

Description of Device Parameters

Proline Cubemass 300

Coriolis flowmeter
Modbus RS485

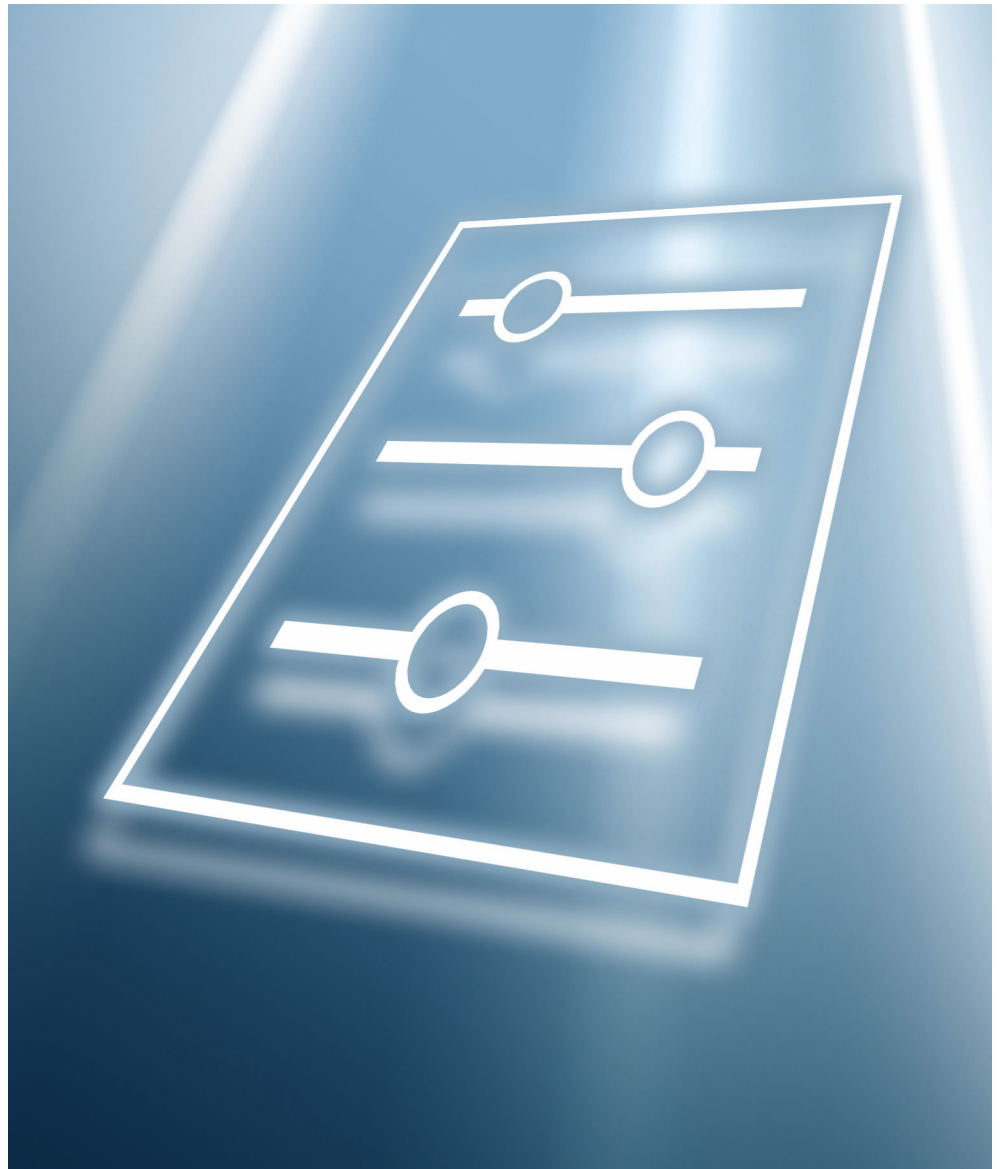


Table of contents

1	About this document	5		
1.1	Document function	5		
1.2	Target group	5		
1.3	Using this document	5		
1.3.1	Information on the document structure	5		
1.3.2	Structure of a parameter description	7		
1.4	Symbols used	7		
1.4.1	Symbols for certain types of information	7		
1.4.2	Symbols in graphics	8		
1.5	Documentation	8		
1.5.1	Standard documentation	8		
1.5.2	Supplementary device-dependent documentation	8		
2	Overview of the Expert operating menu	9		
3	Description of device parameters	12		
3.1	"System" submenu	14		
3.1.1	"Display" submenu	15		
3.1.2	"Configuration backup" submenu	32		
3.1.3	"Diagnostic handling" submenu	35		
3.1.4	"Administration" submenu	49		
3.2	"Sensor" submenu	55		
3.2.1	"Measured values" submenu	55		
3.2.2	"System units" submenu	69		
3.2.3	"Process parameters" submenu	79		
3.2.4	"Measurement mode" submenu	88		
3.2.5	"External compensation" submenu	91		
3.2.6	"Calculated values" submenu	94		
3.2.7	"Sensor adjustment" submenu	97		
3.2.8	"Calibration" submenu	115		
3.2.9	"Testpoints" submenu	117		
3.2.10	"Supervision" submenu	126		
3.3	"I/O configuration" submenu	126		
3.4	"Input" submenu	128		
3.4.1	"Current input 1 to n" submenu	129		
3.4.2	"Status input 1 to n" submenu	132		
3.5	"Output" submenu	134		
3.5.1	"Current output 1 to n" submenu	134		
3.5.2	"Pulse/frequency/switch output 1 to n" submenu	148		
3.5.3	"Relay output 1 to n" submenu	169		
3.5.4	"Double pulse output" submenu	176		
3.6	"Communication" submenu	181		
3.6.1	"Modbus configuration" submenu	182		
3.6.2	"Modbus information" submenu	187		
3.6.3	"Modbus data map" submenu	188		
3.6.4	"Web server" submenu	188		
3.6.5	"WLAN settings" wizard	191		
3.7	"Application" submenu	198		
3.7.1	"Totalizer 1 to n" submenu	199		
3.7.2	"Concentration" submenu	203		
3.7.3	"Petroleum" submenu	204		
3.7.4	"Application specific calculations" submenu	204		
3.7.5	"Medium index" submenu	210		
3.8	"Diagnostics" submenu	212		
3.8.1	"Diagnostic list" submenu	215		
3.8.2	"Event logbook" submenu	219		
3.8.3	"Device information" submenu	221		
3.8.4	"Main electronic module + I/O module 1" submenu	225		
3.8.5	"Sensor electronic module (ISEM)" submenu	226		
3.8.6	"I/O module 2" submenu	227		
3.8.7	"I/O module 3" submenu	228		
3.8.8	"I/O module 4" submenu	229		
3.8.9	"Display module" submenu	230		
3.8.10	"Data logging" submenu	231		
3.8.11	"Min/max values" submenu	241		
3.8.12	"Heartbeat Technology" submenu	247		
3.8.13	"Simulation" submenu	260		
4	Country-specific factory settings	271		
4.1	SI units	271		
4.1.1	System units	271		
4.1.2	Full scale values	271		
4.1.3	Output current span	271		
4.1.4	Pulse value	271		
4.1.5	Switch-on point low flow cut off	272		
4.2	US units	272		
4.2.1	System units	272		
4.2.2	Full scale values	273		
4.2.3	Output current span	273		
4.2.4	Pulse value	273		
4.2.5	Switch-on point low flow cut off	273		
5	Explanation of abbreviated units	274		
5.1	SI units	274		
5.2	US units	274		
5.3	Imperial units	276		
6	Modbus RS485 register information	277		
6.1	Notes	277		
6.1.1	Structure of the register information	277		
6.1.2	Address model	277		
6.2	Overview of the Expert operating menu	278		
6.3	Register information	290		
6.3.1	"System" submenu	290		
6.3.2	"Sensor" submenu	295		
6.3.3	"I/O configuration" submenu	306		
6.3.4	"Input" submenu	306		
6.3.5	"Output" submenu	307		

6.3.6	"Communication" submenu	316
6.3.7	"Application" submenu	317
6.3.8	"Diagnostics" submenu	319
Index		324

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

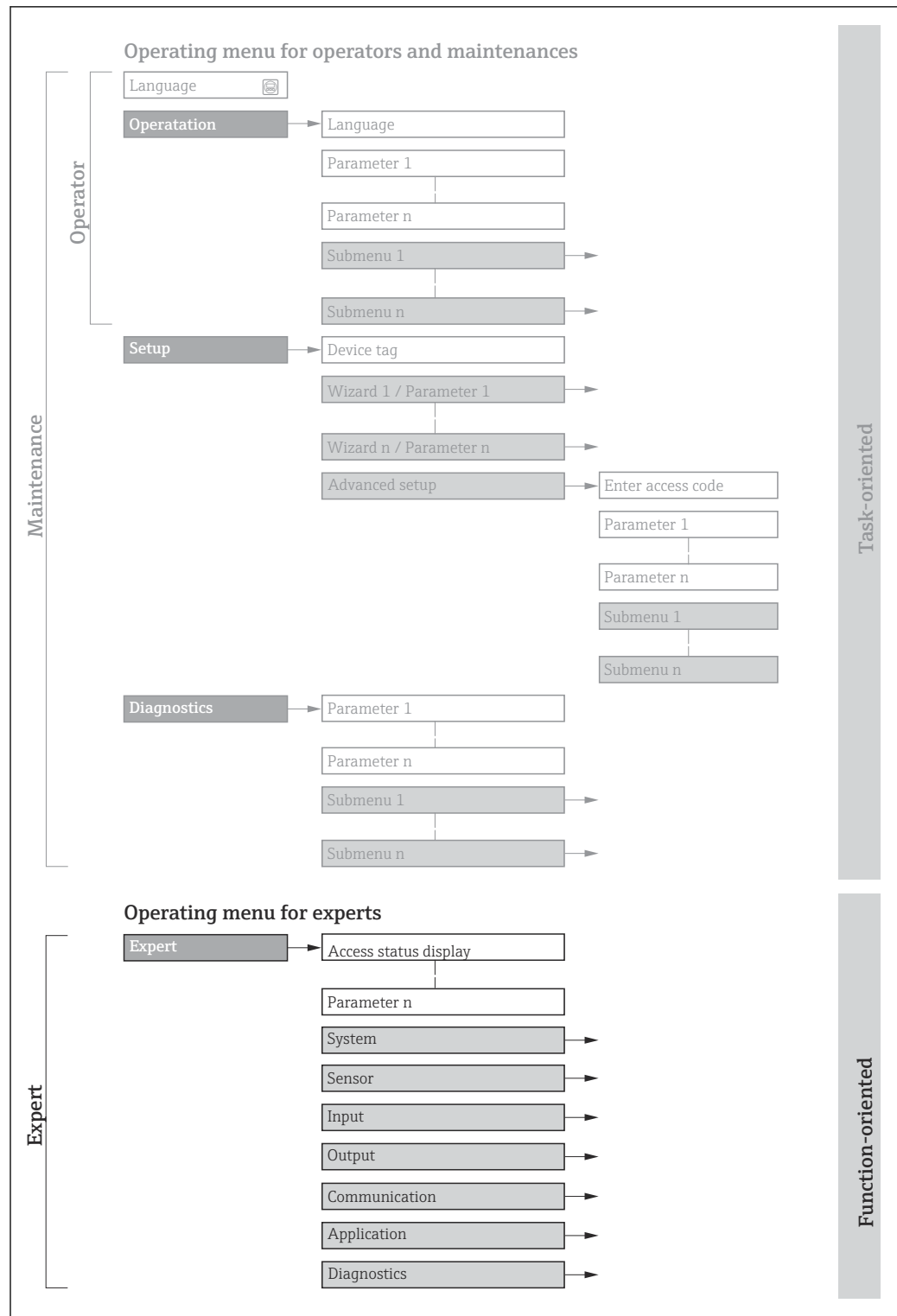
1.2 Target group

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 (→  9), 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 → 8
 - Operating concept of the operating menus: Operating Instructions → 8

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	Parameter entry range	
User interface	Display value/data of 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
 A0028662	Operation via local display
 A0028663	Operation via operating tool
 A0028665	Write-protected parameter

1.4.2 Symbols in graphics

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 300	BA01494D

1.5.2 Supplementary device-dependent documentation

Special Documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Remote display and operating module DKX001	SD01763D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD01671D
Heartbeat Technology	SD01693D
Concentration measurement	SD01715D

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)	→ 	12
Locking status (0004)	→ 	13
User role (0005)	→ 	14
Enter access code (0003)	→ 	14
▶ System	→ 	14
▶ Display	→ 	15
▶ Configuration backup	→ 	32
▶ Diagnostic handling	→ 	35
▶ Administration	→ 	49
▶ Sensor	→ 	55
▶ Measured values	→ 	55
▶ System units	→ 	69
▶ Process parameters	→ 	79
▶ Calculated values	→ 	94
▶ Measurement mode	→ 	88
▶ External compensation	→ 	91
▶ Sensor adjustment	→ 	97
▶ Calibration	→ 	115
▶ Testpoints	→ 	117
▶ Supervision	→ 	126

► I/O configuration	→ 126
I/O module 1 to n terminal numbers (3902-1 to n)	→ 127
I/O module 1 to n information (3906-1 to n)	→ 127
I/O module 1 to n type (3901-1 to n)	→ 127
Apply I/O configuration (3907)	→ 128
I/O alteration code (2762)	→ 128
► Input	→ 128
► Current input 1 to n	→ 129
► Status input 1 to n	→ 132
► Output	→ 134
► Current output 1 to n	→ 134
► Pulse/frequency/switch output 1 to n	→ 148
► Relay output 1 to n	→ 169
► Double pulse output	→ 176
► Communication	→ 181
► Modbus configuration	→ 182
► Modbus information	→ 187
► Modbus data map	→ 188
► Web server	→ 188
► WLAN settings	→ 191
► Application	→ 198
Reset all totalizers (2806)	→ 198
► Totalizer 1 to n	→ 199
► Concentration	→ 203

► Application specific calculations	→ 204
► Medium index	→ 210
► Diagnostics	→ 212
Actual diagnostics (0691)	→ 213
Previous diagnostics (0690)	→ 214
Operating time from restart (0653)	→ 215
Operating time (0652)	→ 215
► Diagnostic list	→ 215
► Event logbook	→ 219
► Device information	→ 221
► Main electronic module + I/O module 1	→ 225
► Sensor electronic module (ISEM)	→ 226
► I/O module 2	→ 227
► I/O module 3	→ 228
► I/O module 4	→ 229
► Display module	→ 230
► Data logging	→ 231
► Min/max values	→ 241
► Heartbeat Technology	→ 247
► Simulation	→ 260

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)	→	12
Locking status (0004)	→	13
User role (0005)	→	14
Enter access code (0003)	→	14
► System	→	14
► Sensor	→	55
► I/O configuration	→	126
► Input	→	128
► Output	→	134
► Communication	→	181
► Application	→	198
► Diagnostics	→	212

Direct access



Navigation

Expert → Direct access (0106)

Description

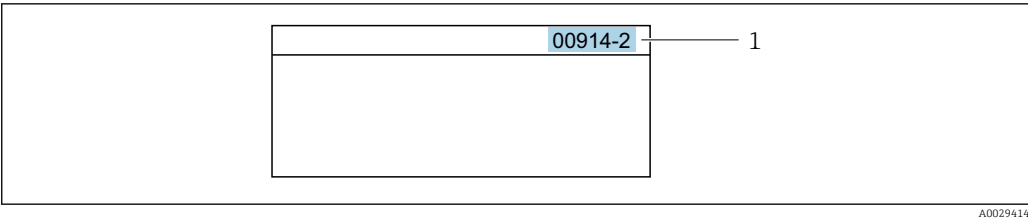
Use this function to enter the access code to enable direct access to the desired parameter via the local display. A parameter number is assigned to each parameter for this purpose.

User entry

0 to 65 535

Additional information

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



1 Direct access code

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

Locking status

Navigation	Expert → Locking status (0004)
Description	Displays the active write protection.
User interface	■ Hardware locked ■ CT active - all parameters ■ Temporarily locked
Additional information	User interface If two or more types of write protection are active, the write protection with the highest priority is shown on the local display. In the operating tool all active types of write protection are displayed. Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 8

Selection

Options	Description
None	The access authorization displayed in the Access status parameter (→ 14) applies . Only appears on local display.
Hardware locked (priority 1)	The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool) .
Temporarily locked (priority 3)	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset, etc.). Once the internal processing has been completed, the parameters can be changed once again.

User role	
Navigation	Expert → User role (0005)
Description	Displays the access authorization to the parameters via the local display, Web browser or operating tool.
User interface	■ Maintenance ■ Service
Factory setting	Maintenance
Additional information	<i>Description</i> Access authorization can be modified via the Enter access code parameter (→ 14). If additional write protection is active, this restricts the current access authorization even further. <i>User interface</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 → 8

Enter access code	
Navigation	Expert → Ent. access code (0003)
Description	Use this function to enter the user-specific release code to remove parameter write protection.
User entry	Max. 16-digit character string comprising numbers, letters and special characters

3.1 "System" submenu

Navigation Expert → System

► System	
► Display	→ 15
► Configuration backup	→ 32
► Diagnostic handling	→ 35
► Administration	→ 49

3.1.1 "Display" submenu

Navigation



Expert → System → Display

► Display		
Display language (0104)	→ 	16
Format display (0098)	→ 	16
Value 1 display (0107)	→ 	19
0% bargraph value 1 (0123)	→ 	20
100% bargraph value 1 (0125)	→ 	21
Decimal places 1 (0095)	→ 	21
Value 2 display (0108)	→ 	21
Decimal places 2 (0117)	→ 	22
Value 3 display (0110)	→ 	22
0% bargraph value 3 (0124)	→ 	23
100% bargraph value 3 (0126)	→ 	23
Decimal places 3 (0118)	→ 	24
Value 4 display (0109)	→ 	24
Decimal places 4 (0119)	→ 	25
Value 5 display (0145)	→ 	25
Decimal places 5 (0149)	→ 	26
Value 6 display (0146)	→ 	26
Decimal places 6 (0150)	→ 	27
Value 7 display (0147)	→ 	27
Decimal places 7 (0151)	→ 	28
Value 8 display (0148)	→ 	28
Decimal places 8 (0152)	→ 	29

Display interval (0096)	→ ⓘ 29
Display damping (0094)	→ ⓘ 30
Header (0097)	→ ⓘ 30
Header text (0112)	→ ⓘ 31
Separator (0101)	→ ⓘ 31
Contrast display (0105)	→ ⓘ 32
Backlight (0111)	→ ⓘ 32

Display language

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

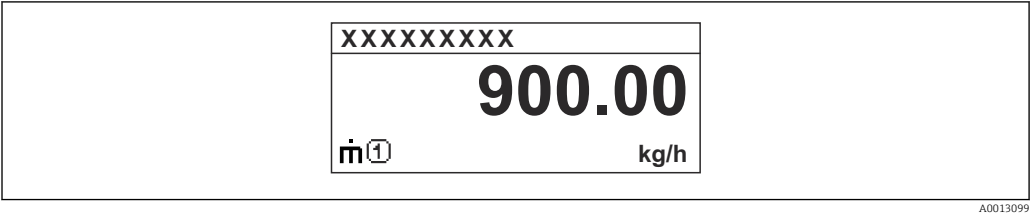
Format display

Navigation	🔍 ⓘ Expert → System → Display → Format display (0098)
Prerequisite	A local display is provided.

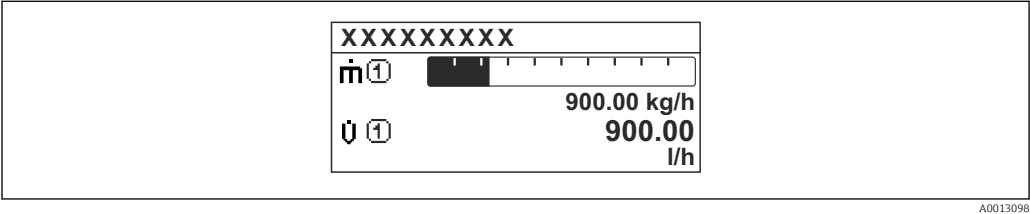
Description	Use this function to select how the measured value is shown on the local display.
Selection	■ 1 value, max. size ■ 1 bargraph + 1 value ■ 2 values ■ 1 value large + 2 values ■ 4 values
Factory setting	1 value, max. size
Additional information	<i>Description</i> The display format (size, bar graph etc.) and number of measured values displayed simultaneously (1 to 8) can be configured. This setting only applies to normal operation.  ■ The Value 1 display parameter (→  19)...Value 8 display parameter (→  28) 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 using the Display interval parameter (→  29).

