

Navigation  Expert → Application

► Application

Reset all tot. (2806)

→  165

► Totalizer 1 to n

→  165

Reset all tot.

Navigation	 Expert → Application → Reset all tot. (2806)						
Description	Use this function to reset all totalizers to the value 0 and restart the totaling process. This deletes all the flow values previously totaled.						
Selection	■ Cancel ■ Reset + totalize						
Factory setting	Cancel						
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 totaled.</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 totaled.
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 totaled.						

3.7.1 "Totalizer 1 to n" submenu

Navigation  Expert → Application → Totalizer 1 to n

► Totalizer 1 to n

Assign variable (0914-1 to n)

→  166

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

→  166

Operation mode (0908–1 to n)	→ 167
Control Tot. 1 to n (0912–1 to n)	→ 168
Preset value 1 to n (0913–1 to n)	→ 168
Failure mode (0901–1 to n)	→ 169

Assign variable

Navigation	Expert → Application → Totalizer 1 to n → Assign variable (0914–1 to n)
Description	Use this function to select a process variable for the Totalizer 1 to n.
Selection	- Off - Volume flow - Mass flow - Correct.vol.flow
Factory setting	Volume flow
Additional information	<i>Description</i> i If the option selected is changed, the device resets the totalizer to 0. <i>Selection</i> If the Off option is selected, only Assign variable parameter (→ 166) 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	One of the following options is selected in the Assign variable parameter (→ 166) of the Totalizer 1 to n submenu: - Volume flow - Mass flow - Correct.vol.flow				
Description	Use this function to select the process variable unit for the Totalizer 1 to n (→ 165).				
Selection	<table><tr><td><i>SI units</i></td><td><i>US units</i></td></tr><tr><td> - g - kg - t </td><td> - oz - lb - STon </td></tr></table> or	<i>SI units</i>	<i>US units</i>	- g - kg - t	- oz - lb - STon
<i>SI units</i>	<i>US units</i>				
- g - kg - t	- oz - lb - STon				

	<i>SI units</i> ■ cm³ ■ dm³ ■ m³ ■ ml ■ l ■ hl ■ Ml Mega <i>US units</i> ■ af ■ ft³ ■ fl oz (us) ■ gal (us) ■ kgal (us) ■ Mgal (us) ■ bbl (us;liq.) ■ bbl (us;beer) ■ bbl (us;oil) ■ bbl (us;tank) <i>Imperial units</i> ■ gal (imp) ■ Mgal (imp) ■ bbl (imp;beer) ■ bbl (imp;oil)
	or
	<i>SI units</i> ■ Nl ■ Nm³ ■ Sm³ <i>US units</i> ■ Sft³ ■ Sgal (us) ■ Sbbl (us;liq.) <i>Imperial units</i> - Sgal (imp)
	or
	<i>Other units</i> None
Factory setting	1
Additional information	<i>Description</i>  The unit is selected separately for each totalizer. It is independent of the selection made in the System units submenu (→  54). <i>Selection</i> The selection is dependent on the process variable selected in the Assign variable parameter (→  166).

Operation mode	
Navigation	 Expert → Application → Totalizer 1 to n → Operation mode (0908–1 to n)
Description	Use this function to select how the totalizer summates the flow.
Selection	■ Net flow total ■ Forward total ■ Reverse total
Factory setting	Net flow total

Additional information*Selection*

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

Control Tot. 1 to n**Navigation**

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

Prerequisite

One of the following options is selected in the **Assign variable** parameter (→  166) of the **Totalizer 1 to n** submenu:
Volume flow

Description

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

Selection

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

Factory setting

Totalize

Additional information*Selection*

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

Preset value 1 to n**Navigation**

  Expert → Application → Totalizer 1 to n → Preset value 1 to n (0913–1 to n)

Prerequisite

One of the following options is selected in the **Assign variable** parameter (→  166) of the **Totalizer 1 to n** submenu:
Volume flow

Description	Use this function to enter a start value for the Totalizer 1 to n.
User entry	Signed floating-point number
Factory setting	0 l
Additional information	<i>Entry</i>  The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→  166). <i>Example</i> 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)
Description	Use this function to select how a totalizer behaves in the event of a device alarm.
Selection	■ Stop ■ Actual value ■ Last valid value
Factory setting	Stop
Additional information	<i>Description</i>  This setting does not affect the failsafe mode of other totalizers and the outputs. This is specified in separate parameters. <i>Selection</i> ■ Stop The totalizer is stopped in the event of a device alarm. ■ Actual value The totalizer continues to count based on the actual measured value; the device alarm is ignored. ■ Last valid value The totalizer continues to count based on the last valid measured value before the device alarm occurred.

3.7.2 "Custody transfer" submenu

 Only available for Promag H.

 For detailed information on the parameter descriptions for custody transfer measurement, see the Special Documentation for the device →  7

Navigation  Expert → Application → Custody transfer

► Custody transfer

3.8 "Diagnostics" submenu

Navigation  Expert → Diagnostics

► Diagnostics

Actual diagnos. (0691)

Prev.diagnostics (0690)

Time fr. restart (0653)

Operating time (0652)

► Diagnostic list

► Event logbook

► Device info

► Main elec.+I/O1

► Sens. electronic

► I/O module 2

► I/O module 3

► Display module

► Min/max val.

► Data logging

► Heartbeat

► Simulation

→  171

→  171

→  172

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→  173

→  177

→  179

→  183

→  184

→  186

→  187

→  188

→  197

→  189

→  208

→  208

Actual diagnos.

Navigation	 Expert → Diagnostics → Actual diagnos. (0691)
Prerequisite	A diagnostic event has occurred.
Description	Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.
User interface	Symbol for diagnostic behavior, diagnostic code and short message.
Additional information	<i>Display</i>  Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→  173).  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 electronics

Timestamp

Navigation	 Expert → Diagnostics → Timestamp
Description	Displays the operating time when the current diagnostic message occurred.
User interface	Days (d), hours (h), minutes (m) and seconds (s)
Additional information	<i>Display</i>  The diagnostic message can be viewed via the Actual diagnos. parameter (→  171). <i>Example</i> For the display format: 24d12h13m00s

Prev.diagnostics

Navigation	 Expert → Diagnostics → Prev.diagnostics (0690)
Prerequisite	Two diagnostic events have already occurred.
Description	Displays the diagnostic message that occurred before the current message.
User interface	Symbol for diagnostic behavior, diagnostic code and short message.

