

Description of Device Parameters

Proline Cubemass 500

EtherNet/IP

Coriolis flowmeter

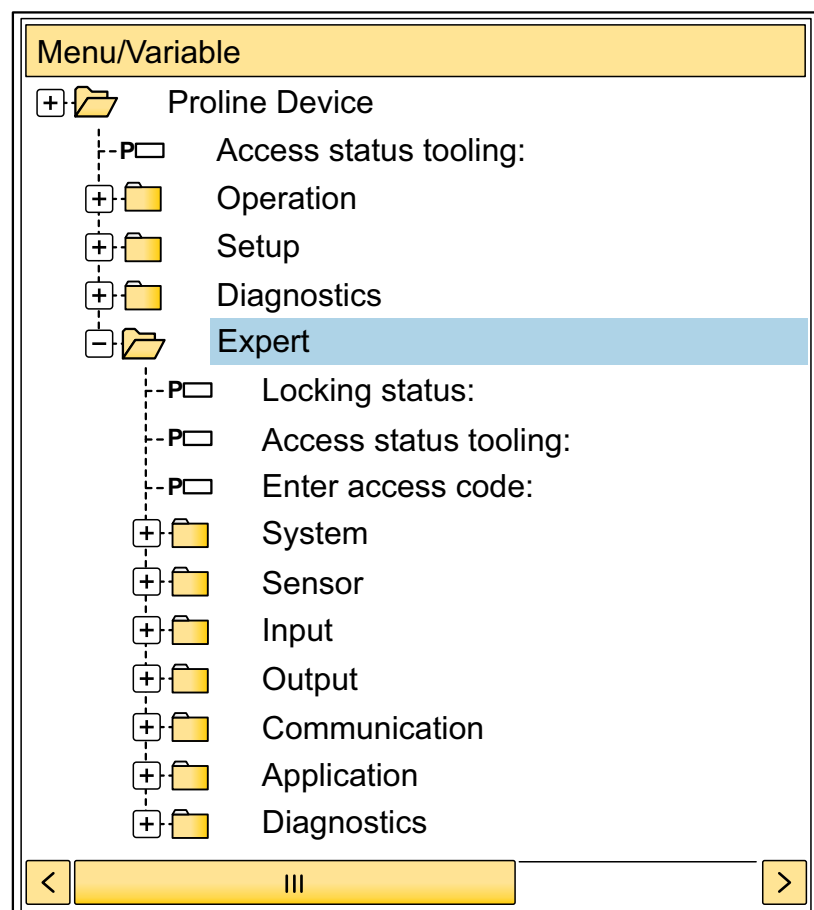


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1 About this document

1.1 Document function

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

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

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

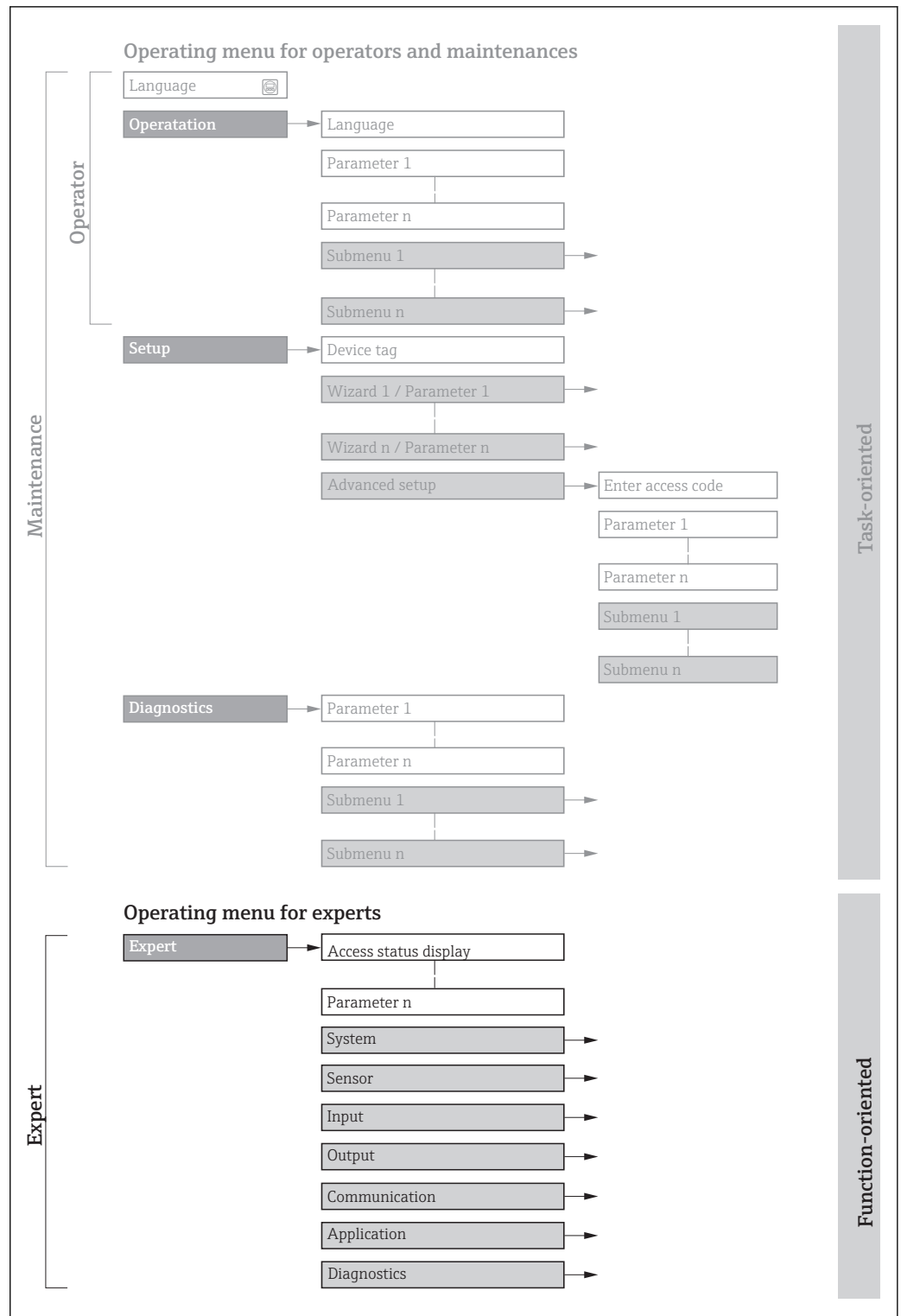
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

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



1 Sample graphic for the schematic layout of the operating menu



Additional information regarding:

- The arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu with a brief description: Operating Instructions → 7
- Operating concept of the operating menus: Operating Instructions → 7

1.3.2 Structure of a parameter description

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

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

1.4 Symbols used

1.4.1 Symbols for certain types of information

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

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

Measuring device	Documentation code
Cubemass C 500	BA01748D

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
Web server	SD01974D
Heartbeat Technology	SD01985D
Concentration measurement	SD02010D

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	→ 	30
▶ Diagn. handling	→ 	33
▶ Administration	→ 	43
▶ Sensor	→ 	47
▶ Measured val.	→ 	48
▶ System units	→ 	61
▶ Process param.	→ 	77
▶ Measurement mode	→ 	86
▶ External comp.	→ 	88
▶ Calculated value	→ 	91
▶ Sensor adjustm.	→ 	94
▶ Calibration	→ 	101
▶ I/O config.	→ 	102
I/O 1 to n terminals (3902–1 to n)	→ 	103
I/O 1 to n info (3906–1 to n)	→ 	103

I/O 1 to n type (3901-1 to n)	→ 103
Apply I/O config (3907)	→ 104
Alteration code (2762)	→ 104
► Input	→ 105
► Current input 1 to n	→ 105
► Status input 1 to n	→ 108
► Output	→ 110
► Curr.output 1 to n	→ 110
► PFS output 1 to n	→ 125
► Relay output 1 to n	→ 149
► Communication	→ 156
► Configuration	→ 156
► WLAN settings	→ 167
► Application	→ 173
Reset all tot. (2806)	→ 174
► Totalizer 1 to n	→ 174
► Concentration	→ 179
► Petroleum	→ 179
► Diagnostics	→ 180
Actual diagnos. (0691)	→ 181
Prev.diagnostics (0690)	→ 181
Time fr. restart (0653)	→ 182
Operating time (0652)	→ 182
► Diagnostic list	→ 183
► Event logbook	→ 187

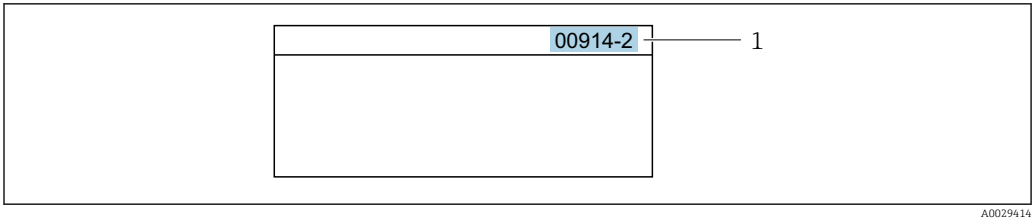
► Device info	→ 189
► Mainboard I/O1	→ 193
► Sens. electronic	→ 194
► I/O module 2	→ 196
► I/O module 3	→ 197
► I/O module 4	→ 198
► Display module	→ 199
► Min/max val.	→ 200
► Data logging	→ 207
► Heartbeat	→ 216
► Simulation	→ 217

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	→	47
► I/O config.	→	102
► Input	→	105
► Output	→	110
► Communication	→	156
► Application	→	173
► Diagnostics	→	180

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	<i>User entry</i> 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	→  30
► Diagn. handling	→  33
► Administration	→  43

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)	→ 	19
100% bargraph 1 (0125)	→ 	20
Decimal places 1 (0095)	→ 	20
Value 2 display (0108)	→ 	20
Decimal places 2 (0117)	→ 	22
Value 3 display (0110)	→ 	22
0% bargraph 3 (0124)	→ 	24
100% bargraph 3 (0126)	→ 	24
Decimal places 3 (0118)	→ 	25
Value 4 display (0109)	→ 	25
Decimal places 4 (0119)	→ 	27
Display interval (0096)	→ 	27
Display damping (0094)	→ 	28
Header (0097)	→ 	28
Header text (0112)	→ 	29
Separator (0101)	→ 	29
Contrast display (0105)	→ 	30
Backlight (0111)	→ 	30

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) * ■ Bahasa Indonesia * ■ 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*

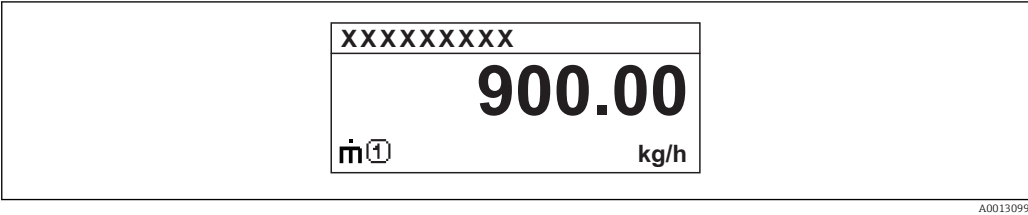
The display format (size, bar graph etc.) and number of measured values displayed simultaneously (1 to 4) can be configured. This setting only applies to normal operation.



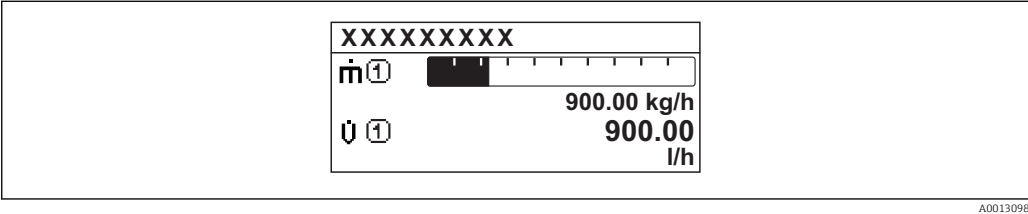
- The **Value 1 display** parameter (→ 18) to **Value 4 display** parameter (→ 25) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured via the **Display interval** parameter (→ 27).

Possible measured values shown on the local display:

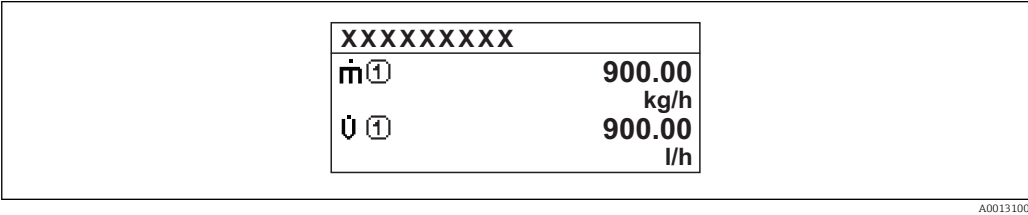
"1 value, max." option



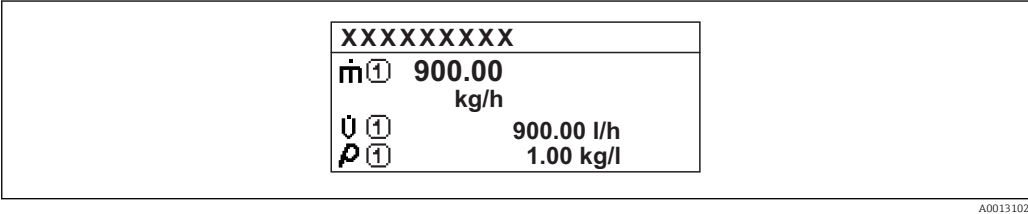
"Bagr. + 1 value" option



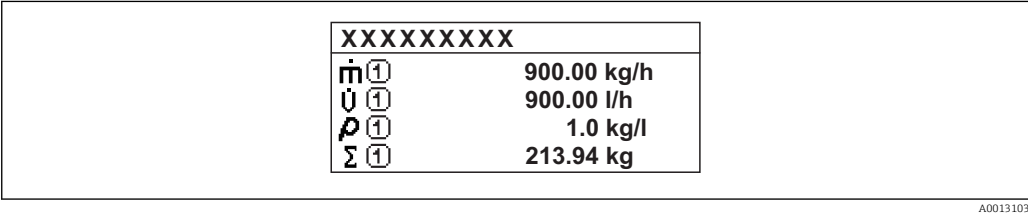
"2 values" option



"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	■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. * ■ Target vol. flow ■ Carrier vol. fl. ■ Targ.corr.vol.fl ■ Carr.corr.vol.fl ■ Density ■ Ref.density ■ Ref.dens.altern. ■ GSV flow ■ GSVa ■ NSV flow ■ NSVa ■ S&W volume flow ■ Water cut ■ Oil density ■ Water density ■ Oil mass flow ■ Water mass flow ■ Oil volume flow ■ Water vol. flow ■ Oil corr.vol.fl. ■ Water corr.v.fl. ■ Density average ■ Temp. average ■ Concentration * ■ Temperature ■ Carr. pipe temp. * ■ Electronic temp. ■ Osc. freq. 0 ■ Osc. ampl. 0 * ■ Freq. fluct. 0 ■ Osc. damping 0 ■ Osc.damp.fluct 0 ■ Signal asymmetry ■ Exc. current 0 ■ Totalizer 1 ■ Totalizer 2 ■ Totalizer 3 ■ Curr.output 1 ■ Curr.output 2 * ■ Curr.output 3 * ■ Curr.output 4 * ■ Pressure

* Visibility depends on order options or device settings

Factory setting	Mass 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 (→  61). <i>Selection</i> ■ Oscil. frequency option Displays the current oscillation frequency of the measuring tubes. This frequency depends on the density of the medium. ■ Oscil. amplitude option Displays the relative oscillation amplitude of the measuring tubes in relation to the preset value. This value is 100 % under optimum conditions. ■ Oscil. damping option Displays the current oscillation damping. Oscillation damping is an indicator of the sensor's current need for excitation power. ■ Signal asymmetry option Displays the relative difference between the oscillation amplitude at the inlet and outlet of the sensor. The measured value is the result of production tolerances of the sensor coils and should remain constant over the life time of a sensor.

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 kg/h ■ 0 lb/min
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 (→  61).

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 →  227
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 (→  61).

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	<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 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
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow
- Carrier mass fl.
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl
- Density
- Ref.density
- Ref.dens.altern.
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Water cut
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water corr.v.fl.
- Oil corr.vol.fl.
- Water vol. flow
- Density average
- Temp. average
- Concentration
- Dynam. viscosity
- Kinematic visc.
- TempCompDynVisc
- TempCompKinVisc
- Temperature
- Carr. pipe temp.
- Electronic temp.
- Osc. freq. 0
- Osc. freq. 1
- Osc. ampl. 0
- Osc. ampl. 1
- Freq. fluct. 0
- Freq. fluct. 1
- Osc. damping 0
- Osc. damping 1
- Osc.damp.fluct 0
- Osc.damp.fluct 1
- Signal asymmetry
- Exc. current 0
- Exc. current 1
- HBSI
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1

- Curr.output 2 *
- Curr.output 3 *
- Curr.output 4 *
- Pressure

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 (→  61).

Decimal places 2



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

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

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

Selection

- X
- X.X
- X.XX
- X.XXX
- X.XXXX

Factory setting X.XX

Additional information *Description*



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

Value 3 display



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

Prerequisite A local display is provided.

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

* Visibility depends on order options or device settings

Selection

- None
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow
- Carrier mass fl.
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl
- Density
- Ref.density
- Ref.dens.altern.
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Water cut
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water corr.v.fl.
- Oil corr.vol.fl.
- Water vol. flow
- Density average
- Temp. average
- Concentration
- Dynam. viscosity
- Kinematic visc.
- TempCompDynVisc
- TempCompKinVisc
- Temperature
- Carr. pipe temp.
- Electronic temp.
- Osc. freq. 0
- Osc. freq. 1
- Osc. ampl. 0
- Osc. ampl. 1
- Freq. fluct. 0
- Freq. fluct. 1
- Osc. damping 0
- Osc. damping 1
- Osc.damp.fluct 0
- Osc.damp.fluct 1
- Signal asymmetry
- Exc. current 0
- Exc. current 1
- HBSI
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1
- Curr.output 2 *

* Visibility depends on order options or device settings

- Curr.output 3 *
- Curr.output 4 *
- Pressure

Factory setting None

Additional information *Description*

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

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

Selection

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

0% bargraph 3

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

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

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

User entry Signed floating-point number

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

Additional information *Description*

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

User entry

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

100% bargraph 3

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

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

* Visibility depends on order options or device settings

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	<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 (→  61).