Possible measured values shown on the local display:

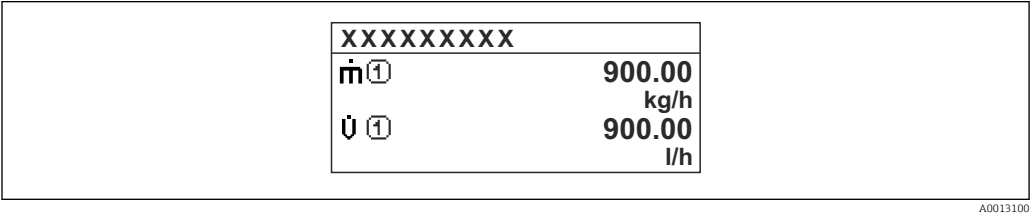
"1 value, max. size" option



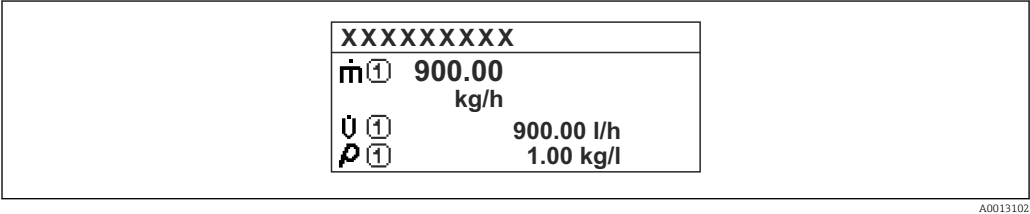
"1 bargraph + 1 value" option



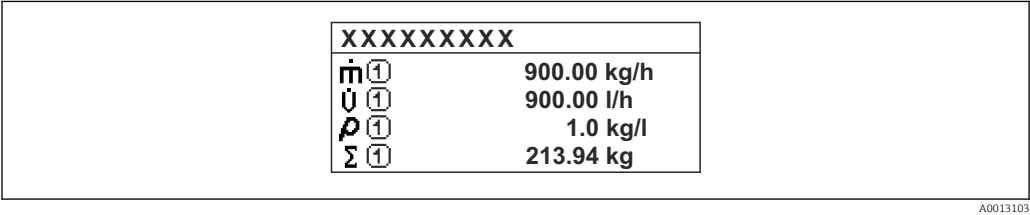
"2 values" option



"1 value large + 2 values" option



"4 values" option



Value 1 display	
Navigation	Expert → System → Display → Value 1 display (0107)
Prerequisite	A local display is provided.
Description	Use this function to select one of the measured values shown on the local display.
Selection	■ Mass flow ■ Volume flow ■ Corrected volume flow * ■ Density ■ Reference density * ■ Density 2 * ■ Time period signal frequency (TPS) * ■ Time period signal (TPS) * ■ Temperature ■ Pressure ■ Totalizer 1 ■ Totalizer 2 ■ Totalizer 3 ■ Concentration * ■ Target mass flow * ■ Carrier mass flow * ■ Target volume flow * ■ Carrier volume flow * ■ Target corrected volume flow * ■ Carrier corrected volume flow * ■ Application specific output 0 * ■ Application specific output 1 * ■ Inhomogeneous medium index ■ Suspended bubbles index * ■ HBSI * ■ Raw value mass flow ■ Exciter current 0 ■ Oscillation damping 0 ■ Oscillation damping fluctuation 0 * ■ Oscillation frequency 0 ■ Frequency fluctuation 0 * ■ Oscillation amplitude 0 * ■ Signal asymmetry ■ Torsion signal asymmetry * ■ Carrier pipe temperature * ■ Electronics temperature ■ Sensor index coil asymmetry ■ Test point 0 ■ Test point 1 ■ Current output 1 ■ Current output 2 * ■ Current output 3 * ■ Current output 4 *
Factory setting	Mass flow

* Visibility depends on order options or device settings

Additional information*Description*

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



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

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 69).

Selection

- **Oscillation frequency** option

Displays the current oscillation frequency of the measuring tubes. This frequency depends on the density of the medium.

- **Oscillation amplitude** option

Displays the relative oscillation amplitude of the measuring tubes in relation to the preset value. This value is 100 % under optimum conditions.

- **Oscillation 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 value 1**Navigation**

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

Prerequisite

A local display is provided.

Description

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

User entry

Signed floating-point number

Factory setting

Country-specific:

- 0 kg/h
- 0 lb/min

Additional information*Description*

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 69).

100% bargraph value 1 	
Navigation	  Expert → System → Display → 100% bargraph 1 (0125)
Prerequisite	A local display is provided.
Description	Use this function to enter the 100% bar graph value to be shown on the display for the measured value 1.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter →  271
Additional information	<i>Description</i>  The Format display parameter (→  16) 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 (→  69).
Decimal places 1 	
Navigation	  Expert → System → Display → Decimal places 1 (0095)
Prerequisite	A measured value is specified in the Value 1 display parameter (→  19).
Description	Use this function to select the number of decimal places for measured value 1.
Selection	■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx ■ x.xxxxx ■ x.xxxxxx
Factory setting	x.xx
Additional information	<i>Description</i>  This setting does not affect the accuracy of the device for measuring or calculating the value.
Value 2 display 	
Navigation	  Expert → System → Display → Value 2 display (0108)
Prerequisite	A local display is provided.

Description	Use this function to select a measured value that is shown on the local display.
Selection	For the picklist, see the Value 1 display parameter (→  19)
Factory setting	None
Additional information	<i>Description</i> If several measured values are displayed at once, the measured value selected here will be the second value to be displayed. The value is only displayed during normal operation.  The Format display parameter (→  16) is used to specify how many measured values are displayed simultaneously and how. <i>Dependency</i>  The unit of the displayed measured value is taken from the System units submenu (→  69).

Decimal places 2

Navigation	  Expert → System → Display → Decimal places 2 (0117)
Prerequisite	A measured value is specified in the Value 2 display parameter (→  21).
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 ■ X.XXXXX ■ X.XXXXXX
Factory setting	X.XX
Additional information	<i>Description</i>  This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 3 display

Navigation	  Expert → System → Display → Value 3 display (0110)
Prerequisite	A local display is provided.
Description	Use this function to select a measured value that is shown on the local display.
Selection	For the picklist, see the Value 1 display parameter (→  19)

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 (→ 16) is used to specify how many measured values are displayed simultaneously and how.

Selection



The unit of the displayed measured value is taken from the **System units** submenu (→ 69).

0% bargraph value 3

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

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

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

User entry Signed floating-point number

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

Additional information *Description*



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

User entry



The unit of the displayed measured value is taken from the **System units** submenu (→ 69).

100% bargraph value 3

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

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

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

User entry Signed floating-point number

Factory setting 0

Additional information	Description  The Format display parameter (→  16) is used to specify that the measured value is to be displayed as a bar graph. User entry  The unit of the displayed measured value is taken from the System units submenu (→  69).
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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 ■ X.XXXXX ■ X.XXXXXX ■ X.XXXXXXX
Factory setting	X.XX
Additional information	Description  This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 4 display

Navigation	  Expert → System → Display → Value 4 display (0109)
Prerequisite	A local display is provided.
Description	Use this function to select a measured value that is shown on the local display.
Selection	For the picklist, see the Value 1 display parameter (→  19)
Factory setting	None

Additional information*Description*

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



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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 69).

Decimal places 4**Navigation**

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

Prerequisite

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

Description

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

Selection

- x
- x.x
- x.xx
- x.xxx
- x.xxxx
- x.xxxxx
- x.xxxxxx

Factory setting

x.xx

Additional information*Description*

This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 5 display**Navigation**

Expert → System → Display → Value 5 display (0145)

Prerequisite

A local display is provided.

Description

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

Selection

For the picklist, see the **Value 1 display** parameter (→ 19)

Factory setting

None

Additional information	<i>Description</i> If several measured values are displayed at once, the measured value selected here will be the fifth value to be displayed. The value is only displayed during normal operation.  The Format display parameter (→  16) is used to specify how many measured values are displayed simultaneously and how. <i>Selection</i>  The unit of the displayed measured value is taken from the System units submenu (→  69).
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Decimal places 5	
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Navigation	  Expert → System → Display → Decimal places 5 (0149)
Prerequisite	A measured value is specified in the Value 5 display parameter (→  25).
Description	Use this function to select the number of decimal places for measured value 5.
Selection	■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx ■ x.xxxxx ■ x.xxxxxx
Factory setting	x.xx
Additional information	<i>Description</i>  This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 6 display	
------------------------	---

Navigation	  Expert → System → Display → Value 6 display (0146)
Prerequisite	A local display is provided.
Description	Use this function to select one of the measured values shown on the local display.
Selection	For the picklist, see the Value 1 display parameter (→  19)
Factory setting	None

Additional information*Description*

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



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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 69).

Decimal places 6**Navigation**

Expert → System → Display → Decimal places 6 (0150)

Prerequisite

A measured value is specified in the **Value 6 display** parameter (→ 26).

Description

Use this function to select the number of decimal places for measured value 6.

Selection

- x
- x.x
- x.xx
- x.xxx
- x.xxxx
- x.xxxxx
- x.xxxxxx

Factory setting

x.xx

Additional information*Description*

This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 7 display**Navigation**

Expert → System → Display → Value 7 display (0147)

Prerequisite

A local display is provided.

Description

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

Selection

For the picklist, see the **Value 1 display** parameter (→ 19)

Factory setting

None

Additional information	<i>Description</i> If several measured values are displayed at once, the measured value selected here will be the seventh value to be displayed. The value is only displayed during normal operation.  The Format display parameter (→  16) is used to specify how many measured values are displayed simultaneously and how. <i>Selection</i>  The unit of the displayed measured value is taken from the System units submenu (→  69).
------------------------	---

Decimal places 7

Navigation	  Expert → System → Display → Decimal places 7 (0151)
Prerequisite	A measured value is specified in the Value 7 display parameter (→  27).
Description	Use this function to select the number of decimal places for measured value 7.
Selection	■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx ■ x.xxxxx ■ x.xxxxxx
Factory setting	x.xx
Additional information	<i>Description</i>  This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 8 display

Navigation	  Expert → System → Display → Value 8 display (0148)
Prerequisite	A local display is provided.
Description	Use this function to select a measured value that is shown on the local display.
Selection	For the picklist, see the Value 1 display parameter (→  19)
Factory setting	None

Additional information*Description*

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



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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 69).

Decimal places 8**Navigation**

Expert → System → Display → Decimal places 8 (0152)

Prerequisite

A measured value is specified in the **Value 8 display** parameter (→ 28).

Description

Use this function to select the number of decimal places for measured value 8.

Selection

- x
- x.x
- x.xx
- x.xxx
- x.xxxx
- x.xxxxx
- x.xxxxxx

Factory setting

x.xx

Additional information*Description*

This setting does not affect the accuracy of the device for measuring or calculating the value.

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 (→  19)...Value 8 display parameter (→  28) are used to specify which measured values are shown on the local display. ■ The display format for the measured values displayed is defined in the Format display parameter (→  16).
-------------------------------	--

Display damping



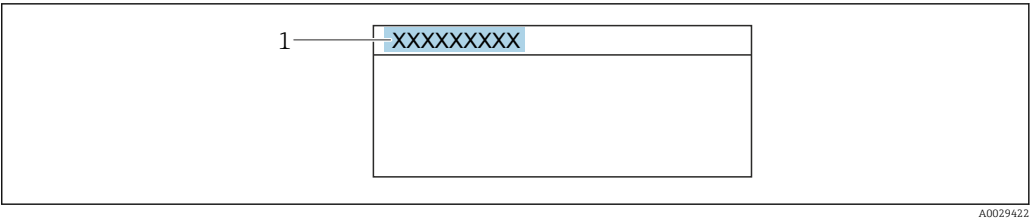
Navigation	  Expert → System → Display → Display damping (0094)
Prerequisite	A local display is provided.
Description	Use this function to enter a time constant for the reaction time of the local display to fluctuations in the measured value caused by process conditions.
User entry	0.0 to 999.9 s
Factory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



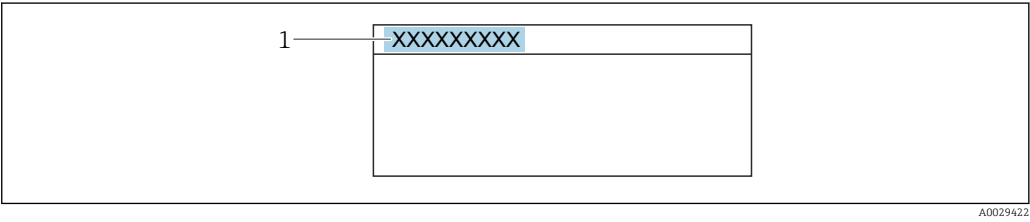
1 Position of the header text on the display

Selection

- Device tag
Is defined in the **Device tag** parameter (→ 222).
- Free text
Is defined in the **Header text** parameter (→ 31).

Header text

Navigation	Expert → System → Display → Header text (0112)
Prerequisite	The Free text option is selected in the Header parameter (→ 30).
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"
- Order code for "Display; operation", option **O** "Remote display 4-line illuminated; 10m/30ft cable; touch control"

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

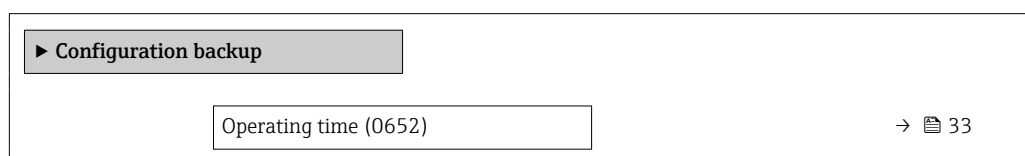
Selection

- Disable
- Enable

Factory setting Enable

3.1.2 "Configuration backup" submenu

Navigation   Expert → System → Config. backup



Last backup (2757)	→ 33
Configuration management (2758)	→ 33
Backup state (2759)	→ 34
Comparison result (2760)	→ 34

Operating time

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

Last backup

Navigation	Expert → System → Config. backup → Last backup (2757)
Description	Displays the time since a backup copy of the data was last saved to the device memory.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

Configuration management



Navigation	Expert → System → Config. backup → Config. managem. (2758)
Description	Use this function to select an action to save the data to the device memory.
Selection	■ Cancel ■ Execute backup ■ Restore * ■ Compare * ■ Clear backup data
Factory setting	Cancel

* Visibility depends on order options or device settings

Additional information *Selection*

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

HistoROM

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

Backup state**Navigation**

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

Description

Displays the status of the data backup process.

User interface

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

Factory setting

None

Comparison result**Navigation**

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

Description

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

User interface

- Settings identical
- Settings not identical
- No backup available

- Backup settings corrupt
- Check not done
- Dataset incompatible

Factory setting

Check not done

Additional information

Description

 The comparison is started via the **Compare** option in the **Configuration management** parameter (→  33).

Selection

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

HistoROM

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

3.1.3 "Diagnostic handling" submenu

Navigation   Expert → System → Diagn. handling

► Diagnostic handling

Alarm delay (0651) →  36

► Diagnostic behavior →  36

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*Effect*

This setting affects the following diagnostic messages:

- 046 Sensor limit exceeded
- 140 Sensor signal asymmetrical
- 142 Sensor index coil asymmetry too high
- 311 Sensor electronics (ISEM) faulty
- 599 Custody transfer logbook full
- 830 Sensor temperature too high
- 831 Sensor temperature too low
- 832 Electronics temperature too high
- 833 Electronics temperature too low
- 834 Process temperature too high
- 835 Process temperature too low
- 843 Process limit
- 862 Partly filled pipe
- 912 Medium inhomogeneous
- 913 Medium unsuitable
- 944 Monitoring failed
- 984 Condensation risk

"Diagnostic behavior" submenu

Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the **Diagnostic behavior** submenu (→  36).

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

Options	Description
Alarm	The device stops measurement. The measured value output via Modbus RS485 and the totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.
Warning	The device continues to measure. The measured value output via Modbus RS485 and the totalizers are not affected. A diagnostic message is generated.

Options	Description
Logbook entry only	The device continues to measure. The diagnostic message is displayed only in the Event logbook submenu (→  219) (Event list submenu (→  220)) 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
→  8

Navigation



Expert → System → Diagn. handling → Diagn. behavior

► Diagnostic behavior		
Assign behavior of diagnostic no. 140 (0708)	→  39	
Assign behavior of diagnostic no. 046 (0709)	→  39	
Assign behavior of diagnostic no. 142 (0647)	→  39	
Assign behavior of diagnostic no. 144 (0731)	→  40	
Assign behavior of diagnostic no. 374 (0710)	→  40	
Assign behavior of diagnostic no. 302 (0739)	→  40	
Assign behavior of diagnostic no. 304 (0635)	→  41	
Assign behavior of diagnostic no. 441 (0657)	→  41	
Assign behavior of diagnostic no. 442 (0658)	→  41	
Assign behavior of diagnostic no. 443 (0659)	→  42	
Assign behavior of diagnostic no. 444 (0740)	→  42	
Assign behavior of diagnostic no. 543 (0643)	→  42	
Assign behavior of diagnostic no. 599 (0644)	→  43	

Assign behavior of diagnostic no. 830 (0800)	→  43
Assign behavior of diagnostic no. 831 (0641)	→  43
Assign behavior of diagnostic no. 832 (0681)	→  44
Assign behavior of diagnostic no. 833 (0682)	→  44
Assign behavior of diagnostic no. 834 (0700)	→  44
Assign behavior of diagnostic no. 835 (0702)	→  45
Assign behavior of diagnostic no. 842 (0638)	→  45
Assign behavior of diagnostic no. 862 (0679)	→  46
Assign behavior of diagnostic no. 912 (0703)	→  46
Assign behavior of diagnostic no. 913 (0712)	→  46
Assign behavior of diagnostic no. 915 (0648)	→  47
Assign behavior of diagnostic no. 941 (0632)	→  47
Assign behavior of diagnostic no. 942 (0633)	→  47
Assign behavior of diagnostic no. 943 (0634)	→  48
Assign behavior of diagnostic no. 944 (0732)	→  48
Assign behavior of diagnostic no. 948 (0744)	→  49
Assign behavior of diagnostic no. 984 (0646)	→  49

Assign behavior of diagnostic no. 140 (Sensor signal asymmetrical)


Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 140 (0708)
Description	Use this function to change the diagnostic behavior of the 140 Sensor signal asymmetrical diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Alarm
Additional information	For a detailed description of the options available: → 36

Assign behavior of diagnostic no. 046 (Sensor limit exceeded)


Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 046 (0709)
Description	Use this function to change the diagnostic behavior of the 046 Sensor limit exceeded diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Alarm
Additional information	For a detailed description of the options available: → 36

Assign behavior of diagnostic no. 142 (Sensor index coil asymmetry too high)


Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 142 (0647)
Description	Change behavior of diagnostic event with diagnostic number 142 'Sensor index coil asymmetry too high'.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Logbook entry only

Assign behavior of diagnostic no. 144 (Measurement error too high)

Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 144 (0731)
Description	Change behavior of diagnostic event with diagnostic number 144 'Measurement error too high'.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Alarm
Additional information	 For a detailed description of the options available: →  36

Assign behavior of diagnostic no. 374 (Sensor electronics (ISEM) faulty)

Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 374 (0710)
Description	Use this function to change the diagnostic behavior of the 374 Sensor electronics (ISEM) faulty diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

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

Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 302 (0739)
Description	Use this function to change the diagnostic behavior of the 302 Device verification active diagnostic message.
Selection	■ Off ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

Assign behavior of diagnostic no. 304


Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 304 (0635)
Description	Change behavior of diagnostic event with diagnostic number 304 'Device verification failed'.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning

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


Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 441 (0657)
Description	Use this function to change the diagnostic behavior of the 441 Current output 1 to n diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 36

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


Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 442 (0658)
Prerequisite	The measuring device has a pulse/frequency/switch output.
Description	Use this function to change the diagnostic behavior of the 442 Frequency output 1 to n diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 36

Assign behavior of 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 443 Pulse output 1 to n diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

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



Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 444 (0740)
Prerequisite	The device has one current input.
Description	Use this function to change the diagnostic behavior of the 444 Current input 1 to n diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

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



Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 543 (0643)
Description	Use this function to change the diagnostic behavior of the 543 Double pulse output diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only

Factory setting Warning

Additional information  For a detailed description of the options available: →  36

Assign behavior of diagnostic no. 599 (Custody transfer logbook full)



Navigation   Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 599 (0644)

Description Use this function to select the diagnostic behavior of the **△S599 Custody transfer logbook full** diagnostic message

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Assign behavior of diagnostic no. 830 (Sensor temperature too high)



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

Description Use this function to change the diagnostic behavior of the **830 Sensor temperature too high** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information  For a detailed description of the options available: →  36

Assign behavior of diagnostic no. 831 (Sensor temperature too low)



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

Description Use this function to change the diagnostic behavior of the **831 Sensor temperature too low** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information  For a detailed description of the options available: →  36

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



Navigation   Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0681)

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

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Logbook entry only

Additional information  For a detailed description of the options available: →  36

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



Navigation   Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0682)

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

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Logbook entry only

Additional information  For a detailed description of the options available: →  36

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



Navigation   Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0700)

Description Use this function to change the diagnostic behavior of the **834 Process temperature too high** diagnostic message.

Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

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

Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0702)
Description	Use this function to change the diagnostic behavior of the 835 Process temperature too low diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

Assign behavior of diagnostic no. 842 (Process limit)

Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 842 (0638)
Description	Use this function to change the diagnostic behavior of the 842 Process limit diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Off
Additional information	 For a detailed description of the options available: →  36

Assign behavior of 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 862 Empty pipe diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

Assign behavior of diagnostic no. 912 (Medium inhomogeneous)



Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 912 (0703)
Description	Use this function to change the diagnostic behavior of the 912 Medium inhomogeneous diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

Assign behavior of diagnostic no. 913 (Medium unsuitable)



Navigation	 Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 913 (0712)
Description	Use this function to change the diagnostic behavior of the 913 Medium unsuitable diagnostic message.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  36

Assign behavior of diagnostic no. 915 (Viscosity out of specification)

Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 915 (0648)
Description	Change behavior of diagnostic event with diagnostic number 915 'Viscosity out of specification'.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Logbook entry only

Assign behavior of diagnostic no. 941 (API/ASTM temperature outside specification)

Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 941 (0632)
Prerequisite	For the following order code: "Application package", option EJ "Petroleum"
Description	Use this function to change the diagnostic behavior of the diagnostic message 'API/ASTM temperature outside specification'.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 36

Assign behavior of diagnostic no. 942 (API/ASTM density out of specification)

Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 942 (0633)
Prerequisite	For the following order code: "Application package", option EJ "Petroleum"
Description	Use this function to change the diagnostic behavior of 'API/ASTM temperature outside specification'.
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available: → 36

Assign behavior of diagnostic no. 943 (API/ASTM pressure outside specification)**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 943 (0634)

Prerequisite

For the following order code:
"Application package", option EJ "Petroleum"

Description

Use this function to change the diagnostic behavior of 'API/ASTM pressure outside specification'.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available: → 36

Assign behavior of diagnostic no. 944 (Monitoring failed)**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 944 (0732)

Description

Use this function to change the diagnostic behavior of the **944 Monitoring failed** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available: → 36

Assign behavior of diagnostic no. 948 (Oscillation damping too high)		
Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 948 (0744)	
Description	Use this function to change the diagnostic behavior of the 948 Oscillation damping too high diagnostic message.	
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only	
Factory setting	Warning	
Additional information	 For a detailed description of the options available: →  36	

Assign behavior of diagnostic no. 984 (Condensation risk)		
Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 984 (0646)	
Description	Change behavior of diagnostic event with diagnostic number 984 'Condensation risk'.	
Selection	■ Off ■ Alarm ■ Warning ■ Logbook entry only	
Factory setting	Warning	

3.1.4 "Administration" submenu

Navigation   Expert → System → Administration

► Administration	
► Define access code	→  50
► Reset access code	→  51
Device reset (0000)	→  52
Transmitter identifier (2765)	→  53

Activate SW option (0029)	→ 53
Software option overview (0015)	→ 54

"Define access code" wizard

 The **Define access code** wizard (→ 50) is only available when operating via the local display or Web browser.