Additional information*Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

Example

For the display format:

⊗F271 Main electronics

Timestamp

Navigation

Expert → Diagnostics → Timestamp

Description

Displays the operating time when the last diagnostic message before the current message occurred.

User interface

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

Additional information*Display*

The diagnostic message can be viewed via the **Prev.diagnostics** parameter (→ 171).

Example

For the display format:

24d12h13m00s

Time fr. restart

Navigation

Expert → Diagnostics → Time fr. restart (0653)

Description

Use this function to display the time the device has been in operation since the last device restart.

User interface

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

Operating time

Navigation

Expert → Diagnostics → Operating time (0652)

Description

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

User interface

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

Additional information

User interface

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

3.8.1 "Diagnostic list" submenu

Navigation  Expert → Diagnostics → Diagnostic list

► Diagnostic list		
Diagnostics 1 (0692)	→ 	173
Diagnostics 2 (0693)	→ 	174
Diagnostics 3 (0694)	→ 	175
Diagnostics 4 (0695)	→ 	175
Diagnostics 5 (0696)	→ 	176

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 electronics

■ F276 I/O module

Timestamp

Navigation

 Expert → Diagnostics → Diagnostic list → Timestamp

Description

Displays the operating time when the diagnostic message with the highest priority occurred.

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

Additional information *Display*



The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 173).

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 electronics

■ F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the second-highest priority occurred.

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

Additional information *Display*



The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 174).

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 electronics ■  F276 I/O module

Timestamp

Navigation	 Expert → Diagnostics → Diagnostic list → Timestamp
Description	Displays the operating time when the diagnostic message with the third-highest priority occurred.
User interface	Days (d), hours (h), minutes (m) and seconds (s)
Additional information	<i>Display</i>  The diagnostic message can be viewed via the Diagnostics 3 parameter (→  175). <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 electronics
- F276 I/O module

Timestamp**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

Description

Displays the operating time when the diagnostic message with the fourth-highest priority occurred.

User interface

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

Additional information*Display*

The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ 175).

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 electronics
- F276 I/O module

Timestamp

Navigation	 Expert → Diagnostics → Diagnostic list → Timestamp
Description	Displays the operating time when the diagnostic message with the fifth-highest priority occurred.
User interface	Days (d), hours (h), minutes (m) and seconds (s)
Additional information	Display  The diagnostic message can be viewed via the Diagnostics 5 parameter (→  176). Example For the display format: 24d12h13m00s

3.8.2 "Event logbook" submenu

Navigation  Expert → Diagnostics → Event logbook

► Event logbook

Filter options (0705)

→  177

► Event list

→  178

Filter options

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

Additional information

Description

-  The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107:
- F = Failure
 - C = Function Check
 - S = Out of Specification
 - M = Maintenance Required

Filter options



Navigation

 Expert → Diagnostics → Event logbook → Filter options

Description

Use this function to select the category whose event messages are displayed in the event list of the operating tool.

Selection

- All
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- Information (I)

Factory setting

All

Additional information

Description

-  The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107:
- F = Failure
 - C = Function Check
 - S = Out of Specification
 - M = Maintenance Required

"Event list" submenu

-  The **Event list** submenu is only displayed if operating via the local display.
- If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module.
- If operating via the Web browser, the event messages can be found directly in the **Event logbook** submenu.

Navigation

 Expert → Diagnostics → Event logbook → Event list

► Event list

Event list →  179

Event list

Navigation	 Expert → Diagnostics → Event logbook → Event list
Description	Displays the history of event messages of the category selected in the Filter options parameter (→  177).
User interface	■ For a "Category I" event message Information event, short message, symbol for event recording and operating time when error occurred ■ For a "Category F, C, S, M" event message (status signal) Diagnostics code, short message, symbol for event recording and operating time when error occurred
Additional information	<i>Description</i> A maximum of 20 event messages are displayed in chronological order. If the Extended HistoROM application package (order option) is enabled in the device, the event list can contain up to 100 entries . The following symbols indicate whether an event has occurred or has ended: ■ : Occurrence of the event ■ : End of the event <i>Examples</i> For the display format: ■ I1091 Configuration modified  24d12h13m00s ■  F271 Main electronics  01d04h12min30s <i>HistoROM</i> A HistoROM is a "non-volatile" device memory in the form of an EEPROM.

3.8.3 "Device info" submenu

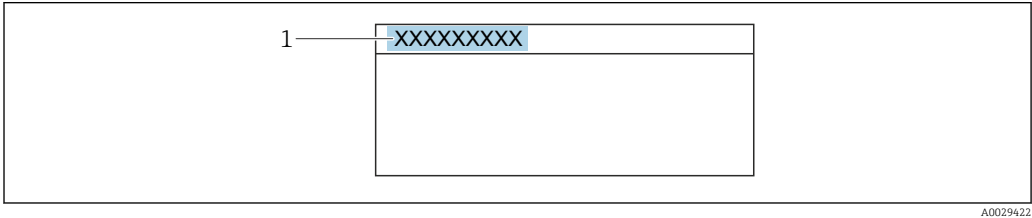
Navigation  Expert → Diagnostics → Device info

► Device info		
Device tag (0011)	→ 	180
Serial number (0009)	→ 	180
Firmware version (0010)	→ 	181
Device name (0020)	→ 	181
Order code (0008)	→ 	181

Ext. order cd. 1 (0023)	→ 182
Ext. order cd. 2 (0021)	→ 182
Ext. order cd. 3 (0022)	→ 182
Config. counter (2751)	→ 182
ENP version (0012)	→ 183

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 lower-case letters or numbers.
Factory setting	Promag
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	A maximum of 11-digit character string comprising letters and numbers.

Additional information*Description***Uses of the serial number**

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

Firmware version**Navigation**

Expert → Diagnostics → Device info → Firmware version (0010)

Description

Displays the device firmware version installed.

User interface

Character string in the format xx.yy.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

Promag300/500

Order code**Navigation**

Expert → Diagnostics → Device info → Order code (0008)

Description

Displays the device order code.