Decimal places 3

Navigation	  Expert → System → Display → Decimal places 3 (0118)
Prerequisite	A measured value is specified in the Value 3 display parameter (→  22).
Description	Use this function to select the number of decimal places for measured value 3.
Selection	■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx
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 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 ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow

- Carrier mass fl.
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl
- Density
- Ref.density
- Ref.dens.altern.
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Water cut
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water corr.v.fl.
- Oil corr.vol.fl.
- Water vol. flow
- Density average
- Temp. average
- Concentration
- Dynam. viscosity
- Kinematic visc.
- TempCompDynVisc
- TempCompKinVisc
- Temperature
- Carr. pipe temp.
- Electronic temp.
- Osc. freq. 0
- Osc. freq. 1
- Osc. ampl. 0
- Osc. ampl. 1
- Freq. fluct. 0
- Freq. fluct. 1
- Osc. damping 0
- Osc. damping 1
- Osc.damp.fluct 0
- Osc.damp.fluct 1
- Signal asymmetry
- Exc. current 0
- Exc. current 1
- HBSI
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1
- Curr.output 2 *
- Curr.output 3 *
- Curr.output 4 *
- Pressure

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 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. <i>Selection</i>  The unit of the displayed measured value is taken from the System units submenu (→  61).
-------------------------------	--

Decimal places 4

Navigation	  Expert → System → Display → Decimal places 4 (0119)
Prerequisite	A measured value is specified in the Value 4 display parameter (→  25).
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	<i>Description</i>  This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

Display interval

Navigation	  Expert → System → Display → Display interval (0096)
Prerequisite	A local display is provided.
Description	Use this function to enter the length of time the measured values are displayed if the values alternate on the display.
User entry	1 to 10 s
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 (→  25) 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



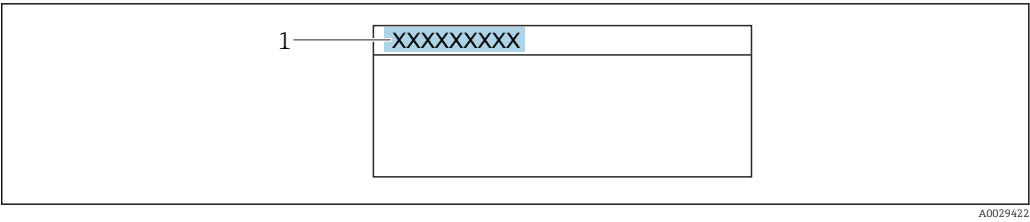
Navigation	  Expert → System → Display → Display damping (0094)
Prerequisite	A local display is provided.
Description	Use this function to enter a time constant for the reaction time of the local display to fluctuations in the measured value caused by process conditions.
User entry	0.0 to 999.9 s
Factory 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.
Selection	■ Device tag ■ Free text
Factory setting	Device tag
Additional information	<i>Description</i> The header text only appears during normal operation.

1) proportional transmission behavior with first order delay



1 Position of the header text on the display

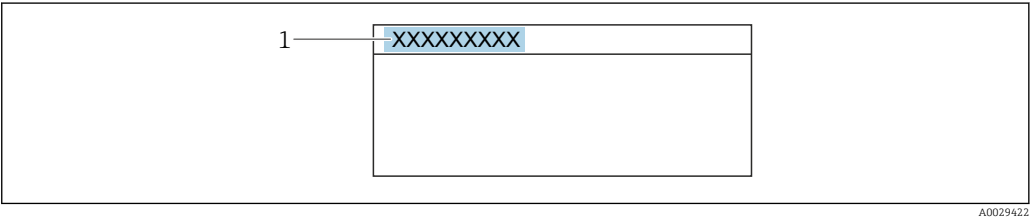
Selection

- Device tag
Is defined in the **Device tag** parameter (→ ⓘ 190).
- Free text
Is defined in the **Header text** parameter (→ ⓘ 29).

Header text

ⓘ

Navigation	ⓘ ⓘ Expert → System → Display → Header text (0112)
Prerequisite	In the Header parameter (→ ⓘ 28), 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	<i>Description</i> The header text only appears during normal operation.



1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator

ⓘ

Navigation	ⓘ ⓘ Expert → System → Display → Separator (0101)
Prerequisite	A local display is provided.

Description	Use this function to select the decimal separator.
Selection	▪ . (point) ▪ , (comma)
Factory setting	. (point)

Contrast display

Navigation	 Expert → System → Display → Contrast display (0105)
Prerequisite	A local display is provided.
Description	Use this function to enter a value to adapt the display contrast to the ambient conditions (e.g. the lighting or viewing angle).
User entry	20 to 80 %
Factory setting	Depends on the display

Backlight

Navigation	 Expert → System → Display → Backlight (0111)
Prerequisite	One of the following conditions is met: ▪ Order code for "Display; operation", option F "4-line, illum.; touch control" ▪ Order code for "Display; operation", option G "4-line, illum.; touch control +WLAN"
Description	Use this function to switch the backlight of the local display on and off.
Selection	▪ Disable ▪ Enable
Factory setting	Enable

3.1.2 "Configuration backup" submenu

Navigation

 Expert → System → Config. backup

► Config. backup

Operating time

→  31

Last backup

→  31

Config. managem.	→ 31
Backup state	→ 32
Compar. result	→ 32

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 (→  31).

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) →  34

► Diagn. behavior →  34

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:

- 046 Sensor limit
- 140 Sensor sig.asym.
- 144 MeasErrorTooHigh
- 830 Sensor temp.
- 831 Sensor temp.
- 832 Electronic temp.
- 833 Electronic temp.
- 834 Process temp.
- 835 Process temp.
- 843 Process limit
- 862 Partly filled
- 912 Medium inhomog.
- 913 Medium unsuitab.
- 944 MonitoringFailed

"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 (→  34).

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

Options	Description
Alarm	The device stops measurement. The totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.
Warning	The device continues to measure. The 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 (→  187) (Event list submenu (→  188)) and is not displayed in alternation with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

Navigation



Expert → System → Diagn. handling → Diagn. behavior

► Diagn. behavior

Diagnostic no. 046 (0709)	→ 36
Diagnostic no. 140 (0708)	→ 36
Diagnostic no. 144 (0731)	→ 36
Diagnostic no. 374 (0710)	→ 37
Diagnostic no. 302 (0739)	→ 37
Diagnostic no. 441 (0657)	→ 37
Diagnostic no. 442 (0658)	→ 38
Diagnostic no. 443 (0659)	→ 38
Diagnostic no. 444 (0740)	→ 38
Diagnostic no. 830 (0800)	→ 39
Diagnostic no. 831 (0641)	→ 39
Diagnostic no. 832 (0681)	→ 40
Diagnostic no. 833 (0682)	→ 40
Diagnostic no. 834 (0700)	→ 40
Diagnostic no. 835 (0702)	→ 41
Diagnostic no. 862 (0679)	→ 41
Diagnostic no. 912 (0703)	→ 41
Diagnostic no. 913 (0712)	→ 42
Diagnostic no. 944 (0732)	→ 42
Diagnostic no. 948 (0744)	→ 42

Diagnostic no. 046 (Sensor limit)



Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 046 (0709)
Description	Option for changing the diagnostic behavior of the diagnostic message 046 Sensor limit .
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Alarm
Additional information	 For a detailed description of the options available, see →  34

Diagnostic no. 140 (Sensor sig.asym.)



Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 140 (0708)
Description	Use this function to change the diagnostic behavior of the diagnostic message 140 Sensor sig.asym..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Alarm
Additional information	 For a detailed description of the options available, see →  34

Diagnostic no. 144 (MeasErrorTooHigh)



Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 144 (0731)
Description	Option for changing the diagnostic behavior of the diagnostic message 144 MeasErrorTooHigh .
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Alarm
Additional information	 For a detailed description of the options available, see →  34

Diagnostic no. 374 (Sensor electron.)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 374 (0710)
Description	Option for changing the diagnostic behavior of the diagnostic message 374 Sensor electron..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	For a detailed description of the options available, see → 34

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 → 34

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 → 34

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 → 34

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 → 34

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 →  34

Diagnostic no. 830 (Sensor temp.)



Navigation   Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 830 (0800)

Description Use this function to change the diagnostic behavior of the diagnostic message **830 Sensor temp..**

- Selection**
- Off
 - Alarm
 - Warning
 - Logbook only

Factory setting Warning

Additional information  For a detailed description of the options available, see →  34

Diagnostic no. 831 (Sensor temp.)



Navigation   Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 831 (0641)

Description Use this function to change the diagnostic behavior of the diagnostic message **831 Sensor temp..**

- Selection**
- Off
 - Alarm
 - Warning
 - Logbook only

Factory setting Warning

Additional information  For a detailed description of the options available, see →  34

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 → 34

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 → 34

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 → 34

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 →  34	
Diagnostic no. 862 (Empty pipe)		
Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 862 (0679)	
Description	Use this function to change the diagnostic behavior of the diagnostic message 862 Empty pipe.	
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only	
Factory setting	Warning	
Additional information	 For a detailed description of the options available, see →  34	
Diagnostic no. 912 (Medium inhomog.)		
Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 912 (0703)	
Description	Option for changing the diagnostic behavior of the diagnostic message 912 Medium inhomog. .	
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only	
Factory setting	Warning	
Additional information	 For a detailed description of the options available, see →  34	

Diagnostic no. 913 (Medium unsuitab.)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 913 (0712)
Description	Option for changing the diagnostic behavior of the diagnostic message 913 Medium unsuitab..
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	For a detailed description of the options available, see → 34

Diagnostic no. 944 (MonitoringFailed)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 944 (0732)
Description	Option for changing the diagnostic behavior of the diagnostic message 944 MonitoringFailed.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning
Additional information	For a detailed description of the options available, see → 34

Diagnostic no. 948 (Oscill. damping)



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 948 (0744)
Description	Option for changing the diagnostic behavior of the diagnostic message 948 Oscill. damping.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook only
Factory setting	Warning

Additional information

 For a detailed description of the options available, see →  34

3.1.4 "Administration" submenu

Navigation  Expert → System → Administration

▶ Administration

▶ Def. access code →  43

▶ Reset acc. code →  44

Device reset (0000) →  45

Activate SW opt. (0029) →  46

SW option overv. (0015) →  47

"Def. access code" wizard

 The **Def. access code** wizard (→  43) 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 →  43

Confirm code →  44

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)

→  44

Reset acc. code (0024)

→  45

Operating time

Navigation	  Expert → System → Administration → Reset acc. code → Operating time (0652)
Description	Use this function to display the length of time the device has been in operation.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

Additional information *User interface*

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

Reset 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 (→ 47).
- ↳ 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 (→  47).

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
- HBT Monitoring
- HBT Verification
- Concentration
- Petroleum
- Viscosity
- HydrocaViscTrend

Additional information

Description

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

"Extend. HistoROM" option

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

"HBT Verification" option and "HBT Monitoring" option

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

"Concentration" option

Order code for "Application package", option **ED** "Concentration"

3.2 "Sensor" submenu

Navigation

  Expert → Sensor

► Sensor

► Measured val.

→  48

► System units	→ 61
► Process param.	→ 77
► Measurement mode	→ 86
► External comp.	→ 88
► Calculated value	→ 91
► Sensor adjustm.	→ 94
► Calibration	→ 101

3.2.1 "Measured values" submenu

Navigation   Expert → Sensor → Measured val.

► Measured val.	
► Process variab.	→ 48
► Totalizer	→ 54
► Input values	→ 55
► Output values	→ 57

"Process variab." submenu

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

► Process variab.	
Mass flow (1838)	→ 49
Volume flow (1847)	→ 49
Correct.vol.flow (1851)	→ 50
Density (1850)	→ 50
Ref.density (1852)	→ 50
Temperature (1853)	→ 50
Pressure value (6129)	→ 51

Concentration (1887)	→ ⓘ 51
Target mass flow (1864)	→ ⓘ 51
Carrier mass fl. (1865)	→ ⓘ 52
Targ.corr.vol.fl (1893)	→ ⓘ 52
Carr.corr.vol.fl (1894)	→ ⓘ 53
Target vol. flow (1895)	→ ⓘ 53
Carrier vol. fl. (1896)	→ ⓘ 53

Mass flow

Navigation	🔍📄 Expert → Sensor → Measured val. → Process variab. → Mass flow (1838)
Description	Displays the mass flow that is currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i> ⓘ The unit is taken from the Mass flow unit parameter (→ ⓘ 61)

Volume flow

Navigation	🔍📄 Expert → Sensor → Measured val. → Process variab. → Volume flow (1847)
Description	Displays the volume flow currently calculated.
User interface	Signed floating-point number
Additional information	<i>Description</i> The volume flow is calculated from the mass flow currently measured and the density currently measured. <i>Dependency</i> ⓘ The unit is taken from the Volume flow unit parameter (→ ⓘ 63)

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 (→  65)

Density

Navigation	 Expert → Sensor → Measured val. → Process variab. → Density (1850)
Description	Displays the density currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Density unit parameter (→  66)

Ref.density

Navigation	 Expert → Sensor → Measured val. → Process variab. → Ref.density (1852)
Description	Displays the reference density currently calculated.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Ref. dens. unit parameter (→  67)

Temperature

Navigation	 Expert → Sensor → Measured val. → Process variab. → Temperature (1853)
Description	Displays the medium temperature currently measured.
User interface	Signed floating-point number

Additional information*Dependency*

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

Pressure value

Navigation

Expert → Sensor → Measured val. → Process variab. → Pressure value (6129)

Description

Displays the fixed or external pressure value.

User interface

Signed floating-point number

Additional information*Dependency*

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

Concentration

Navigation

Expert → Sensor → Measured val. → Process variab. → Concentration (1887)

Prerequisite

For the following order code:

Order code for "Application package", option **ED** "Concentration"



The software options currently enabled are displayed in the **SW option overv.** parameter (→ 47).

Description

Displays the concentration currently calculated.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Concentr. unit** parameter (0613).

Target mass flow

Navigation

Expert → Sensor → Measured val. → Process variab. → Target mass flow (1864)

Prerequisite

With the following conditions:

Order code for "Application package", option **ED** "Concentration"



The software options currently enabled are displayed in the **SW option overv.** parameter (→ 47).

Description

Displays the mass flow currently measured for the target medium.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 61)

Carrier mass fl.**Navigation**

Expert → Sensor → Measured val. → Process variab. → Carrier mass fl. (1865)

Prerequisite

With the following conditions:

Order code for "Application package", option **ED** "Concentration"



The software options currently enabled are displayed in the **SW option overv.** parameter (→ 47).

Description

Displays the mass flow currently measured for the carrier medium.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 61)

Targ.corr.vol.fl**Navigation**

Expert → Sensor → Measured val. → Process variab. → Targ.corr.vol.fl (1893)

Prerequisite

With the following conditions:

- Order code for "Application package", option **ED** "Concentration"

- In the **Liquid type** parameter, the **Ethanol in water** option or **%mass / %volume** option is selected.



The software options currently enabled are displayed in the **SW option overv.** parameter (→ 47).

Description

Displays the corrected volume flow currently measured for the target fluid.

User interface

Signed floating-point number

Additional information*Dependency*

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

Carr.corr.vol.fl

Navigation	 Expert → Sensor → Measured val. → Process variab. → Carr.corr.vol.fl (1894)
Prerequisite	With the following conditions: ▪ Order code for "Application package", option ED "Concentration" ▪ In the Liquid type parameter, the Ethanol in water option or %mass / %volume option is selected.  The software options currently enabled are displayed in the SW option overv. parameter (→  47).
Description	Displays the corrected volume flow currently measured for the carrier fluid.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Volume flow unit parameter (→  63)

Target vol. flow

Navigation	 Expert → Sensor → Measured val. → Process variab. → Target vol. flow (1895)
Prerequisite	With the following conditions: ▪ Order code for "Application package", option ED "Concentration" ▪ The WT-% option or the User conc. option is selected in the Concentr. unit parameter.  The software options currently enabled are displayed in the SW option overv. parameter (→  47).
Description	Displays the volume flow currently measured for the target fluid.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Volume flow unit parameter (→  63)

Carrier vol. fl.

Navigation	 Expert → Sensor → Measured val. → Process variab. → Carrier vol. fl. (1896)
Prerequisite	With the following conditions: ▪ Order code for "Application package", option ED "Concentration" ▪ The WT-% option or the User conc. option is selected in the Concentr. unit parameter.  The software options currently enabled are displayed in the SW option overv. parameter (→  47).
Description	Displays the volume flow currently measured for the carrier fluid.

User interface Signed floating-point number

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

"Totalizer" submenu

Navigation  Expert → Sensor → Measured val. → Totalizer

► Totalizer

Totalizer val. 1 to n (0911-1 to n) →  54

Tot. overflow 1 to n (0910-1 to n) →  55

Totalizer val. 1 to n

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→  175) 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 (→  179).

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 (→  177).
 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→  175).

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 · 10⁷ (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 (→  175) 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 (→  175).

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	→  56
▶ Val.stat.inp. 1 to n	→  56

"Current input 1 to n" submenu

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

► Current input 1 to n

Measured val. 1 to n (1603–1 to n)

→  56

Measur. curr. 1 to n (1604–1 to n)

→  56

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)

→  57

Val.stat.inp.

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

"Output values" submenu

Navigation  Expert → Sensor → Measured val. → Output values

► Output values	
► Value curr.out 1 to n	→  57
► PFS output 1 to n	→  58
► Relay output 1 to n	→  60

"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)	→  57
Measur. curr. 1 to n (0366-1 to n)	→  58

Output curr. 1 to n

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

Measur. curr. 1 to n

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

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

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

► PFS output 1 to n

Output freq. 1 to n (0471–1 to n)

→  58

Pulse output 1 to n (0456–1 to n)

→  58

Switch status 1 to n (0461–1 to n)

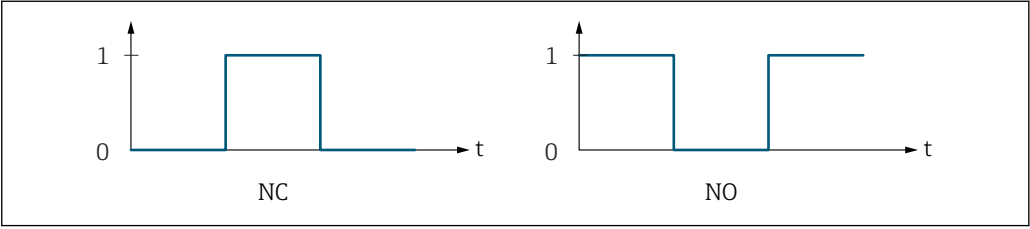
→  59

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 (→  127), 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 (→  127), 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 (→ ⓘ 148) 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 (→ ⓘ 132)) 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 (→ ⓘ 127).
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)

→  60

Switch cycles (0815–1 to n)

→  60

Max. cycles no. (0817–1 to n)

→  60

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

Mass flow unit (0554)

→  61

Mass unit (0574)

→  62

Volume flow unit (0553)

→  63

Volume unit (0563)

→  64

Cor.volflow unit (0558)

→  65

Corr. vol. unit (0575)

→  65

Density unit (0555)

→  66

Ref. dens. unit (0556)

→  67

Temperature unit (0557)

→  68

Pressure unit (0564)

→  68

Date/time format (2812)

→  69

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 ■ g/min ■ g/h ■ g/d ■ kg/s ■ kg/min ■ kg/h ■ kg/d ■ t/s ■ t/min ■ t/h ■ t/d		■ oz/s ■ oz/min ■ oz/h ■ oz/d ■ lb/s ■ lb/min ■ lb/h ■ lb/d ■ STon/s ■ STon/min ■ STon/h ■ STon/d	
Factory setting	Country-specific:			
	■ kg/h ■ lb/min			
Additional information	<i>Result</i>			
	The selected unit applies for: ■ Target mass flow parameter (→  51) ■ Carrier mass fl. parameter (→  52) ■ Mass flow parameter (→  49)			
	<i>Selection</i>			
	 For an explanation of the abbreviated units: →  230			
	<i>Customer-specific units</i>			
	 The unit for the customer-specific mass is specified in the Mass text parameter (→  71).			