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

Navigation  Expert → System → Administration → Def. access code

► Define access code	
Define access code	→ 50
Confirm access code	→ 51

Define access code

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

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

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

Additional information *Description*

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

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

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

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

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

User entry

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

Factory setting

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

Confirm access code		
Navigation	 Expert → System → Administration → Def. access code → Confirm code	
Description	Enter the defined release code a second time to confirm the release code.	
User entry	Max. 16-digit character string comprising numbers, letters and special characters	

"Reset access code" submenu

Navigation  Expert → System → Administration → Reset acc. code

▶ Reset access code

Operating time (0652)

→  51

Reset access code (0024)

→  51

Operating time

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

Reset access code	
Navigation	 Expert → System → Administration → Reset acc. code → Reset acc. code (0024)
Description	Use this function to enter a reset code to reset the user-specific access codes to the factory setting .
User entry	Character string comprising numbers, letters and special characters
Factory setting	0x00

Additional information*Description*

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

User entry

The reset code can only be entered via:

- Web browser
- DeviceCare, FieldCare (via CDI RJ45 interface)
- Fieldbus

Additional parameters in the "Administration" submenu**Device reset****Navigation**

Expert → System → Administration → Device reset (0000)

Description

Reset the device configuration - either entirely or in part - to a defined state.

Selection

- Cancel
- To delivery settings
- Restart device
- Restore S-DAT backup *

Factory setting

Cancel

Additional information*Options*

Options	Description
Cancel	No action is executed and the user exits the parameter.
To delivery settings	Every parameter for which a customer-specific default setting was ordered is reset to the customer-specific value. All other parameters are reset to the factory setting.
Restart device	The restart resets every parameter with data stored in volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.
Restore S-DAT backup	Restores the data that is saved on the S-DAT. Additional information: This function can be used to resolve the memory issue "083 Memory content inconsistent" or to restore the S-DAT data when a new S-DAT has been installed. This option is displayed only in an alarm condition.

* Visibility depends on order options or device settings

Transmitter identifier 	
Navigation	  Expert → System → Administration → Transm. identif. (2765)
Description	Select transmitter identifier.
User interface	■ Unknown ■ 500 ■ 300
Factory setting	300
Activate SW option 	
Navigation	  Expert → System → Administration → Activate SW opt. (0029)
Description	Use this function to enter an activation code to enable an additional, ordered software option.
User entry	Max. 10-digit string consisting of numbers.
Factory setting	Depends on the software option ordered
Additional information	<i>Description</i> If a measuring device was ordered with an additional software option, the activation code is programmed in the device at the factory. <i>User entry</i>  To activate a software option subsequently, please contact your Endress+Hauser sales organization. NOTE! The activation code is linked to the serial number of the measuring device and varies according to the device and software option. If an incorrect or invalid code is entered, this results in the loss of software options that have already been activated. ▶ Before you enter a new activation code, make a note of the current activation code . ▶ Enter the new activation code provided by Endress+Hauser when the new software option was ordered. ▶ Once the activation code has been entered, check if the new software option is displayed in the Software option overview parameter (→  54). ↳ The new software option is active if it is displayed. ↳ If the new software option is not displayed or all software options have been deleted, the code entered was either incorrect or invalid. ▶ If the code entered is incorrect or invalid, enter the old activation code .

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

Example for a software option

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

 The software options currently enabled are displayed in the **Software option overview** parameter (→  54).

Web browser

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

Software option overview

Navigation

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

Description

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

User interface

- Extended HistoROM *
- Viscosity/Hydrocarbon viscosity monitor.
- Custody transfer
- Application specific calculations
- Heartbeat Monitoring *
- Heartbeat Verification *
- Concentration *
- Extended density function

Additional information

Description

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

"Extended HistoROM" option

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

"Heartbeat Verification" option and "Heartbeat Monitoring" option

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

"Concentration" option

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

"Extended density function" option

 Only available for Promass Q DN25 to DN100.

Order code for "Application package", option EH "Extended density function"

Option "Premium density + Extended density function"

 Only available for Promass Q DN25.

* Visibility depends on order options or device settings

Order code for "Application package", option EI "Premium density, $\pm 0.1 \text{ kg/m}^3$ + Extended density function"

3.2 "Sensor" submenu

Navigation  Expert → Sensor

► Sensor		
► Measured values	→ 	55
► System units	→ 	69
► Process parameters	→ 	79
► Calculated values	→ 	94
► Measurement mode	→ 	88
► External compensation	→ 	91
► Sensor adjustment	→ 	97
► Calibration	→ 	115
► Testpoints	→ 	117

3.2.1 "Measured values" submenu

Navigation  Expert → Sensor → Measured val.

► Measured values		
► Process variables	→ 	56
► Totalizer	→ 	61
► Input values	→ 	63
► Output values	→ 	65

"Process variables" submenu

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

► Process variables		
Mass flow	→ 	56
Volume flow	→ 	57
Corrected volume flow	→ 	57
Density	→ 	57
Reference density	→ 	57
Temperature	→ 	58
Pressure	→ 	58
Concentration	→ 	58
Target mass flow	→ 	59
Carrier mass flow	→ 	59
Target corrected volume flow	→ 	59
Carrier corrected volume flow	→ 	60
Target volume flow	→ 	60
Carrier volume flow	→ 	61

Mass flow

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

Description Displays the mass flow that is currently measured.

User interface Signed floating-point number

Additional information Dependency  The unit is taken from the **Mass flow unit** parameter (→  70)

Volume flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → Volume flow (1847)
Description	Displays the volume flow that is 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 (→  71)

Corrected volume flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → CorrecVolumeFlow (1851)
Description	Displays the corrected volume flow that is currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Corrected volume flow unit parameter (→  74)

Density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Density (1850)
Description	Displays the density that is currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Density unit parameter (→  75)

Reference density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Ref.density (1852)
Description	Displays the reference density that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

 The unit is taken from the **Reference density unit** parameter (→  76)

Temperature

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

Description Displays the medium temperature that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

 The unit is taken from the **Temperature unit** parameter (→  78)

Pressure

Navigation  Expert → Sensor → Measured val. → Process variab. → Pressure (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 (→  78)

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 **Software option overview** parameter (→  54).

Description Displays the concentration that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

 The unit is taken from the **Concentration 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 Software option overview parameter (→  54).
Description	Displays the mass flow that is currently measured for the target medium.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Mass flow unit parameter (→  70)

Carrier mass flow

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 Software option overview parameter (→  54).
Description	Displays the mass flow of the carrier medium 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 (→  70)

Target corrected volume flow

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" - The Ethanol in water option or %mass / %volume option is selected in the Liquid type parameter.  The software options currently enabled are displayed in the Software option overview parameter (→  54).
Description	Displays the corrected volume flow that is 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 (→ 71)

Carrier corrected volume flow**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 **Software option overview** parameter (→ 54).

Description

Displays the corrected 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 (→ 71)

Target volume 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 **Ethanol in water** option or **%mass / %volume** option is selected in the **Liquid type** parameter.
- The **%vol** option is selected in the **Concentration unit** parameter.



The software options currently enabled are displayed in the **Software option overview** parameter (→ 54).

Description

Displays the volume flow currently measured for the target medium.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Volume flow unit** parameter (→ 71)

Carrier volume flow

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 Ethanol in water option or %mass / %volume option is selected in the Liquid type parameter. ▪ The %vol option is selected in the Concentration unit parameter.  The software options currently enabled are displayed in the Software option overview parameter (→  54).
Description	Use this function to display the volume flow currently measured for the carrier medium.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Volume flow unit parameter (→  71)

"Totalizer" submenu

Navigation  Expert → Sensor → Measured val. → Totalizer

 Totalizer		
Totalizer value 1 to n (0911-1 to n)	→	 61
Totalizer overflow 1 to n (0910-1 to n)	→	 62

Totalizer value 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 process variable parameter (→  199) of the Totalizer 1 to n submenu.
Description	Displays the current totalizer counter reading.
User interface	Signed floating-point number

Additional information

Description

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

 In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→  203).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Totalizer operation mode** parameter (→  201).

 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→  200).

Example

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

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

Totalizer 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 process variable** parameter (→  199) 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 value 1 to n** parameter.

User interface

 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→  200).

Example

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

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

Totalizer 1 to n value

Navigation	 Expert → Sensor → Measured val. → Totalizer → Tot. 1 to n value
Description	Shows the totalizer value reported to the controller for further processing.
User interface	Signed floating-point number
Factory setting	0 m ³

Totalizer 1 to n status

Navigation	 Expert → Sensor → Measured val. → Totalizer → Tot. 1 to n status
Description	Shows the status of the totalizer value reported to the controller for further processing ('Good', 'Uncertain', 'Bad').
User interface	■ Good ■ Uncertain ■ Bad
Factory setting	Good

Totalizer 1 to n status (Hex)

Navigation	 Expert → Sensor → Measured val. → Totalizer → Status 1 to n (Hex)
Description	Shows the status of the totalizer value reported to the controller for further processing (Hex).
User interface	0 to 255
Factory setting	128

"Input values" submenu

Navigation  Expert → Sensor → Measured val. → Input values

► Input values	
► Current input 1 to n	→  64
► Value status input 1 to n	→  64

"Current input 1 to n" submenu

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

► Current input 1 to n

Measured values 1 to n (1603-1 to n)

→  64

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

→  64

Measured values 1 to n

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

Description Displays the current input value.

User interface Signed floating-point number

Measured current 1 to n

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

Description Displays the current value of the current input.

User interface 0 to 22.5 mA

"Value status input 1 to n" submenu

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

► Value status input 1 to n

Value status input (1353-1 to n)

→  65

Value status input

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

"Output values" submenu

Navigation  Expert → Sensor → Measured val. → Output values

► Output values		
► Value current output 1 to n		→  65
► Pulse/frequency/switch output 1 to n		→  66
► Relay output 1 to n		→  68
► Double pulse output		→  69

"Value current output 1 to n" submenu

Navigation  Expert → Sensor → Measured val. → Output values → Val. curr.outp 1 to n

► Value current output 1 to n		
Output current (0361-1 to n)		→  65
Measured current (0366-1 to n)		→  66

Output current

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

Measured current

Navigation	  Expert → Sensor → Measured val. → Output values → Val. curr.outp 1 to n → Measur. curr. (0366-1 to n)
Description	Displays the actual measured value of the output current.
User interface	0 to 30 mA

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

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

Pulse/frequency/switch output 1 to n

Output frequency (0471-1 to n)

→  66

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

→  66

Switch state (0461-1 to n)

→  67

Output frequency

Navigation	  Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Output freq. (0471-1 to n)
Prerequisite	In the Operating mode parameter (→  150), the Frequency option is selected.
Description	Displays the actual value of the output frequency which is currently measured.
User interface	0.0 to 12 500.0 Hz

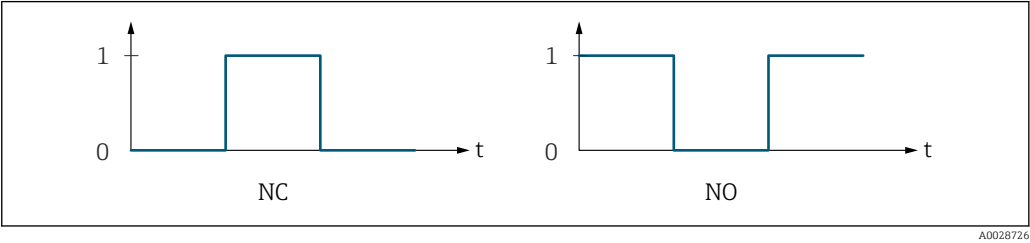
Pulse output 1 to n

Navigation	  Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Pulse output 1 to n (0456-1 to n)
Prerequisite	The Pulse option is selected in the Operating mode parameter (→  150) parameter.
Description	Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

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



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

The output behavior can be reversed via the **Invert output signal** parameter (→ ⓘ 169) 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 (→ ⓘ 155)) can be configured.

Switch state

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ ⓘ 150).

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 state (0801-1 to n)

→  68

Switch cycles (0815-1 to n)

→  68

Max. switch cycles number (0817-1 to n)

→  68

Switch state

Navigation	 Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Switch state (0801-1 to n)
Description	Displays the current status of the relay output.
User interface	■ Open ■ Closed
Additional information	User interface ■ Open The relay output is not conductive. ■ Closed The relay output is conductive.

Switch cycles

Navigation	 Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Switch cycles (0815-1 to n)
Description	Displays all the switch cycles performed.
User interface	Positive integer

Max. switch cycles number

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

User interface Positive integer

"Double pulse output" submenu

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

► Double pulse output

Pulse output (0987) →  69

Pulse output

- Navigation   Expert → Sensor → Measured val. → Output values → Double pulse out → Pulse output (0987)
- Description Displays the pulse frequency of the double pulse output which is currently output.
- User interface Positive floating-point number
- Additional information  For a detailed description and example: **Pulse output** parameter (→  66)

3.2.2 "System units" submenu

Navigation   Expert → Sensor → System units

► System units

Mass flow unit (0554) →  70

Mass unit (0574) →  71

Volume flow unit (0553) →  71

Volume unit (0563) →  73

Corrected volume flow unit (0558) →  74

Corrected volume unit (0575) →  74

Density unit (0555)	→ 75
Reference density unit (0556)	→ 76
Density 2 unit (0619)	→ 77
Temperature unit (0557)	→ 78
Pressure unit (0564)	→ 78
Date/time format (2812)	→ 79

Mass flow unit



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

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

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

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

Additional information *Effect*
The selected unit applies for:
■ **Target mass flow** parameter (→ 59)
■ **Carrier mass flow** parameter (→ 59)
■ **Mass flow** parameter (→ 56)

Selection
 For an explanation of the abbreviated units: → 274

Customer-specific units
 The unit for the customer-specific mass is specified in the **User mass text** parameter.

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> ■ g ■ kg ■ t <i>US units</i> ■ oz ■ lb ■ STon	
Factory setting	Country-specific: ■ kg ■ lb	
Additional information	<i>Selection</i> For an explanation of the abbreviated units: → 274 <i>Customer-specific units</i> The unit for the customer-specific mass is specified in the User mass text parameter.	
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
- kft³/s
- kft³/min
- kft³/h
- kft³/d
- MMft³/s
- MMft³/min
- MMft³/h
- Mft³/d
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)
- gal/s (us)
- gal/min (us)
- gal/h (us)
- gal/d (us)
- Mgal/s (us)
- Mgal/min (us)
- Mgal/h (us)
- Mgal/d (us)
- bbl/s (us;oil)
- bbl/min (us;oil)
- bbl/h (us;oil)
- bbl/d (us;oil)
- bbl/s (us;tank)
- bbl/min (us;tank)
- bbl/h (us;tank)
- bbl/d (us;tank)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)

Imperial units

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

or

US units

- 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) *

Imperial units

- bbl/s (imp;beer) *
- bbl/min (imp;beer) *
- bbl/h (imp;beer) *
- bbl/d (imp;beer) *

* Visibility depends on order options or device settings

Factory setting	Depends on country: ■ l/h ■ gal/min (us)
Additional information	<i>Effect</i> The selected unit applies for: Volume flow parameter (→ ⓘ 57) <i>Selection</i> ⓘ For an explanation of the abbreviated units: → ⓘ 274 <i>Customer-specific units</i> ⓘ The unit for the customer-specific volume is specified in the User volume text parameter.

Volume unit	ⓘ
-------------	---

Navigation	ⓘ ⓘ Expert → Sensor → System units → Volume unit (0563)		
Description	Use this function to select the unit for the volume.		
Selection	<i>SI units</i> ■ cm³ ■ dm³ ■ m³ ■ ml ■ l ■ hl ■ Ml Mega	<i>US units</i> ■ af ■ ft³ ■ Mft³ ■ Mft³ ■ 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)
	or		
	<i>US units</i> ■ bbl (us;liq.) * ■ bbl (us;beer) *	<i>Imperial units</i> ■ bbl (imp;beer) *	
	* Visibility depends on order options or device settings		

Factory setting	Country-specific: ■ l ■ gal (us)
Additional information	<i>Selection</i> ⓘ For an explanation of the abbreviated units: → ⓘ 274 <i>Customer-specific units</i> ⓘ The unit for the customer-specific volume is specified in the User volume text parameter.

Corrected volume flow unit

Navigation	Expert → Sensor → System units → Cor.volflow unit (0558)		
Description	Use this function to select the unit for the corrected volume flow.		
Selection	<i>SI units</i> ■ Nl/s ■ Nl/min ■ Nl/h ■ Nl/d ■ Nhl/s ■ Nhl/min ■ Nhl/h ■ Nhl/d ■ Nm³/s ■ Nm³/min ■ Nm³/h ■ Nm³/d ■ Sl/s ■ Sl/min ■ Sl/h ■ Sl/d ■ Sm³/s ■ Sm³/min ■ Sm³/h ■ Sm³/d	<i>US units</i> ■ Sft³/s ■ Sft³/min ■ Sft³/h ■ Sft³/d ■ MSft³/s ■ MSft³/min ■ MSft³/h ■ MSft³/D ■ MMSft³/s ■ MMSft³/min ■ MMSft³/h ■ MMSft³/d ■ Sgal/s (us) ■ Sgal/min (us) ■ Sgal/h (us) ■ Sgal/d (us) ■ Sbbbl/s (us;liq.) ■ Sbbbl/min (us;liq.) ■ Sbbbl/h (us;liq.) ■ Sbbbl/d (us;liq.) ■ Sbbbl/s (us;oil) ■ Sbbbl/min (us;oil) ■ Sbbbl/h (us;oil) ■ Sbbbl/d (us;oil)	<i>Imperial units</i> ■ Sgal/s (imp) ■ Sgal/min (imp) ■ Sgal/h (imp) ■ Sgal/d (imp)
Factory setting	Country-specific: ■ Nl/h ■ Sft³/min		
Additional information	<i>Result</i> The selected unit applies for: Corrected volume flow parameter (→ 57) <i>Selection</i> For an explanation of the abbreviated units: → 274		

Corrected volume unit

Navigation	Expert → Sensor → System units → Corr. vol. unit (0575)
Description	Use this function to select the unit for the corrected volume.

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ NI ■ Nhl ■ Nm³ ■ SI ■ Sm³	■ Sft³ ■ MSft³ ■ MMSft³ ■ Sgal (us) ■ Sbbl (us;liq.) ■ Sbbl (us;oil)	Sgal (imp)

Factory setting	Country-specific: ■ NI ■ Sft³
-----------------	--

Additional information	<i>Selection</i>  For an explanation of the abbreviated units: →  274
------------------------	--

Density unit	
--------------	---

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

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

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ g/cm³ ■ g/m³ ■ g/ml ■ g/l ■ kg/l ■ kg/dm³ ■ kg/m³ ■ SD4°C ■ SD15°C ■ SD20°C ■ SG4°C ■ SG15°C ■ SG20°C	■ lb/ft³ ■ lb/gal (us) ■ lb/bbl (us;oil) ■ lb/bbl (us;tank) ■ lb/in³ ■ STon/yd³	■ lb/gal (imp) ■ lb/bbl (imp;oil)

Other units
°API

or

US units
SG60°F*

* Visibility depends on order options or device settings
--

or

- US units

 - lb/bbl (us;liq.) *
 - lb/bbl (us;beer) *
- Imperial units

 - lb/bbl (imp;beer) *

* Visibility depends on order options or device settings

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

- Additional information
- Effect

The selected unit applies for:
 - **Density setpoint 1** parameter (→ ⓘ 99)
 - **Density setpoint 2** parameter (→ ⓘ 99)
 - **Density** parameter (→ ⓘ 57)

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: → ⓘ 274

Customer-specific units
 -  The unit for the customer-specific density is specified in the **User density text** parameter.

Reference density 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:

- **External reference density** parameter (→ ⓘ 95)
- **Fixed reference density** parameter (→ ⓘ 96)
- **Reference density** parameter (→ ⓘ 57)

Selection

 For an explanation of the abbreviated units: → ⓘ 274

Density 2 unit



Navigation

 Expert → Sensor → System units → Density 2 unit (0619)

Description

Select second density unit.

Selection

SI units

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

US units

- lb/ft³
- lb/gal (us)
- lb/bbl (us;oil)
- lb/bbl (us;tank)
- lb/in³
- STon/yd³

Imperial units

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

Other units

°API

or

US units

SG60°F *

* Visibility depends on order options or device settings

or

US units

- lb/bbl (us;liq.) *
- lb/bbl (us;beer) *

Imperial units

lb/bbl (imp;beer) *

* Visibility depends on order options or device settings

Factory setting

Depends on country:

- kg/l
- lb/ft³

Additional information	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).
------------------------	--

i

For an explanation of the abbreviated units: → 274

Customer-specific units

i

The unit for the customer-specific density is specified in the **User density text** parameter.

Temperature unit	
Navigation	Expert → Sensor → System units → Temperature unit (0557)
Description	Use this function to select the unit for the temperature.
Selection	SI units ■ °C ■ K US units ■ °F ■ °R

Navigation	Expert → Sensor → System units → Pressure unit (0564)
Description	Use this function to select the unit for the pipe pressure.

Selection	<i>SI units</i>	<i>US units</i>
	■ MPa a ■ MPa g ■ kPa a ■ kPa g ■ Pa a ■ Pa g ■ bar ■ bar g	■ psi a ■ psi g
Factory setting	Country-specific: ■ bar a ■ psi a	
Additional information	<i>Result</i> The unit is taken from: ■ Pressure value parameter (→  92) ■ External pressure parameter (→  92) ■ Pressure value parameter (→  58)	
	<i>Selection</i>  For an explanation of the abbreviated units: →  274	

Date/time format		
Navigation	  Expert → Sensor → System units → Date/time format (2812)	
Description	Use this function to select the desired time format for calibration history.	
Selection	■ dd.mm.yy hh:mm ■ dd.mm.yy hh:mm am/pm ■ mm/dd/yy hh:mm ■ mm/dd/yy hh:mm am/pm	
Factory setting	dd.mm.yy hh:mm	
Additional information	<i>Selection</i>	
	 For an explanation of the abbreviated units: →  274	

3.2.3 "Process parameters" submenu

Navigation   Expert → Sensor → Process param.