User interface

Character string composed of letters, numbers and certain punctuation marks (e.g. /).

Additional information*Description*

The order code can be found on the nameplate of the sensor and transmitter in the "Order code" field.

The order code is generated from the extended order code through a process of reversible transformation. The extended order code indicates the attributes for all the device features in the product structure. The device features are not directly readable from the order code.

**Uses of the order code**

- To order an identical spare device.
- To identify the device quickly and easily, e.g. when contacting Endress+Hauser.

Ext. order cd. 1

**Navigation** Expert → Diagnostics → Device info → Ext. order cd. 1 (0023)**Description**

Displays the first part of the extended order code.

On account of length restrictions, the extended order code is split into a maximum of 3 parameters.

User interface

Character string

Additional information

Description

The extended order code indicates the version of all the features of the product structure for the measuring device and thus uniquely identifies the measuring device.

 The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.

Ext. order cd. 2

**Navigation** Expert → Diagnostics → Device info → Ext. order cd. 2 (0021)**Description**

Displays the second part of the extended order code.

User interface

Character string

Additional information

For additional information, see **Ext. order cd. 1** parameter (→  182)

Ext. order cd. 3

**Navigation** Expert → Diagnostics → Device info → Ext. order cd. 3 (0022)**Description**

Displays the third part of the extended order code.

User interface

Character string

Additional information

For additional information, see **Ext. order cd. 1** parameter (→  182)

Config. counter

Navigation Expert → Diagnostics → Device info → Config. counter (2751)**Description**

Displays the number of parameter modifications for the device. When the user changes a parameter setting, this counter is incremented.

User interface

0 to 65 535

ENP version	
Navigation	 Expert → Diagnostics → Device info → ENP version (0012)
Description	Displays the version of the electronic nameplate.
User interface	Character string
Factory setting	2.02.00
Additional information	<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.

3.8.4 "Mainboard module" submenu

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

► Main elec.+I/O1

Software rev.

Build no. softw.

Bootloader rev.

→  183

→  183

→  184

Software rev.	
Navigation	 Expert → Diagnostics → Main elec.+I/O1 → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer
Build no. softw.	
Navigation	 Expert → Diagnostics → Main elec.+I/O1 → Build no. softw. (0079)
Description	Displays the software build number of the module.
User interface	Positive integer

Bootloader rev.

Navigation	 Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)
Description	Displays the bootloader revision of the software.
User interface	Positive integer

3.8.5 "Sens. electronic" submenu

Navigation  Expert → Diagnostics → Sens. electronic

► Sens. electronic

Software rev. (0072)

→  184

Build no. softw. (0079)

→  184

Bootloader rev. (0073)

→  185

Software rev.

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

Build no. softw.

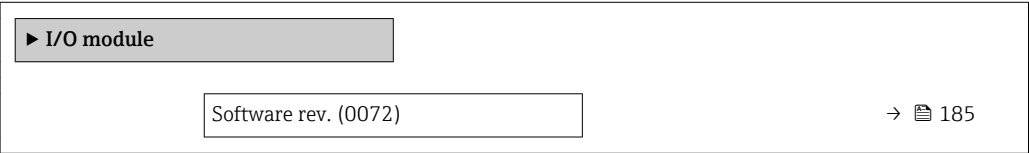
Navigation	 Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)
Description	Displays the software build number of the module.
User interface	Positive integer

Bootloader rev.

Navigation	 Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)
Description	Displays the bootloader revision of the software.
User interface	Positive integer

3.8.6 "I/O module 1" submenu

Navigation  Expert → Diagnostics → I/O module 1



I/O 1 terminals

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

Software rev.

Navigation	 Expert → Diagnostics → I/O module 2 → Software rev. (0072)  Expert → Diagnostics → I/O module 3 → Software rev. (0072)  Expert → Diagnostics → I/O module 4 → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer

3.8.7 "I/O module 2" submenu

Navigation  Expert → Diagnostics → I/O module 2

► I/O module 2		
I/O 2 terminals	→ 	186
Software rev.	→ 	186
Build no. softw.	→ 	186
Bootloader rev.	→ 	187

I/O 1 terminals

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

Software rev.

Navigation	 Expert → Diagnostics → I/O module 2 → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. softw.

Navigation	 Expert → Diagnostics → I/O module 2 → Build no. softw. (0079)
Description	Displays the software build number of the module.
User interface	Positive integer

Bootloader rev.

Navigation	 Expert → Diagnostics → I/O module 2 → Bootloader rev. (0073)
Description	Displays the bootloader revision of the software.
User interface	Positive integer

3.8.8 "I/O module 3" submenu

Navigation  Expert → Diagnostics → I/O module 3

▶ I/O module 3		
I/O 3 terminals	→ 	187
Software rev.	→ 	187
Build no. softw.	→ 	188
Bootloader rev.	→ 	188

I/O 1 terminals

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

Software rev.

Navigation	 Expert → Diagnostics → I/O module 3 → Software rev. (0072)
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. softw.

Navigation	 Expert → Diagnostics → I/O module 3 → Build no. softw. (0079)
Description	Displays the software build number of the module.
User interface	Positive integer

Bootloader rev.

Navigation	 Expert → Diagnostics → I/O module 3 → Bootloader rev. (0073)
Description	Displays the bootloader revision of the software.
User interface	Positive integer

3.8.9 "Display module" submenu

Navigation  Expert → Diagnostics → Display module

► Display module

Software rev. (0072)

Build no. softw. (0079)

Bootloader rev. (0073)

→  188

→  189

→  189

Software rev.

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

Build no. softw.	
Navigation	 Expert → Diagnostics → Display module → Build no. softw. (0079)
Description	Displays the software build number of the module.
User interface	Positive integer

Bootloader rev.	
Navigation	 Expert → Diagnostics → Display module → Bootloader rev. (0073)
Description	Displays the bootloader revision of the software.
User interface	Positive integer

3.8.10 "Data logging" submenu

Navigation  Expert → Diagnostics → Data logging

► Data logging	
Assign chan. 1	→  190
Assign chan. 2	→  191
Assign chan. 3	→  191
Assign chan. 4	→  191
Logging interval	→  192
Clear logging	→  192
Data logging	→  193
Logging delay	→  193
Data log.control	→  193
Data log. status	→  194
Logging duration	→  194

► Displ.channel 1	→ 195
► Displ.channel 2	→ 196
► Displ.channel 3	→ 196
► Displ.channel 4	→ 196

Assign chan. 1



Navigation

Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

Prerequisite

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

 The software options currently enabled are displayed in the **SW option overv.** parameter (→ 43).