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*Selection*

For an explanation of the abbreviated units: → 230

Customer-specific unitsThe unit for the customer-specific mass is specified in the **Mass text** parameter (→ 71).**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;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;oil)
- bbl/min (imp;oil)
- bbl/h (imp;oil)
- bbl/d (imp;oil)

or

	<i>US units</i> ■ 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) <i>Imperial units</i> ■ bbl/s (imp;beer) ■ bbl/min (imp;beer) ■ bbl/h (imp;beer) ■ bbl/d (imp;beer)
Factory setting	Country-specific: ■ l/h ■ gal/min (us)
Additional information	<i>Result</i> The selected unit applies for: Volume flow parameter (→ ⓘ 49) <i>Selection</i>  For an explanation of the abbreviated units: → ⓘ 230 <i>Customer-specific units</i>  The unit for the customer-specific volume is specified in the Volume text parameter (→ ⓘ 70).

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> ■ cm³ ■ dm³ ■ m³ ■ ml ■ l ■ hl ■ Ml Mega or <i>US units</i> ■ bbl (us;liq.) ■ bbl (us;beer)	<i>US units</i> ■ af ■ ft³ ■ fl oz (us) ■ gal (us) ■ kgal (us) ■ Mgal (us) ■ bbl (us;oil) ■ bbl (us;tank)	<i>Imperial units</i> ■ gal (imp) ■ Mgal (imp) ■ bbl (imp;oil)
Factory setting	Country-specific: ■ l ■ gal (us)		

Additional information

Selection

 For an explanation of the abbreviated units: →  230

Customer-specific units

 The unit for the customer-specific volume is specified in the **Volume text** parameter (→  70).

Cor.volflow unit



Navigation

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

Description

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

Selection

SI units	US units	Imperial units
■ NI/s	■ Sft ³ /s	■ Sgal/s (imp)
■ NI/min	■ Sft ³ /min	■ Sgal/min (imp)
■ NI/h	■ Sft ³ /h	■ Sgal/h (imp)
■ NI/d	■ Sft ³ /d	■ Sgal/d (imp)
■ Nm ³ /s	■ Sgal/s (us)	
■ Nm ³ /min	■ Sgal/min (us)	
■ Nm ³ /h	■ Sgal/h (us)	
■ Nm ³ /d	■ Sgal/d (us)	
■ Sm ³ /s	■ Sbbl/s (us;liq.)	
■ Sm ³ /min	■ Sbbl/min (us;liq.)	
■ Sm ³ /h	■ Sbbl/h (us;liq.)	
■ Sm ³ /d	■ Sbbl/d (us;liq.)	

Factory setting

Country-specific:
■ NI/h
■ Sft³/min

Additional information

Result

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

Selection

 For an explanation of the abbreviated units: →  230

Corr. vol. unit



Navigation

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

Description

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

Selection	SI units ■ NI ■ Nm³ ■ Sm³
-----------	--

US units

■

 Sft³

■

 Sgal (us)

■

 Sbbl (us;liq.)

Imperial units

■

 Sgal (imp)

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 ■ g/ml ■ kg/l ■ kg/dm³ ■ kg/m³ ■ SD4°C ■ SD15°C ■ SD20°C ■ SG4°C ■ SG15°C ■ SG20°C or US units SG60°F Other units °API or US units ■ lb/bbl (us;liq.) ■ lb/bbl (us;beer) Imperial units lb/bbl (imp;beer)

Additional information*Result*

The selected unit applies for:

- **Density setpt 1** parameter
- **Density setpt 2** parameter
- **Density** parameter (→  50)

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: →  230

Customer-specific units

 The unit for the customer-specific density is specified in the **Density text** parameter (→  74).

Ref. dens. unit**Navigation**

  Expert → Sensor → System units → Ref. dens. unit (0556)

Description

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

Selection*SI units*

- kg/Nm³
- kg/Nl
- g/Scm³
- kg/Sm³
- RD15°C
- RD20°C

US units

- lb/Sft³
- RD60°F

Other units

°APIbase

Factory setting

Country-dependent

- kg/Nl
- lb/Sft³

Additional information*Result*

The selected unit applies for:

- **Ext. ref.density** parameter (→  92)
- **Fix ref.density** parameter (→  92)
- **Ref.density** parameter (→  50)

Selection

 For an explanation of the abbreviated units: →  230

Temperature unit



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

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

Selection

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

Factory setting

Country-specific:

- °C
- °F

Additional information

Result

The selected unit applies for:

- **Maximum value** parameter (→ 202)
- **Minimum value** parameter (→ 203)
- **Maximum value** parameter (→ 203)
- **Minimum value** parameter (→ 203)
- **Maximum value** parameter (→ 204)
- **Minimum value** parameter (→ 204)
- **External temp.** parameter (→ 90)
- **Temperature** parameter (→ 50)
- **Ref. temperature** parameter (→ 93)

Selection

For an explanation of the abbreviated units: → 230

Pressure unit



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

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

Selection

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

Factory setting

Country-specific:

- bar a
- psi a

Additional information

Result

The unit is taken from:

- **Pressure value** parameter (→ ⓘ 89)
- **External press.** parameter (→ ⓘ 89)
- **Pressure value** parameter (→ ⓘ 51)

Selection

 For an explanation of the abbreviated units: → ⓘ 230

Date/time format



Navigation

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

Description

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

Selection

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

Factory setting

dd.mm.yy hh:mm

Additional information

Selection

 For an explanation of the abbreviated units: → ⓘ 230

"User-spec. units" submenu

Navigation

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

► User-spec. units

Volume text (0567)

→ ⓘ 70

Volume offset (0569)

→ ⓘ 71

Volume factor (0568)

→ ⓘ 71

Mass text (0560)

→ ⓘ 71

Mass offset (0562)

→ ⓘ 72

Mass factor (0561)

→ ⓘ 72

Corr. vol. text (0592)

→ ⓘ 73

Corr vol. offset (0602)	→  73
Cor.vol. factor (0590)	→  73
Density text (0570)	→  74
Density offset (0571)	→  74
Density factor (0572)	→  74
Spec. enth. text (0585)	→  74
Spec. enth. off. (0584)	→  75
Spec. enth. fac. (0583)	→  75
Energy text (0600)	→  75
Energy offset (0599)	→  76
Energy factor (0586)	→  76
Pressure text (0581)	→  76
Pressure offset (0580)	→  77
Pressure factor (0579)	→  77

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 (→ 63)
- **Volume unit** parameter (→ 64)

Example

If the text GLAS is entered, the choose list of the **Volume flow unit** parameter (→ 63) 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*Description*

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	<i>Result</i>  The defined unit is shown as an option in the choose list of the following parameters: ▪ Mass flow unit parameter (→  61) ▪ Mass unit parameter (→  62) <i>Example</i> If the text CENT for "centner" is entered, the following options are displayed in the picklist for the Mass flow unit parameter (→  61): ▪ CENT/s ▪ CENT/min ▪ CENT/h ▪ CENT/d

Mass offset

Navigation	  Expert → Sensor → System units → User-spec. units → Mass offset (0562)
Description	Use this function to enter the zero point shift for the user-specific mass and mass flow unit.
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

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
Additional information	<i>Example</i> Mass of 1 Zentner = 50 kg → 0.02 Zentner = 1 kg → entry: 0.02

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 (→  65) ▪ Corr. vol. unit parameter (→  65) <i>Example</i> If the text GLAS is entered, the choose list of the Cor.volflow unit parameter (→  65) 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 (→  66). <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*

Example

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 *Example*
 $1 \text{ W} \times \text{min} = 60 \text{ J} \rightarrow 0.166 \text{ W} \times \text{min} = 1 \text{ J} \rightarrow \text{user entry: } 0.0166$

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		<i>Result</i>  The defined unit is shown as an option in the choose list of the Pressure unit parameter (→  68).
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	<i>Example</i> 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.

Flow damping (1802)

Density damping (1803)

Temp. damping (1822)

Flow override (1839)

→  78

→  78

→  79

→  79

► Low flow cut off	→ 80
► Partial pipe det	→ 83

Flow damping



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

Description Use this function to enter a time constant for flow damping (PT1 element). Reduction of the variability of the flow measured value (in relation to interference). For this purpose, the depth of the flow filter is adjusted: when the filter setting increases, the reaction time of the device also increases.

User entry 0 to 100.0 s

Factory setting 0 s

Additional information

Description

The damping is performed by a PT1 element ²⁾.

User entry

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

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

Result

The damping affects the following variables of the device:

- Outputs → 110
- Low flow cut off → 80
- Totalizers → 174

Density damping



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

Description Use this function to enter a time constant for the damping (PT1 element) of the density measured value.

User entry 0 to 999.9 s

Factory setting 0 s

2) Proportional behavior with first-order lag

Additional information*Description*

The damping is performed by a PT1 element ³⁾.

User entry

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



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

Temp. damping**Navigation**

Expert → Sensor → Process param. → Temp. damping (1822)

Description

Use this function to enter a time constant for the damping (PT1 element) of the temperature measured value.

User entry

0 to 999.9 s

Factory setting

0 s

Additional information*Description*

The damping is performed by a PT1 element ⁴⁾.

User entry

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



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

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

3) Proportional behavior with first-order lag

4) Proportional behavior with first-order lag

Additional information

Description

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 (→ 109).

"Low flow cut off" submenu

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

► Low flow cut off

Assign variable (1837)

→ 80

On value (1805)

→ 80

Off value (1804)

→ 81

Pres. shock sup. (1806)

→ 82

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

Factory setting Mass flow

On value

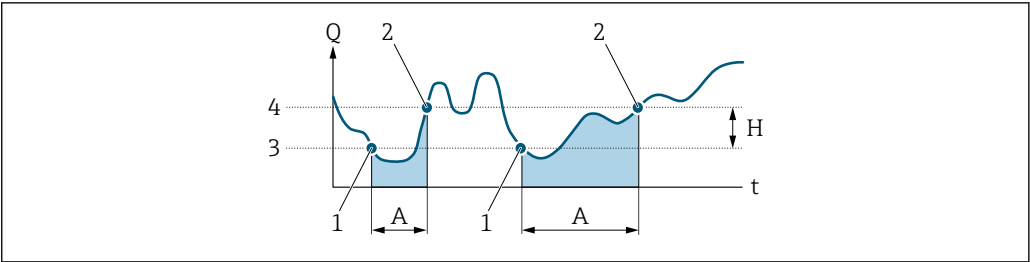
Navigation Expert → Sensor → Process param. → Low flow cut off → On value (1805)

- Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 80):
- Mass flow
 - Volume flow
 - Correct.vol.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 → 81.
User entry	Positive floating-point number
Factory setting	Depends on country and nominal diameter→ 228
Additional information	<i>Dependency</i>  The unit depends on the process variable selected in the Assign variable parameter (→ 80).

Off value	
-----------	---

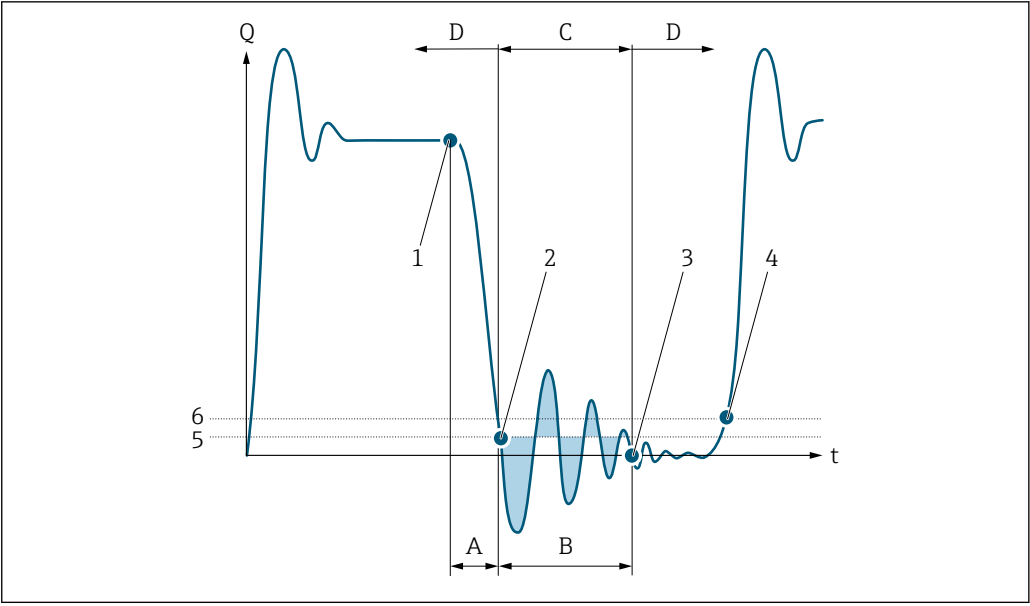
Navigation	 Expert → Sensor → Process param. → Low flow cut off → Off value (1804)
Prerequisite	One of the following options is selected in the Assign variable parameter (→ 80): ■ Mass flow ■ Volume flow ■ Correct.vol.flow
Description	Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value→ 80.
User entry	0 to 100.0 %
Factory setting	50 %
Additional information	<i>Example</i>



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- 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 (→  80): ■ Mass flow ■ Volume 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	<i>Description</i> Pressure shock suppression is enabled ■ Prerequisite: – Flow rate < on-value of low flow cut off - or – Changing the flow direction ■ 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. <i>Example</i> 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.



- 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

"Partial pipe det" submenu

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

► Partial pipe det

Assign variable (1860)

Low value (1861)

High value (1858)

Response time (1859)

Max. damping (6040)

→  84

→  84

→  84

→  85

→  85

Assign variable

Navigation	  Expert → Sensor → Process param. → Partial pipe det → Assign variable (1860)
Description	Use this function to select a process variable to detect empty or partially filled measuring tubes. For gas measurement: Deactivate monitoring due to low gas density.
Selection	■ Off ■ Density ■ Ref.density
Factory setting	Off

Low value

Navigation	  Expert → Sensor → Process param. → Partial pipe det → Low value (1861)
Prerequisite	One of the following options is selected in the Assign variable parameter (→  84): ■ Density ■ Ref.density
Description	Use this function to enter a lower limit value to enable detection of empty or partially filled measuring tubes. If the measured density falls below this value, monitoring is enabled.
User entry	Signed floating-point number
Factory setting	200
Additional information	<i>User entry</i> The lower limit value must be less than the upper limit value defined in the High value parameter (→  84).  The unit depends on the process variable selected in the Assign variable parameter (→  84). <i>Limit value</i>  If the displayed value is outside the limit value, the measuring device displays the diagnostic message  S862 Partly filled.

High value

Navigation	  Expert → Sensor → Process param. → Partial pipe det → High value (1858)
Prerequisite	One of the following options is selected in the Assign variable parameter (→  84): ■ Density ■ Ref.density

Description	Use this function to enter an upper limit value to enable detection of empty or partially filled measuring tubes. If the measured density exceeds this value, detection is enabled.
User entry	Signed floating-point number
Factory setting	6 000
Additional information	<i>User entry</i> The upper limit value must be greater than the lower limit value defined in the Low value parameter (→  84).  The unit depends on the process variable selected in the Assign variable parameter (→  84). <i>Limit value</i>  If the displayed value is outside the limit value, the measuring device displays the diagnostic message △S862 Partly filled.

Response time

Navigation	  Expert → Sensor → Process param. → Partial pipe det → Response time (1859)
Prerequisite	One of the following options is selected in the Assign variable parameter (→  84): ■ Density ■ Ref.density
Description	Use this function to enter the minimum length of time (debouncing time) the signal must be present for the diagnostic message △S862 Partly filled to be triggered if the measuring pipe is empty or partially full.
User entry	0 to 100 s
Factory setting	1 s

Max. damping

Navigation	  Expert → Sensor → Process param. → Partial pipe det → Max. damping (6040)
Description	Use this function to enter a damping value to enable detection of empty or partially filled measuring tubes.
User entry	Positive floating-point number
Factory setting	0
Additional information	<i>Description</i> If oscillation damping exceeds the specified value, the measuring device presumes that the pipe is partially filled and the flow signal is set to 0. The measuring device displays the

diagnostic message **△S862 Partly filled**. In the case of non-homogeneous media or air pockets, the damping of the measuring tubes increases.

User entry

- Damping is disabled if **0** is entered (factory setting).
- Damping is enabled if the value entered is greater than **0**.
- The value entered depends on application-specific influence variables, such as the medium, nominal diameter, sensor etc.

Example

- If the pipe is filled normally the value of the oscillation damping is 500.
- If the pipe is partially filled the value of the oscillation damping is > 5000.
- A practical damping value would then be 2000: enter 2000 as the value.

3.2.4 "Measurement mode" submenu

Navigation   Expert → Sensor → Measurement mode

► Measurement mode

Select medium (6062)

Select gas type (6074)

Sound velocity (6147)

Temp. coeff. SV (6181)

→  86

→  87

→  87

→  88

Multi-freq.activ

Navigation   Expert → Sensor → Measurement mode → Multi-freq.activ (6242)

Description Switching the dual mode of the sensor on and off.

Selection

- No
- Yes

Factory setting No

Select medium

Navigation   Expert → Sensor → Measurement mode → Select medium (6062)

Description Use this function to select the type of medium.

Selection

- Liquid
- Gas

Factory setting Liquid

Select gas type

Navigation   Expert → Sensor → Measurement mode → Select gas type (6074)

Prerequisite The **Gas** option is selected in the **Select medium** parameter (→  86).

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

Selection

- Air
- Ammonia NH₃
- Argon Ar
- Sulf. hex.fl.SF₆
- Oxygen O₂
- Ozone O₃
- Nitrog. ox. NO_x
- Nitrogen N₂
- Nitrous ox. N₂O
- Methane CH₄
- Hydrogen H₂
- Helium He
- Hydrog.chlor.HCl
- Hydrog.sulf. H₂S
- Ethylene C₂H₄
- Carbon diox. CO₂
- Carbon monox. CO
- Chlorine Cl₂
- Butane C₄H₁₀
- Propane C₃H₈
- Propylene C₃H₆
- Ethane C₂H₆
- Others

Factory setting Methane CH₄

Additional information *Description*
 The gas type needs to be selected so that it is possible to comply with accuracy specifications in gas applications.

Sound velocity

Navigation   Expert → Sensor → Measurement mode → Sound velocity (6147)

Prerequisite In the **Select gas type** parameter (→  87), the **Others** option is selected.

Description Use this function to enter the sound velocity of the gas at 0 °C (+32 °F).