► Process parameters

Flow damping (1802)

→  80

Density damping (1803)	→  81
Temperature damping (1822)	→  81
Flow override (1839)	→  82
Density limit (4199)	→  82
► Low flow cut off	→  82
► Partially filled pipe detection	→  85

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).

Effect

 The damping affects the following variables of the device:

- Outputs →  134
- Low flow cut off →  82
- Totalizers →  199

2) Proportional behavior with first-order lag

**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
Additional information	<i>Description</i>  The damping is performed by a PT1 element ³⁾. <i>User entry</i> ■ Value = 0: no damping ■ Value > 0: damping is increased  Damping is switched off if 0 is entered (factory setting).

**Temperature damping**

Navigation	 Expert → Sensor → Process param. → Temp. damping (1822)
Description	Use this function to enter a time constant for the damping (PT1 element) of the temperature measured value.
User entry	0 to 999.9 s
Factory setting	0 s
Additional information	<i>Description</i>  The damping is performed by a PT1 element ⁴⁾. <i>User entry</i> ■ Value = 0: no damping ■ Value > 0: damping is increased  Damping is switched off if 0 is entered (factory setting).

3) Proportional behavior with first-order lag

4) Proportional behavior with first-order lag

Flow override



Navigation	 Expert → Sensor → Process param. → Flow override (1839)
Description	Use this function to select whether to interrupt the evaluation of measured values. This is useful for the cleaning processes of a pipeline, for example.
Selection	■ Off ■ On
Factory setting	Off
Additional information	<i>Description</i> Flow override is active ■ The 453 Flow override diagnostic message is output. ■ Output values ■ Temperature: continues to be output ■ Totalizer 1...3: stop being totalized  The Flow override option can also be activated in the Status input submenu: Assign status input parameter (→  132).

Density limit



Navigation	 Expert → Sensor → Process param. → Density limit (4199)
Description	Enter limit value for the observed oil density. For higher °API values or lower kg/m³ values this limit value will be output.
User entry	Positive floating-point number
Factory setting	0 kg/l

"Low flow cut off" submenu

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

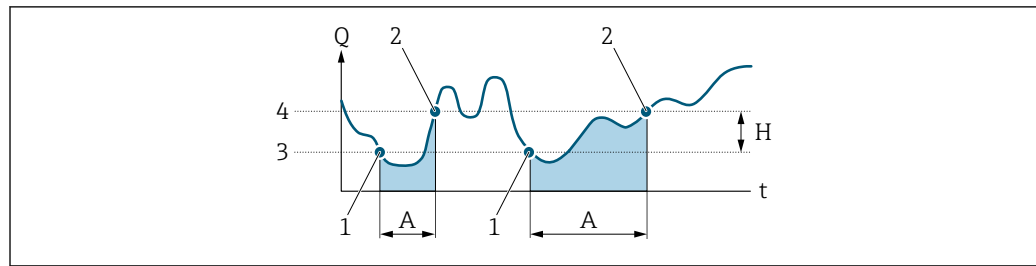
 Low flow cut off	
Assign process variable (1837)	→  83
On value low flow cutoff (1805)	→  83
Off value low flow cutoff (1804)	→  83
Pressure shock suppression (1806)	→  84

Assign process variable 	
Navigation	  Expert → Sensor → Process param. → Low flow cut off → Assign variable (1837)
Description	Use this function to select the process variable for low flow cutoff detection.
Selection	■ Off ■ Mass flow ■ Volume flow ■ Corrected volume flow *
Factory setting	Mass flow
On value low flow cutoff 	
Navigation	  Expert → Sensor → Process param. → Low flow cut off → On value (1805)
Prerequisite	A process variable is selected in the Assign process variable parameter (→  83).
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 →  83.
User entry	Positive floating-point number
Factory setting	Depends on country and nominal diameter →  272
Additional information	<i>Dependency</i>  The unit depends on the process variable selected in the Assign process variable parameter (→  83).
Off value low flow cutoff 	
Navigation	  Expert → Sensor → Process param. → Low flow cut off → Off value (1804)
Prerequisite	A process variable is selected in the Assign process variable parameter (→  83).
Description	Use this function to enter a switch-off value for low flow cut off. The switch-off value is entered as a positive hysteresis from the switch-on value →  83.
User entry	0 to 100.0 %
Factory setting	50 %

* Visibility depends on order options or device settings

Additional information

Example



A0012887

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

Pressure shock suppression



Navigation

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

Prerequisite

A process variable is selected in the **Assign process variable** parameter (→ 83).

Description

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

User entry

0 to 100 s

Factory setting

0 s

Additional information

Description

Pressure shock suppression is enabled

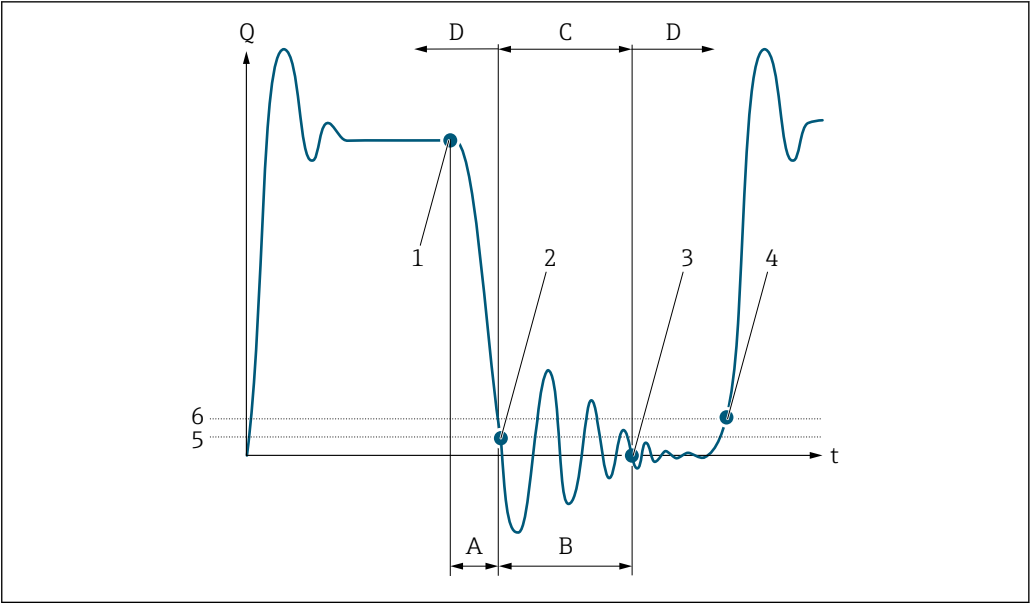
- Prerequisite:
 - Flow rate < on-value of low flow cut off
 - or
 - Change in the flow direction
- Output values
 - Flow displayed: 0
 - Totalizer: the totalizers are pegged at the last correct value

Pressure shock suppression is disabled

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

Example

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



- Q* Flow
- t* Time
- A* After run
- B* Pressure shock
- C* Pressure shock suppression active according to 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 current flow value is processed and displayed again
- 5* On value for low flow cut off
- 6* Off value for low flow cut off

"Partially filled pipe detection" submenu

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

► Partially filled pipe detection

Assign process variable (1860) →  86

Low value partial filled pipe detection (1861) →  86

High value partial filled pipe detection (1858) →  86

Response time part. filled pipe detect. (1859) →  87

Maximum damping partial filled pipe det. (6040) →  87

Assign process 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 ■ Calculated reference density
Factory setting	Off

Low value partial filled pipe detection

Navigation	  Expert → Sensor → Process param. → Partial pipe det → Low value (1861)
Prerequisite	A process variable is selected in the Assign process variable parameter (→  86).
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	Depends on country: ■ 200 kg/m³ ■ 12.5 lb/ft³
Additional information	<i>User entry</i> The lower limit value must be less than the upper limit value defined in the High value partial filled pipe detection parameter (→  86).  The unit depends on the process variable selected in the Assign process variable parameter (→  86). <i>Limit value</i>  If the displayed value is outside the limit value, the measuring device displays the 862 Partly filled pipe diagnostic message.

High value partial filled pipe detection

Navigation	  Expert → Sensor → Process param. → Partial pipe det → High value (1858)
Prerequisite	A process variable is selected in the Assign process variable parameter (→  86).
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	Depends on country: ■ 6 000 kg/m³ ■ 374.6 lb/ft³
Additional information	<i>User entry</i> The upper limit value must be greater than the lower limit value defined in the Low value partial filled pipe detection parameter (→  86).  The unit depends on the process variable selected in the Assign process variable parameter (→  86). <i>Limit value</i>  If the displayed value is outside the limit value, the measuring device displays the 862 Partly filled pipe diagnostic message.

Response time part. filled pipe detect.



Navigation	  Expert → Sensor → Process param. → Partial pipe det → Response time (1859)
Prerequisite	A process variable is selected in the Assign process variable parameter (→  86).
Description	Use this function to enter the minimum time (hold time) the signal must be present before diagnostic message S962 "Pipe only partly filled" is triggered in the event of a partially filled or empty measuring pipe.
User entry	0 to 100 s
Factory setting	1 s

Maximum damping partial filled pipe det.



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

⚠**S862 Partly filled pipe** diagnostic message. 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 type

Select gas type

Reference sound velocity

Temperature coefficient sound velocity

Gas Fraction Handler

→  88

→  89

→  89

→  90

→  90

Select medium type

Navigation	 Expert → Sensor → Measurement mode → SelectMediumType (6062)
Description	Use this function to select the type of medium: "Gas" or "Liquid". Select the "Other" option in exceptional cases in order to enter the properties of the medium manually (e.g. for highly compressive liquids such as sulfuric acid).
Selection	■ Liquid ■ Gas ■ Other
Factory setting	Liquid

Select gas type



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

Prerequisite In the **Medium selection** submenu, the **Gas** option is selected.

Description Select measured gas type.

Selection

- Air
- Ammonia NH₃
- Argon Ar
- Sulfur hexafluoride SF₆
- Oxygen O₂
- Ozone O₃
- Nitrogen oxide NO_x
- Nitrogen N₂
- Nitrous oxide N₂O
- Methane CH₄
- Methane CH₄ + 10% Hydrogen H₂
- Methane CH₄ + 20% Hydrogen H₂
- Methane CH₄ + 30% Hydrogen H₂
- Hydrogen H₂
- Helium He
- Hydrogen chloride HCl
- Hydrogen sulfide H₂S
- Ethylene C₂H₄
- Carbon dioxide CO₂
- Carbon monoxide CO
- Chlorine Cl₂
- Butane C₄H₁₀
- Propane C₃H₈
- Propylene C₃H₆
- Ethane C₂H₆
- Other

Factory setting Methane CH₄

Reference sound velocity



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

Prerequisite In the **Select gas type** parameter (→ 89), the **Other** option is selected.

Description Enter 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

Temperature coefficient sound velocity 	
Navigation	 Expert → Sensor → Measurement mode → Temp. coeff. SV (6181)
Prerequisite	In the Select gas type parameter (→  89), the Other option is selected.
Description	Enter the temperature coefficient for the gas sound velocity.
User entry	Positive floating point number
Factory setting	0.87 (m/s)/K
Gas Fraction Handler 	
Navigation	 Expert → Sensor → Measurement mode → Gas Frac Handler (6377)
Description	Activates the Gas Fraction Handler function for two phase media.
Selection	■ Off ■ Moderate ■ Powerful
Factory setting	Moderate
Additional information	■ When a second phase is detected, large fluctuations in the flow and density will occur. ■ The Gas Fraction Handler stabilizes the output values and enables better readability for operators and easier interpretation by the distributed control system. ■ The level of smoothing is adjusted according to the severity of the disturbances introduced by the second phase. The influence of the disturbances can be configured in two steps via this switch: ■ Off option: Deactivates the Gas Fraction Handler. When a second phase is present, large fluctuations of flow and density will occur. ■ Moderate option: Use for applications with low level or intermittent levels of second phase. ■ Powerful option: Use for applications with very significant levels of second phase. The Gas Fraction Handler is cumulative to any fixed damping constants applied to flow and density that are set elsewhere in the instrument parameterization. Additional information in the Medium index submenu (→  210)

3.2.5 "External compensation" submenu

Navigation  Expert → Sensor → External comp.

► External compensation		
Pressure compensation (6130)	→ 	91
Pressure value (6059)	→ 	92
External pressure (6209)	→ 	92
Temperature correction source (6184)	→ 	92
External temperature (6080)	→ 	93
Application specific input source 0 (6401)	→ 	93
Application specific input source 1 (6402)	→ 	94

Pressure compensation



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 *
Factory setting	Off
Additional information	Selection ■ Fixed value A fixed pressure value is used for compensation: Pressure value parameter (→  92) ■ External value The pressure value read in via MODBUS is used for compensation. ■ Current input 1 option, Current input 2 option The pressure value read in via the current input is used for compensation.

* Visibility depends on order options or device settings

Pressure value

Navigation	  Expert → Sensor → External comp. → Pressure value (6059)
Prerequisite	In the Pressure compensation parameter (→  91), the Fixed value option is selected.
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	1.01325 bar
Additional information	<i>Dependency</i>  The unit is taken from the Pressure unit parameter (→  78)

External pressure

Navigation	  Expert → Sensor → External comp. → External press. (6209)
Prerequisite	In the Pressure compensation parameter (→  91), the External value option or the Current input 1...n option is selected.
Description	Displays the external pressure value.
Additional information	<i>Dependency</i>  The unit is taken from the Pressure unit parameter (→  78)

Temperature correction source

Navigation	  Expert → Sensor → External comp. → Temp.corr.source (6184)
Description	Use this function to select the temperature mode.
Selection	■ Internal measured value ■ External value ■ Current input 1 * ■ Current input 2 * ■ Current input 3 *
Factory setting	Internal measured value

* Visibility depends on order options or device settings

Additional information	<i>Description</i> Use this function to select the type of temperature compensation. <i>Selection</i> All the options available for selection are used for measured value compensation. ■ Internal measured value The temperature value measured internally (temperature sensor of the measuring sensor) is used for compensation. ■ Current input 1 option, Current input 2 option, Visibility depends on order options or device settings. The temperature value read in via the current input is used for compensation.
-------------------------------	--

External temperature

Navigation	 Expert → Sensor → External comp. → External temp. (6080)
Prerequisite	In the Temperature mode parameter (→  92), the External value option or the Current input 1...n option is selected.
Description	Displays the external temperature.
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  78)

Temperature mode

Navigation	 Expert → Sensor → External comp. → Temperature mode (6341)
Description	Select temperature mode for temperature compensation.
Selection	■ Internal measured value ■ External value
Factory setting	Internal measured value

Application specific input source 0

Navigation	 Expert → Sensor → External comp. → Spec. source 0 (6401)
Prerequisite	Only if application-specific calculation has been ordered as a special option.
Description	Select source for input value 0 used for the application specific calculation.

Selection	■ Off ■ External value ■ Current input 1 [*] ■ Current input 2 [*] ■ Current input 3 [*]
Factory setting	Off

Application specific input source 1

Navigation	Expert → Sensor → External comp. → Spec. source 1 (6402)
Prerequisite	Only if application-specific calculation has been ordered as a special option.
Description	Select source for the input value 1 used for the application specific calculation.
Selection	■ Off ■ External value ■ Current input 1 [*] ■ Current input 2 [*] ■ Current input 3 [*]
Factory setting	Off

3.2.6 "Calculated values" submenu

Navigation

Expert → Sensor → Calculated value

► Calculated values

► Corrected volume flow calculation

→ 94

"Corrected volume flow calculation" submenu

Navigation

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

► Corrected volume flow calculation

Select reference density

→ 95

External reference density

→ 95

Fixed reference density

→ 96

* Visibility depends on order options or device settings

Reference temperature	→ 96
Linear expansion coefficient	→ 97
Square expansion coefficient	→ 97

Select reference density



Navigation	Expert → Sensor → Calculated value → Corr. vol.flow. → Select ref. dens (1812)
Description	Use this function to select the reference density for calculating the corrected volume flow.
Selection	■ Fixed reference density ■ Calculated reference density ■ Current input 1 * ■ Current input 2 *
Factory setting	Calculated reference density
Additional information	<i>Selection</i> The Reference density by API table 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 → 91 → 91) 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.

External reference density

Navigation	Expert → Sensor → Calculated value → Corr. vol.flow. → Ext. ref.density (6198)
Prerequisite	In the Corrected volume flow calculation parameter (→ 95), the External reference 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 Reference density unit parameter (→ 76)

* Visibility depends on order options or device settings

5) liquefied petroleum gas

Fixed reference density

Navigation	Expert → Sensor → Calculated value → Corr. vol.flow. → Fix ref.density (1814)
Prerequisite	The Fixed reference density option is selected in the Corrected volume flow calculation parameter (→ 95) parameter.
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 Reference density unit parameter (→ 76)

Reference temperature

Navigation	Expert → Sensor → Calculated value → Corr. vol.flow. → Ref. temperature (1816)
Prerequisite	The Calculated reference density option is selected in the Corrected volume flow calculation parameter (→ 95) parameter.
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 (→ 78)

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 expansion coefficient 	
Navigation	  Expert → Sensor → Calculated value → Corr. vol.flow. → Linear exp coeff (1817)
Prerequisite	The Calculated reference density option is selected in the Corrected volume flow calculation parameter (→  95) 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 expansion coefficient 	
Navigation	  Expert → Sensor → Calculated value → Corr. vol.flow. → Square exp coeff (1818)
Prerequisite	The Calculated reference density option is selected in the Corrected volume flow calculation parameter (→  95) 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 adjustment	
Installation direction (1809)	→  98
► Density adjustment	→  98
► Extended density adjustment	→  101
► Process variable adjustment	→  104
► Zero verification	→  109
► Zero adjustment	→  112

Installation direction

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

"Density adjustment" submenu

- Note the following before performing the adjustment:
- A density adjustment only makes sense if there is little variation in the operating conditions and the density adjustment is performed under the operating conditions.
 - The density adjustment scales the internally computed density value with a user-specific slope and offset.
 - A 1-point or 2-point density adjustment can be performed.
 - For a 2-point density adjustment, there must be a difference of at least 0.2 kg/l between the two target density values.
 - The reference media must be gas-free or pressurized so that any gas they contain is compressed.
 - The reference density measurements must be performed at the same medium temperature that prevails in the process, as otherwise the density adjustment will not be accurate.
 - The correction resulting from the density adjustment can be deleted with the **Restore original** option.

Navigation Expert → Sensor → Sensor adjustm. → Density adjustm.

► Density adjustment

Density adjustment mode (6043)

→ 99

Density setpoint 1 (6045)

→ 99

Density setpoint 2 (6046)

→ 99

Execute density adjustment (6041)

→ 100

Progress (2808)

→ 100

Density adjustment factor (6042)	→ 100
Density adjustment offset (6044)	→ 100

Density adjustment mode

Navigation	  Expert → Sensor → Sensor adjustm. → Density adjustm. → Adjustment mode (6043)
Description	Displays the method for field density adjustment.
Selection	■ 1 point adjustment ■ 2 point adjustment
Factory setting	1 point adjustment

Density setpoint 1

Navigation	  Expert → Sensor → Sensor adjustm. → Density adjustm. → Density setpt 1 (6045)
Description	Displays the existing density value.
User entry	The entry depends on the unit selected in the Density unit parameter (0555) (→  75).
Factory setting	1 kg/l

Density setpoint 2

Navigation	  Expert → Sensor → Sensor adjustm. → Density adjustm. → Density setpt 2 (6046)
Prerequisite	In the Density adjustment mode parameter, the 2 point adjustment option is selected.
Description	Displays the second density setpoint.
User entry	The entry depends on the unit selected in the Density unit parameter (0555) (→  75).
Factory setting	1 kg/l

Execute density adjustment

Navigation	 Expert → Sensor → Sensor adjustm. → Density adjustm. → Density adjustm. (6041)
Description	Select the next step to be performed for the density adjustment.
Selection	■ Cancel * ■ Busy * ■ Ok * ■ Density adjust failure * ■ Measure density 1 * ■ Measure density 2 * ■ Calculate * ■ Restore original *
Factory setting	Ok

Progress

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

Density adjustment factor

Navigation	  Expert → Sensor → Sensor adjustm. → Density adjustm. → Dens. adj factor (6042)
Description	Displays the current correction factor for the density.
User interface	Signed floating-point number
Factory setting	1
Additional information	 Manual adjustment of the value: Density factor parameter (→  107)

Density adjustment offset

Navigation	 Expert → Sensor → Sensor adjustm. → Density adjustm. → Dens. adj offset (6044)
Description	Shows the calculated correction offset for the density.

* Visibility depends on order options or device settings

User interface	Signed floating-point number
Factory setting	0
Additional information	 Manual adjustment of the value: Density offset parameter (→  106)

"Extended density adjustment" submenu

 For detailed information on the parameter descriptions of the "Extended density adjustment" application package, see the Special Documentation for the device →  8

Navigation   Expert → Sensor → Sensor adjustm. → ExtendDensAdjust

► Extended density adjustment		
Constant offset (5968)	→ 	101
Linear density factor (5967)	→ 	102
Linear temperature factor (5966)	→ 	102
Linear pressure factor (5965)	→ 	102
Quadratic density factor (5964)	→ 	102
Quadratic temperature factor (5963)	→ 	103
Quadratic pressure factor (5962)	→ 	103
Combined density-temperature factor (5961)	→ 	103
Combined density-pressure factor (5971)	→ 	103
Combined temperature-pressure factor (5970)	→ 	104
Cubic temperature factor (5969)	→ 	104

Constant offset	
-----------------	---

Navigation	  Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → ConstantOffset (5968)
Description	Shows the constant offset.

User entry

Signed floating-point number

Factory setting

0 kg/m³

Linear density factor

Navigation

 Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → LinearDensFactor (5967)

Description

Shows the linear density factor.

User entry

Signed floating-point number

Factory setting

1

Linear temperature factor

Navigation

 Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → LinearTempFactor (5966)

Description

Shows the linear temperature factor.

User entry

Signed floating-point number

Factory setting

0 (kg/m³)/°C

Linear pressure factor

Navigation

 Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → LinearPressFact (5965)

Description

Shows the linear pressure factor.

User entry

Signed floating-point number

Factory setting

0 (kg/m³)/bara

Quadratic density factor

Navigation

 Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → QuadrDensFactor (5964)

Description

Shows the quadratic density factor.