Description

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

Selection

- Off
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity^{*}
- CorrConductivity^{*}
- Curr.output 1
- Curr.output 2^{*}
- Curr.output 3^{*}
- Curr.output 4^{*}
- Temperature^{*}
- Electronic temp.

Factory setting

Off

Additional information

Description

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

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

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

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

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

Assign chan. 2		
Navigation	  Expert → Diagnostics → Data logging → Assign chan. 2 (0852)	
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).	
Description	Options for the assignment of a process variable to the data logging channel.	
Selection	Picklist, see Assign channel 1 parameter (→  190)	
Factory setting	Off	
Assign chan. 3		
Navigation	  Expert → Diagnostics → Data logging → Assign chan. 3 (0853)	
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).	
Description	Options for the assignment of a process variable to the data logging channel.	
Selection	Picklist, see Assign channel 1 parameter (→  190)	
Factory setting	Off	
Assign chan. 4		
Navigation	  Expert → Diagnostics → Data logging → Assign chan. 4 (0854)	
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).	
Description	Options for the assignment of a process variable to the data logging channel.	
Selection	Picklist, see Assign channel 1 parameter (→  190)	
Factory setting	Off	

Logging interval 	
Navigation	 Expert → Diagnostics → Data logging → Logging interval (0856)
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).
Description	Use this function to enter the logging interval $T_{\log}$ for data logging.
User entry	0.1 to 3 600.0 s
Factory setting	1.0 s
Additional information	<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: ■ $T_{\log} = 1000 \times 1 \text{ s} = 1\,000 \text{ s} \approx 15 \text{ min}$ ■ $T_{\log} = 1000 \times 10 \text{ s} = 10\,000 \text{ s} \approx 3 \text{ h}$ ■ $T_{\log} = 1000 \times 80 \text{ s} = 80\,000 \text{ s} \approx 1 \text{ d}$ ■ $T_{\log} = 1000 \times 3\,600 \text{ s} = 3\,600\,000 \text{ s} \approx 41 \text{ d}$
Clear logging 	
Navigation	 Expert → Diagnostics → Data logging → Clear logging (0855)
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).
Description	Use this function to clear the entire logging data.
Selection	■ Cancel ■ Clear data
Factory setting	Cancel

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
Factory setting	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 (→ 193), the Not overwriting option is selected.
Description	Use this function to enter the time delay for measured value logging.
User entry	0 to 999 h
Factory setting	0 h
Additional information	<i>Description</i> Once measured value logging has been started with the Data log.control parameter (→ 193), the device does not save any data for the duration of the time delay entered.

Data log.control



Navigation	Expert → Diagnostics → Data logging → Data log.control (0857)
Prerequisite	In the Data logging parameter (→ 193), the Not overwriting option is selected.

Description	Use this function to start and stop measured value logging.
Selection	■ None ■ Delete + start ■ Stop
Factory setting	None
Additional information	<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 log. status

Navigation	 Expert → Diagnostics → Data logging → Data log. status (0858)
Prerequisite	In the Data logging parameter (→  193), the Not overwriting option is selected.
Description	Displays the measured value logging status.
User interface	■ Done ■ Delay active ■ Active ■ Stopped
Factory setting	Done
Additional information	<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.

Logging duration

Navigation	 Expert → Diagnostics → Data logging → Logging duration (0861)
Prerequisite	In the Data logging parameter (→  193), the Not overwriting option is selected.
Description	Displays the total logging duration.

User interface	Positive floating-point number
Factory setting	0 s

"Displ.channel 1" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 1



Display channel 1

Navigation  Expert → Diagnostics → Data logging → Displ.channel 1

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

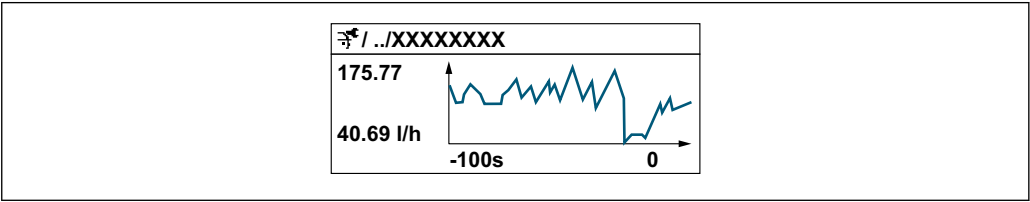
 The software options currently enabled are displayed in the **SW option overv.** parameter (→  43).

One of the following options is selected in the **Assign chan. 1** parameter (→  190):

- Conductivity^{*}
- CorrConductivity^{*}
- Temperature^{*}

Description Displays the measured value trend for the logging channel in the form of a chart.

Additional information *Description*



 10 Chart of a measured value trend

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

* Visibility depends on order options or device settings

"Displ.channel 2" submenu

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

► Displ.channel 2

Display channel 2 →  196

Display channel 2

- Navigation  Expert → Diagnostics → Data logging → Displ.channel 2
- Prerequisite A process variable is defined in the **Assign chan. 2** parameter.
- Description See the **Display channel 1** parameter →  195

"Displ.channel 3" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 3

► Displ.channel 3

Display channel 3 →  196

Display channel 3

- Navigation  Expert → Diagnostics → Data logging → Displ.channel 3
- Prerequisite A process variable is defined in the **Assign chan. 3** parameter.
- Description See the **Display channel 1** parameter →  195

"Displ.channel 4" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 4

► Displ.channel 4

Display channel 4 →  197

Display channel 4

Navigation	 Expert → Diagnostics → Data logging → Displ.channel 4
Prerequisite	A process variable is defined in the Assign chan. 4 parameter.
Description	See the Display channel 1 parameter →  195

3.8.11 "Min/max val." submenu

Navigation   Expert → Diagnostics → Min/max val.