User entry	1 to 99 999.9999 m/s
Factory setting	415.0 m/s

Temp. coeff. SV

Navigation	  Expert → Sensor → Measurement mode → Temp. coeff. SV (6181)
Prerequisite	The Others option is selected in the Select gas type parameter (→  87).
Description	Use this function to enter a temperature coefficient for the sound velocity of the gas.
User entry	Positive floating-point number
Factory setting	0 (m/s)/K

3.2.5 "External comp." submenu

Navigation   Expert → Sensor → External comp.

► External comp.

Pressure compen. (6130)

→  88

Pressure value (6059)

→  89

External press. (6209)

→  89

Temp.corr.source (6184)

→  90

External temp. (6080)

→  90

Pressure compen.

Navigation	  Expert → Sensor → External comp. → Pressure compen. (6130)
Description	Use this function to select the type of pressure compensation.
Selection	■ Off ■ Fixed value ■ External value

- Current input 1 ^{*}
- Current input 2 ^{*}
- Current input 3 ^{*}

Factory setting Off

Additional information *Selection*

- Fixed value
A fixed pressure value is used for compensation: **Pressure value** parameter (→  89)
- External value
The pressure value read in via EtherNet/IP is used for compensation.
- **Current input 1** option, **Current input 3** option
The pressure value read in via the current input is used for compensation.

 For more information, see the "Cyclic data transmission" section of the Operating Instructions

Pressure value

Navigation   Expert → Sensor → External comp. → Pressure value (6059)

Prerequisite The **Fixed value** option is selected in the **Pressure compen.** parameter (→  88).

Description Use this function to enter a value for the process pressure that is used for pressure correction.

User entry Positive floating-point number

Factory setting 0 bar

Additional information *User entry*

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

External press.

Navigation   Expert → Sensor → External comp. → External press. (6209)

Prerequisite The **External value** option is selected in the **Pressure compen.** parameter (→  88).

Description Use this function to enter an external pressure value.

User interface Positive floating-point number

Factory setting 0 bar

* Visibility depends on order options or device settings

Additional information *User entry*

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

Temp.corr.source**Navigation**

Expert → Sensor → External comp. → Temp.corr.source (6184)

Description

Use this function to select the temperature mode.

Selection

- Internal value
- External value
- Current input 1
- Current input 2
- Current input 3

Factory setting

Internal value

Additional information*Description*

Use this function to select the type of temperature compensation.

Selection

All the options available for selection are used for measured value compensation.

- Internal value
The temperature value measured internally (temperature sensor of the measuring sensor) is used for compensation.
- External value
The temperature value read in via EtherNet/IP is used for compensation.
- Current input 1
The temperature value read in via the current input is used for compensation.



For more information, see the "Cyclic data transmission" section of the Operating Instructions

External temp.**Navigation**

Expert → Sensor → External comp. → External temp. (6080)

Prerequisite

In the **Temperature mode** parameter (→ 90), the **External value** option is selected.

Description

Use this function to enter the external temperature.

User interface

–273.15 to 99 999 °C

Factory setting

Country-specific:

- 0 °C
- +32 °F

Additional information	Description
	 The unit is taken from the Temperature unit parameter (→  68)
Temperature mode 	
Navigation	  Expert → Sensor → External comp. → Temperature mode (6341)
Description	...
Selection	■ Internal value ■ External value
Factory setting	Internal value

3.2.6 "Calculated value" submenu

Navigation   Expert → Sensor → Calculated value

► Calculated value

► Corr. vol.flow.

→  91

"Corr. vol.flow." submenu

Navigation   Expert → Sensor → Calculated value → Corr. vol.flow.

► Corr. vol.flow.

Corr. vol.flow. (1812)

→  92

Ext. ref.density (6198)

→  92

Fix ref.density (1814)

→  92

Ref. temperature (1816)

→  93

Linear exp coeff (1817)

→  93

Square exp coeff (1818)

→  94

Corr. vol.flow.

Navigation	 Expert → Sensor → Calculated value → Corr. vol.flow. → Corr. vol.flow. (1812)
Description	Use this function to select the reference density for calculating the corrected volume flow.
Selection	■ Fix ref.density ■ Calc ref density ■ Ext. ref.density ■ Current input 1 * ■ Current input 2 * ■ Current input 3 *
Factory setting	Calc ref density
Additional information	<i>Selection</i> The Ref. dens API 53 option is suitable only for applications involving LPG ⁵⁾, where the flow rate is measured on the basis of the corrected volume flow. Selecting this option means that the reference density is used, taking into account the values in table 53 E of API MPMS section 11.2. Temperature measurement (measured internally or read into the device from an external source →  88 →  88) and density measurement take place during operation while the medium is flowing. The mass flow is divided by the reference density to give the corrected volume flow and is issued as an output signal.

Ext. ref.density

Navigation	 Expert → Sensor → Calculated value → Corr. vol.flow. → Ext. ref.density (6198)
Prerequisite	In the Corr. vol.flow. parameter (→  92), the Ext. ref.density option is selected.
Description	Displays the reference density which is read in externally, e.g. via the current input.
User interface	Floating point number with sign
Additional information	<i>Dependency</i>  The unit is taken from the Ref. dens. unit parameter (→  67)

Fix ref.density

Navigation	 Expert → Sensor → Calculated value → Corr. vol.flow. → Fix ref.density (1814)
Prerequisite	The Fix ref.density option is selected in the Corr. vol.flow. parameter (→  92) parameter.

* Visibility depends on order options or device settings
 5) liquefied petroleum gas

Description	Use this function to enter a fixed value for the reference density.
User entry	Positive floating-point number
Factory setting	1 kg/Nl
Additional information	<i>Dependency</i>  The unit is taken from the Ref. dens. unit parameter (→  67)

Ref. temperature



Navigation	 Expert → Sensor → Calculated value → Corr. vol.flow. → Ref. temperature (1816)
Prerequisite	The Calc ref density option is selected in the Corr. vol.flow. parameter (→  92).
Description	Use this function to enter a reference temperature for calculating the reference density.
User entry	–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 (→  68)

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]

Linear exp coeff



Navigation	 Expert → Sensor → Calculated value → Corr. vol.flow. → Linear exp coeff (1817)
Prerequisite	The Calc ref density option is selected in the Corr. vol.flow. parameter (→  92) parameter.

Description	Use this function to enter a linear, fluid-specific expansion coefficient for calculating the reference density.
User entry	Signed floating-point number
Factory setting	0.0 1/K
Square exp coeff	

Navigation	Expert → Sensor → Calculated value → Corr. vol.flow. → Square exp coeff (1818)
Prerequisite	The Calc ref density option is selected in the Corr. vol.flow. parameter (→ 92) 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 entry	Signed floating-point number
Factory setting	0.0 1/K ²

3.2.7 "Sensor adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm.

► Sensor adjustm.

Install. direct. (1809)

→ 94

► Zero point adj.

→ 95

► Variable adjust

→ 96

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.

"Zero point adj." submenu

- 
 - It is generally not necessary to perform zero point adjustment.
 - However, this function may be needed in some applications with low flow and strict accuracy requirements.
 - A zero point adjustment cannot increase repeatability.
 - The following conditions should be met to perform a zero point adjustment successfully without the adjustment finishing in an error:
 - The real flow must be **0**.
 - The pressure must be at least 15 psi g.
 - The adjustment takes a maximum of 60 s. The more stable the conditions, the faster the adjustment is completed.
 - This function can also be used to check the health of the measuring device.
A healthy measuring device has a maximum zero point deviation of ±100 compared to the factory setting of the measuring device (calibration report).

Navigation

  Expert → Sensor → Sensor adjustm. → Zero point adj.

► Zero point adj.

Zero point adj. (6196)

→  95

Progress (2808)

→  96

Zero point adj.



Navigation

  Expert → Sensor → Sensor adjustm. → Zero point adj. → Zero point adj. (6196)

Description

Use this function to select the start of the zero point adjustment.

 Observe conditions →  95.

Selection

- Cancel
- Busy
- Zero adjust fail
- Start

Factory setting

Cancel

Additional information	Description
	■ Cancel If zero point adjustment has failed, select this option to cancel zero point adjustment.
	■ Busy Is displayed during zero point adjustment.
	■ Zero adjust fail Is displayed if zero point adjustment has failed.
	■ Start Select this option to start zero point adjustment.

Progress

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

"Variable adjust" submenu

Navigation  Expert → Sensor → Sensor adjustm. → Variable adjust

► Variable adjust		
Mass flow offset (1831)	→	 97
Mass flow factor (1832)	→	 97
Vol. flow offset (1841)	→	 97
Vol. flow factor (1846)	→	 98
Density offset (1848)	→	 98
Density factor (1849)	→	 98
Corr. vol offset (1866)	→	 99
Corr. vol factor (1867)	→	 99
Ref.dens. offset (1868)	→	 99
Ref.dens. factor (1869)	→	 100

Temp. offset (1870)	→ 100
Temp. factor (1871)	→ 100

Mass flow offset

Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Mass flow offset (1831)
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	<i>Description</i> Corrected value = (factor × value) + offset

Mass flow factor

Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Mass flow factor (1832)
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	<i>Description</i> Corrected value = (factor × value) + offset

Vol. flow offset

Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Vol. flow offset (1841)
Description	Use this function to enter the zero point shift for the volume flow trim. The volume flow unit on which the shift is based is m ³ /s.
User entry	Signed floating-point number
Factory setting	0 m ³ /s

Additional information *Description*

 Corrected value = (factor × value) + offset

Vol. flow factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

 Corrected value = (factor × value) + offset

Density offset

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

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

User entry Signed floating-point number

Factory setting 0 kg/m³

Additional information *Description*

 Corrected value = (factor × value) + offset

Density factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information	<i>Description</i>  Corrected value = (factor × value) + offset
Corr. vol offset 	
Navigation	  Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol offset (1866)
Description	Use 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 Nm ³ /s.
User entry	Signed floating-point number
Factory setting	0 Nm ³ /s
Additional information	<i>Description</i>  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	<i>Description</i>  Corrected value = (factor × value) + offset
Ref.dens. offset 	
Navigation	  Expert → Sensor → Sensor adjustm. → Variable adjust → Ref.dens. offset (1868)
Description	Use this parameter to enter the zero point shift for the reference density trim. The reference density unit on which the shift is based is 1 kg/Nm ³ .
User entry	Signed floating-point number
Factory setting	0 kg/Nm ³

Additional information *Description*

 Corrected value = (factor × value) + offset

Ref.dens. factor**Navigation**

 Expert → Sensor → Sensor adjustm. → Variable adjust → Ref.dens. factor (1869)

Description

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

User entry

Positive floating-point number

Factory setting

1

Additional information *Description*

 Corrected value = (factor × value) + offset

Temp. offset**Navigation**

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

Description

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

User entry

Signed floating-point number

Factory setting

0 K

Additional information *Description*

 Corrected value = (factor × value) + offset

Temp. factor**Navigation**

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

Description

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

User entry

Positive floating-point number

Factory setting

1

Additional information	<i>Description</i>  $\text{Corrected value} = (\text{factor} \times \text{value}) + \text{offset}$
-------------------------------	--

3.2.8 "Calibration" submenu

Navigation   Expert → Sensor → Calibration

► Calibration		
Cal. factor (6025)	→ 	101
Zero point (6195)	→ 	101
Nominal diameter (2807)	→ 	102
C0 to 5 (6022)	→ 	102

Cal. factor

Navigation	  Expert → Sensor → Calibration → Cal. factor (6025)
Description	Displays the current calibration factor for the sensor.
User interface	Signed floating-point number
Factory setting	Depends on nominal diameter and calibration.

Zero point

Navigation	  Expert → Sensor → Calibration → Zero point (6195)
Description	Use this function to enter the zero point correction value for the sensor.
User entry	Signed floating-point number
Factory setting	Depends on nominal diameter and calibration.

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.

C0 to 5

Navigation	 Expert → Sensor → Calibration → C0 to 5 (6022)
Description	Displays the current density coefficients C0 to 5 of the sensor.
User interface	Signed floating-point number
Factory setting	0

3.3 "I/O configuration" submenu

Navigation  Expert → I/O config.

► I/O config.		
I/O 1 to n terminals (3902-1 to n)	→	 103
I/O 1 to n info (3906-1 to n)	→	 103
I/O 1 to n type (3901-1 to n)	→	 103
Apply I/O config (3907)	→	 104
Alteration code (2762)	→	 104

I/O 1 to n terminals

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

I/O 1 to n info

Navigation	 Expert → I/O config. → I/O 1 to n info (3906–1 to n)
Description	Displays information about the plugged in I/O module.
User interface	■ Not plugged ■ Invalid ■ Not configurable ■ Configurable ■ EtherNet/IP
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

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 (→  103).

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

3.4 "Input" submenu

Navigation  Expert → Input

► Input

► Current input 1 to n

→  105

► Status input 1 to n

→  108

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)

→  105

Signal mode (1610-1 to n)

→  106

Current span (1605-1 to n)

→  106

0/4 mA value (1606-1 to n)

→  106

20 mA value (1607-1 to n)

→  107

Failure mode (1601-1 to n)

→  107

Failure value (1602-1 to n)

→  108

Terminal no.	
Navigation	 Expert → Input → Current input 1 to n → Terminal no. (1611-1 to n)
Description	Displays the terminal numbers used by the current input module.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)
Additional information	"Not used" option The current input module does not use any terminal numbers.

Signal mode

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

Current span

Navigation	 Expert → Input → Current input 1 to n → Current span (1605–1 to n)
Description	Use this function to select the current range for the process value output and the upper and lower level for signal on alarm.
Selection	■ 4...20 mA ■ 4...20 mA NAMUR ■ 4...20 mA US ■ 0...20 mA
Factory setting	Country-specific: ■ 4...20 mA NAMUR ■ 4...20 mA US
Additional information	<i>Examples</i>  Sample values for the current range: Current span parameter (→  113)

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 (→  106)
- Failure mode (→  107)

Configuration examples

 Pay attention to the configuration examples for **4 mA value** parameter (→  114).

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 (→  114).

Failure mode**Navigation**

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

Description

Use this function to select the input behavior when measuring a current outside the configured **Current span** parameter (→  106).

Selection

- Alarm
- Last valid value
- Defined value

Factory setting

Alarm

Additional information*Options*

- Alarm
An error message is set.
- Last valid value
The last valid measured value is used.
- Defined value
A user-defined measured value is used (**Failure value** parameter (→  108)).

Failure value

Navigation	  Expert → Input → Current input 1 to n → Failure value (1602-1 to n)
Prerequisite	In the Failure mode parameter (→  107), the Defined value option is selected.
Description	Use this function to enter the value that the device uses if it does not receive an input signal from the external device, or if the input signal is invalid.
User entry	Signed floating-point number
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)

→  108

Assign stat.inp. (1352-1 to n)

→  109

Val.stat.inp. (1353-1 to n)

→  109

Active level (1351-1 to n)

→  109

Response time (1354-1 to n)

→  110

Terminal no.

Navigation	  Expert → Input → Status input 1 to n → Terminal no. (1358-1 to n)
Description	Displays the terminal numbers used by the status input module.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)
Additional information	<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 (→ 79) is activated. Note on the Flow override (→ 79): ■ The Flow override (→ 79) 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	→  110
► PFS output 1 to n	→  125
► Relay output 1 to n	→  149

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)	→  111
Signal mode (0377-1 to n)	→  111
Assign curr. 1 to n (0359-1 to n)	→  112
Current span (0353-1 to n)	→  113
Fixed current (0365-1 to n)	→  114
0/4 mA value (0367-1 to n)	→  114
20 mA value (0372-1 to n)	→  116

Measuring mode (0351-1 to n)	→  116
Damping out. 1 to n (0363-1 to n)	→  121
Response time (0378-1 to n)	→  122
Failure mode (0364-1 to n)	→  123
Failure current (0352-1 to n)	→  125
Output curr. 1 to n (0361-1 to n)	→  125
Measur. curr. 1 to n (0366-1 to n)	→  125

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

Signal mode



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



Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→ 18)

Selection

- Off
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl
- Density
- Ref.density
- Ref.dens.altern.
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Water cut
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water vol. flow
- Oil corr.vol.fl.
- Water corr.v.fl.
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0
- Pressure

Factory setting

Mass flow

* Visibility depends on order options or device settings

Current span

Navigation

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

Description

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

Selection

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

Factory setting

Country-specific:

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

Additional information

Description

- i

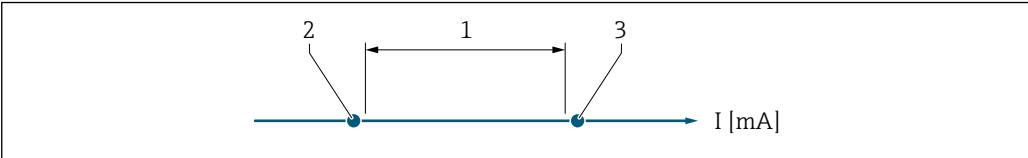
 In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 123).
- If the measured value is outside the measuring range, the diagnostic message **△S441 Curr.output 1 to n** is displayed.
- The measuring range is specified via the **0/4 mA value** parameter (→ 114) and **20 mA value** parameter (→ 116).

"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 114).

Example

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



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

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

i

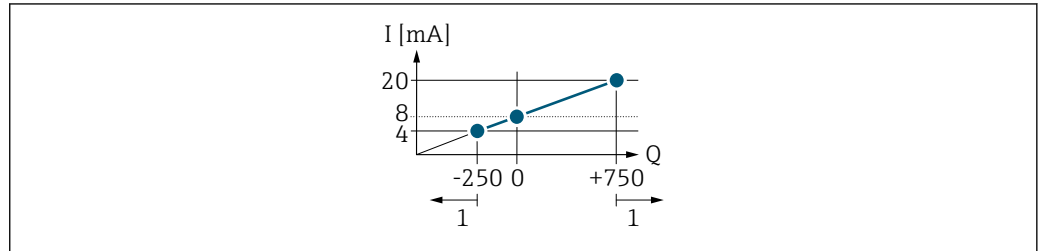
 If the flow exceeds or falls below the upper or lower signal on alarm level, the diagnostic message **△S441 Curr.output 1 to n** is displayed.

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 (→  113).
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 (→  113): ■ 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 kg/h ■ 0 lb/min
Additional information	<i>Description</i> Positive and negative values are permitted depending on the process variable assigned in the Assign curr. parameter (→  112). 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 (→  116). <i>Dependency</i>  The unit depends on the process variable selected in the Assign curr. parameter (→  112). <i>Current output behavior</i> The current output behaves differently depending on the settings configured in the following parameters: ■ Current span (→  113) ■ Failure mode (→  123) <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 (→  114) = not equal to zero flow (e.g. -250 m³/h)
- **20 mA value** parameter (→  116) = not equal to zero flow (e.g. +750 m³/h)
- Calculated current value = 8 mA at zero flow



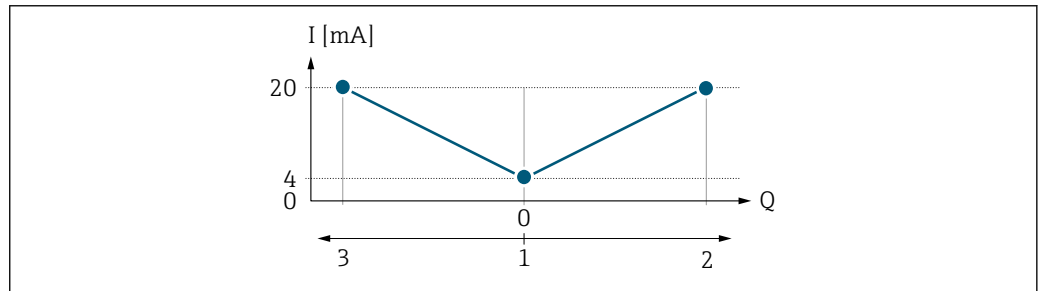
A0013757

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 (→  114) and **20 mA value** parameter (→  116). 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



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 (→  114) and **20 mA value** parameter (→  116) must have the same sign. The value for the **20 mA value** parameter (→  116) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→  116) (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 →  116.