User entry Signed floating-point number

Factory setting 0 1/(kg/m³)

Quadratic temperature factor



Navigation Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → QuadrTempFactor (5963)

Description Shows the quadratic temperature factor.

User entry Signed floating-point number

Factory setting 0 (kg/m³)/°C²

Quadratic pressure factor



Navigation Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → QuadrPressFactor (5962)

Description Shows the quadratic pressure factor.

User entry Signed floating-point number

Factory setting 0 (kg/m³)/bara²

Combined density-temperature factor



Navigation Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → DensTempFactor (5961)

Description Shows the combined density-temperature factor.

User entry Signed floating-point number

Factory setting 0 1/°C

Combined density-pressure factor



Navigation Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → DensPressFactor (5971)

Description Shows the combined density-pressure factor.

User entry	Signed floating-point number
Factory setting	0 1/bara

Combined temperature-pressure factor

Navigation	  Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → TempPressFactor (5970)
Description	Shows the combined temperature-pressure factor.
User entry	Signed floating-point number
Factory setting	0 (kg/m³)/(°C bara)

Cubic temperature factor

Navigation	  Expert → Sensor → Sensor adjustm. → ExtendDensAdjust → CubicTempFactor (5969)
Description	Shows the cubic temperature factor.
User entry	Signed floating-point number
Factory setting	0 (kg/m³)/°C³

"Process variable adjustment" submenu

 The adjustments to the offsets and factors in the **Process variable adjustment** submenu (→  104) do not affect the calculated values, such as concentration, NSV.

Navigation   Expert → Sensor → Sensor adjustm. → Variable adjust

► Process variable adjustment

Mass flow offset (1831)

→  105

Mass flow factor (1832)

→  105

Volume flow offset (1841)

→  106

Volume flow factor (1846)

→  106

Density offset (1848)

→  106

Density factor (1849)	→  107
Corrected volume flow offset (1866)	→  107
Corrected volume flow factor (1867)	→  107
Reference density offset (1868)	→  108
Reference density factor (1869)	→  108
Temperature offset (1870)	→  108
Temperature factor (1871)	→  109

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

Volume 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	<i>Description</i>  Corrected value = (factor × value) + offset	
Volume 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	<i>Description</i>  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/m ³ .	
User entry	Signed floating-point number	
Factory setting	0 kg/m ³	
Additional information	<i>Description</i>  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

Corrected volume flow 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

Corrected volume flow 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

Reference density 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	<i>Description</i>  Corrected value = (factor × value) + offset
Reference density 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	<i>Description</i>  Corrected value = (factor × value) + offset
Temperature offset 	
Navigation	  Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. offset (1870)
Description	Use this function to enter the zero point shift for the temperature trim. The temperature unit on which the shift is based is K.
User entry	Signed floating-point number
Factory setting	0 K
Additional information	<i>Description</i>  Corrected value = (factor × value) + offset

Temperature factor		
Navigation	 Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. factor (1871)	
Description	Use this function to enter a quantity factor for the temperature. In each case, this factor refers to the temperature in K.	
User entry	Positive floating-point number	
Factory setting	1	
Additional information	<i>Description</i>  Corrected value = (factor × value) + offset	

"Zero verification" wizard

Navigation  Expert → Sensor → Sensor adjustm. → ZeroVerification

► Zero verification

Process conditions

→  109

Progress (2808)

→  110

Status (6253)

→  110

Additional information

→  110

Recommendation: (6000)

→  111

Root cause (6444)

→  111

Abort cause

→  111

Zero point measured (5999)

→  111

Zero point standard deviation (5996)

→  112

Process conditions	
Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → Process condit.
Description	Ensure process conditions as follows.

Selection	■ Tubes are completely filled ■ Process operational pressure applied ■ No-flow conditions (closed valves) ■ Process and ambient temperatures stable
------------------	--

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

Progress

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → Progress (2808)
-------------------	--

Description	The progress of the process is indicated.
--------------------	---

User interface	0 to 100 %
-----------------------	------------

Status

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → Status (6253)
-------------------	---

Description	Shows the status of the process.
--------------------	----------------------------------

User interface	■ Busy ■ Failed ■ Done
-----------------------	--

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

Additional information

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → Additional info.
-------------------	---

Description	Indicate whether to display additional information.
--------------------	---

Selection	■ Hide ■ Show
------------------	--

Factory setting	Hide
------------------------	------

Recommendation:

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → Recommendation: (6000)
Description	Indicates whether an adjustment is recommended. Only recommended if the measured zero point deviates significantly from the current zero point.
User interface	■ Do not adjust zero point ■ Adjust zero point
Factory setting	–

Root cause

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → Root cause (6444)
Description	Shows the diagnostic and remedy.
User interface	■ Zero point too high. Ensure no-flow. ■ Zero point is unstable. Ensure no-flow. ■ Fluctuation high. Avoid 2-phase medium.
Factory setting	–

Abort cause

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → Abort cause
Description	Indicates why the wizard was aborted.
User interface	■ Check process conditions! ■ A technical issue has occurred
Factory setting	–

Zero point measured

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → ZeroPointMeasur. (5999)
Description	Shows the zero point measured for the adjustment.
User interface	Signed floating-point number
Factory setting	–

Zero point standard deviation

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → ZeroStdDev (5996)
Description	Shows the standard deviation of the zero point measured.
User interface	Positive floating-point number
Factory setting	–

"Zero adjustment" wizard

Navigation  Expert → Sensor → Sensor adjustm. → Zero adjustment

► Zero adjustment		
Process conditions	→	 113
Progress (2808)	→	 113
Status (6253)	→	 113
Root cause (6444)	→	 113
Abort cause	→	 114
Root cause (6444)	→	 113
Reliability of measured zero point (5982)	→	 114
Additional information	→	 114
Reliability of measured zero point (5982)	→	 114
Zero point measured (5999)	→	 114
Zero point standard deviation (5996)	→	 115
Select action (5995)	→	 115

Process conditions

Navigation	 Expert → Sensor → Sensor adjustm. → Zero adjustment → Process condit.
Description	Ensure process conditions as follows.
Selection	■ Tubes are completely filled ■ Process operational pressure applied ■ No-flow conditions (closed valves) ■ Process and ambient temperatures stable
Factory setting	–

Progress

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

Status

Navigation	 Expert → Sensor → Sensor adjustm. → Zero adjustment → Status (6253)
Description	Shows the status of the process.
User interface	■ Busy ■ Failed ■ Done
Factory setting	–

Root cause

Navigation	  Expert → Sensor → Sensor adjustm. → Zero adjustment → Root cause (6444)
Description	Shows the diagnostic and remedy.
User interface	■ Zero point too high. Ensure no-flow. ■ Zero point is unstable. Ensure no-flow. ■ Fluctuation high. Avoid 2-phase medium.

Abort cause

Navigation	 Expert → Sensor → Sensor adjustm. → Zero adjustment → Abort cause
Description	Indicates why the wizard was aborted.
User interface	■ Check process conditions! ■ A technical issue has occurred
Factory setting	–

Reliability of measured zero point

Navigation	  Expert → Sensor → Sensor adjustm. → Zero adjustment → ZeroReliability (5982)
Description	Indicates the reliability of the zero point measured.
User interface	■ Not done ■ Good ■ Uncertain
Factory setting	–

Additional information

Navigation	 Expert → Sensor → Sensor adjustm. → Zero adjustment → Additional info.
Description	Indicate whether to display additional information.
Selection	■ Hide ■ Show
Factory setting	Hide

Zero point measured

Navigation	 Expert → Sensor → Sensor adjustm. → Zero adjustment → ZeroPointMeasur. (5999)
Description	Shows the zero point measured for the adjustment.
User interface	Signed floating-point number
Factory setting	–

Zero point standard deviation

Navigation	 Expert → Sensor → Sensor adjustm. → Zero adjustment → ZeroStdDev (5996)
Description	Shows the standard deviation of the zero point measured.
User interface	Positive floating-point number
Factory setting	0

Select action

Navigation	 Expert → Sensor → Sensor adjustm. → Zero adjustment → Select action (5995)
Description	Select the zero point value to apply.
Selection	▪ Keep current zero point ▪ Apply zero point measured ▪ Apply factory zero point *
Factory setting	Keep current zero point

3.2.8 "Calibration" submenu

Navigation   Expert → Sensor → Calibration

► Calibration

Calibration factor (6025)

→  116

Zero point (6195)

→  116

Nominal diameter (2807)

→  116

C0 to 5 (6022)

→  116

* Visibility depends on order options or device settings

Calibration 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	Depends on nominal diameter and calibration.

3.2.9 "Testpoints" submenu

 The **Testpoints** submenu (→  117) is used to test the measuring device or the application.

Navigation   Diagnostics → Testpoints

Navigation   Expert → Sensor → Testpoints

► Testpoints		
Raw value mass flow	→ 	118
Oscillation frequency 0 to 1	→ 	118
Frequency fluctuation 0 to 1	→ 	118
Oscillation amplitude 0 to 1	→ 	119
Oscillation damping 0 to 1	→ 	119
Oscillation damping fluctuation 0 to 1	→ 	122
Signal asymmetry 0	→ 	122
Torsion signal asymmetry	→ 	122
Sensor electronics temperature (ISEM)	→ 	123
Carrier pipe temperature	→ 	123
Casing pipe temperature	→ 	124
Exciter current 0 to 1	→ 	124
Test point 0	→ 	124
Test point 1	→ 	124
Temperature difference measuring tube	→ 	125
Temperat. difference meas. tube-carrier	→ 	125
Sensor index coil asymmetry	→ 	125
Sensor index coil asymmetry reliability	→ 	125

Raw value mass flow

Navigation	  Diagnostics → Testpoints → Raw mass flow (6140)   Expert → Sensor → Testpoints → Raw mass flow (6140)
Description	Shows the current measured raw value of the mass flow.
User interface	Signed floating-point number
Additional information	<i>Description</i> Displays the mass flow value before offset and factor correction, damping, low flow cut off and monitoring of a partially filled pipe. This value can be used to check the current zero point; similar to the zero point verification function. <i>Dependency</i>  The unit is taken from the Mass flow unit parameter (→  70)

Oscillation frequency 0 to 1

Navigation	  Diagnostics → Testpoints → Osc. freq. 0 to 1 (6067)   Expert → Sensor → Testpoints → Osc. freq. 0 to 1 (6067)
Prerequisite	■ Oscillation frequency 0 is available for all Promass sensors. ■ Oscillation frequency 1 is only available for the Promass I and Promass Q sensors.
Description	Shows the current oscillation frequency of the measuring tubes. The frequency depends on the medium density.
User interface	Positive floating point number

Frequency fluctuation 0 to 1

Navigation	  Diagnostics → Testpoints → Freq. fluct. 0 to 1 (6175)   Expert → Sensor → Testpoints → Freq. fluct. 0 to 1 (6175)
Prerequisite	Order code for "Application package", option EB "Heartbeat Verification + Monitoring" available: ■ Frequency fluctuation 0 is available for all Promass sensors. ■ Frequency fluctuation 1 is only available for the Promass I and Promass Q sensors.
Description	Shows the current fluctuation of the oscillation frequency.
User interface	Signed floating-point number

Oscillation amplitude 0 to 1

Navigation	  Diagnostics → Testpoints → Osc. ampl. 0 to 1 (6006)   Expert → Sensor → Testpoints → Osc. ampl. 0 to 1 (6006)
Prerequisite	Order code for "Application package", option EB "Heartbeat Verification + Monitoring" available: ■ Oscillation amplitude 0 is available for all Promass sensors. ■ Oscillation amplitude 1 is only available for the Promass I and Promass Q sensors.
Description	Use this function to display the relative oscillation amplitude of the sensor in relation to the optimum value.
User interface	Signed floating-point number
Additional information	<i>Description</i> This value is 100 % under optimum conditions. The value can fall in the case of complex media (two-phase, high viscosity or high gas velocity). <i>Limit values</i> 5 %  If the displayed value is outside the limit value, the measuring device displays the following diagnostic messages: ■ △S913 Medium unsuitable diagnostic message, associated service ID 205 Osc Amp Limit Explanation: The measured oscillation amplitude has dropped below the xMin limit value. ■ △S912 Medium inhomogeneous diagnostic message, associated service ID 196 Fluid Inhomogeneous Amp ■ Explanation: The fluctuation (standard deviation) of the amplitude is too high. ■ Possible cause: Air or suspended solids in the medium (multiphase)

Oscillation damping 0 to 1

Navigation	  Diagnostics → Testpoints → Osc. damping 0 to 1 (6038)   Expert → Sensor → Testpoints → Osc. damping 0 to 1 (6038)
Prerequisite	■ Oscillation damping 0 is available for all Promass sensors. ■ Oscillation damping 1 is only available for the Promass I and Promass Q sensors.
Description	Displays the current oscillation damping.
User interface	Positive floating-point number

Additional information*Description*

Oscillation damping is an indicator of the sensor's current need for excitation power.

Typical values

Sensor	Material	DN		Nominal value, air	Nominal value, water
		[mm]	[in]	[A/m]	[A/m]
Promass A	Stainless steel, 1.4539 (904L)	1	1/24	250	300
		2	1/12	4	6
		4	1/8	8	12
	Alloy C22, 2.4602 (N 06022)	1	1/24	213	255
		2	1/12	4	6
		4	1/8	8	11
	Stainless steel, 1.4539 (904L), high-pressure version	2	1/12	6	7
		4	1/8	12	15
	Promass E	Stainless steel, 1.4539 (904L)	8	3/8	230
15			1/2	600	750
25			1	320	380
40			1 1/2	500	650
50			2	270	310
80			3	500	360
Promass F	Stainless steel, 1.4539 (904L)	8	3/8	60	70
		15	1/2	160	190
		25	1	270	310
		40	1 1/2	510	560
		50	2	320	330
		80	3	180	190
		100	4	200	200
	Stainless steel, 1.4404 (316L)	150	6	200	210
		250	10	310	330
	Alloy C22, 2.4602 (N 06022)	8	3/8	50	55
		15	1/2	120	140
		25	1	200	220
		40	1 1/2	340	380
		50	2	210	230
		80	3	160	180
		100	4	180	180
		150	6	200	200
Promass F HT	Alloy C22, 2.4602 (N 06022)	25	1	700	750
		50	2	800	900
		80	3	700	700
Promass G	Stainless steel, 1.4435 (316L)	8	3/8	235	245
		15	1/2	620	660
		25	1	630	660

Sensor	Material	DN		Nominal value, air	Nominal value, water
		[mm]	[in]	[A/m]	[A/m]
Promass H	Zirconium 702/R 60702	8	$\frac{3}{8}$	180	180
		15	$\frac{1}{2}$	120	110
		25	1	400	230
		40	$1\frac{1}{2}$	180	160
		50	2	100	70
	Tantalum 2.5W	8	$\frac{3}{8}$	200	210
		15	$\frac{1}{2}$	120	120
		25	1	500	220
		40	$1\frac{1}{2}$	125	120
		50	2	80	70
Promass I	Grade 9 titanium Grade 2 titanium (flange)	8	$\frac{3}{8}$	70	90
		15	$\frac{1}{2}$	110	130
		25, 15 FB	$1, \frac{1}{2}$ FB	110	120
		40, 25 FB	$1\frac{1}{2}, \frac{1}{2}$ FB	270	270
		50, 40 FB	$2, 1\frac{1}{2}$ FB	210	180
		80	3	200	190
Promass O	Stainless steel, 25Cr Duplex (Super Duplex), 1.4410 (UNS S 32750)	80	3	160	170
		100	4	170	220
		150	6	230	250
Promass P	Stainless steel, 1.4435 (316L)	8	$\frac{3}{8}$	250	300
		15	$\frac{1}{2}$	250	300
		25	1	500	620
		40	$1\frac{1}{2}$	280	340
		50	2	370	450
Promass S 8x1B	Stainless steel, EN 1.4539 (ASTM 904L)	8	$\frac{3}{8}$	210	260
		15	$\frac{1}{2}$	270	300
		25	1	460	530
		40	$1\frac{1}{2}$	255	290
		50	2	230	290
Promass S 8x1C	Stainless steel, 1.4435 (316L)	8	$\frac{3}{8}$	210	260
		15	$\frac{1}{2}$	270	300
		25	1	460	530
		40	$1\frac{1}{2}$	280	340
		50	2	370	450
Promass X	Stainless steel, 1.4404/316 (316L)	350	14	380	420

Limit values

The damping depends on the transmitter type and model and changes with the type of medium (differences between models: approx. $\pm 30\%$). The minimum value is reached when the sensor is empty. The value can reach several 1000 in the case of viscous media,

and even several 10 000 in the case of multi-phase media. In such cases, the relative oscillation amplitude should also be used for diagnosis.



If the displayed value is outside the limit value, the measuring device displays the following diagnostic message:

△S862 Partly filled pipe diagnostic message, associated service ID **146 Density Monitoring**

Oscillation damping fluctuation 0 to 1

Navigation	Diagnostics → Testpoints → Osc.damp.fluct0 to 1 (6172) Expert → Sensor → Testpoints → Osc.damp.fluct0 to 1 (6172)
Prerequisite	Order code for "Application package", option EB "Heartbeat Verification + Monitoring" available: ■ Tube damping fluctuation 0 is available for all Promass sensors. ■ Tube damping fluctuation 1 is only available for the Promass I and Promass Q sensors.
Description	Shows the current fluctuation of the oscillation damping.
User interface	Signed floating-point number

Signal asymmetry 0

Navigation	Diagnostics → Testpoints → Signal asymm. 0 (6013) Expert → Sensor → Testpoints → Signal asymm. 0 (6013)
Description	Displays the relative difference between the oscillation amplitude measured at the inlet and outlet of the sensor.
User interface	Signed floating-point number
Additional information	<i>Description</i> The measured value is the result of production tolerances of the sensor coils and should remain constant over the life time of a sensor.

Torsion signal asymmetry

Navigation	Diagnostics → Testpoints → Tors.sig.asymm. (6289) Expert → Sensor → Testpoints → Tors.sig.asymm. (6289)
Prerequisite	This parameter is only available: with the order code for "Application package", option EB "Heartbeat Verification + Monitoring" and the Promass I or Promass Q sensor.

Description	Shows the relative difference of the signal amplitudes of the inlet sensor and outlet sensor of the second oscillation mode.
User interface	Signed floating-point number

Sensor electronics temperature (ISEM)

Navigation	  Diagnostics → Testpoints → Sensor elec.temp (6053)   Expert → Sensor → Testpoints → Sensor elec.temp (6053)
Description	Displays the current temperature inside the main electronics.
User interface	Signed floating-point number
Additional information	NOTE! Stay within the specified ambient temperature range. <i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  78)

Carrier pipe temperature

Navigation	  Diagnostics → Testpoints → Carr. pipe temp. (6027)   Expert → Sensor → Testpoints → Carr. pipe temp. (6027)
Prerequisite	■ Order code for "Application package", option EB "Heartbeat Verification + Monitoring" ■ If the carrier tube temperature is provided: Cubemass C
Description	Use this function to display the current temperature of the measuring tube housing. Displays the 2nd measured temperature for compensation.
User interface	Signed floating-point number
Additional information	<i>Limit values</i> In thermally insulated sensors, the carrier tube temperature can reach the temperature of the medium. <i>Dependency</i>  The unit is taken from the Temperature unit parameter (0557)

Casing pipe temperature

Navigation	  Diagnostics → Testpoints → CasingPipeTemp. (6411)   Expert → Sensor → Testpoints → CasingPipeTemp. (6411)
Prerequisite	This parameter is only available: with the order code for "Application package", option EB "Heartbeat Verification + Monitoring" and the Promass I sensor
Description	Displays the temperature of the casing pipe.
User interface	Signed floating-point number

Exciter current 0 to 1

Navigation	  Diagnostics → Testpoints → Exc. current 0 to 1 (6055)   Expert → Sensor → Testpoints → Exc. current 0 to 1 (6055)
Prerequisite	■ Exciter current 0 is available for all Promass sensors. ■ Exciter current 1 is only available for the Promass I and Promass Q sensors.
Description	Rms value of the exciter current.
User interface	Signed floating-point number
Additional information	NOTE! The maximum available excitation current has been reached when the oscillation amplitude shown is less than 100 %.

Test point 0

Navigation	  Diagnostics → Testpoints → Test point 0 (6425)   Expert → Sensor → Testpoints → Test point 0 (6425)
Description	Shows the value for the selected test point. Can only be configured by Endress+Hauser.
Factory setting	0

Test point 1

Navigation	  Diagnostics → Testpoints → Test point 1 (6426)   Expert → Sensor → Testpoints → Test point 1 (6426)
Description	Shows the value for the selected test point. Can only be configured by Endress+Hauser.

Factory setting 0

Temperature difference measuring tube

Navigation   Diagnostics → Testpoints → TempDiffMeasTube (6344)
  Expert → Sensor → Testpoints → TempDiffMeasTube (6344)

Prerequisite This parameter is only available for the Promass Q sensor.

Description Shows the temperature difference between the outlet and the inlet of the measuring tube.

User interface Signed floating-point number

Temperat. difference meas. tube-carrier

Navigation   Diagnostics → Testpoints → TempDiffTubeCarr
  Expert → Sensor → Testpoints → TempDiffTubeCarr

Description Shows the temperature difference between the measuring tube and the carrier pipe.

User interface Signed floating-point number

Factory setting 0 K

Sensor index coil asymmetry

Navigation   Diagnostics → Testpoints → SensIndCoilAsym. (5951)
  Expert → Sensor → Testpoints → SensIndCoilAsym. (5951)

Description Shows the sensor index coil asymmetry (SICA) currently measured.

User interface Signed floating-point number

Factory setting 0 %

Sensor index coil asymmetry reliability

Navigation   Diagnostics → Testpoints → SensIndCoilAReli (5952)
  Expert → Sensor → Testpoints → SensIndCoilAReli (5952)

Description Indicates the reliability of the sensor index coil asymmetry value (SICA) currently measured.

User interface	■ Good ■ Uncertain ■ Bad
Factory setting	Bad

3.2.10 "Supervision" submenu

Navigation   Expert → Sensor → Supervision

► Supervision

Sensor Index Coil Asymmetry value

Sensor index coil asymmetry

Navigation	  Expert → Sensor → Supervision → SensIndCoilAsym. (5951)
Description	Shows the sensor index coil asymmetry (SICA) currently measured.
User interface	Signed floating-point number
Factory setting	0 %

3.3 "I/O configuration" submenu

Navigation   Expert → I/O config.