▶ Min/max val.		
Reset min/max (6541)		→  197
▶ Main elect.temp.		→  198
▶ Temperature		→  199

Reset min/max



Navigation	  Expert → Diagnostics → Min/max val. → Reset min/max (6541)
Description	Use this function to select measured variables whose minimum, maximum and average measured values are to be reset.
Selection	■ Cancel ■ Terminal volt. ■ IO module temp.
Factory setting	Cancel

"Main elect.temp." submenu

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

► Main elect.temp.

Minimum value (6547)

→  198

Maximum value (6545)

→  198

Minimum value

Navigation	 Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (6547)
Description	Displays the lowest previously measured temperature value of the main electronics module.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  57)

Maximum value

Navigation	 Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (6545)
Description	Displays the highest previously measured temperature value of the main electronics module.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  57)

"Temperature" submenu

Navigation  Expert → Diagnostics → Min/max val. → Temperature

► Temperature

Minimum value (6681)

→  199

Maximum value (6680)

→  199

Minimum value

Navigation	 Expert → Diagnostics → Min/max val. → Temperature → Minimum value (6681)
Prerequisite	One of the following conditions is met: ■ Order code for "Sensor option", option CI "Medium temperature measurement" or ■ The temperature is read into the flowmeter from an external device.
Description	Displays the lowest previously measured medium temperature value.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  57)

Maximum value

Navigation	 Expert → Diagnostics → Min/max val. → Temperature → Maximum value (6680)
Prerequisite	One of the following conditions is met: ■ Order code for "Sensor option", option CI "Medium temperature measurement" or ■ The temperature is read into the flowmeter from an external device.
Description	Displays the highest previously measured medium temperature value.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  57)

3.8.12 "Data logging" submenu

Navigation  Expert → Diagnostics → Data logging

► Data logging		
Assign chan. 1	→ 	190
Assign chan. 2	→ 	191
Assign chan. 3	→ 	191
Assign chan. 4	→ 	191
Logging interval	→ 	192
Clear logging	→ 	192
Data logging	→ 	193
Logging delay	→ 	193
Data log.control	→ 	193
Data log. status	→ 	194
Logging duration	→ 	194
► Displ.channel 1	→ 	195
► Displ.channel 2	→ 	196
► Displ.channel 3	→ 	196
► Displ.channel 4	→ 	196

Assign chan. 1



Navigation  Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

Prerequisite The **Extended HistoROM** application package is available.
 The software options currently enabled are displayed in the **SW option overv.** parameter (→  43).

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

Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity * ■ Conductivity * ■ CorrConductivity * ■ Curr.output 1 ■ Curr.output 2 * ■ Curr.output 3 * ■ Curr.output 4 * ■ Temperature * ■ Electronic temp.
Factory setting	Off
Additional information	<i>Description</i> A total of 1000 measured values can be logged. This means: ■ 1000 data points if 1 logging channel is used ■ 500 data points if 2 logging channels are used ■ 333 data points if 3 logging channels are used ■ 250 data points if 4 logging channels are used Once the maximum number of data points is reached, the oldest data points in the data log are cyclically overwritten in such a way that the last 1000, 500, 333 or 250 measured values are always in the log (ring memory principle).  The log contents are cleared if the option selected is changed.
Assign chan. 2 	
Navigation	 Expert → Diagnostics → Data logging → Assign chan. 2 (0852)
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).
Description	Options for the assignment of a process variable to the data logging channel.
Selection	Picklist, see Assign channel 1 parameter (→  190)
Factory setting	Off

* Visibility depends on order options or device settings

Assign chan. 3		
Navigation	 Expert → Diagnostics → Data logging → Assign chan. 3 (0853)	
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).	
Description	Options for the assignment of a process variable to the data logging channel.	
Selection	Picklist, see Assign channel 1 parameter (→  190)	
Factory setting	Off	
Assign chan. 4		
Navigation	 Expert → Diagnostics → Data logging → Assign chan. 4 (0854)	
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).	
Description	Options for the assignment of a process variable to the data logging channel.	
Selection	Picklist, see Assign channel 1 parameter (→  190)	
Factory setting	Off	
Logging interval		
Navigation	 Expert → Diagnostics → Data logging → Logging interval (0856)	
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43).	
Description	Use this function to enter the logging interval $T_{\log}$ for data logging.	
User entry	0.1 to 3 600.0 s	
Factory setting	1.0 s	

Additional information*Description*

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time $T_{\log}$:

- If 1 logging channel is used: $T_{\log} = 1000 \times t_{\log}$
- If 2 logging channels are used: $T_{\log} = 500 \times t_{\log}$
- If 3 logging channels are used: $T_{\log} = 333 \times t_{\log}$
- If 4 logging channels are used: $T_{\log} = 250 \times t_{\log}$

Once this time elapses, the oldest data points in the data log are cyclically overwritten such that a time of $T_{\log}$ always remains in the memory (ring memory principle).



The log contents are cleared if the length of the logging interval is changed.

Example

If 1 logging channel is used:

- $T_{\log} = 1000 \times 1 \text{ s} = 1\,000 \text{ s} \approx 15 \text{ min}$
- $T_{\log} = 1000 \times 10 \text{ s} = 10\,000 \text{ s} \approx 3 \text{ h}$
- $T_{\log} = 1000 \times 80 \text{ s} = 80\,000 \text{ s} \approx 1 \text{ d}$
- $T_{\log} = 1000 \times 3\,600 \text{ s} = 3\,600\,000 \text{ s} \approx 41 \text{ d}$

Clear logging**Navigation**

Expert → Diagnostics → Data logging → Clear logging (0855)

Prerequisite

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



The software options currently enabled are displayed in the **SW option overv.** parameter (→ 43).

Description

Use this function to clear the entire logging data.

Selection

- Cancel
- Clear data

Factory setting

Cancel

Additional information*Selection*

- Cancel
The data is not cleared. All the data is retained.
- Clear data
The logging data is cleared. The logging process starts from the beginning.

Data logging**Navigation**

Expert → Diagnostics → Data logging → Data logging (0860)

Description

Use this function to select the data logging method.

Selection

- Overwriting
- Not overwriting

Factory setting Overwriting

Additional information *Selection*

- Overwriting
The device memory applies the FIFO principle.
- Not overwriting
Data logging is canceled if the measured value memory is full (single shot).