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 (→  113): ■ 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 →  227
Additional information	<i>Description</i> Positive and negative values are permitted depending on the process variable assigned in the Assign curr. parameter (→  112). 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 (→  114). <i>Dependency</i>  The unit depends on the process variable selected in the Assign curr. parameter (→  112). <i>Example</i> ■ 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 (→  116), different signs cannot be entered for the values of the 0/4 mA value parameter (→  114) and 20 mA value parameter (→  116). The diagnostic message △S441 Curr.output 1 to n is displayed. <i>Configuration examples</i>  Observe the configuration examples for the 0/4 mA value parameter (→  114).

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 (→  112): ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. *

* Visibility depends on order options or device settings

- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0



Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→ 18)

One of the following options is selected in the **Current span** parameter (→ 113):

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

Description

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

Selection

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

Factory setting

Forward flow

Additional information

Description



The process variable that is assigned to the current output via the **Assign curr.** parameter (→ 112) is displayed below the parameter.

"Forward flow" option

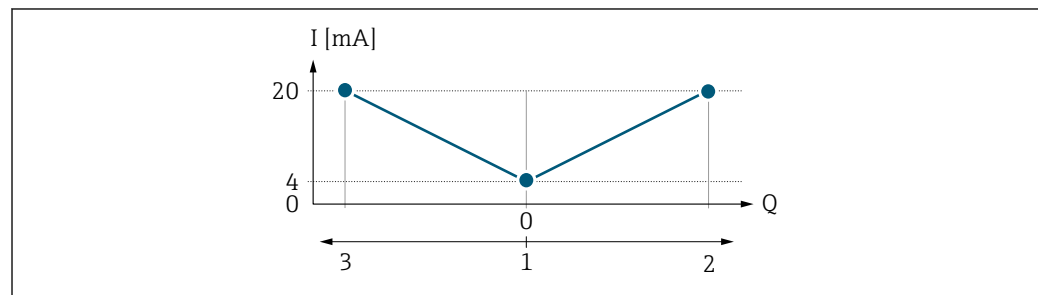
The current output signal is proportional to the process variable assigned. The measuring range is defined by the values that are assigned to the 0/4 mA and 20 mA current value.

* Visibility depends on order options or device settings

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 (→  114) and **20 mA value** parameter (→  116) must have the same sign.
- The value for the **20 mA value** parameter (→  116) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→  116) (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.

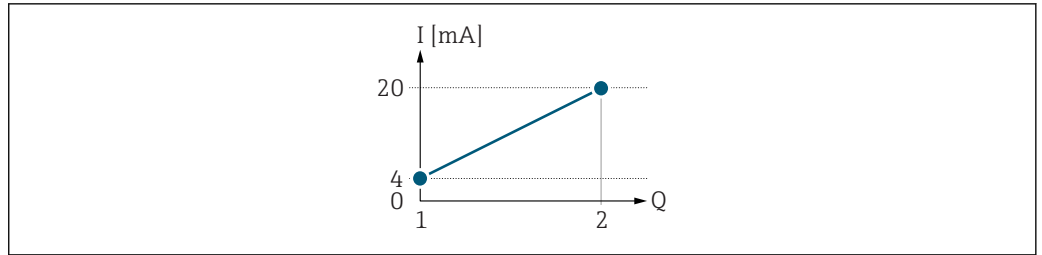
Flow values can aggregate in the buffer in the event of prolonged and unwanted fluid reverse flow. However, these flows are not taken into consideration by the current output configuration, i.e. the reverse flow is not compensated.

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

2 Measuring range

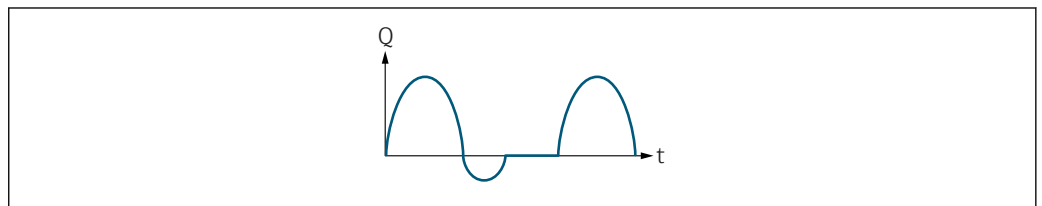
I Current

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

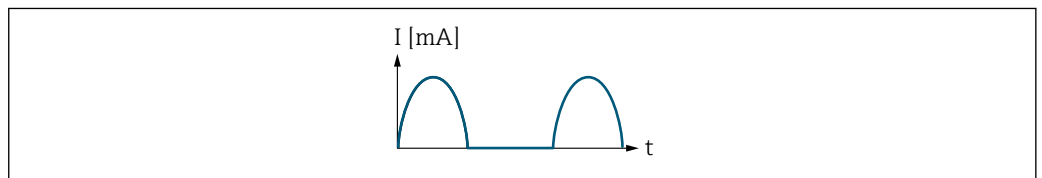
3 Flow response

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..



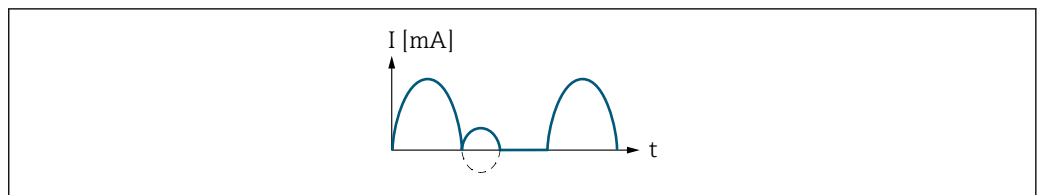
A0028092

I Current

t Time

With **Forward/Reverse** option

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



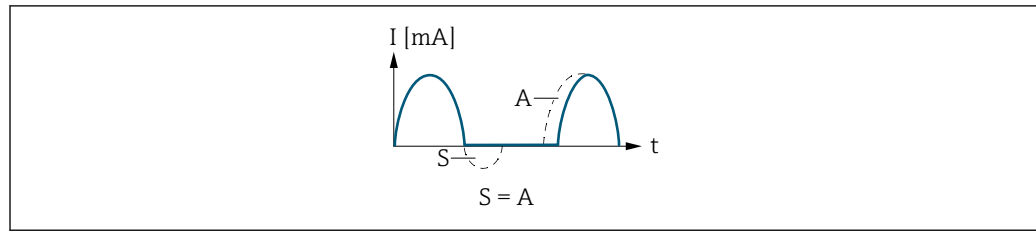
A0028093

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.

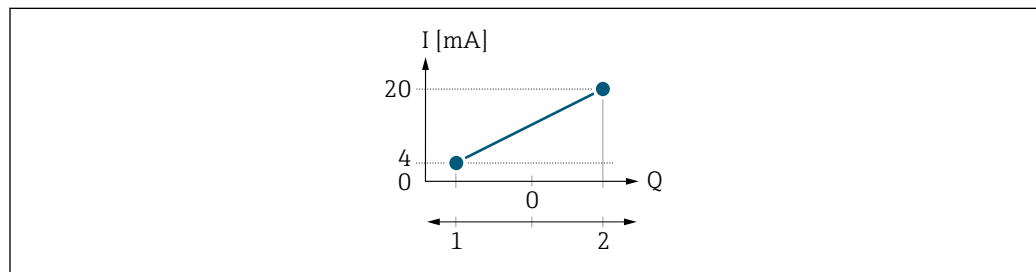


A0028094

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

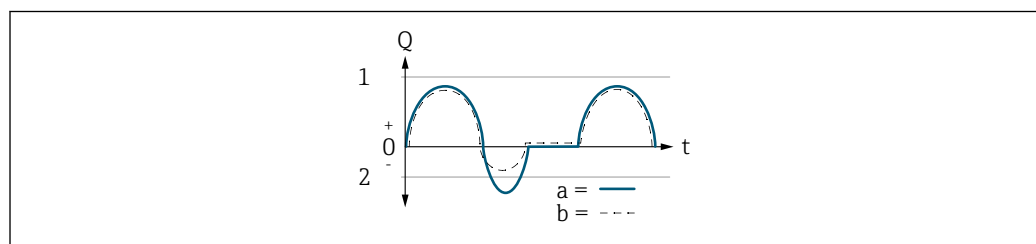


A0028095

4 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

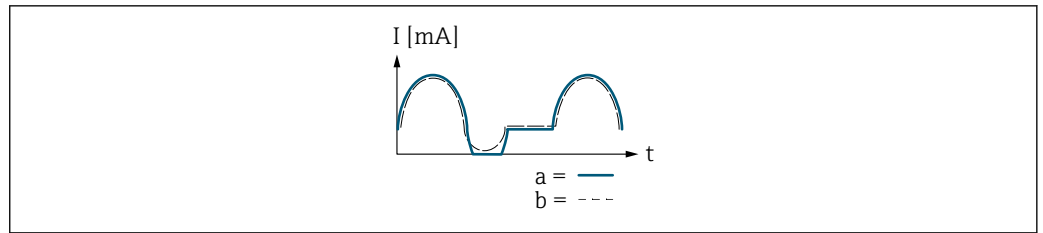


A0028098

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

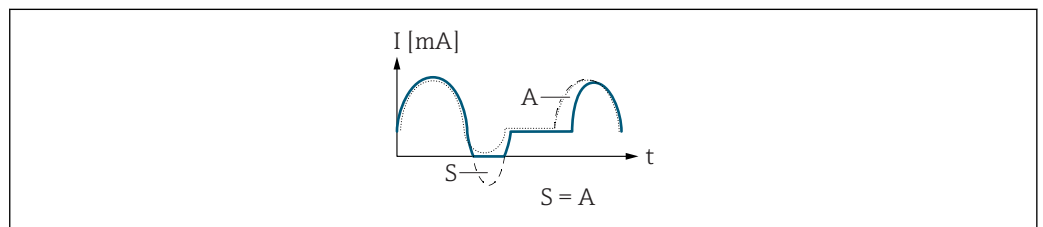
I Current
 t Time

With **Forward/Reverse** option

This option is not possible in this case as the values for the **0/4 mA value** parameter (→ 114) and **20 mA value** parameter (→ 116) 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 (→ 112):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0
- Osc. damping 0

* Visibility depends on order options or device settings

- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

 Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→  18)

One of the following options is selected in the **Current span** parameter (→  113):

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

Description

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

User entry

0.0 to 999.9 s

Factory setting

1.0 s

Additional information

Entry

Use this function to enter a time constant (PT1 element⁶⁾) 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 (→  112):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0
- Osc. damping 0

⁶⁾ proportional transmission behavior with first order delay

* Visibility depends on order options or device settings

- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

 Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→  18)

One of the following options is selected in the **Current span** parameter (→  113):

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

Description

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

User interface

Positive floating-point number

Additional information

Description

 The response time is made up of the time specified for the following dampings:

- Current output damping →  121
- and
- Depending on the measured variable assigned to the output.
 - Flow damping
 - or
 - Density damping
 - or
 - Temperature damping

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 (→  112):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0
- Osc. damping 0

* Visibility depends on order options or device settings

- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

 Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→  18)

One of the following options is selected in the **Current span** parameter (→  113):

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

Description

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

Selection

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

Factory setting

Max.

Additional information

Description

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

"Min." option

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

 The signal on alarm level is defined via the **Current span** parameter (→  113).

"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 (→  113).

"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 (→  125).

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 (→  123).	
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)

→  127

Signal mode (0490-1 to n)

→  127

Operating mode (0469-1 to n)

→  127

Assign pulse 1 to n (0460-1 to n)

→  129

Value per pulse (0455-1 to n)	→  130
Pulse width (0452-1 to n)	→  130
Measuring mode (0457-1 to n)	→  131
Failure mode (0480-1 to n)	→  132
Pulse output 1 to n (0456-1 to n)	→  133
Assign freq. (0478-1 to n)	→  133
Min. freq. value (0453-1 to n)	→  134
Max. freq. value (0454-1 to n)	→  135
Val. at min.freq (0476-1 to n)	→  136
Val. at max.freq (0475-1 to n)	→  136
Measuring mode (0479-1 to n)	→  137
Damping out. 1 to n (0477-1 to n)	→  138
Response time (0491-1 to n)	→  139
Failure mode (0451-1 to n)	→  140
Failure freq. (0474-1 to n)	→  141
Output freq. 1 to n (0471-1 to n)	→  142
Switch out funct (0481-1 to n)	→  142
Assign diag. beh (0482-1 to n)	→  143
Assign limit (0483-1 to n)	→  143
Switch-on value (0466-1 to n)	→  145
Switch-off value (0464-1 to n)	→  146
Assign dir.check (0484-1 to n)	→  146
Assign status (0485-1 to n)	→  147
Switch-on delay (0467-1 to n)	→  147
Switch-off delay (0465-1 to n)	→  147

Failure mode (0486-1 to n)	→ 148
Switch status 1 to n (0461-1 to n)	→ 148
Invert outp.sig. (0470-1 to n)	→ 148

Terminal no.

Navigation	  Expert → Output → PFS output 1 to n → Terminal no. (0492-1 to n)
Description	Displays the terminal numbers used by the pulse/frequency/switch output module.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)
Additional information	<i>"Not used" option</i> 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

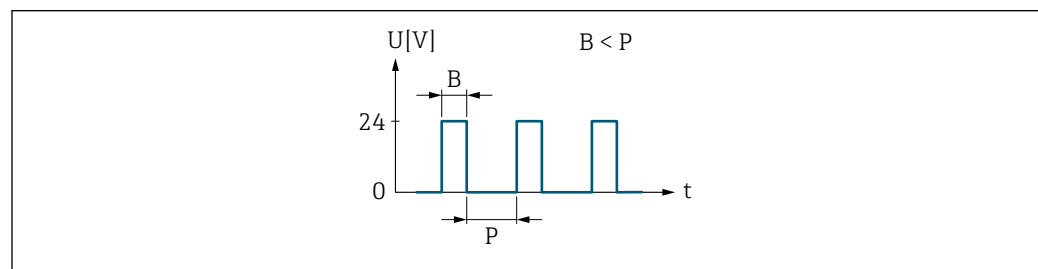
Additional information*"Pulse" option*

Quantity-dependent pulse with configurable pulse width

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

Example

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



A00268B3

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

B Pulse width entered

P Pauses between the individual pulses

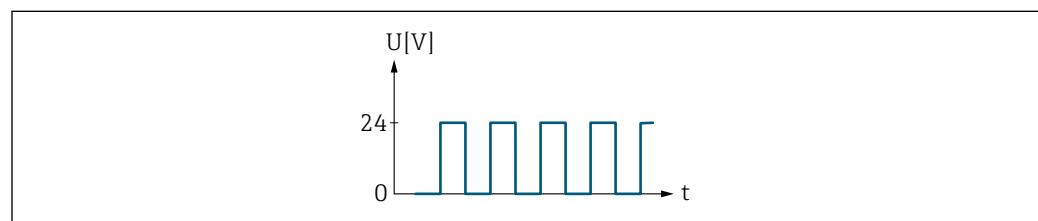
"Frequency" option

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 mass flow, volume flow, corrected volume flow, target mass flow, carrier mass flow, density, reference density, concentration, temperature, carrier tube temperature, electronic temperature, vibration frequency, frequency fluctuation, oscillation amplitude, oscillation damping, oscillation damping fluctuation, signal asymmetry or excitation current.

Example

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



A00268B6

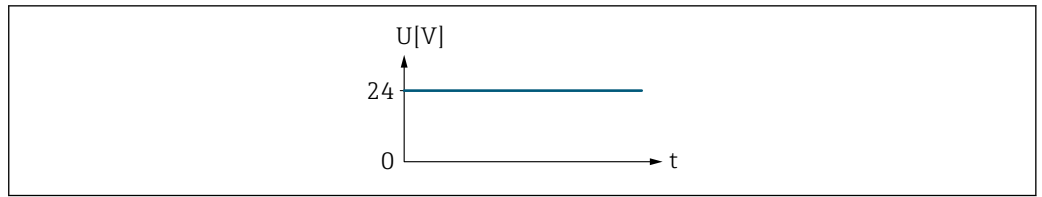
6 Flow-proportional frequency output

"Switch" option

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

Example

Alarm response without alarm

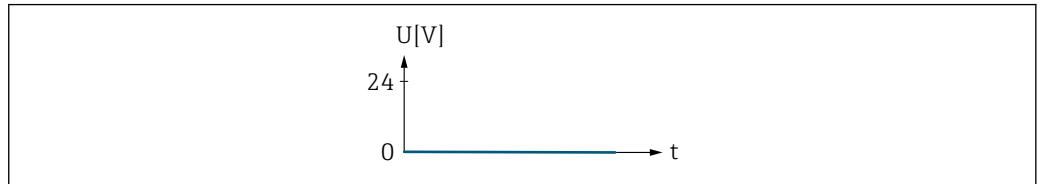


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7 No alarm, high level

Example

Alarm response in case of alarm



A0026885

8 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 (→ 127).

Description

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

Selection

- Off
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow^{*}
- Carrier mass fl.^{*}
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water vol. flow
- Oil corr.vol.fl.
- Water corr.v.fl.

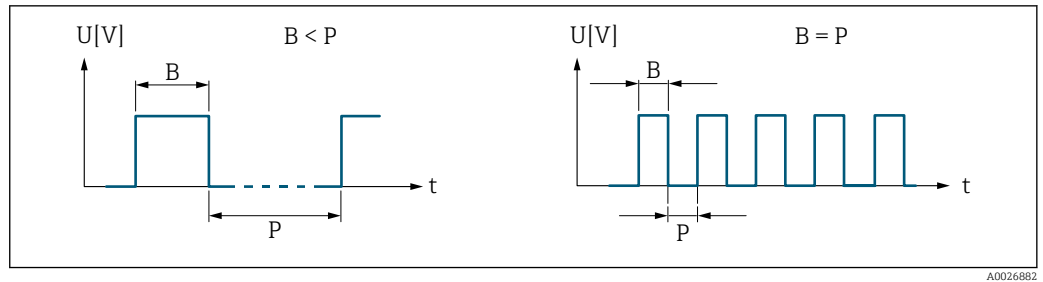
Factory setting

Off

* Visibility depends on order options or device settings

Value per pulse 	
Navigation	  Expert → Output → PFS output 1 to n → Value per pulse (0455-1 to n)
Prerequisite	In the Operating mode parameter (→  127), the Pulse option is selected, and one of the following options is selected in the Assign pulse parameter (→  129): ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. *
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 →  227
Additional information	<i>Entry</i> Weighting of the pulse output with a quantity. The lower the pulse value, the ■ better the resolution. ■ the higher the frequency of the pulse response.
Pulse width 	
Navigation	  Expert → Output → PFS output 1 to n → Pulse width (0452-1 to n)
Prerequisite	In the Operating mode parameter (→  127), the Pulse option is selected, and one of the following options is selected in the Assign pulse parameter (→  129): ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. *
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	<i>Description</i> ■ Define how long a pulse is (duration). ■ The maximum pulse rate is defined by $f_{\max} = 1 / (2 \times \text{pulse width})$. ■ The interval between two pulses lasts at least as long as the set pulse width. ■ The maximum flow is defined by $Q_{\max} = f_{\max} \times \text{pulse value}$. ■ If the flow exceeds these limit values, the measuring device displays the diagnostic message  S443 Pulse output 1 to n.