► I/O configuration

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

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

I/O module 1 to n type (3901-1 to n)

Apply I/O configuration (3907)

I/O alteration code (2762)

→  127

→  127

→  127

→  128

→  128

I/O module 1 to n terminal numbers

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

I/O module 1 to n information

Navigation	 Expert → I/O config. → I/O 1 to n info (3906–1 to n)
Description	Displays information about the plugged in I/O module.
User interface	■ Not plugged ■ Invalid ■ Not configurable ■ Configurable ■ MODBUS
Additional information	<i>"Not plugged" option</i> The I/O module is not plugged in. <i>"Invalid" option</i> The I/O module is not plugged correctly. <i>"Not configurable" option</i> The I/O module is not configurable. <i>"Configurable" option</i> The I/O module is configurable. <i>"MODBUS" option</i> The I/O module is configured for Modbus.

I/O module 1 to n type

Navigation	 Expert → I/O config. → I/O 1 to n type (3901–1 to n)
Prerequisite	For the following order code: ■ "Output; input 2", option D "Configurable I/O initial setting off" ■ "Output; input 3", option D "Configurable I/O initial setting off"
Description	Use this function to select the I/O module type for the configuration of the I/O module.

Selection	■ Off ■ Current output * ■ Current input * ■ Status input * ■ Pulse/frequency/switch output * ■ Double pulse output * ■ Relay output *
Factory setting	Off

Apply I/O configuration

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

I/O alteration code

Navigation	Expert → I/O config. → I/O alterat.code (2762)
Description	Use this function to enter the ordered activation code to activate the I/O configuration change.
User entry	Positive integer
Factory setting	0
Additional information	Description The I/O configuration is changed in the I/O module type parameter (→ 127).

3.4 "Input" submenu

Navigation

Expert → Input



* Visibility depends on order options or device settings

► Current input 1 to n	→ 129
► Status input 1 to n	→ 132

3.4.1 "Current input 1 to n" submenu

Navigation  Expert → Input → Current input 1 to n

► Current input 1 to n	
Terminal number (1611-1 to n)	→ 129
Signal mode (1610-1 to n)	→ 129
Current span (1605-1 to n)	→ 130
0/4 mA value (1606-1 to n)	→ 130
20 mA value (1607-1 to n)	→ 131
Failure mode (1601-1 to n)	→ 131
Failure value (1602-1 to n)	→ 131

Terminal number

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

Signal mode

Navigation	 Expert → Input → Current input 1 to n → Signal mode (1610-1 to n)
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... 20.5 mA)
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 0...20 mA (0... 20.5 mA)

Factory setting Country-specific:

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

Additional information *Examples*

Sample values for the current range: **Current span** parameter (→ 137)

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 (→ 130)
- Failure mode (→ 131)

Configuration examples

Pay attention to the configuration examples for **4 mA value** parameter (→ 138).

* Visibility depends on order options or device settings

20 mA value 	
Navigation	  Expert → Input → Current input 1 to n → 20 mA value (1607–1 to n)
Description	Use this function to enter a value for the 20 mA current.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter
Additional information	<i>Configuration examples</i>  Pay attention to the configuration examples for 4 mA value parameter (→  138).
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 (→  130).
Selection	■ Alarm ■ Last valid value ■ Defined value
Factory setting	Alarm
Additional information	<i>Options</i> ■ Alarm An error message is set. ■ Last valid value The last valid measured value is used. ■ Defined value A user-defined measured value is used (Failure value parameter (→  131)).
Failure value 	
Navigation	  Expert → Input → Current input 1 to n → Failure value (1602–1 to n)
Prerequisite	In the Failure mode parameter (→  131), 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 number (1358-1 to n)

→  132

Assign status input (1352-1 to n)

→  132

Value status input (1353-1 to n)

→  133

Active level (1351-1 to n)

→  133

Response time status input (1354-1 to n)

→  133

Terminal number

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

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

User interface

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

Additional information

"Not used" option

The status input module does not use any terminal numbers.

Assign status input

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

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

Selection

- Off
- Reset totalizer 1
- Reset totalizer 2
- Reset totalizer 3
- Reset all totalizers
- Flow override
- Zero adjustment
- Reset weighted averages *
- Reset weighted averages + totalizer 3 *

* Visibility depends on order options or device settings

Factory setting Off

Additional information *Selection*

- Off
The status input is switched off.
- Reset totalizer 1...3
The individual totalizers are reset.
- Reset all totalizers
All totalizers are reset.
- Flow override
The Flow override (→  82) is activated.



Note on the Flow override (→  82):

- The Flow override (→  82) is enabled as long as the level is at the status input (continuous signal).
- All other assignments react to a change in level (pulse) at the status input.

Value status input

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

Description Displays the current input signal level.

User interface

- High
- Low

Active level



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

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

Selection

- High
- Low

Factory setting High

Response time status input



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

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

User entry 5 to 200 ms

Factory setting 50 ms

3.5 "Output" submenu

Navigation  Expert → Output

► Output

► Current output 1 to n

→  134

► Pulse/frequency/switch output 1 to n

→  148

► Relay output 1 to n

→  169

► Double pulse output

→  176

3.5.1 "Current output 1 to n" submenu

Navigation  Expert → Output → Curr.output 1 to n

► Current output 1 to n

Terminal number

→  135

Signal mode

→  135

Process variable current output

→  135

Current range output

→  137

Fixed current

→  138

Lower range value output

→  138

Upper range value output

→  140

Measuring mode current output

→  141

Damping current output

→  146

Failure behavior current output

→  147

Failure current

→  148

Output current	→ 148
Measured current	→ 148

Terminal number

Navigation	 Expert → Output → Curr.output 1 to n → Terminal no. (0379-1 to n)
Description	Displays the terminal numbers used by the current output module.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3)
Additional information	<i>"Not used" option</i> The current output module does not use any terminal numbers.

Signal mode

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

Process variable current output

Navigation	 Expert → Output → Curr.output 1 to n → Proc.var. outp (0359-1 to n)
Description	Use this function to select a process variable for the current output.  Detailed description of the options Oscillation frequency, Oscillation amplitude, Oscillation damping and Signal asymmetry: Value 1 display parameter (→ 19)
Selection	■ Off * ■ Mass flow ■ Volume flow ■ Corrected volume flow * ■ Density ■ Reference density *

* Visibility depends on order options or device settings

- Temperature
- Pressure
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Reference density alternative *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- Target mass flow *
- Carrier mass flow *
- Concentration *
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Reference density alternative *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- Target volume flow *
- Carrier volume flow *
- Target corrected volume flow *
- Carrier corrected volume flow *
- Application specific output 0 *
- Application specific output 1 *
- Inhomogeneous medium index
- Suspended bubbles index *
- Raw value mass flow
- Exciter current 0
- Oscillation damping 0
- Oscillation damping fluctuation 0 *
- Oscillation frequency 0
- Frequency fluctuation 0 *
- Signal asymmetry
- Torsion signal asymmetry *
- Carrier pipe temperature
- Frequency fluctuation 0 *
- Oscillation amplitude 0 *
- Oscillation damping fluctuation 0 *
- Electronics temperature

* Visibility depends on order options or device settings

- Sensor index coil asymmetry
- Test point 0
- Test point 1

Factory setting Mass flow

Current range output 🔒

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

Description Select current range for process value output and upper/lower level for alarm signal.

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

- Factory setting
- Depends on country:
- 4...20 mA NE (3.8...20.5 mA)
 - 4...20 mA US (3.9...20.8 mA)

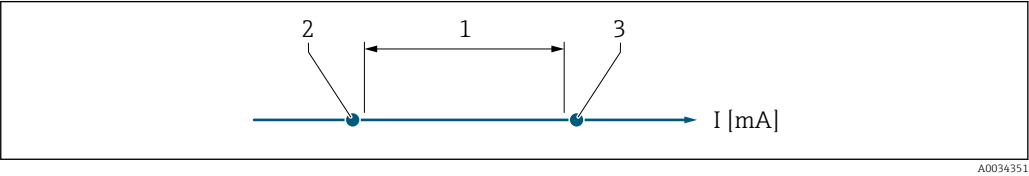
- Additional information *Description*
- i** ■ In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 📄 147).
- If the measured value is outside the measuring range, the **△S441 Current output 1 to n** diagnostic message is displayed.
 - The measuring range is specified via the **Lower range value output** parameter (→ 📄 138) and **Upper range value output** parameter (→ 📄 140).

"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 📄 138).

Example

Shows the relationship between the current range for the output of the process value and the two signal on alarm levels:



A0034351

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

Selection

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

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



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

Fixed current



Navigation

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

Prerequisite

The **Fixed current** option is selected in the **Current span** parameter (→ 137).

Description

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

User entry

0 to 22.5 mA

Factory setting

22.5 mA

Lower range value output



Navigation

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

Prerequisite

One of the following options is selected in the **Current span** parameter (→ 137):

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

Description

Use this function to enter a value for the start of measuring range.

User entry

Signed floating-point number

Factory setting

Depends on country:

- 0 kg/h
- 0 lb/min

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 135). In addition, the value can be greater

than or smaller than the value assigned for the 20 mA current in the **Upper range value output** parameter (→ [140](#)).

Dependency



The unit depends on the process variable selected in the **Assign current output** parameter (→ [135](#)).

Current output behavior

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

- Current span (→ [137](#))
- Failure mode (→ [147](#))

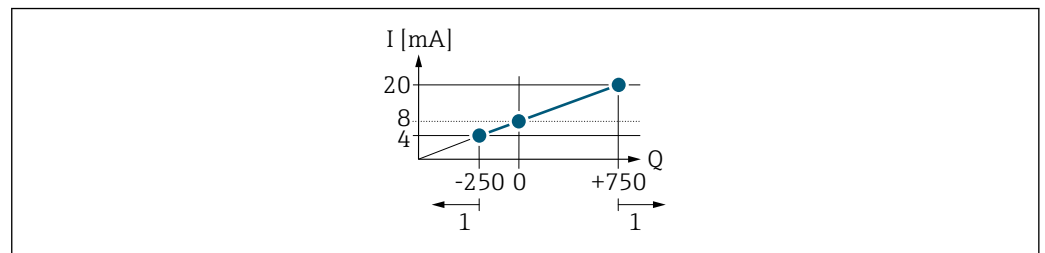
Configuration examples

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

Configuration example A

Measurement mode with **Forward flow** option

- **Lower range value output** parameter (→ [138](#)) = not equal to zero flow (e.g. -250 m³/h)
- **Upper range value output** parameter (→ [140](#)) = not equal to zero flow (e.g. +750 m³/h)
- Calculated current value = 8 mA at zero flow



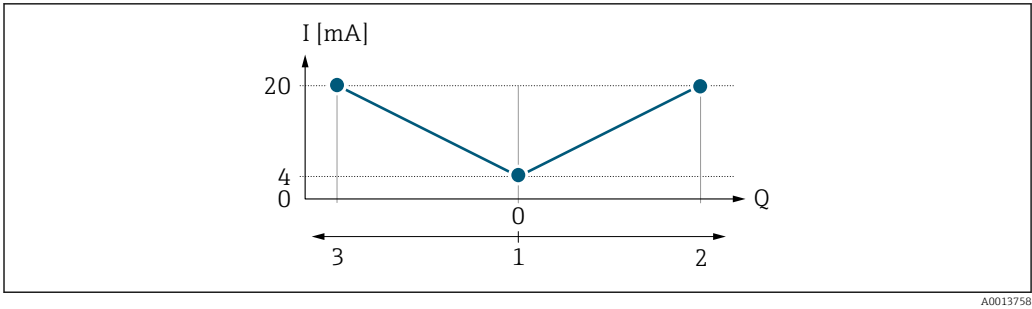
A0013757

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 **Lower range value output** parameter (→ [138](#)) and **Upper range value output** parameter (→ [140](#)). If the effective flow exceeds or falls below this operational range, the **△S441 Current output 1 to n** diagnostic message is output.

Configuration example B

Measurement mode with **Forward/Reverse flow** option



- I Current
- Q Flow
- 1 Start of measuring range output (0/4 mA)
- 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 **Lower range value output** parameter (→ ⓘ 138) and **Upper range value output** parameter (→ ⓘ 140) must have the same algebraic sign. The value for the **Upper range value output** parameter (→ ⓘ 140) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (→ ⓘ 140) (e.g. forward flow).

Configuration example C

Measurement mode with **Reverse flow compensation** option
If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s → ⓘ 141.

Upper range value output ⓘ

Navigation	ⓘ ⓘ Expert → Output → Curr.output 1 to n → Upp.range outp (0372-1 to n)
Prerequisite	One of the following options is selected in the Current span parameter (→ ⓘ 137): ■ 4...20 mA NE (3.8...20.5 mA) ■ 4...20 mA US (3.9...20.8 mA) ■ 4...20 mA (4... 20.5 mA) ■ 0...20 mA (0... 20.5 mA)
Description	Use this function to enter a value for the end of measuring range.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter → ⓘ 271
Additional information	Description Positive and negative values are permitted depending on the process variable assigned in the Assign current output parameter (→ ⓘ 135). In addition, the value can be greater

than or smaller than the value assigned for the 0/4 mA current in the **Lower range value output** parameter (→  138).

Dependency

 The unit depends on the process variable selected in the **Assign current output** parameter (→  135).

Example

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

If the **Forward/Reverse flow** option is selected in the **Measuring mode** parameter (→  141), different algebraic signs cannot be entered for the values for the **Lower range value output** parameter (→  138) and **Upper range value output** parameter (→  140). The **△S441 Current output 1 to n** diagnostic message is displayed.

Configuration examples

 Pay attention to the configuration examples for the **Lower range value output** parameter (→  138).

Measuring mode current output



Navigation

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

Prerequisite

One of the following options is selected in the **Assign current output** parameter (→  135):

- Mass flow
- Volume flow
- Corrected volume flow
- Target mass flow *
- Carrier mass flow *
- Density
- Reference density
- Concentration *
- Temperature
- Carrier pipe temperature *
- Electronics temperature
- Oscillation frequency 0
- Oscillation amplitude 0 *
- Frequency fluctuation 0
- Oscillation damping 0
- Oscillation damping fluctuation 0
- Signal asymmetry
- Exciter current 0

 Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry: Value 1 display** parameter (→  19)

* Visibility depends on order options or device settings

One of the following options is selected in the **Current span** parameter (→  137):

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

Description

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

Selection

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

Factory setting

Forward flow

Additional information

Description

 The process variable that is assigned to the current output via the **Assign current output** parameter (→  135) is displayed below the parameter.

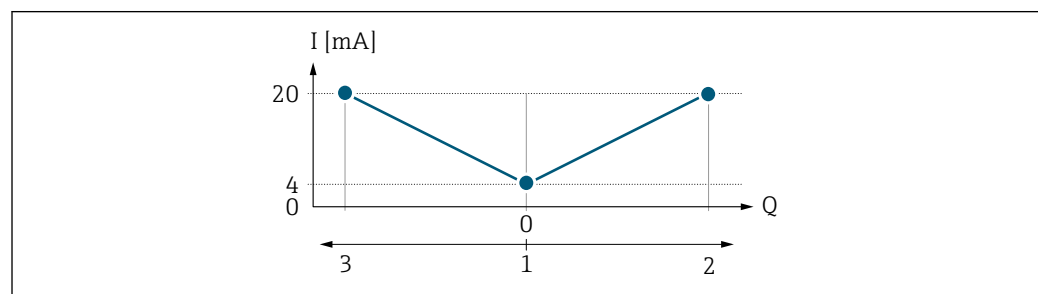
"Forward flow" option

The current output signal is proportional to the process variable assigned. The measuring range is defined by the values that are assigned to the **Lower range value output** parameter (→  138) and the **Upper range value output** parameter (→  140).

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.:
 - start of measuring range = $-5 \text{ m}^3/\text{h}$
 - end of measuring range = $10 \text{ m}^3/\text{h}$
- If the effective flow exceeds or falls below this measuring range, the **△S441 Current output 1 to n** diagnostic message is output.

"Forward/Reverse flow" option



A0013758

- I* Current
- Q* Flow
- 1* Start of measuring range output (0/4 mA)
- 2* Forward flow
- 3* Reverse flow

* Visibility depends on order options or device settings

- The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **Lower range value output** parameter (→  138) and **Upper range value output** parameter (→  140) must have the same algebraic sign.
- The value for the **Upper range value output** parameter (→  140) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (→  140) (e.g. forward flow).

"Reverse flow compensation" option

The **Reverse flow compensation** option is primarily used to compensate for intermittent backflow that can arise with displacement pumps due to wear or high-viscosity medium. The reverse flow is recorded in a buffer memory and offset against the next forward flow.

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

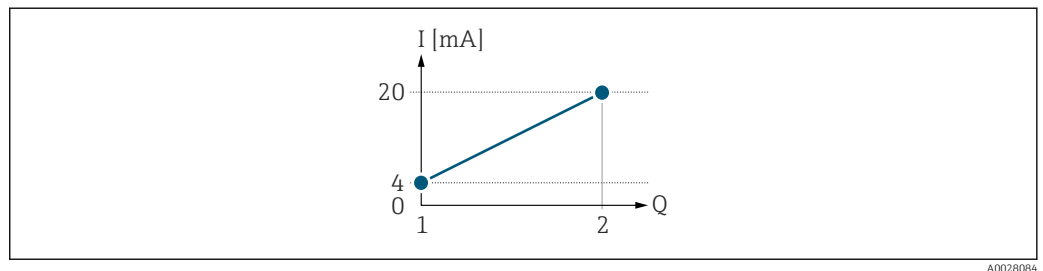
In the event of prolonged and undesired reverse flow, flow values can accumulate in the buffer memory. Due to the configuration of the current output, these values are not factored in, however, i.e. there is no compensation for the reverse flow.

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

Examples of how the current output behaves

Example 1

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



A0028084

 2 Measuring range

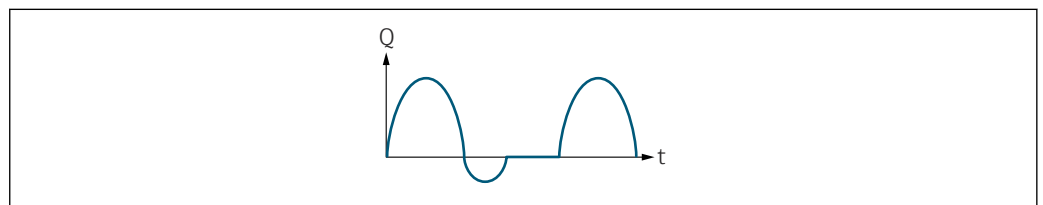
I Current

Q Flow

1 Lower range value (Start of measuring range output)

2 Upper range value (end of measuring range output)

With the following flow response:



A0028091

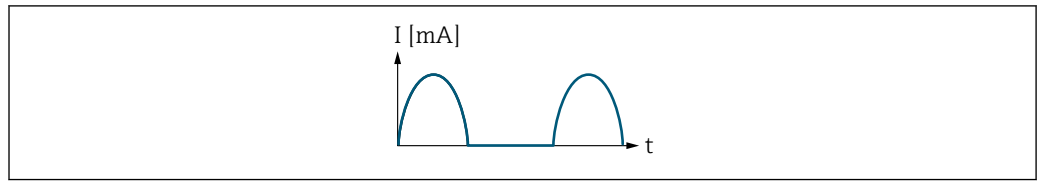
 3 Flow response

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..

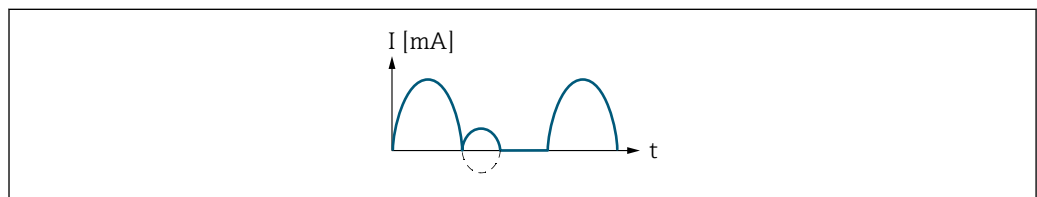


A0028092

I Current
 t Time

With **Forward/Reverse flow** option

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

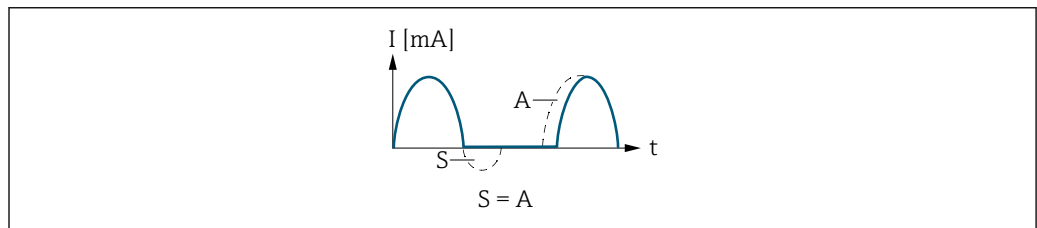


A0028093

I Current
 t Time

With **Reverse flow compensation** option

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

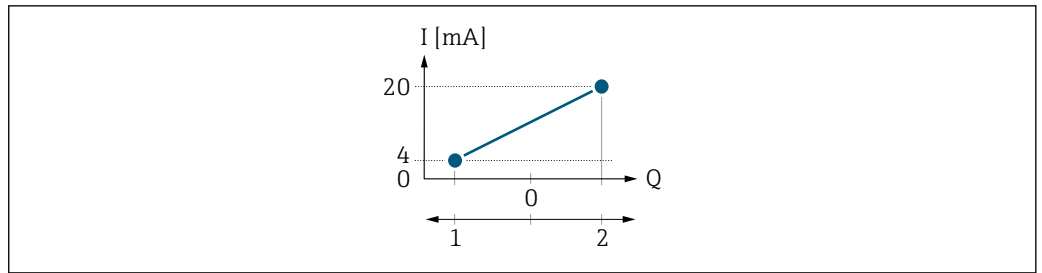


A0028094

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

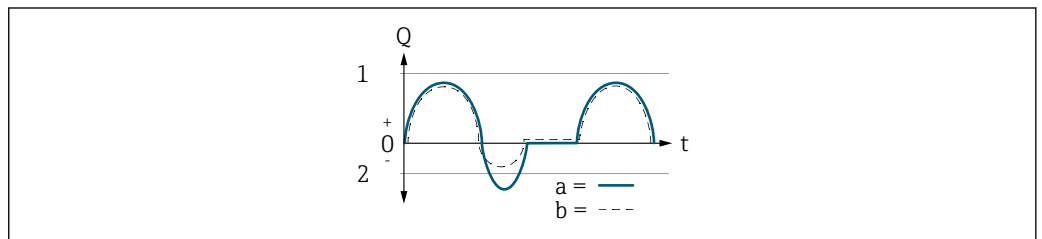
I Current

Q Flow

1 Lower range value (Start of measuring range output)

2 Upper range value (end of measuring range output)

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



A0028098

Q Flow

t Time

1 Lower range value (Start of measuring range output)

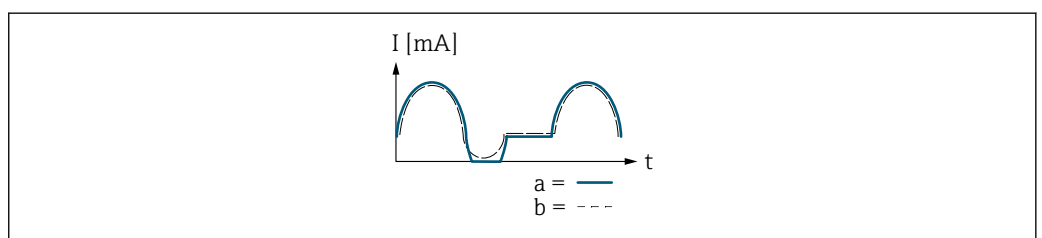
2 Upper range value (end of measuring range output)

With **Forward flow** option

- a (—): The flow components outside the scaled measuring range cannot be taken into account for signal output.