Logging delay

Navigation   Expert → Diagnostics → Data logging → Logging delay (0859)

Prerequisite In the **Data logging** parameter (→  193), the **Not overwriting** option is selected.

Description Use this function to enter the time delay for measured value logging.

User entry 0 to 999 h

Factory setting 0 h

Additional information *Description*

Once measured value logging has been started with the **Data log.control** parameter (→  193), the device does not save any data for the duration of the time delay entered.

Data log.control

Navigation   Expert → Diagnostics → Data logging → Data log.control (0857)

Prerequisite In the **Data logging** parameter (→  193), the **Not overwriting** option is selected.

Description Use this function to start and stop measured value logging.

Selection

- None
- Delete + start
- Stop

Factory setting None

Additional information *Selection*

- None
Initial measured value logging status.
- Delete + start
All the measured values recorded for all the channels are deleted and measured value logging starts again.
- Stop
Measured value logging is stopped.

Data log. status

Navigation	 Expert → Diagnostics → Data logging → Data log. status (0858)
Prerequisite	In the Data logging parameter (→  193), the Not overwriting option is selected.
Description	Displays the measured value logging status.
User interface	■ Done ■ Delay active ■ Active ■ Stopped
Factory setting	Done
Additional information	<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.

Logging duration

Navigation	 Expert → Diagnostics → Data logging → Logging duration (0861)
Prerequisite	In the Data logging parameter (→  193), the Not overwriting option is selected.
Description	Displays the total logging duration.
User interface	Positive floating-point number
Factory setting	0 s

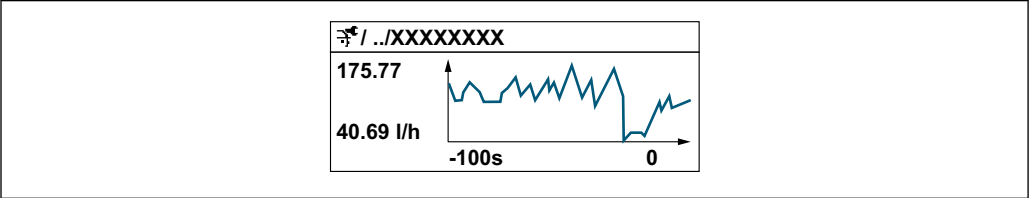
"Displ.channel 1" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 1

► Displ.channel 1

Display channel 1 →  195

Display channel 1

Navigation	 Expert → Diagnostics → Data logging → Displ.channel 1
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the SW option overv. parameter (→  43). One of the following options is selected in the Assign chan. 1 parameter (→  190): ■ Conductivity* ■ CorrConductivity* ■ Temperature*
Description	Displays the measured value trend for the logging channel in the form of a chart.
Additional information	<i>Description</i>  A0034352  11 <i>Chart of a measured value trend</i> ■ x-axis: depending on the number of channels selected displays 250 to 1000 measured values of a process variable. ■ y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.

"Displ.channel 2" submenu

Navigation	 Expert → Diagnostics → Data logging → Displ.channel 2
	 Displ.channel 2 Display channel 2 →  196

Display channel 2

Navigation	 Expert → Diagnostics → Data logging → Displ.channel 2
Prerequisite	A process variable is defined in the Assign chan. 2 parameter.

* Visibility depends on order options or device settings

Description See the **Display channel 1** parameter →  195

"Displ.channel 3" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 3

► Displ.channel 3

Display channel 3 →  196

Display channel 3

Navigation  Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite A process variable is defined in the **Assign chan. 3** parameter.

Description See the **Display channel 1** parameter →  195

"Displ.channel 4" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 4

► Displ.channel 4

Display channel 4 →  197

Display channel 4

Navigation  Expert → Diagnostics → Data logging → Displ.channel 4

Prerequisite A process variable is defined in the **Assign chan. 4** parameter.

Description See the **Display channel 1** parameter →  195

3.8.13 "Heartbeat" submenu

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

Navigation  Expert → Diagnostics → Heartbeat

▶ Heartbeat

▶ Base settings

▶ Perform.verific.

▶ Verific. results

▶ Monitor. results

3.8.14 "Simulation" submenu

Navigation  Expert → Diagnostics → Simulation

▶ Simulation

Assign proc.var. (1810)

Proc. var. value (1811)

Status inp. sim. (1355)

Signal level (1356)

Curr.inp 1 to n sim. (1608-1 to n)

Value curr.inp 1 to n (1609-1 to n)

Curr.out. 1 to n sim. (0354-1 to n)

Value curr.out 1 to n (0355-1 to n)

FreqOutputSim 1 to n (0472-1 to n)

Freq value 1 to n (0473-1 to n)

Puls.outp.sim. 1 to n (0458-1 to n)

Pulse value 1 to n (0459-1 to n)

Switch sim. 1 to n (0462-1 to n)

→  209

→  209

→  210

→  210

→  211

→  211

→  211

→  212

→  212

→  213

→  213

→  214

→  214

Switch status 1 to n (0463-1 to n)	→  215
Relay out. 1 to n sim (0802-1 to n)	→  215
Switch status 1 to n (0803-1 to n)	→  216
Dev. alarm sim. (0654)	→  216
Event category (0738)	→  217
Diag. event sim. (0737)	→  217

Assign proc.var.



Navigation	 Expert → Diagnostics → Simulation → Assign proc.var. (1810)
Description	Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Flow velocity ■ Conductivity * ■ CorrConductivity * ■ Temperature *
Factory setting	Off
Additional information	<i>Description</i>  The simulation value of the process variable selected is defined in the Proc. var. value parameter (→  209).

Proc. var. value



Navigation	 Expert → Diagnostics → Simulation → Proc. var. value (1811)
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

* Visibility depends on order options or device settings

Factory setting 0

Additional information *Entry*



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

Status inp. sim.

Navigation Expert → Diagnostics → Simulation → Status inp. sim. (1355)

Description Use this function to switch simulation of the status input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Factory setting Off

Additional information *Description*



The desired simulation value is defined in the **Signal level** parameter (→ 210).

Selection

■ Off

Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated.

■ On

Simulation for the status input is active.