* Visibility depends on order options or device settings



A0026882

B Pulse width entered
P Pauses between the individual pulses

Example

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

Measuring mode



Navigation

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

Prerequisite

In the **Operating mode** parameter (→ 127) the **Pulse** option is selected and in the **Assign pulse** parameter (→ 129) one of the following options is selected:

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *

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

* Visibility depends on order options or device settings

Additional information*Selection*

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

 For a detailed description of the options available, see the **Measuring mode** parameter (→  116)

Examples

 For a detailed description of the configuration examples, see the **Measuring mode** parameter (→  116)

Failure mode**Navigation**

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

Prerequisite

In the **Operating mode** parameter (→  127), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→  129):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *

Description

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

Selection

- Actual value
- No pulses

Factory setting

No pulses

Additional information*Description*

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

Selection

- Actual value
In the event of a device alarm, the pulse output continues on the basis of the current flow measurement. The fault is ignored.
- No pulses
In the event of a device alarm, the pulse output is "switched off".

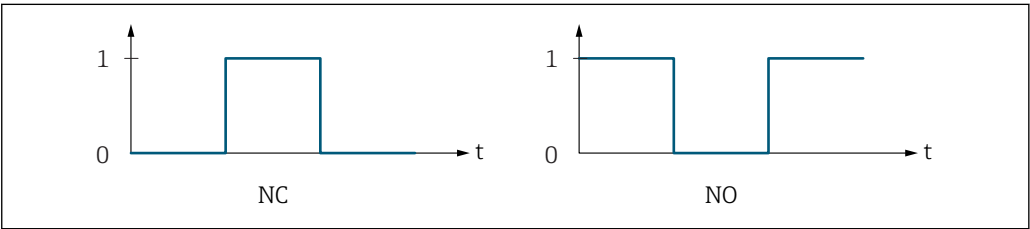
NOTICE! A device alarm is a measuring device error that must be taken seriously. It can affect the measurement quality such that the quality can no longer be guaranteed. The

* Visibility depends on order options or device settings

Actual value option is only recommended if it can be guaranteed that all possible alarm conditions will not affect the measurement quality.

Pulse output 1 to n

Navigation	Expert → Output → PFS output 1 to n → Pulse output 1 to n (0456–1 to n)
Prerequisite	In the Operating mode parameter (→ 127), 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.



A0028726

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

The output behavior can be reversed via the **Invert outp.sig.** parameter (→ 148) 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 (→ 132)) 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 (→ 127) parameter.
Description	Use this function to select the process variable for the frequency output. Detailed description of the options Oscil. frequency, Oscil. amplitude, Oscil. damping and Signal asymmetry: Value 1 display parameter (→ 18)
Selection	■ Off ■ Mass flow ■ Volume flow

- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl
- Density
- Ref.density
- Ref.dens.altern.
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Water cut
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water vol. flow
- Oil corr.vol.fl.
- Water corr.v.fl.
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0
- HBSI
- Pressure

Factory setting Off

Min. freq. value 

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

Prerequisite In the **Operating mode** parameter (→  127), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→  133):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density

* Visibility depends on order options or device settings

- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0



Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→ 18)

Description Use this function to enter the start value frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 0.0 Hz

Max. freq. value



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

Prerequisite In the **Operating mode** parameter (→ 127), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 133):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0



Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→ 18)

Description Use this function to enter the end value frequency.

User entry 0.0 to 10 000.0 Hz

* Visibility depends on order options or device settings

Factory setting10000.0 Hz

Val. at min.freq

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

Prerequisite

In the **Operating mode** parameter (→ 📄 127), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 📄 133):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

 Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→ 📄 18)

DescriptionUse this function to enter the measured value for the start value frequency.

User entrySigned floating-point number

Factory settingDepends on country and nominal diameter

Additional information

Dependency

 The entry depends on the process variable selected in the **Assign freq.** parameter (→ 📄 133).

Val. at max.freq

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

Prerequisite

In the **Operating mode** parameter (→ 📄 127), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 📄 133):

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

- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0



Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→  18)

Description	Use this function to enter the measured value for the end value frequency.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter
Additional information	<i>Description</i> Use this function to enter the maximum measured value at the maximum frequency. The selected process variable is output as a proportional frequency. <i>Dependency</i>  The entry depends on the process variable selected in the Assign freq. parameter (→  133).

Measuring mode



Navigation	  Expert → Output → PFS output 1 to n → Measuring mode (0479-1 to n)
Prerequisite	In the Operating mode parameter (→  127) the Frequency option is selected and in the Assign freq. parameter (→  133) one of the following options is selected: ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. * ■ Density ■ Ref.density ■ Concentration * ■ Temperature ■ Carr. pipe temp. * ■ Electronic temp. ■ Osc. freq. 0 ■ Freq. fluct. 0

* Visibility depends on order options or device settings

- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

 Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→  18)

Description

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

Selection

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

Factory setting

Forward flow

Additional information

Selection

 For a detailed description of the options available, see the **Measuring mode** parameter (→  116)

Examples

 For a detailed description of the configuration examples, see the **Measuring mode** parameter (→  116)

Damping out. 1 to n



Navigation

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

Prerequisite

In the **Operating mode** parameter (→  127) the **Frequency** option is selected and in the **Assign freq.** parameter (→  133) one of the following options is selected:

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

 Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→  18)

* Visibility depends on order options or device settings

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	<i>User entry</i> Use this function to enter a time constant (PT1 element ⁷⁾) for frequency output damping: ■ If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables. ■ On the other hand, the current output reacts more slowly if a high time constant is entered.  Damping is switched off if 0 is entered (factory setting). The frequency output is subject to separate damping that is independent of all preceding time constants.

Response time

Navigation	 Expert → Output → PFS output 1 to n → Response time (0491–1 to n)
Prerequisite	In the Operating mode parameter (→  127) the Frequency option is selected and in the Assign freq. parameter (→  133) one of the following options is selected: ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. * ■ Density ■ Ref.density ■ Concentration * ■ Temperature ■ Carr. pipe temp. * ■ Electronic temp. ■ Osc. freq. 0 ■ Freq. fluct. 0 ■ Osc. ampl. 0 * ■ Osc. damping 0 ■ Osc.damp.fluct 0 ■ Signal asymmetry ■ Exc. current 0  Detailed description of the options Oscil. frequency, Oscil. amplitude, Oscil. damping and Signal asymmetry: Value 1 display parameter (→  18)
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

⁷⁾ proportional transmission behavior with first order delay
^{*} Visibility depends on order options or device settings

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 →  121 and ■ Depending on the measured variable assigned to the output. – Flow damping or – Density damping or – Temperature damping
Failure mode	
Navigation	  Expert → Output → PFS output 1 to n → Failure mode (0451-1 to n)
Prerequisite	In the Operating mode parameter (→  127), the Frequency option is selected, and one of the following options is selected in the Assign freq. parameter (→  133): ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. * ■ Density ■ Ref.density ■ Concentration * ■ Temperature ■ Carr. pipe temp. * ■ Electronic temp. ■ Osc. freq. 0 ■ Freq. fluct. 0 ■ Osc. ampl. 0 * ■ Osc. damping 0 ■ Osc.damp.fluct 0 ■ Signal asymmetry ■ Exc. current 0  Detailed description of the options Oscil. frequency, Oscil. amplitude, Oscil. damping and Signal asymmetry: Value 1 display parameter (→  18)
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*Selection*■ **Actual value**

In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored.

■ **Defined value**

In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure freq. (→  141) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.

■ **0 Hz**

In the event of a device alarm, the frequency output is "switched off".

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

Failure freq.**Navigation**

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

Prerequisite

In the **Operating mode** parameter (→  127), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→  133):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0



Detailed description of the options **Oscil. frequency**, **Oscil. amplitude**, **Oscil. damping** and **Signal asymmetry: Value 1 display** parameter (→  18)

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

* Visibility depends on order options or device settings

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 (→  127), the Frequency option is selected.
Description	Displays the actual value of the output frequency which is currently measured.
User interface	0.0 to 12 500.0 Hz

Switch out funct



Navigation	 Expert → Output → PFS output 1 to n → Switch out funct (0481–1 to n)
Prerequisite	The Switch option is selected in the Operating mode parameter (→  127).
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 (→  127), the Switch option is selected. ■ In the Switch out funct parameter (→  142), 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.	
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 (→  127) parameter. ■ The Limit option is selected in the Switch out funct parameter (→  142) parameter.	
Description	Use this function to select a process variable for the limit function.	
Selection	■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. * ■ Target vol. flow ■ Carrier vol. fl. ■ Targ.corr.vol.fl ■ Carr.corr.vol.fl ■ Density ■ Ref.density ■ Ref.dens.altern. ■ GSV flow	

* Visibility depends on order options or device settings

- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Water cut
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water vol. flow
- Oil corr.vol.fl.
- Water corr.v.fl.
- Concentration *
- Temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Oscil. damping
- Pressure

Factory setting

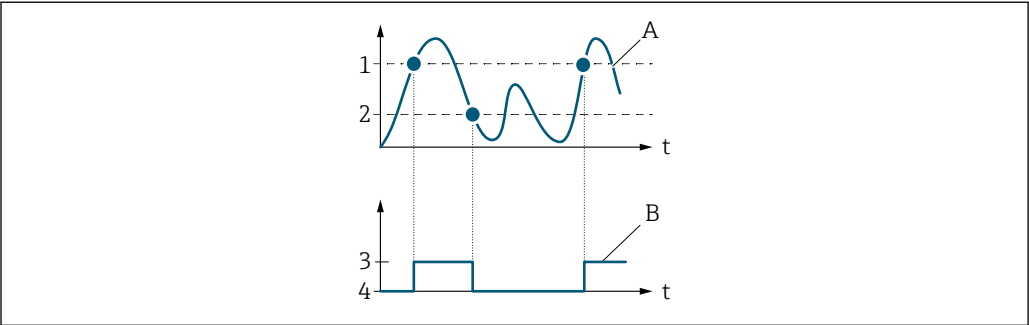
Mass flow

Additional information

Description

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

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



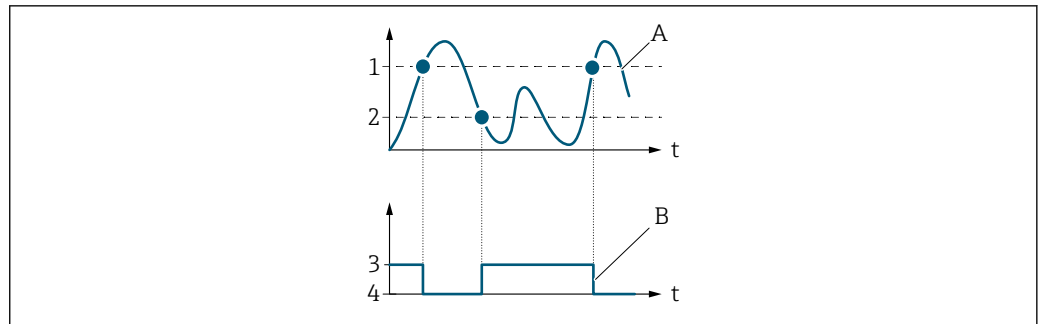
A0026891

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

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

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

* Visibility depends on order options or device settings

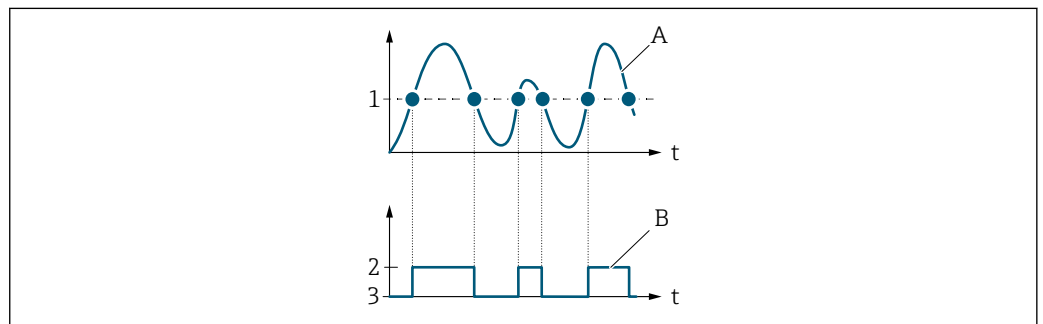


A0026892

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

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

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



A0026893

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

Switch-on value



Navigation

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

Prerequisite

- In the **Operating mode** parameter (→ 127), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 142), 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 kg/h
 - 0 lb/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 depends on the process variable selected in the Assign limit parameter (→  143).
-------------------------------	--

Switch-off value	
-------------------------	---

Navigation	  Expert → Output → PFS output 1 to n → Switch-off value (0464–1 to n)
Prerequisite	■ In the Operating mode parameter (→  127), the Switch option is selected. ■ In the Switch out funct parameter (→  142), 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 kg/h ■ 0 lb/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 depends on the process variable selected in the Assign limit parameter (→  143).

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 (→  127). ■ The Fl. direct.check option is selected in the Switch out funct parameter (→  142).
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 Mass 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 (→  127).
 ■ The **Status** option is selected in the **Switch out funct** parameter (→  142).

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

Selection ■ Partial pipe det
 ■ Low flow cut off

Factory setting Partial pipe det

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

Switch-on delay

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

Prerequisite ■ The **Switch** option is selected in the **Operating mode** parameter (→  127).
 ■ The **Limit** option is selected in the **Switch out funct** parameter (→  142).

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 (→  127).
 ■ The **Limit** option is selected in the **Switch out funct** parameter (→  142).

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

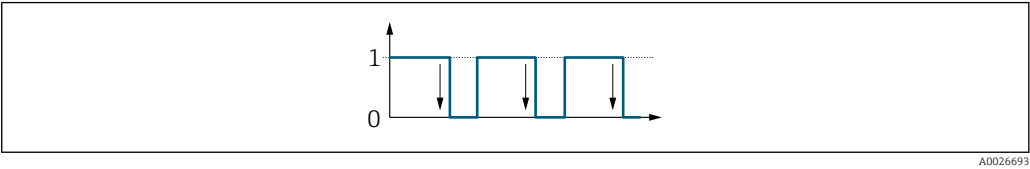
User entry 0.0 to 100.0 s

Factory setting 0.0 s

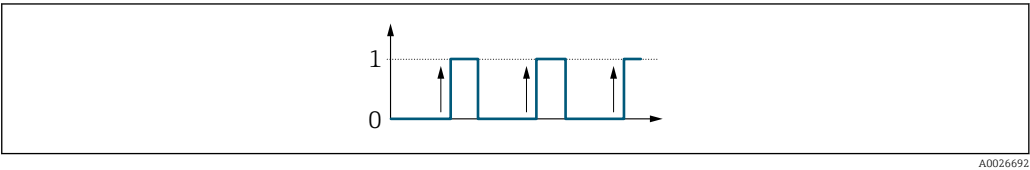
Failure mode 	
Navigation	  Expert → Output → PFS output 1 to n → Failure mode (0486–1 to n)
Description	Use this function to select a failsafe mode for the switch output in the event of a device alarm.
Selection	■ Actual status ■ Open ■ Closed
Factory setting	Open
Additional information	<i>Options</i> ■ Actual status In the event of a device alarm, faults are ignored and the current behavior of the input value is output by the switch output. The Actual status option behaves in the same way as the current input value. ■ Open In the event of a device alarm, the switch output's transistor is set to non-conductive. ■ Closed In the event of a device alarm, the switch output's transistor is set to conductive.
Switch status 1 to n	
Navigation	  Expert → Output → PFS output 1 to n → Switch status 1 to n (0461–1 to n)
Prerequisite	The Switch option is selected in the Operating mode parameter (→  127).
Description	Displays the current switch status of the status output.
User interface	■ Open ■ Closed
Additional information	<i>User interface</i> ■ Open The switch output is not conductive. ■ Closed The switch output is conductive.
Invert 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.	→  150
Relay outp.func.	→  150
Assign dir.check	→  151
Assign limit	→  151
Assign diag. beh	→  152
Assign status	→  153
Switch-off value	→  153
Switch-off delay	→  153
Switch-on value	→  154
Switch-on delay	→  154
Failure mode	→  154

Switch status	→ 155
Powerless relay	→ 155

Terminal no.

Navigation	Expert → Output → Relay output 1 to n → Terminal no. (0812-1 to n)
Description	Displays the terminal numbers used by the relay output module.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)
Additional information	<i>"Not used" option</i> 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 (→  150), 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	Mass flow

Assign limit

Navigation	 Expert → Output → Relay output 1 to n → Assign limit (0807–1 to n)
Prerequisite	In the Relay outp.func. parameter (→  150), the Limit option is selected.
Description	Use this function to select a process variable for the limit value function.
Selection	■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. * ■ Target vol. flow ■ Carrier vol. fl. ■ Targ.corr.vol.fl ■ Carr.corr.vol.fl ■ Density ■ Ref.density ■ Ref.dens.altern. ■ GSV flow ■ GSVa ■ NSV flow

* Visibility depends on order options or device settings

- NSVa
- S&W volume flow
- Water cut
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water vol. flow
- Oil corr.vol.fl.
- Water corr.v.fl.
- Concentration *
- Temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Oscil. damping
- Pressure

Factory setting

Mass flow

Assign diag. beh**Navigation**

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

PrerequisiteIn the **Relay outp.func.** parameter (→ 150), 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.

* Visibility depends on order options or device settings

Assign status



Navigation	 Expert → Output → Relay output 1 to n → Assign status (0805–1 to n)
Prerequisite	In the Relay outp.func. parameter (→  150), the Digital Output option is selected.
Description	Use this function to select the device status for the relay output.
Selection	■ Partial pipe det ■ Low flow cut off
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 (→  150), 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 kg/h ■ 0 lb/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 (→  151).