The **△S441 Current output 1 to n** diagnostic message is output.

- b (---): The current output signal is proportional to the process variable assigned.



A0028100

I Current

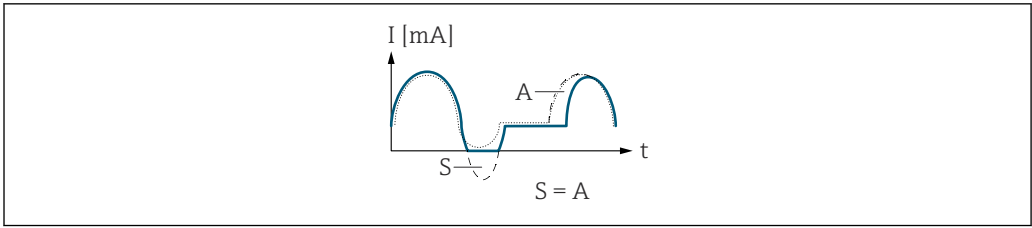
t Time

With **Forward/Reverse flow** option

This option cannot be selected here since the values for the **Lower range value output** parameter (→ 138) and **Upper range value output** parameter (→ 140) have different algebraic signs.

With **Reverse flow compensation** option

Flow components outside the measuring 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 current output



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

Prerequisite A process variable is selected in the **Assign current output** parameter (→  135) and one of the following options is selected in the **Current span** parameter (→  137):

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

User entry 0.0 to 999.9 s

Factory setting 1.0 s

Additional information *User 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).

6) proportional transmission behavior with first order delay

**Failure behavior current output**

Navigation	Expert → Output → Curr.output 1 to n → Fail.behav.out (0364-1 to n)
Prerequisite	A process variable is selected in the Assign current output parameter (→ 135) and one of the following options is selected in the Current span parameter (→ 137): ■ 4...20 mA NE (3.8...20.5 mA) ■ 4...20 mA US (3.9...20.8 mA) ■ 4...20 mA (4... 20.5 mA) ■ 0...20 mA (0... 20.5 mA)
Description	Use this function to select the value of the current output in the event of a device alarm.
Selection	■ Min. ■ Max. ■ Last valid value ■ Actual value ■ Fixed value
Factory setting	Max.
Additional information	<i>Description</i> This setting does not affect the failsafe mode of other outputs and totalizers. This is specified in separate parameters. <i>"Min." option</i> 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 (→ 137). <i>"Max." option</i> 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 (→ 137). <i>"Last valid value" option</i> The current output adopts the last measured value that was valid before the device alarm occurred. <i>"Actual value" option</i> The current output adopts the measured value on the basis of the current flow measurement; the device alarm is ignored. <i>"Defined value" option</i> The current output adopts a defined measured value. The measured value is defined via the Failure current parameter (→ 148).

Failure current

Navigation	  Expert → Output → Curr.output 1 to n → Fail. current (0352-1 to n)
Prerequisite	The Defined value option is selected in the Failure mode parameter (→  147).
Description	Use this function to enter a fixed value that the current output adopts in the event of a device alarm.
User entry	0 to 22.5 mA
Factory setting	22.5 mA

Output current

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

Measured current

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

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

Navigation   Expert → Output → PFS output 1 to n

► Pulse/frequency/switch output
1 to n

Terminal number (0492-1 to n)

→  150

Signal mode (0490-1 to n)

→  150

Operating mode (0469-1 to n)

→  150

Assign pulse output (0460-1 to n)

→  152

Pulse scaling (0455-1 to n)	→  153
Pulse width (0452-1 to n)	→  153
Measuring mode (0457-1 to n)	→  154
Failure mode (0480-1 to n)	→  155
Pulse output 1 to n (0456-1 to n)	→  156
Assign frequency output (0478-1 to n)	→  156
Minimum frequency value (0453-1 to n)	→  157
Maximum frequency value (0454-1 to n)	→  158
Measuring value at minimum frequency (0476-1 to n)	→  158
Measuring value at maximum frequency (0475-1 to n)	→  158
Measuring mode (0479-1 to n)	→  159
Damping output (0477-1 to n)	→  160
Failure mode (0451-1 to n)	→  161
Failure frequency (0474-1 to n)	→  162
Output frequency (0471-1 to n)	→  162
Switch output function (0481-1 to n)	→  162
Assign diagnostic behavior (0482-1 to n)	→  163
Assign limit (0483-1 to n)	→  164
Switch-on value (0466-1 to n)	→  166
Switch-off value (0464-1 to n)	→  166
Assign flow direction check (0484-1 to n)	→  167
Assign status (0485-1 to n)	→  167
Switch-on delay (0467-1 to n)	→  167

Switch-off delay (0465-1 to n)	→ 168
Failure mode (0486-1 to n)	→ 168
Switch state (0461-1 to n)	→ 168
Invert output signal (0470-1 to n)	→ 169

Terminal number

Navigation	  Expert → Output → PFS output 1 to n → Terminal no. (0492-1 to n)
Description	Displays the terminal numbers used by the pulse/frequency/switch output module.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3)
Additional information	<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 [*] ■ Passive NE
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.

* Visibility depends on order options or device settings

Selection

- Pulse
- Frequency
- Switch

Factory setting

Pulse

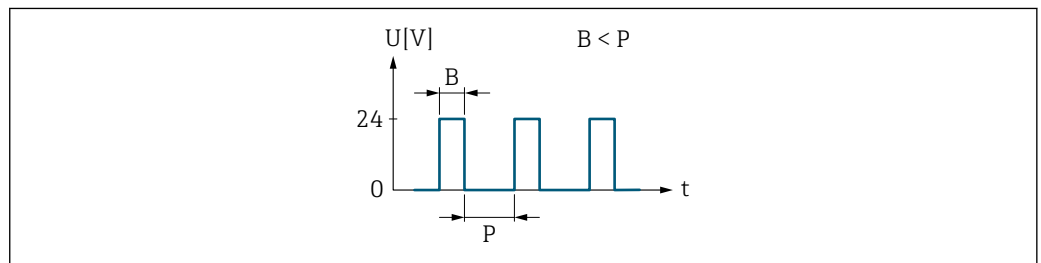
Additional information*"Pulse" option*

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



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

B Pulse width entered

P Pauses between the individual pulses

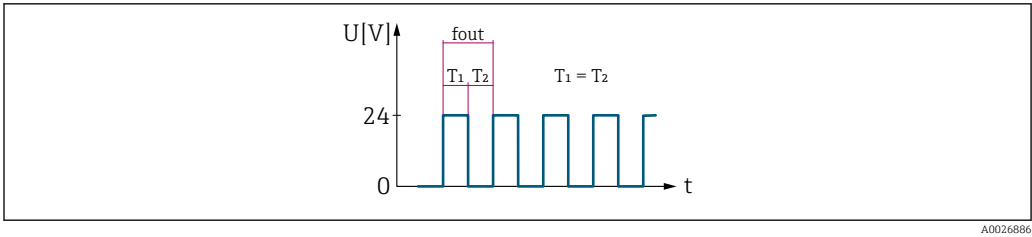
"Frequency" option

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

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, electronics temperature, oscillation 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



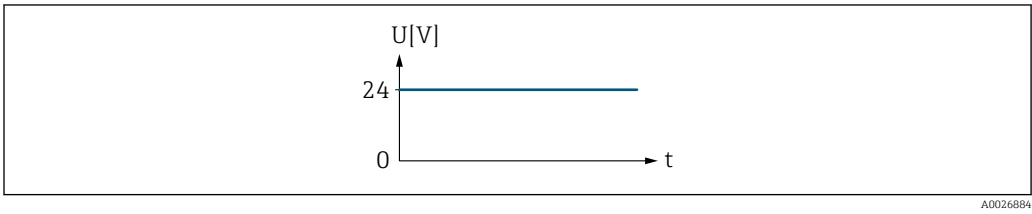
6 Flow-proportional frequency output

"Switch" option

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

Example

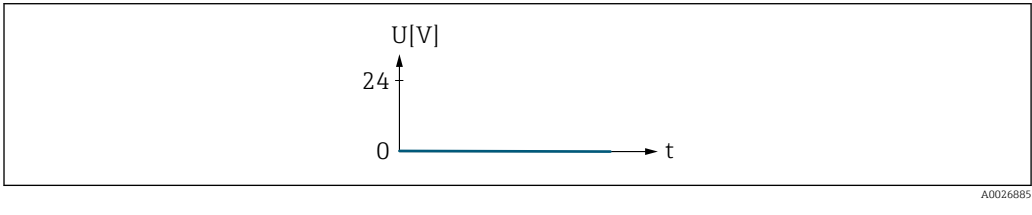
Alarm response without alarm



7 No alarm, high level

Example

Alarm response in case of alarm



8 Alarm, low level

Assign pulse output



Navigation

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

Prerequisite

The **Pulse** option is selected in the **Operating mode** parameter (→ 150).

Description

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

Selection

- Off
- Mass flow
- Volume flow
- Corrected volume flow *
- Target mass flow *
- Carrier mass flow *
- Target volume flow *
- Carrier volume flow *

* Visibility depends on order options or device settings

- Target corrected volume flow *
- Carrier corrected volume flow *
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *

Factory setting Off

Pulse scaling

Navigation	  Expert → Output → PFS output 1 to n → Pulse scaling (0455-1 to n)
Prerequisite	The Pulse option is selected in the Operating mode parameter (→  150) and a process variable is selected in the Assign pulse output parameter (→  152).
Description	Use this function to enter the value for the measured value that a pulse is equivalent to.
User entry	Positive floating point number
Factory setting	Depends on country and nominal diameter →  271
Additional information	<i>User entry</i> Weighting of the pulse output with a quantity. The lower the pulse value, the ■ better the resolution. ■ the higher the frequency of the pulse response.

Pulse width

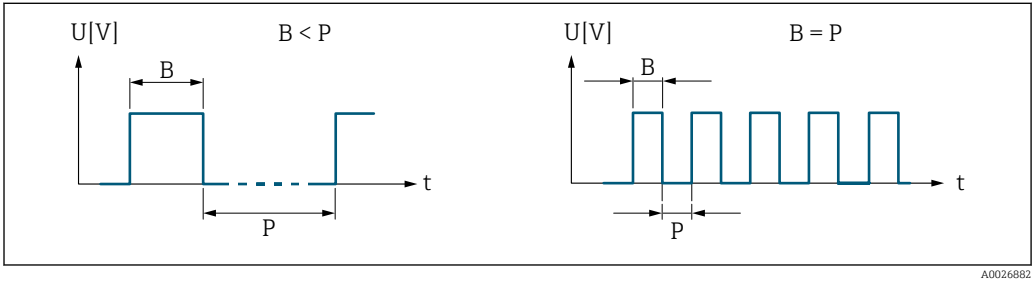
Navigation	  Expert → Output → PFS output 1 to n → Pulse width (0452-1 to n)
Prerequisite	The Pulse option is selected in the Operating mode parameter (→  150) and a process variable is selected in the Assign pulse output parameter (→  152).
Description	Use this function to enter the duration of the output pulse.
User entry	0.05 to 2 000 ms
Factory setting	100 ms

* Visibility depends on order options or device settings

Additional information

Description

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



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 (→ 150), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse output** parameter (→ 152):

- Mass flow
- Volume flow
- Corrected volume flow
- Target mass flow *
- Carrier mass flow *

Description

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

Selection

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

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 flow**
Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
- **Reverse flow**
Negative flow is output, positive flow is not output.
- **Reverse flow compensation**
The flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s.



For a detailed description of the options available, see the **Measuring mode** parameter (→ 141)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 141)

Failure mode**Navigation**

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

Prerequisite

The **Pulse** option is selected in the **Operating mode** parameter (→ 150) and a process variable is selected in the **Assign pulse output** parameter (→ 152).

Description

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

Selection

- **Actual value**
- **No pulses**

Factory setting

No pulses

Additional information*Description*

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

Selection

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

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

Pulse output 1 to n

Navigation

🔍📄 Expert → Output → PFS output 1 to n → Pulse output 1 to n (0456-1 to n)

Prerequisite

The **Pulse** option is selected in the **Operating mode** parameter (→ 📄 150) parameter.

Description

Displays the pulse frequency currently output.

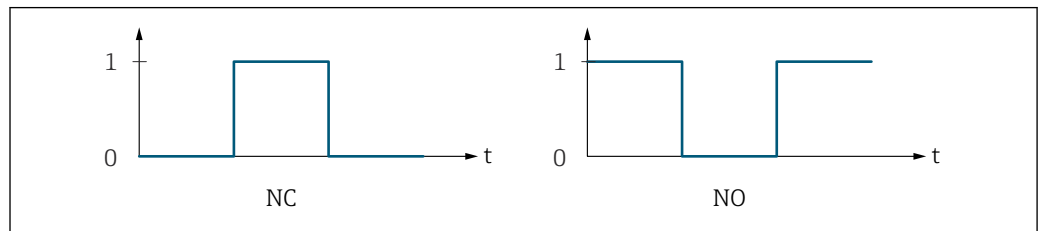
User interface

Positive floating-point number

Additional information

Description

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



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

The output behavior can be reversed via the **Invert output signal** parameter (→ 📄 169) 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 (→ 📄 155)) can be configured.

Assign frequency output



Navigation

🔍📄 Expert → Output → PFS output 1 to n → Assign freq. (0478-1 to n)

Prerequisite

In the **Operating mode** parameter (→ 📄 150), the **Frequency** option is selected.

Description

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

i Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry: Value 1 display** parameter (→ 📄 19)

Selection

- Off
- Mass flow
- Volume flow
- Corrected volume flow *
- Density
- Reference density *

* Visibility depends on order options or device settings

- Time period signal frequency (TPS) *
- Temperature
- Pressure
- Concentration *
- Target mass flow *
- Carrier mass flow *
- Target volume flow *
- Carrier volume flow *
- Target corrected volume flow *
- Carrier corrected volume flow *
- Application specific output 0 *
- Application specific output 1 *
- Inhomogeneous medium index
- Suspended bubbles index *
- HBSI *
- Raw value mass flow
- Exciter current 0
- Oscillation damping 0
- Oscillation damping fluctuation 0 *
- Oscillation frequency 0
- Frequency fluctuation 0 *
- Oscillation amplitude 0 *
- Signal asymmetry
- Torsion signal asymmetry *
- Carrier pipe temperature
- Electronics temperature
- Sensor index coil asymmetry
- Test point 0
- Test point 1

Factory setting Off

Minimum frequency value



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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 150) and a process variable is selected in the **Assign frequency output** parameter (→ 156).

Description Use this function to enter the minimum frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 0.0 Hz

* Visibility depends on order options or device settings

Maximum frequency value



Navigation	Expert → Output → PFS output 1 to n → Max. freq. value (0454–1 to n)
Prerequisite	The Frequency option is selected in the Operating mode parameter (→ 150) and a process variable is selected in the Assign frequency output parameter (→ 156).
Description	Use this function to enter the end value frequency.
User entry	0.0 to 10 000.0 Hz
Factory setting	10 000.0 Hz

Measuring value at minimum frequency



Navigation	Expert → Output → PFS output 1 to n → Val. at min.freq (0476–1 to n)
Prerequisite	The Frequency option is selected in the Operating mode parameter (→ 150) and a process variable is selected in the Assign frequency output parameter (→ 156).
Description	Use this function to enter the measured value for the start value frequency.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter
Additional information	<i>Dependency</i> The entry depends on the process variable selected in the Assign frequency output parameter (→ 156).

Measuring value at maximum frequency



Navigation	Expert → Output → PFS output 1 to n → Val. at max.freq (0475–1 to n)
Prerequisite	The Frequency option is selected in the Operating mode parameter (→ 150) and a process variable is selected in the Assign frequency output parameter (→ 156).
Description	Use this function to enter the measured value for the end value frequency.
User entry	Signed floating-point number
Factory setting	Depends on country and nominal diameter

Additional information*Description*

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

Dependency

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 156).

Measuring mode**Navigation**

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

Prerequisite

In the **Operating mode** parameter (→ 150), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→ 156):

- Mass flow
- Volume flow
- Corrected volume flow
- Target mass flow *
- Carrier mass flow *
- Density
- Reference density
- Concentration *
- Temperature
- Carrier pipe temperature *
- Electronics temperature
- Oscillation frequency 0
- Frequency fluctuation 0
- Oscillation amplitude 0 *
- Oscillation damping 0
- Oscillation damping fluctuation 0
- Signal asymmetry
- Exciter current 0



Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry: Value 1 display** parameter (→ 19)

Description

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

Selection

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

Factory setting

Forward flow

* Visibility depends on order options or device settings

Additional information*Selection*

 For a detailed description of the options available, see the **Measuring mode** parameter (→  141)

Examples

 For a detailed description of the configuration examples, see the **Measuring mode** parameter (→  141)

Damping output**Navigation**

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

Prerequisite

In the **Operating mode** parameter (→  150), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→  156):

- Mass flow
- Volume flow
- Corrected volume flow
- Target mass flow *
- Carrier mass flow *
- Density
- Reference density
- Concentration *
- Temperature
- Carrier pipe temperature *
- Electronics temperature
- Oscillation frequency 0
- Frequency fluctuation 0
- Oscillation amplitude 0 *
- Oscillation damping 0
- Oscillation damping fluctuation 0
- Signal asymmetry
- Exciter current 0

 Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry: Value 1 display** parameter (→  19)

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

* Visibility depends on order options or device settings

Additional information*User entry*

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.

Failure mode**Navigation**

Expert → Output → PFS output 1 to n → Failure mode (0451-1 to n)

Prerequisite

The **Frequency** option is selected in the **Operating mode** parameter (→ 150) and a process variable is selected in the **Assign frequency output** parameter (→ 156).

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

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 frequency (→ 162) 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.