Signal level

Navigation Expert → Diagnostics → Simulation → Signal level (1356)

Prerequisite In the **Status inp. sim.** parameter (→ 210), the **On** option is selected.

Description Use this function to select the signal level for the simulation of the status input. In this way, users can verify the correct configuration of the status input and the correct function of upstream feed-in units.

Selection

- High
- Low

Curr.inp 1 to n sim.		
Navigation	  Expert → Diagnostics → Simulation → Curr.inp 1 to n sim. (1608–1 to n)	
Description	Option for switching simulation of the current input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.  The desired simulation value is defined in the Value curr.inp 1 to n parameter.	
Selection	■ Off ■ On	
Factory setting	Off	
Additional information	<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 curr.inp 1 to n		
Navigation	  Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609–1 to n)	
Prerequisite	In the Curr.inp 1 to n sim. parameter, the On option is selected.	
Description	Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.	
User entry	0 to 22.5 mA	
Curr.out. 1 to n sim.		
Navigation	  Expert → Diagnostics → Simulation → Curr.out. 1 to n sim. (0354–1 to n)	
Description	Use this function to switch simulation of the current output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.	
Selection	■ Off ■ On	
Factory setting	Off	

Additional information	<i>Description</i>  The desired simulation value is defined in the Value curr.out 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.
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Value curr.out 1 to n



Navigation	 Expert → Diagnostics → Simulation → Value curr.out 1 to n (0355-1 to n)
Prerequisite	In the Curr.out. 1 to n sim. parameter, the On option is selected.
Description	Use this function to enter a current value for the simulation. In this way, users can verify the correct adjustment of the current output and the correct function of downstream switching units.
User entry	3.59 to 22.5 mA
Additional information	<i>Dependency</i> The input range is dependent on the option selected in the Current span parameter (→  107).

FreqOutputSim 1 to n



Navigation	 Expert → Diagnostics → Simulation → FreqOutputSim 1 to n (0472-1 to n)
Prerequisite	In the Operating mode parameter (→  121), the Frequency option is selected.
Description	Use this function to switch simulation of the frequency output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	■ Off ■ On
Factory setting	Off

Additional information*Description*

The desired simulation value is defined in the **Freq value 1 to n** parameter.

Selection

- Off
Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
Frequency simulation is active.

Freq value 1 to n**Navigation**

Expert → Diagnostics → Simulation → Freq value 1 to n (0473–1 to n)

Prerequisite

In the **FreqOutputSim 1 to n** parameter, the **On** option is selected.

Description

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

User entry

0.0 to 12 500.0 Hz

Puls.outp.sim. 1 to n**Navigation**

Expert → Diagnostics → Simulation → Puls.outp.sim. 1 to n (0458–1 to n)

Prerequisite

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

Description

Use this function to switch simulation of the pulse output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- Fixed value
- Down-count. val.

Factory setting

Off

Additional information*Description*

The desired simulation value is defined in the **Pulse value 1 to n** parameter.

Selection

- Off
Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (→ 124).
- Down-count. val.
The pulses specified in the **Pulse value** parameter (→ 214) are output.

Pulse value 1 to n**Navigation**

Expert → Diagnostics → Simulation → Pulse value 1 to n (0459–1 to n)

Prerequisite

In the **Puls.outp.sim. 1 to n** parameter, the **Down-count. val.** option is selected.

Description

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

User entry

0 to 65 535

Switch sim. 1 to n**Navigation**

Expert → Diagnostics → Simulation → Switch sim. 1 to n (0462–1 to n)

Prerequisite

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

Description

Use this function to switch simulation of the switch output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Factory setting

Off

Additional information*Description*

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection

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

Switch status 1 to n**Navigation**

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

Description

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

Selection

- Open
- Closed

Additional information*Selection*

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

Relay out. 1 to n sim**Navigation**

Expert → Diagnostics → Simulation → Relay out. 1 to n sim (0802–1 to n)

Description

Use this function to switch simulation of the relay output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Factory setting

Off

Additional information *Description*

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection

- Off
Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
Relay simulation is active.

Switch status 1 to n**Navigation**

Expert → Diagnostics → Simulation → Switch status 1 to n (0803–1 to n)

Prerequisite

The **On** option is selected in the **Switch sim. 1 to n** parameter parameter.

Description

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

Selection

- Open
- Closed

Additional information*Selection*

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

Dev. alarm sim.**Navigation**

Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

Description

Use this function to switch the device alarm on and off.

Selection

- Off
- On

Factory setting

Off

Additional information*Description*

The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Event category		
Navigation	 Expert → Diagnostics → Simulation → Event category (0738)	
Description	Use this function to select the category of the diagnostic events that are displayed for the simulation in the Diag. event sim. parameter (→  217).	
Selection	■ Sensor ■ Electronics ■ Configuration ■ Process	
Factory setting	Process	
Diag. event sim.		
Navigation	  Expert → Diagnostics → Simulation → Diag. event sim. (0737)	
Description	Use this function to select a diagnostic event for the simulation process that is activated.	
Selection	■ Off ■ Diagnostic event picklist (depends on the category selected)	
Factory setting	Off	
Additional information	<i>Description</i>  For the simulation, you can choose from the diagnostic events of the category selected in the Event category parameter (→  217).	

4 Country-specific factory settings

4.1 SI units



Not valid for USA and Canada.

4.1.1 System units

Volume flow	l/h
Volume	m ³
Conductivity	µS/cm
Temperature	°C
Mass flow	kg/h
Mass	kg
Density	kg/l
Corrected volume flow	NI/h
Corrected volume	Nm ³

4.1.2 Full scale values



The factory settings apply to the following parameters:

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

Nominal diameter [mm]	(v ~ 2.5 m/s) [dm ³ /min]
2	0.5
4	2
8	8
15	25
25	75
32	125
40	200
50	300
65	500
80	750
100	1200
125	1850
150	150 m ³ /h
200	300 m ³ /h
250	500 m ³ /h
300	750 m ³ /h
350	1000 m ³ /h
400	1200 m ³ /h
450	1500 m ³ /h

Nominal diameter [mm]	($v \sim 2.5 \text{ m/s}$) [dm ³ /min]
500	2 000 m ³ /h
600	2 500 m ³ /h