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 (→  150), 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 (→  150), 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 kg/h ■ 0 lb/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 (→  151).
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 (→  150), 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	
► Configuration	→  156
► WLAN settings	→  167

3.6.1 "Configuration" submenu

Navigation  Expert → Communication → Configuration

► Configuration	
► Input assembly	→  160
Webserv.language (7221)	→  156
MAC Address (7214)	→  157
Default netw.set (7401)	→  157
DHCP client (7212)	→  158
IP address (7209)	→  158
Subnet mask (7211)	→  158
Default gateway (7210)	→  159
Webserver funct. (7222)	→  159
Login page (7273)	→  159
Capability flags (7439)	→  160
User description (7432)	→  160

Webserv.language

Navigation  Expert → Communication → Configuration → Webserv.language (7221)

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

Selection	■ English * ■ Deutsch * ■ Français * ■ Español * ■ Italiano * ■ Nederlands * ■ Portuguesa * ■ Polski * ■ русский язык(Ru) * ■ Svenska * ■ Türkçe * ■ 中文 (Chinese) * ■ 日本語 (Japanese) * ■ 한국어 (Korean) * ■ Bahasa Indonesia * ■ tiếng Việt (Vit) * ■ čeština (Czech) *
Factory setting	English

MAC Address

Navigation	 Expert → Communication → Configuration → MAC Address (7214)
Description	Displays the MAC ⁸⁾ 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	<i>Example</i> For the display format 00:07:05:10:01:5F

Default netw.set

Navigation	 Expert → Communication → Configuration → Default netw.set (7401)
Description	Displays the use of default network settings.
User interface	■ Off ■ On
Factory setting	Off

* Visibility depends on order options or device settings

8) Media Access Control

Additional information *User interface*

The **On** option is displayed as soon as the last octet of the IP address is set via DIP switches.

DHCP client



Navigation  Expert → Communication → Configuration → 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 (→  158), Subnet mask (→  158) and Default gateway (→  159) are set automatically.

 Identification is via the MAC address of the measuring device.

IP address



Navigation  Expert → Communication → Configuration → IP address (7209)

Description Displays the IP address of the Web server of the measuring device.

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

Factory setting 192.168.1.212

Subnet mask



Navigation  Expert → Communication → Configuration → Subnet mask (7211)

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

Default gateway

Navigation	Expert → Communication → Configuration → Default gateway (7210)
Description	Use this function to enter 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 → Configuration → Webserver funct. (7222)
Description	Use this function to switch the Web server on and off.
Selection	■ Off ■ HTML Off ■ On
Factory setting	On

Additional information*Description*

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

Options

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

Login page

Navigation	Expert → Communication → Configuration → Login page (7273)
Description	Use this function to select the format of the login page.
Selection	■ Without header ■ With header
Factory setting	With header

Capability flags

Navigation	 Expert → Communication → Configuration → Capability flags (7439)
Description	Displays the DLR (Device Level Ring) properties of the device.
User interface	■ Announce-b. node ■ Beacon-b. node ■ Supervisor cap. ■ Redund. gateway ■ Flush tab. frame
Factory setting	Beacon-b. node

User description

Navigation	 Expert → Communication → Configuration → User description (7432)
Description	Use this function to enter the user-defined device name and location (separated by a semicolon).
Factory setting	description;location

"Input assembly" submenu

Navigation  Expert → Communication → Configuration → Input assembly

► Input assembly

Position 1 (7402)

→  161

Position 2 (7413)

→  162

Position 3 (7415)

→  162

Position 4 (7416)

→  163

Position 5 (7417)

→  163

Position 6 (7418)

→  163

Position 7 (7419)

→  163

Position 8 (7420)

→  164

Position 9 (7421)	→ 164
Position 10 (7403)	→ 164
Position 11 (7404)	→ 164
Position 12 (7405)	→ 165
Position 13 (7406)	→ 165
Position 14 (7407)	→ 165
Position 15 (7408)	→ 166
Position 16 (7409)	→ 166
Position 17 (7410)	→ 166
Position 18 (7411)	→ 166
Position 19 (7412)	→ 167
Position 20 (7414)	→ 167

Position 1



Navigation

Expert → Communication → Configuration → Input assembly → Position 1 (7402)

Description

Use this function to select a process variable for input value 1.

Selection

- Off
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow
- Carrier mass fl.
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl
- Density
- Ref.density
- Concentration
- Dynam. viscosity
- Kinematic visc.
- TempCompDynVisc
- TempCompKinVisc
- Temperature
- Carr. pipe temp.
- Electronic temp.

- Osc. freq. 0
- Osc. freq. 1
- Osc. ampl. 0
- Osc. ampl. 1
- Freq. fluct. 0
- Freq. fluct. 1
- Osc. damping 0
- Osc. damping 1
- Osc.damp.fluct 0
- Osc.damp.fluct 1
- Signal asymmetry
- Exc. current 0
- Exc. current 1
- Spv.exc.curr. 1
- Spv.exc.curr. 2
- HBSI
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Ref.dens.altern.
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow

Factory setting

Mass flow

Position 2**Navigation**

Expert → Communication → Configuration → Input assembly → Position 2 (7413)

Description

Use this function to select a process variable for input value 2.

SelectionPicklist, see **Input assembly position 1** parameter (→ 161)**Factory setting**

Volume flow

Position 3**Navigation**

Expert → Communication → Configuration → Input assembly → Position 3 (7415)

Description

Use this function to select a process variable for input value 3.

SelectionPicklist, see **Input assembly position 1** parameter (→ 161)**Factory setting**

Correct.vol.flow

Position 4



Navigation	Expert → Communication → Configuration → Input assembly → Position 4 (7416)
Description	Use this function to select a process variable for input value 4.
Selection	Picklist, see Input assembly position 1 parameter (→ 161)
Factory setting	Temperature

Position 5



Navigation	Expert → Communication → Configuration → Input assembly → Position 5 (7417)
Description	Use this function to select a process variable for input value 5.
Selection	Picklist, see Input assembly position 1 parameter (→ 161)
Factory setting	Density

Position 6



Navigation	Expert → Communication → Configuration → Input assembly → Position 6 (7418)
Description	Use this function to select a process variable for input value 6.
Selection	Picklist, see Input assembly position 1 parameter (→ 161)
Factory setting	Ref.density

Position 7



Navigation	Expert → Communication → Configuration → Input assembly → Position 7 (7419)
Description	Use this function to select a process variable for input value 7.
Selection	Picklist, see Input assembly position 1 parameter (→ 161)
Factory setting	Spv.exc.curr. 1

Position 8



Navigation	 Expert → Communication → Configuration → Input assembly → Position 8 (7420)
Description	Use this function to select a process variable for input value 8.
Selection	Picklist, see Input assembly position 1 parameter (→  161)
Factory setting	Totalizer 1

Position 9



Navigation	 Expert → Communication → Configuration → Input assembly → Position 9 (7421)
Description	Use this function to select a process variable for input value 9.
Selection	Picklist, see Input assembly position 1 parameter (→  161)
Factory setting	Totalizer 2

Position 10



Navigation	 Expert → Communication → Configuration → Input assembly → Position 10 (7403)
Description	Use this function to select a process variable for input value 10.
Selection	Picklist, see Input assembly position 1 parameter (→  161)
Factory setting	Totalizer 3

Position 11



Navigation	 Expert → Communication → Configuration → Input assembly → Position 11 (7404)
Description	Use this function to select a process variable for input value 11.
Selection	■ Off ■ Actual diagnos. ■ Prev.diagnostics ■ Mass flow unit ■ Volume flow unit ■ Cor.volfow unit ■ Temperature unit ■ Density unit ■ Ref. dens. unit

- Concentr. unit
- Dyn. visc. unit
- Kin. visc. unit
- Current unit
- Unit totalizer 1
- Unit totalizer 2
- Unit totalizer 3
- Verific. results
- Verific. status

Factory setting Mass flow unit

Position 12



Navigation Expert → Communication → Configuration → Input assembly → Position 12 (7405)

Description Use this function to select a process variable for input value 12.

Selection Picklist, see **Input assembly position 11** parameter (→ 164)

Factory setting Volume flow unit

Position 13



Navigation Expert → Communication → Configuration → Input assembly → Position 13 (7406)

Description Use this function to select a process variable for input value 13.

Selection Picklist, see **Input assembly position 11** parameter (→ 164)

Factory setting Cor.volflow unit

Position 14



Navigation Expert → Communication → Configuration → Input assembly → Position 14 (7407)

Description Use this function to select a process variable for input value 14.

Selection Picklist, see **Input assembly position 11** parameter (→ 164)

Factory setting Temperature unit

Position 15



Navigation	Expert → Communication → Configuration → Input assembly → Position 15 (7408)
Description	Use this function to select a process variable for input value 15.
Selection	Picklist, see Input assembly position 11 parameter (→ 164)
Factory setting	Density unit

Position 16



Navigation	Expert → Communication → Configuration → Input assembly → Position 16 (7409)
Description	Use this function to select a process variable for input value 16.
Selection	Picklist, see Input assembly position 11 parameter (→ 164)
Factory setting	Ref. dens. unit

Position 17



Navigation	Expert → Communication → Configuration → Input assembly → Position 17 (7410)
Description	Use this function to select a process variable for input value 17.
Selection	Picklist, see Input assembly position 11 parameter (→ 164)
Factory setting	Current unit

Position 18



Navigation	Expert → Communication → Configuration → Input assembly → Position 18 (7411)
Description	Use this function to select a process variable for input value 18.
Selection	Picklist, see Input assembly position 11 parameter (→ 164)
Factory setting	Unit totalizer 1

Position 19		
Navigation	 Expert → Communication → Configuration → Input assembly → Position 19 (7412)	
Description	Use this function to select a process variable for input value 19.	
Selection	Picklist, see Input assembly position 11 parameter (→  164)	
Factory setting	Unit totalizer 2	

Position 20		
Navigation	 Expert → Communication → Configuration → Input assembly → Position 20 (7414)	
Description	Use this function to select a process variable for input value 20.	
Selection	Picklist, see Input assembly position 11 parameter (→  164)	
Factory setting	Unit totalizer 3	

3.6.2 "WLAN settings" submenu

Navigation  Expert → Communication → WLAN settings

▶ WLAN settings		
WLAN (2702)		→  168
WLAN mode (2717)		→  168
SSID name (2714)		→  169
Network security (2705)		→  169
Sec. identific. (2718)		→  169
User name (2715)		→  170
WLAN password (2716)		→  170
WLAN IP address (2711)		→  170
WLAN MAC address (2703)		→  170

WLAN subnet mask (2709)	→ ⓘ 171
WLAN MAC address (2703)	→ ⓘ 170
WLAN passphrase (2706)	→ ⓘ 171
Assign SSID name (2708)	→ ⓘ 171
SSID name (2707)	→ ⓘ 172
WLAN channel (2704)	→ ⓘ 172
Select antenna (2713)	→ ⓘ 172
Connection state (2722)	→ ⓘ 172
Rec.sig.strength (2721)	→ ⓘ 173
WLAN IP address (2711)	→ ⓘ 170
Gateway IP addr. (2719)	→ ⓘ 173
IP address DNS (2720)	→ ⓘ 173

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	<i>Selection</i> ■ 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 ⁹⁾ 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.

9) Media Access Control

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 (→  169).

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 ¹⁰⁾.

Selection

- Device tag
- User-defined

Factory setting User-defined

Additional information *Selection*

- Device tag
The device tag name is used as the SSID.
- User-defined
A user-defined name is used as the SSID.

¹⁰⁾ Service Set Identifier

SSID name

Navigation	 Expert → Communication → WLAN settings → SSID name (2707)
Prerequisite	▪ The User-defined option is selected in the Assign SSID name parameter (→  171). ▪ The Access point option is selected in the WLAN mode parameter (→  168).
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_Promass_500_A802000)

WLAN channel

Navigation	 Expert → Communication → WLAN settings → WLAN channel (2704)
Description	Use this function to enter the WLAN channel.
User entry	1 to 11
Factory setting	6
Additional information	<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.

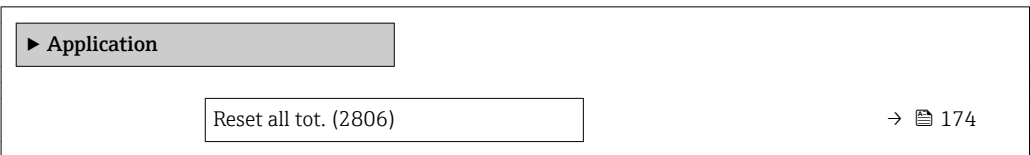
Navigation	 Expert → Communication → WLAN settings → Gateway IP addr. (2719)
Description	Use this function to enter the IP address of the gateway.
Factory setting	192.168.1.212

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

3.7 "Application" submenu

Navigation  Expert → Application



► Totalizer	→ 174
► Concentration	→ 179
► Petroleum	→ 179

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

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)	→ 175
Unit totalizer 1 to n (0915-1 to n)	→ 175
Operation mode (0908-1 to n)	→ 177
Control Tot. 1 to n (0912-1 to n)	→ 177
Preset value 1 to n (0913-1 to n)	→ 178
Failure mode (0901-1 to n)	→ 179

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 ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. * ■ Target vol. flow ■ Carrier vol. fl. ■ Targ.corr.vol.fl ■ Carr.corr.vol.fl ■ GSV flow ■ GSVa ■ NSV flow ■ NSVa ■ S&W volume flow ■ Oil mass flow ■ Water mass flow ■ Oil volume flow ■ Water vol. flow ■ Oil corr.vol.fl. ■ Water corr.v.fl.
Factory setting	Mass flow
Additional information	<i>Description</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 (→ 175) 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 (→ 175) of the Totalizer 1 to n submenu: ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. *

* Visibility depends on order options or device settings

Description Use this function to select the process variable unit for the Totalizer 1 to n (→  174).

Selection

SI units

- g
- kg
- t

US units

- oz
- lb
- STon

or

SI units

- cm³
- dm³
- m³
- ml
- l
- hl
- Ml Mega

US units

- af
- ft³
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us;oil)
- bbl (us;tank)

Imperial units

- gal (imp)
- Mgal (imp)
- bbl (imp;oil)

or

US units

- bbl (us;liq.)
- bbl (us;beer)

Imperial units

- bbl (imp;beer)

or

SI units

- Nl
- Nm³
- Sl
- Sm³

US units

- Sft³
- Sgal (us)
- Sbbl (us;liq.)

Imperial units

- Sgal (imp)

or

Other units

None

Factory setting

Country-specific:

- kg
- lb

Additional information

Description



The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→  61).

Selection

The selection is dependent on the process variable selected in the **Assign variable** parameter (→  175).

Operation mode 	
Navigation	  Expert → Application → Totalizer 1 to n → Operation mode (0908-1 to n)
Prerequisite	One of the following options is selected in the Assign variable parameter (→  175) of the Totalizer 1 to n submenu: ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. *
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	<i>Selection</i> ■ 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 (→  175) of the Totalizer 1 to n submenu: ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. *
Description	Use this function to select the control of totalizer value 1-3.
Selection	■ Totalize ■ Reset + hold ■ Preset + hold ■ Reset + totalize ■ Preset+totalize ■ Hold

* Visibility depends on order options or device settings

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 (→  175) of the **Totalizer 1 to n** submenu:

- Volume flow
- Mass flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *

Description Use this function to enter a start value for the Totalizer 1 to n.

User entry Signed floating-point number

Factory setting Country-specific:

- 0 kg
- 0 lb

Additional information *Entry*

 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→  175).

Example

This configuration is suitable for applications such as iterative filling processes with a fixed batch quantity.

* Visibility depends on order options or device settings

Failure mode	
Navigation	Expert → Application → Totalizer 1 to n → Failure mode (0901–1 to n)
Prerequisite	One of the following options is selected in the Assign variable parameter (→ 175) of the Totalizer 1 to n submenu: ■ Volume flow ■ Mass flow ■ Correct.vol.flow ■ Target mass flow * ■ Carrier mass fl. *
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 "Concentration" submenu

For detailed information on the parameter descriptions for the **Concentration** application package, refer to the Special Documentation for the device → 7

Navigation Expert → Application → Concentration

► Concentration

3.7.3 "Petroleum" submenu

For detailed information on the parameter descriptions for the **Petroleum** application package, refer to the Special Documentation for the device → 7

* Visibility depends on order options or device settings

Navigation  Expert → Application → Petroleum

► Petroleum

3.8 "Diagnostics" submenu

Navigation  Expert → Diagnostics

► Diagnostics

Actual diagnos. (0691)

→  181

Prev.diagnostics (0690)

→  181

Time fr. restart (0653)

→  182

Operating time (0652)

→  182

► Diagnostic list

→  183

► Event logbook

→  187

► Device info

→  189

► Main elec.+I/O1

→  193

► Sens. electronic

→  194

► I/O module 2

→  196

► I/O module 3

→  197

► I/O module 4

→  198

► Display module

→  199

► Min/max val.

→  200

► Data logging

→  207

► Heartbeat

→  216

► Simulation

→  217

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 (→  183).  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 (→  181). <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 (→  181).

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)	→ 	183
Diagnostics 2 (0693)	→ 	184
Diagnostics 3 (0694)	→ 	185
Diagnostics 4 (0695)	→ 	185
Diagnostics 5 (0696)	→ 	186

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 (→ 183).

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 (→ 184).

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 (→  185). <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 (→  185).

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	<i>Display</i>  The diagnostic message can be viewed via the Diagnostics 5 parameter (→  186).
	<i>Example</i> For the display format: 24d12h13m00s

3.8.2 "Event logbook" submenu

Navigation  Expert → Diagnostics → Event logbook

► Event logbook

Filter options (0705) →  187

► Event list →  188

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 →  189

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 (→  187).
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

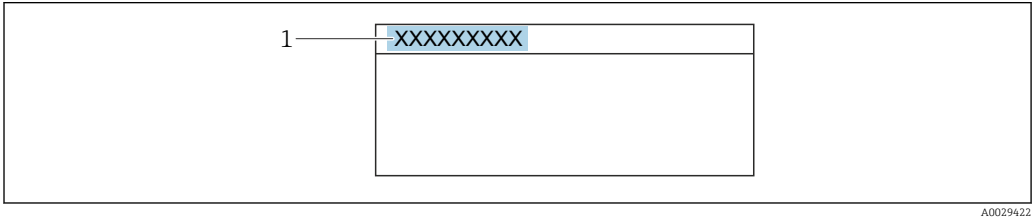
Navigation  Expert → Diagnostics → Device info

► Device info		
Device tag (0011)	→ 	190
Serial number (0009)	→ 	190
Firmware version (0010)	→ 	191
Device name (0020)	→ 	191
Order code (0008)	→ 	191

Ext. order cd. 1 (0023)	→ 192
Ext. order cd. 2 (0021)	→ 192
Ext. order cd. 3 (0022)	→ 192
Config. counter (2751)	→ 192
ENP version (0012)	→ 193

Device tag

Navigation	  Expert → Diagnostics → Device info → Device tag (0011)
Description	Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.
User interface	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).
Factory setting	Promass
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

Cubemass 300/500

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 (→ 192)

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 (→ 192)

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.

→  193

→  193

→  194

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)

→  194

Build no. softw. (0079)

→  194

Bootloader rev. (0073)

→  195

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.