4.1.3 Output current span

Current output 1 to n	4 to 20 mA NAMUR
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4.1.4 Pulse value

Nominal diameter [mm]	($\sim 2 \text{ pulse/s}$) [dm ³]
2	0.005
4	0.025
8	0.1
15	0.2
25	0.5
32	1
40	1.5
50	2.5
65	5
80	5
100	10
125	15
150	0.03 m ³
200	0.05 m ³
250	0.05 m ³
300	0.1 m ³
350	0.1 m ³
400	0.15 m ³
450	0.25 m ³
500	0.25 m ³
600	0.3 m ³

4.1.5 On value low flow cut off

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

Nominal diameter [mm]	($v \sim 0.04 \text{ m/s}$) [m ³ /h]
2	0.01
4	0.05
8	0.1
15	0.5
25	1

Nominal diameter [mm]	(v ~ 0.04 m/s) [m³/h]
32	2
40	3
50	5
65	8
80	12
100	20
125	30
150	2.5
200	5
250	7.5
300	10
350	15
400	20
450	25
500	30
600	40

4.2 US units

 Only valid for USA and Canada.

4.2.1 System units

Volume flow	gal/min (us)
Volume	gal (us)
Temperature	°F
Mass flow	lb/min
Mass	lb
Density	lb/ft³
Corrected volume flow	Sft³/h
Corrected volume	Sft³

4.2.2 Full scale values

 The factory settings apply to the following parameters:

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

Nominal diameter [in]	(v ~ 2.5 m/s) [gal/min]
1/12	0.1
1/8	0.5
3/8	2
1/2	6

Nominal diameter [in]	(v ~ 2.5 m/s) [gal/min]
1	18
1½	50
2	75
3	200
4	300
5	450
6	600
8	1200
10	1500
12	2400
14	3600
15	4800
16	4800
18	6000
20	7500
24	10500

4.2.3 Output current span

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

4.2.4 Pulse value

Nominal diameter [in]	(~ 2 pulse/s) [gal]
1/12	0.001
1/8	0.005
3/8	0.02
½	0.1
1	0.2
1½	0.5
2	0.5
3	2
4	2
5	5
6	5
8	10
10	15
12	25
14	30
15	50
16	50
18	50

Nominal diameter [in]	(~ 2 pulse/s) [gal]
20	75
24	100

4.2.5 On value low flow cut off



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

Nominal diameter [in]	(v ~ 0.04 m/s) [gal/min]
1/12	0.002
1/8	0.008
3/8	0.025
1/2	0.15
1	0.25
1 1/2	0.75
2	1.25
3	2.5
4	4
5	7
6	12
8	15
10	30
12	45
14	60
15	60
16	60
18	90
20	120
24	180

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Density	g/cm ³ , g/m ³	Gram/volume unit
	kg/dm ³ , kg/l, kg/m ³	Kilogram/volume unit
	SD4°C, SD15°C, SD20°C	Specific density: The specific density is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
	SG4°C, SG15°C, SG20°C	Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
Conductivity	μS/mm	Microsiemens/length unit
	nS/cm, μS/cm, mS/cm, S/cm	Nano-, Micro-, Milli-, Siemens/length unit
	μS/m, mS/m, S/m, kS/m, MS/m	Micro-, Milli-, Siemens, Kilo-, Megasiemens/length unit
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
Temperature	°C, K	Celsius, Kelvin
Volume	cm ³ , dm ³ , m ³	Cubic centimeter, cubic decimeter, cubic meter
	ml, l, hl, Ml Mega	Milliliter, liter, hectoliter, megaliter
Time	s, m, h, d, y	Second, minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Density	lb/ft ³ , lb/gal (us)	Pound/cubic foot, pound/gallon
	lb/bbl (us;liq.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)	Pound/volume unit
Mass	oz, lb, STon	Ounce, pound, standard ton
Mass flow	oz/s, oz/min, oz/h, oz/d	Ounce/time unit
	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	STon/s, STon/min, STon/h, STon/d	Standard ton/time unit
Corrected volume	Sft ³ , Sgal (us), Sbbl (us;liq.)	Standard cubic foot, standard gallon, standard barrel
Correct.vol.flow	Sft ³ /s, Sft ³ /min, Sft ³ /h, Sft ³ /d	Standard cubic foot/time unit
	Sgal/s (us), Sgal/min (us), Sgal/h (us), Sgal/d (us)	Standard gallon/time unit
	Sbbl/s (us;liq.), Sbbl/min (us;liq.), Sbbl/h (us;liq.), Sbbl/d (us;liq.)	Barrel/time unit (normal liquids)
Temperature	°F, °R	Fahrenheit, Rankine
Volume	af	Acre foot
	ft ³	Cubic foot

Process variable	Units	Explanation
	fl oz (us), gal (us), kgal (us), Mgal (us)	Fluid ounce, gallon, kilogallon, million gallon
	bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)	Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)
Volume flow	af/s, af/min, af/h, af/d	Acre foot/time unit
	ft ³ /s, ft ³ /min, ft ³ /h, ft ³ /d	Cubic foot/time unit
	fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us)	Fluid ounce/time unit
	gal/s (us), gal/min (us), gal/h (us), gal/d (us)	Gallon/time unit
	kgal/s (us), kgal/min (us), kgal/h (us), kgal/d (us)	Kilogallon/time unit
	Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us)	Million gallon/time unit
	bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.)	Barrel/time unit (normal liquids) Normal liquids: 31.5 gal/bbl
	bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer)	Barrel /time unit (beer) Beer: 31.0 gal/bbl
	bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 42.0 gal/bbl
	bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank)	Barrel/time unit (filling tank) Filling tanks: 55.0 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

5.3 Imperial units

Process variable	Units	Explanation
Density	lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)	Pound/volume unit
Corrected volume	Sgal (imp)	Standard gallon
Correct.vol.flow	Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp)	Standard gallon/time unit
Volume	gal (imp), Mgal (imp)	Gallon, mega gallon
	bbl (imp;beer), bbl (imp;oil)	Barrel (beer), barrel (petrochemicals)
Volume flow	gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)	Gallon/time unit
	Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)	Mega gallon/time unit
	bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)	Barrel /time unit (beer) Beer: 36.0 gal/bbl
	bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 34.97 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

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