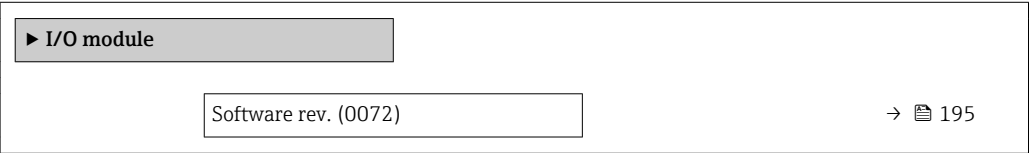
Navigation	  Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)
Description	Displays the software build number of the module.
User interface	Positive integer

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) ■ 20-21 (I/O 4)

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	→ 	196
Software rev.	→ 	196
Build no. softw.	→ 	196
Bootloader rev.	→ 	197

I/O 1 terminals

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

Software rev.

Navigation	 Expert → Diagnostics → I/O module 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		→  197
Software rev.		→  197
Build no. softw.		→  198
Bootloader rev.		→  198

I/O 1 terminals

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

Software rev.

Navigation	 Expert → Diagnostics → I/O module 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 "I/O module 4" submenu

Navigation

  Expert → Diagnostics → I/O module 4

► I/O module 4

I/O 4 terminals

→  198

Software rev.

→  199

Build no. softw.

→  199

Bootloader rev.

→  199

I/O 1 terminals

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

Software rev.	
Navigation	  Expert → Diagnostics → I/O module 4 → 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 4 → 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 4 → Bootloader rev. (0073)
Description	Displays the bootloader revision of the software.
User interface	Positive integer

3.8.10 "Display module" submenu

Navigation   Expert → Diagnostics → Display module

► Display module

Software rev. (0072)

Build no. softw. (0079)

Bootloader rev. (0073)

→  200

→  200

→  200

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

3.8.11 "Min/max val." submenu

Navigation   Expert → Diagnostics → Min/max val.

► Min/max val.

Reset min/max (6151)

→  201

► Main elect.temp.

→  201

► Sensor elec.temp

→  202

► Medium temp.

→  203

► Carr. pipe temp.

→  204

► Oscil. frequency

→  205

► Oscil. amplitude	→ ⓘ 205
► Oscil. damping	→ ⓘ 206
► Signal asymmetry	→ ⓘ 207

Reset min/max

ⓘ

Navigation	ⓘ ⓘ Expert → Diagnostics → Min/max val. → Reset min/max (6151)
Description	Use this function to select measured variables whose minimum, maximum and average measured values are to be reset.
Selection	■ Cancel ■ Oscil. amplitude ■ Oscil. damping ■ Oscil. frequency ■ Signal asymmetry
Factory setting	Cancel
Additional information	<i>Selection</i> ⓘ Detailed description of the options Oscil. frequency, Oscil. amplitude, Oscil. damping and Signal asymmetry: Value 1 display parameter (→ ⓘ 18)

"Main electronic temperature" submenu

Navigation	ⓘ ⓘ Expert → Diagnostics → Min/max val. → Main elect.temp.						
	<table><tr><td>► Main elect.temp.</td><td></td></tr><tr><td>Minimum value (0688)</td><td>→ ⓘ 201</td></tr><tr><td>Maximum value (0665)</td><td>→ ⓘ 202</td></tr></table>	► Main elect.temp.		Minimum value (0688)	→ ⓘ 201	Maximum value (0665)	→ ⓘ 202
► Main elect.temp.							
Minimum value (0688)	→ ⓘ 201						
Maximum value (0665)	→ ⓘ 202						

Minimum value

Navigation	ⓘ ⓘ Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (0688)
Description	Displays the lowest previously measured temperature value of the electronics module in the transmitter.

User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  68)

Maximum value

Navigation	  Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (0665)
Description	Displays the highest previously measured temperature value of the electronics module in the transmitter.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  68)

"Sensor electronic temperature (ISEM)" submenu

Navigation   Expert → Diagnostics → Min/max val. → Sensor elec.temp

► Sensor elec.temp

Minimum value (6052)

→  203

Maximum value (6051)

→  202

Maximum value

Navigation	  Expert → Diagnostics → Min/max val. → Sensor elec.temp → Maximum value (6051)
Description	Displays the highest previously measured temperature value of the electronics module in the sensor connection housing.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  68)

Minimum value

Navigation	 Expert → Diagnostics → Min/max val. → Sensor elec.temp → Minimum value (6052)
Description	Displays the lowest previously measured temperature value of the electronics module in the sensor connection housing.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  68)

"Medium temp." submenu

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

► Medium temp.

Minimum value (6109)

→  203

Maximum value (6108)

→  203

Minimum value

Navigation	 Expert → Diagnostics → Min/max val. → Medium temp. → Minimum value (6109)
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 (→  68)

Maximum value

Navigation	 Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (6108)
Description	Displays the highest previously measured medium temperature value.
User interface	Signed floating-point number

Additional information

Dependency

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

"Carr. pipe temp." submenu

Navigation   Expert → Diagnostics → Min/max val. → Carr. pipe temp.

► Carr. pipe temp.

Minimum value (6030)

→  204

Maximum value (6029)

→  204

Minimum value

Navigation

  Expert → Diagnostics → Min/max val. → Carr. pipe temp. → Minimum value (6030)

Prerequisite

For the following order code
"Application package", option **EB** "Heartbeat Verification + Monitoring"

Description

Displays the lowest previously measured temperature value of the carrier pipe.

User interface

Signed floating-point number

Additional information

Dependency

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

Maximum value

Navigation

  Expert → Diagnostics → Min/max val. → Carr. pipe temp. → Maximum value (6029)

Prerequisite

For the following order code
"Application package", option **EB** "Heartbeat Verification + Monitoring"

Description

Displays the highest previously measured temperature value of the carrier pipe.

User interface

Signed floating-point number

Additional information

Dependency

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

"Oscil. frequency" submenu

Navigation

 Expert → Diagnostics → Min/max val. → Oscil. frequency

► Oscil. frequency

Minimum value (6071)

→  205

Maximum value (6070)

→  205

Minimum value

Navigation	  Expert → Diagnostics → Min/max val. → Oscil. frequency → Minimum value (6071)
Description	Displays the lowest previously measured oscillation frequency.
User interface	Signed floating-point number

Maximum value

Navigation	  Expert → Diagnostics → Min/max val. → Oscil. frequency → Maximum value (6070)
Description	Displays the highest previously measured oscillation frequency.
User interface	Signed floating-point number

"Oscil. amplitude" submenu

Navigation

 Expert → Diagnostics → Min/max val. → Oscil. amplitude

► Oscil. amplitude

Minimum value (6010)

→  206

Maximum value (6009)

→  206

Minimum value

Navigation	  Expert → Diagnostics → Min/max val. → Oscil. amplitude → Minimum value (6010)
Description	Displays the lowest previously measured oscillation amplitude.
User interface	Signed floating-point number

Maximum value

Navigation	  Expert → Diagnostics → Min/max val. → Oscil. amplitude → Maximum value (6009)
Description	Displays the highest previously measured oscillation amplitude.
User interface	Signed floating-point number

"Oscil. damping" submenu

Navigation   Expert → Diagnostics → Min/max val. → Oscil. damping

► Oscil. damping

Minimum value (6122)

→  206

Maximum value (6121)

→  206

Minimum value

Navigation	  Expert → Diagnostics → Min/max val. → Oscil. damping → Minimum value (6122)
Description	Displays the lowest previously measured oscillation damping.
User interface	Signed floating-point number

Maximum value

Navigation	  Expert → Diagnostics → Min/max val. → Oscil. damping → Maximum value (6121)
Description	Displays the highest previously measured oscillation damping.

User interface Signed floating-point number

"Signal asymmetry" submenu

Navigation   Expert → Diagnostics → Min/max val. → Signal asymmetry

► Signal asymmetry

Minimum value (6015)

→  207

Maximum value (6014)

→  207

Minimum value

Navigation   Expert → Diagnostics → Min/max val. → Signal asymmetry → Minimum value (6015)

Description Displays the lowest previously measured signal asymmetry.

User interface Signed floating-point number

Maximum value

Navigation   Expert → Diagnostics → Min/max val. → Signal asymmetry → Maximum value (6014)

Description Displays the highest previously measured signal asymmetry.

User interface Signed floating-point number

3.8.12 "Data logging" submenu

Navigation   Expert → Diagnostics → Data logging

► Data logging

Assign chan. 1

→  208

Assign chan. 2

→  210

Assign chan. 3	→  210
Assign chan. 4	→  210
Logging interval	→  211
Clear logging	→  211
Data logging	→  212
Logging delay	→  212
Data log.control	→  212
Data log. status	→  213
Logging duration	→  213
► Displ.channel 1	→  214
► Displ.channel 2	→  215
► Displ.channel 3	→  215
► Displ.channel 4	→  216

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 (→  47).

Description

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

Selection

- Off
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl

* Visibility depends on order options or device settings

- Density
- Ref.density
- Ref.dens.altern.
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Water cut
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water vol. flow
- Oil corr.vol.fl.
- Water corr.v.fl.
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Oscil. amplitude *
- Freq. fluct. 0
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0
- HBSI
- Curr.output 1
- Curr.output 2 *
- Curr.output 3 *
- Curr.output 4 *
- Pressure

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 (→  47).	
Description	Options for the assignment of a process variable to the data logging channel.	
Selection	Picklist, see Assign channel 1 parameter (→  208)	
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 (→  47).	
Description	Options for the assignment of a process variable to the data logging channel.	
Selection	Picklist, see Assign channel 1 parameter (→  208)	
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 (→  47).	
Description	Options for the assignment of a process variable to the data logging channel.	
Selection	Picklist, see Assign channel 1 parameter (→  208)	
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 (→ 47).
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 (→ 47).
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 (→ 212), 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 (→ 212), 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 (→ 212), 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 (→  212), 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 (→  212), 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 →  214

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 (→  47).

One of the following options is selected in the **Assign chan. 1** parameter (→  208):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Carr. pipe temp. *
- Electronic temp.
- Curr.output 1
- Osc. freq. 0
- Freq. fluct. 0
- Oscil. amplitude *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

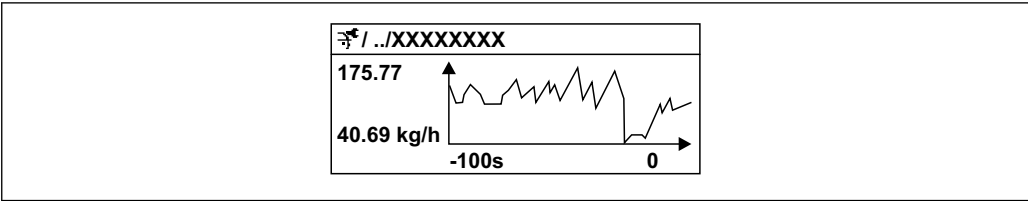
Description

Displays the measured value trend for the logging channel in the form of a chart.

* Visibility depends on order options or device settings

Additional information

Description



9 Chart of a measured value trend

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

"Displ.channel 2" submenu

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

► Displ.channel 2

Display channel 2 →  215

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 →  214

"Displ.channel 3" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 3

► Displ.channel 3

Display channel 3 →  216

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 →  214

"Displ.channel 4" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 4

► Displ.channel 4

Display channel 4 →  216

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 →  214

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

► HBT Monitoring
► Monitor. results

3.8.14 "Simulation" submenu

Navigation   Expert → Diagnostics → Simulation

► Simulation	
Assign proc.var. (1810)	→  218
Proc. var. value (1811)	→  219
Status inp. sim. (1355)	→  219
Signal level (1356)	→  219
Curr.inp 1 to n sim. (1608-1 to n)	→  220
Value curr.inp 1 to n (1609-1 to n)	→  220
Curr.out. 1 to n sim. (0354-1 to n)	→  221
Value curr.out 1 to n (0355-1 to n)	→  221
FreqOutputSim 1 to n (0472-1 to n)	→  221
Freq value 1 to n (0473-1 to n)	→  222
Puls.outp.sim. 1 to n (0458-1 to n)	→  222
Pulse value 1 to n (0459-1 to n)	→  223
Switch sim. 1 to n (0462-1 to n)	→  223
Switch status 1 to n (0463-1 to n)	→  224
Relay out. 1 to n sim (0802-1 to n)	→  224
Switch status 1 to n (0803-1 to n)	→  225
Dev. alarm sim. (0654)	→  225
Event category (0738)	→  226
Diag. event sim. (0737)	→  226

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 ■ Mass flow ■ Volume flow ■ Correct.vol.flow ■ Target vol. flow ■ Carrier vol. fl. ■ Targ.corr.vol.fl ■ Carr.corr.vol.fl ■ Density ■ Ref.density ■ Ref.dens.altern. ■ GSV flow ■ GSVa ■ NSV flow ■ NSVa ■ S&W volume flow ■ Water cut ■ Oil density ■ Water density ■ Oil mass flow ■ Water mass flow ■ Oil volume flow ■ Water vol. flow ■ Oil corr.vol.fl. ■ Water corr.v.fl. ■ Density average ■ Temp. average ■ Temperature * ■ Concentration * ■ Target mass flow * ■ Carrier mass fl. *
Factory setting	Off
Additional information	Description  The simulation value of the process variable selected is defined in the Proc. var. value parameter (→  219).

* Visibility depends on order options or device settings

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
Factory setting	0
Additional information	<i>Entry</i>  The unit of the displayed measured value is taken from the System units submenu (→  61).
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	<i>Description</i>  The desired simulation value is defined in the Signal level parameter (→  219). <i>Selection</i> ■ Off Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Simulation for the status input is active.
Signal level	
Navigation	 Expert → Diagnostics → Simulation → Signal level (1356)
Prerequisite	In the Status inp. sim. parameter (→  219), the On option is selected.

Description Use this function to select the signal level for the simulation of the status input. In this way, users can verify the correct configuration of the status input and the correct function of upstream feed-in units.

Selection

- High
- Low

Curr.inp 1 to n sim.



Navigation Expert → Diagnostics → Simulation → Curr.inp 1 to n sim. (1608–1 to n)

Description Option for switching simulation of the current input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.



The desired simulation value is defined in the **Value curr.inp 1 to n** parameter.

Selection

- Off
- On

Factory setting Off

Additional information *Selection*

- Off
Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
Current simulation is active.

Value curr.inp 1 to n



Navigation Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609–1 to n)

Prerequisite In the **Curr.inp 1 to n sim.** parameter, the **On** option is selected.

Description Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.

User entry 0 to 22.5 mA

Curr.out. 1 to n sim. 	
Navigation	  Expert → Diagnostics → Simulation → Curr.out. 1 to n sim. (0354–1 to n)
Description	Use this function to switch simulation of the current output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	■ Off ■ On
Factory setting	Off
Additional information	<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.
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 (→  113).
FreqOutputSim 1 to n 	
Navigation	  Expert → Diagnostics → Simulation → FreqOutputSim 1 to n (0472–1 to n)
Prerequisite	In the Operating mode parameter (→  127), 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 (→  127), 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 (→ 130).
- Down-count. val.
The pulses specified in the **Pulse value** parameter (→ 223) 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 (→ 127), 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	<i>Description</i>  The desired simulation value is defined in the Switch status 1 to n parameter. <i>Selection</i> ■ Off Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Switch simulation is active.
-------------------------------	--

Switch status 1 to n	
-----------------------------	---

Navigation	 Expert → Diagnostics → Simulation → Switch status 1 to n (0463–1 to n)
Description	Use this function to select a switch value for the simulation. In this way, users can verify the correct adjustment of the switch output and the correct function of downstream switching units.
Selection	■ Open ■ Closed
Additional information	<i>Selection</i> ■ 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	<i>Description</i>  The desired simulation value is defined in the Switch status 1 to n parameter. <i>Selection</i> ■ 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	<i>Selection</i> ■ Open Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ Closed Relay simulation is active.
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	<i>Description</i> The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

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 (→  226).
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 (→  226).

4 Country-specific factory settings

4.1 SI units



Not valid for USA and Canada.

4.1.1 System units

Mass	kg
Mass flow	kg/h
Volume	l
Volume flow	l/h
Corrected volume	NI
Corrected volume flow	NI/h
Density	kg/l
Reference density	kg/NI
Temperature	°C
Pressure	bar a

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]	[kg/h]
1	4
2	20
4	90
6	200

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]	[kg/p]
1	0.001
2	0.01
4	0.01
6	0.1

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]	On-value for liquid [kg/h]
1	0.08
2	0.4
4	1.8
6	4

Nominal diameter [mm]	Switch-on value for gas [kg/h]
1	0.02
2	0.1
4	0.45
6	1

4.2 US units

 Only valid for USA and Canada.

4.2.1 System units

Mass	lb
Mass flow	lb/min
Volume	gal (us)
Volume flow	gal/min (us)
Corrected volume	Sft ³
Corrected volume flow	Sft ³ /min
Density	lb/ft ³
Reference density	lb/Sft ³
Temperature	°F
Pressure	psi a

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]	[lb/min]
1/24	0.15
1/12	0.75
1/8	3.3
1/4	7.4

4.2.3 Output current span

Current output 1 to n	4 to 20 mA US
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4.2.4 Pulse value

Nominal diameter [in]	[lb/p]
$1/24$	0.002
$1/12$	0.02
$1/8$	0.02
$1/4$	0.2

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]	On-value for liquid [lb/min]
$1/24$	0.003
$1/12$	0.015
$1/8$	0.066
$1/4$	0.15

Nominal diameter [in]	Switch-on value for gas [lb/min]
$1/24$	0.001
$1/12$	0.004
$1/8$	0.016
$1/4$	0.0375

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).
Pressure	Pa a, kPa a, MPa a	Pascal, kilopascal, megapascal (absolute)
	bar	Bar
	Pa g, kPa g, MPa g	Pascal, kilopascal, megapascal (relative/gauge)
	bar g	Bar (relative/gauge)
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
Ref.density	kg/Nm ³ , kg/Nl, g/Scm ³ , kg/Sm ³	Kilogram, gram/standard volume unit
Corrected volume	Nl, Nm ³ , Sm ³	Normal liter, normal cubic meter, standard cubic meter
Correct.vol.flow	Nl/s, Nl/min, Nl/h, Nl/d	Normal liter/time unit
	Nm ³ /s, Nm ³ /min, Nm ³ /h, Nm ³ /d	Normal cubic meter/time unit
	Sm ³ /s, Sm ³ /min, Sm ³ /h, Sm ³ /d	Standard cubic meter/time unit
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
Volume flow	cm ³ /s, cm ³ /min, cm ³ /h, cm ³ /d	Cubic centimeter/time unit
	dm ³ /s, dm ³ /min, dm ³ /h, dm ³ /d	Cubic decimeter/time unit
	m ³ /s, m ³ /min, m ³ /h, m ³ /d	Cubic meter/time unit
	ml/s, ml/min, ml/h, ml/d	Milliliter/time unit
	l/s, l/min, l/h, l/d	Liter/time unit
	hl/s, hl/min, hl/h, hl/d	Hectoliter/time unit
	Ml/s, Ml/min, Ml/h, Ml/d	Megaliter/time unit
Time	s, m, h, d, y	Second, minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Density	lb/ft ³ , 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

Process variable	Units	Explanation
Pressure	psi a	Pounds per square inch (absolute)
	psi g	Pounds per square inch (gauge)
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
Ref.density	lb/Sft ³	Weight unit/standard volume 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
	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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