7) proportional transmission behavior with first order delay

Failure frequency 	
Navigation	  Expert → Output → PFS output 1 to n → Failure freq. (0474–1 to n)
Prerequisite	In the Operating mode parameter (→  150), the Frequency option is selected, in the Assign frequency output parameter (→  156) a process variable is selected, and in the Failure mode parameter (→  161), the Defined value option is selected.
Description	Use this function to enter the value for the frequency output in the event of a device alarm in order to bypass the alarm.
User entry	0.0 to 12 500.0 Hz
Factory setting	0.0 Hz
Output frequency 	
Navigation	  Expert → Output → PFS output 1 to n → Output freq. (0471–1 to n)
Prerequisite	In the Operating mode parameter (→  150), the Frequency option is selected.
Description	Displays the actual value of the output frequency which is currently measured.
User interface	0.0 to 12 500.0 Hz
Switch output function 	
Navigation	  Expert → Output → PFS output 1 to n → Switch out funct (0481–1 to n)
Prerequisite	The Switch option is selected in the Operating mode parameter (→  150).
Description	Use this function to select a function for the switch output.
Selection	■ Off ■ On ■ Diagnostic behavior ■ Limit ■ Flow direction 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). ■ Diagnostic behavior Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level. ■ Limit Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level. ■ Flow direction check Indicates the flow direction (forward or reverse flow). ■ Status Displays the device status depending on whether empty pipe detection or low flow cut off is selected.
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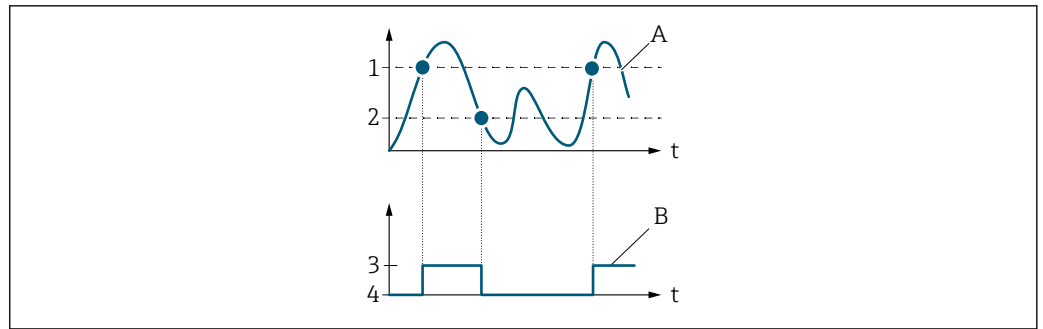
Assign diagnostic behavior



Navigation	Expert → Output → PFS output 1 to n → Assign diag. beh (0482–1 to n)
Prerequisite	■ In the Operating mode parameter (→ 150), the Switch option is selected. ■ In the Switch output function parameter (→ 162), the Diagnostic behavior option is selected.
Description	Use this function to select the diagnostic event category that is displayed for the switch output.
Selection	■ Alarm ■ Alarm or warning ■ Warning
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	■ In the Operating mode parameter (→ 150), the Switch option is selected. ■ In the Switch output function parameter (→ 162), the Limit option is selected.
Description	Use this function to select a process variable for the limit function.
Selection	■ Mass flow ■ Volume flow ■ Corrected volume flow * ■ Target mass flow * ■ Carrier mass flow * ■ Target volume flow * ■ Carrier volume flow * ■ Target corrected volume flow * ■ Carrier corrected volume flow * ■ Density ■ Reference density * ■ Reference density alternative * ■ GSV flow * ■ GSV flow alternative * ■ NSV flow * ■ NSV flow alternative * ■ S&W volume flow * ■ Water cut * ■ Oil density * ■ Water density * ■ Oil mass flow * ■ Water mass flow * ■ Oil volume flow * ■ Water volume flow * ■ Oil corrected volume flow * ■ Water corrected volume flow * ■ Concentration * ■ Temperature ■ Totalizer 1 ■ Totalizer 2 ■ Totalizer 3 ■ Oscillation damping ■ Pressure ■ Application specific output 0 * ■ Application specific output 1 * ■ Inhomogeneous medium index ■ Suspended bubbles index *
Factory setting	Volume flow
Additional information	<i>Description</i> Behavior of status output when Switch-on value > Switch-off value: ■ Process variable > Switch-on value: transistor is conductive ■ Process variable < Switch-off value: transistor is non-conductive

* Visibility depends on order options or device settings

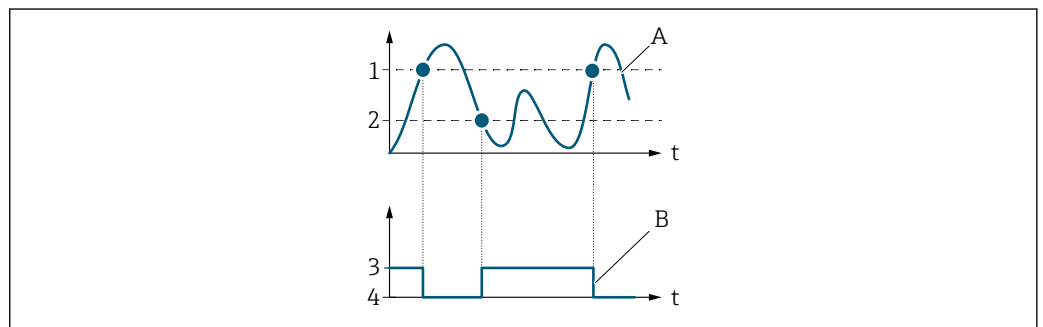


A0026891

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

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

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

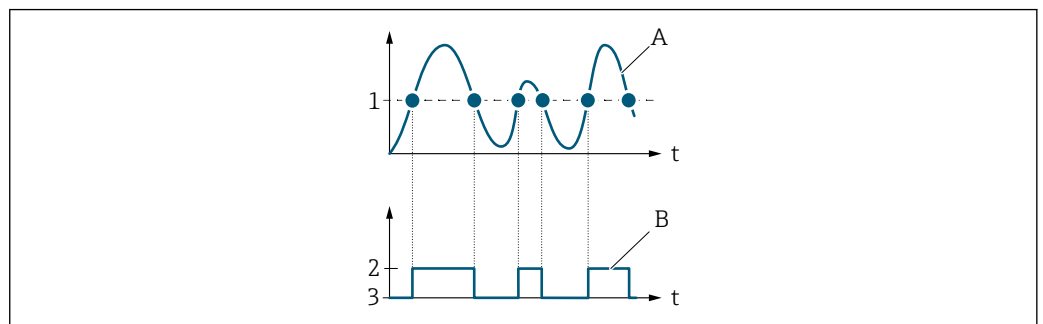


A0026892

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

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

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



A0026893

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

Switch-on value 	
Navigation	 Expert → Output → PFS output 1 to n → Switch-on value (0466–1 to n)
Prerequisite	■ The Switch option is selected in the Operating mode parameter (→  150). ■ The Limit option is selected in the Switch output function parameter (→  162).
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 (→  164).
Switch-off value 	
Navigation	 Expert → Output → PFS output 1 to n → Switch-off value (0464–1 to n)
Prerequisite	■ The Switch option is selected in the Operating mode parameter (→  150). ■ The Limit option is selected in the Switch output function parameter (→  162).
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 (→  164).

Assign flow direction check 	
Navigation	 Expert → Output → PFS output 1 to n → Assign dir.check (0484-1 to n)
Prerequisite	■ The Switch option is selected in the Operating mode parameter (→  150). ■ The Flow direction check option is selected in the Switch output function parameter (→  162).
Description	Use this function to select a process variable for monitoring the flow direction.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Corrected volume 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 (→  150). ■ The Status option is selected in the Switch output function parameter (→  162).
Description	Use this function to select a device status for the switch output.
Selection	■ Partially filled pipe detection ■ Low flow cut off
Factory setting	Partially filled pipe detection
Additional information	<i>Selection</i> If empty pipe detection or low flow cut off are active, 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 (→  150). ■ The Limit option is selected in the Switch output function parameter (→  162).
Description	Use this function to enter a delay time for switching on the switch output.
User entry	0.0 to 100.0 s

* Visibility depends on order options or device settings

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 (→ 150).
- The **Limit** option is selected in the **Switch output function** parameter (→ 162).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Failure mode



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

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

Selection

- Actual status
- Open
- Closed

Factory setting Open

Additional information *Options*

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

Switch state

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 150).

Description Displays the current switch status of the status output.

User interface

- Open
- Closed

Additional information

User interface

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

Invert output signal

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

Description

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

Selection

- No
- Yes

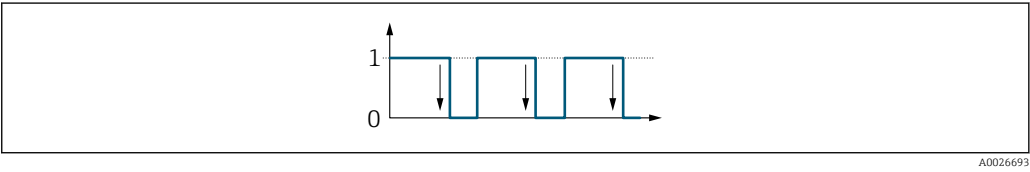
Factory setting

No

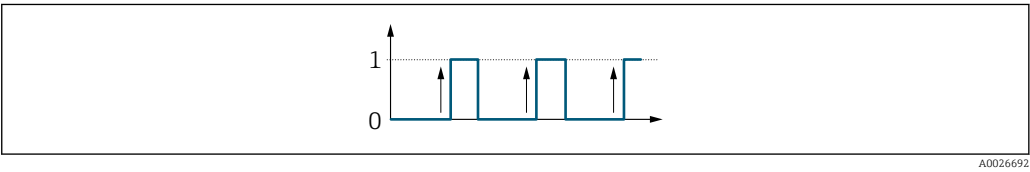
Additional information

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 number (0812-1 to n) →  170

Relay output function (0804-1 to n) →  170

Assign flow direction check (0808-1 to n)	→  171
Assign limit (0807-1 to n)	→  171
Assign diagnostic behavior (0806-1 to n)	→  172
Assign status (0805-1 to n)	→  173
Switch-off value (0809-1 to n)	→  173
Switch-off delay (0813-1 to n)	→  174
Switch-on value (0810-1 to n)	→  174
Switch-on delay (0814-1 to n)	→  175
Failure mode (0811-1 to n)	→  175
Switch state (0801-1 to n)	→  175
Powerless relay status (0816-1 to n)	→  176

Terminal number

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

Relay output function

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

	■ Limit ■ Flow direction check ■ Digital Output
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). ■ Diagnostic behavior Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level. ■ Limit Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level. ■ Flow direction check Indicates the flow direction (forward or reverse flow). ■ Digital Output Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.

Assign flow direction check



Navigation	Expert → Output → Relay output 1 to n → Assign dir.check (0808-1 to n)
Prerequisite	The Flow direction check option is selected in the Relay output function parameter (→ 170).
Description	Use this function to select a process variable for monitoring the flow direction.
Selection	■ Off ■ Volume flow ■ Mass flow ■ Corrected volume flow *
Factory setting	Mass flow

Assign limit



Navigation	Expert → Output → Relay output 1 to n → Assign limit (0807-1 to n)
Prerequisite	The Limit option is selected in the Relay output function parameter (→ 170).
Description	Use this function to select a process variable for the limit value function.

* Visibility depends on order options or device settings

Selection

- Mass flow
- Volume flow
- Corrected volume flow *
- Target mass flow *
- Carrier mass flow *
- Target volume flow *
- Carrier volume flow *
- Target corrected volume flow *
- Carrier corrected volume flow *
- Density
- Reference density *
- Reference density alternative *
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- Concentration *
- Temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Oscillation damping
- Pressure
- Application specific output 0 *
- Application specific output 1 *
- Inhomogeneous medium index
- Suspended bubbles index *

Factory setting

Mass flow

Assign diagnostic behavior**Navigation**

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

Prerequisite

In the **Relay output function** parameter (→ 170), the **Diagnostic behavior** option is selected.

Description

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

* Visibility depends on order options or device settings

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

Assign status

Navigation	 Expert → Output → Relay output 1 to n → Assign status (0805–1 to n)
Prerequisite	In the Relay output function parameter (→  170), the Digital Output option is selected.
Description	Use this function to select the device status for the relay output.
Selection	■ Partially filled pipe detection ■ Low flow cut off
Factory setting	Partially filled pipe detection

Switch-off value

Navigation	 Expert → Output → Relay output 1 to n → Switch-off value (0809–1 to n)
Prerequisite	In the Relay output function parameter (→  170), 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 (→  171).
-------------------------------	---

Switch-off delay	
Navigation	  Expert → Output → Relay output 1 to n → Switch-off delay (0813–1 to n)
Prerequisite	In the Relay output function parameter (→  170), the Limit option is selected.
Description	Use this function to enter a delay time for switching off the switch output.
User entry	0.0 to 100.0 s
Factory setting	0.0 s

Switch-on value	
Navigation	  Expert → Output → Relay output 1 to n → Switch-on value (0810–1 to n)
Prerequisite	The Limit option is selected in the Relay output function parameter (→  170).
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 (→  171).
-------------------------------	---

Switch-on delay



Navigation	 Expert → Output → Relay output 1 to n → Switch-on delay (0814-1 to n)
Prerequisite	In the Relay output function parameter (→  170), 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 state

Navigation	 Expert → Output → Relay output 1 to n → Switch state (0801-1 to n)
Description	Displays the current status of the relay output.
User interface	■ Open ■ Closed

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

3.5.4 "Double pulse output" submenu

Navigation Expert → Output → Double pulse out

► Double pulse output

Master terminal number (0981)

→ 177

Slave terminal number (0990)

→ 177

Signal mode (0991)

→ 177

Assign pulse output (0982)

→ 178

Value per pulse (0983)

→ 178

Pulse width (0986)

→ 179

Phase shift (0992)

→ 179

Measuring mode (0984)

→ 179

Failure mode (0985)	→ 180
Pulse output (0987)	→ 181
Invert output signal (0993)	→ 181

Master terminal number

Navigation	Expert → Output → Double pulse out → Master term. no. (0981)
Description	Displays the master terminal number for the double pulse output.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3)
Additional information	<i>"Not used" option</i> The double pulse output does not use any terminal numbers.

Slave terminal number

Navigation	Expert → Output → Double pulse out → Slave term. no. (0990)
Description	Displays the slave terminal number for the double pulse output.
User interface	■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3)
Additional information	<i>"Not used" option</i> The double pulse output does not use any terminal numbers.

Signal mode



Navigation	Expert → Output → Double pulse out → Signal mode (0991)
Description	Use this function to select the signal mode for the double pulse output.
Selection	■ Passive ■ Active * ■ Passive NE

* Visibility depends on order options or device settings

Factory setting

Passive

Assign pulse output

Navigation

 Expert → Output → Double pulse out → Assign pulse (0982)

Description

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

- Selection
- Off
 - Mass flow
 - Volume flow
 - Corrected volume flow *
 - Target mass flow *
 - Carrier mass flow *
 - Target volume flow *
 - Carrier volume flow *
 - Target corrected volume flow *
 - Carrier corrected volume flow *
 - GSV flow *
 - GSV flow alternative *
 - NSV flow *
 - NSV flow alternative *
 - S&W volume flow *
 - Oil mass flow *
 - Water mass flow *
 - Oil volume flow *
 - Water volume flow *
 - Oil corrected volume flow *
 - Water corrected volume flow *

Factory setting

Off

Value per pulse

Navigation

 Expert → Output → Double pulse out → Value per pulse (0983)

Description

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

User entry

Signed floating-point number

Factory setting

Depends on country and nominal diameter →  271

Additional information

User entry
Weighting of the pulse output with a quantity.
The lower the pulse value, the

- better the resolution.
- the higher the frequency of the pulse response.

*

Visibility depends on order options or device settings

Pulse width

Navigation	 Expert → Output → Double pulse out → Pulse width (0986)
Description	Use this function to enter the duration of the output pulse.
User entry	0.5 to 2 000 ms
Factory setting	0.5 ms
Additional information	 For a detailed description and example: Pulse width parameter (→  153)

Phase shift

Navigation	 Expert → Output → Double pulse out → Phase shift (0992)
Description	Use this function to select the degree of phase shift.
Selection	■ 90° ■ 180°
Factory setting	90°
Additional information	<i>Selection</i> ■ 90° Phase shift by a quarter period. ■ 180° Phase shift by a half period, which is equivalent to a phase reversal.

Measuring mode

Navigation	 Expert → Output → Double pulse out → Measuring mode (0984)
Description	Use this function to select the measuring mode for the double pulse output.
Selection	■ Forward flow ■ Forward/Reverse flow ■ Reverse flow ■ Reverse flow compensation
Factory setting	Forward flow

Additional information*Selection*

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

 For a detailed description of the options available, see the **Measuring mode** parameter (→  141)

Examples

 For a detailed description of the configuration examples, see the **Measuring mode** parameter (→  141)

Failure mode**Navigation**

 Expert → Output → Double pulse out → Failure mode (0985)

Description

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

Selection

- Actual value
- No pulses

Factory setting

No pulses

Additional information*Description*

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

Selection

- Actual value
In the event of a device alarm, the double pulse output continues on the basis of the current flow measurement. The fault is ignored.
- No pulses
In the case of the double pulse output, if a device alarm occurs one pulse output is stopped and the other pulse output runs at the maximum pulse frequency.

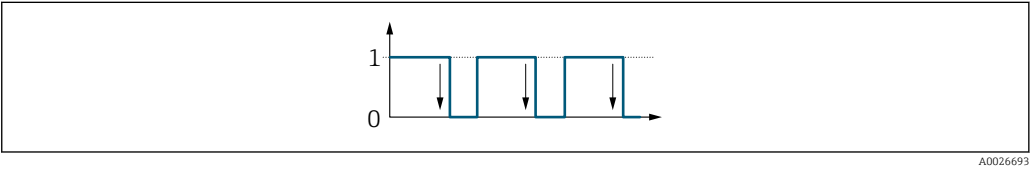
NOTICE! A device alarm is a measuring device error that must be taken seriously. It can affect the measurement quality such that the quality can no longer be guaranteed. The **Actual value** option is only recommended if it can be guaranteed that all possible alarm conditions will not affect the measurement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

Pulse output

Navigation	Expert → Output → Double pulse out → Pulse output (0987)
Description	Displays the pulse frequency of the double pulse output which is currently output.
User interface	Positive floating-point number
Additional information	For a detailed description and example: Pulse output parameter (→ 66)

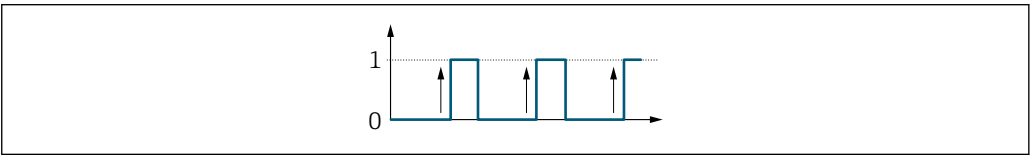
Invert output signal

Navigation	Expert → Output → Double pulse out → Invert outp.sig. (0993)
Description	Use this function to select whether to invert the output signal.
Selection	■ No ■ Yes
Factory setting	No
Additional information	<i>Selection</i> No option (passive - negative)



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Yes option (passive - positive)



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3.6 "Communication" submenu

Navigation Expert → Communication

► Communication

► Modbus configuration

→ 182

► Modbus information	→ 187
► Modbus data map	→ 188
► Web server	→ 188

3.6.1 "Modbus configuration" submenu

Navigation  Expert → Communication → Modbus config.

► Modbus configuration	
Bus address (7112)	→ 182
Baudrate (7111)	→ 183
Data transfer mode (7115)	→ 183
Parity (7122)	→ 183
Byte order (7113)	→ 184
Telegram delay (7146)	→ 185
Failure mode (7116)	→ 185
Bus termination (7155)	→ 186
Fieldbus writing access (7156)	→ 186

Bus address



Navigation	  Expert → Communication → Modbus config. → Bus address (7112)
Description	For entering the device address.
User entry	1 to 247
Factory setting	247

Baudrate



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

Description Use this function to select a transmission rate.

Selection

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

Factory setting 19200 BAUD

Data transfer mode



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

Description Use this function to select the data transmission mode.

Selection

- ASCII
- RTU

Factory setting RTU

Additional information *Options*

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

Parity



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

Description Use this function to select the parity bit.

Selection

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

Factory setting Even

Additional information

Options

Picklist **ASCII** option:

- 0 = **Even** option
- 1 = **Odd** option

Picklist **RTU** option:

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

Byte order

Navigation

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

Description

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

Selection

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

Factory setting

1-0-3-2

Additional information

Description

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

Changing the byte sequence in the host system often requires a extensive knowledge and significant programming efforts. Endress+Hauser introduced the **Byte order** parameter (→ 184) for this reason.

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

Byte transmission sequence

Byte addressing, i.e. the transmission sequence of the bytes, is not specified in the Modbus specification. For this reason, it is important to coordinate or match the addressing method between the master and slave during commissioning. This can be configured in the measuring device using the **Byte order** parameter (→ 184).

The bytes are transmitted depending on the selection in the **Byte order** parameter (→ 184):

FLOAT				
	Sequence			
Options	1.	2.	3.	4.
1 - 0 - 3 - 2 *	Byte 1 (MMMMMMMM)	Byte 0 (MMMMMMMM)	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM)
0 - 1 - 2 - 3	Byte 0 (MMMMMMMM)	Byte 1 (MMMMMMMM)	Byte 2 (EMMMMMMM)	Byte 3 (SEEEEEEE)

2 - 3 - 0 - 1	Byte 2 (EMMMMMMM)	Byte 3 (SEEEEEEE)	Byte 0 (MMMMMMMM)	Byte 1 (MMMMMMMM)
3 - 2 - 1 - 0	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM)	Byte 1 (MMMMMMMM)	Byte 0 (MMMMMMMM)
* = factory setting, S = sign, E = exponent, M = mantissa				

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

STRING					
Presentation taking the example of a device parameter with a data length of 18 bytes.					
	Sequence				
Options	1.	2.	...	17.	18.
1 - 0 - 3 - 2 * 3 - 2 - 1 - 0	Byte 17 (MSB)	Byte 16	...	Byte 1	Byte 0 (LSB)
0 - 1 - 2 - 3 2 - 3 - 0 - 1	Byte 16	Byte 17 (MSB)	...	Byte 0 (LSB)	Byte 1
* = factory setting, MSB = most significant byte, LSB = least significant byte					

Telegram delay



Navigation

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

Description

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

User entry

0 to 100 ms

Factory setting

6 ms

Failure mode



Navigation

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

Description

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

Selection

- NaN value
- Last valid value

Factory setting NaN value

Additional information *Options*

- NaN value
The device outputs the NaN value ⁸⁾.
- Last valid value
The device outputs the last valid measured value before the fault occurred.

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

Bus termination

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

Description Displays whether the terminating resistor is enabled or disabled.

User interface

- Off
- On

Factory setting Off

Additional information *Selection*

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

 For detailed information about enabling the terminating resistor, see the Operating Instructions for the device, "Enabling the terminating resistor" section →  8

Fieldbus writing access

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

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

Selection

- Read + write
- Read only

Factory setting Read + write

8) Not a Number

Additional information

Description

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

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

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

3.6.2 "Modbus information" submenu

Navigation  Expert → Communication → Modbus info

► Modbus information

Device ID (7153)

→  187

Device revision (7154)

→  187

Device ID

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

Description Displays the device ID for identifying the measuring device.

User interface 4-digit hexadecimal number

Device revision

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

Description Displays the device revision.

User interface 4-digit hexadecimal number

3.6.3 "Modbus data map" submenu

Navigation  Expert → Communication → Modbus data map

► Modbus data map

Scan list register 0 to 15 (7114)

→  188

Scan list register 0 to 15



Navigation	 Expert → Communication → Modbus data map → Scan list reg.0 to 15 (7114)
Description	Use this function to enter the scan list register. By entering the register address (1-based), up to 16 device parameters can be grouped by assigning them to the scan list registers 0 to 15. The data of the device parameters assigned here are read out via the register addresses 5051 to 5081.
User entry	1 to 65 535
Factory setting	1

3.6.4 "Web server" submenu

Navigation  Expert → Communication → Web server

► Web server

Web server language (7221)

→  189

MAC address (7214)

→  189

DHCP client (7212)

→  189

IP address (7209)

→  190

Subnet mask (7211)

→  190

Default gateway (7210)

→  190

Web server functionality (7222)

→  191

Login page (7273)

→  191

Web server language

Navigation	  Expert → Communication → Web server → Webserv.language (7221)
Description	Use this function to select the language configured for the Web server.
Selection	■ English ■ Deutsch ■ Français ■ Español ■ Italiano ■ Nederlands ■ Portuguesa ■ Polski ■ русский язык (Russian) ■ Svenska ■ Türkçe ■ 中文 (Chinese) ■ 日本語 (Japanese) ■ 한국어 (Korean) ■ tiếng Việt (Vietnamese) ■ čeština (Czech)
Factory setting	English

MAC address

Navigation	  Expert → Communication → Web server → MAC Address (7214)
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.
Additional information	<i>Example</i> For the display format 00:07:05:10:01:5F

DHCP client

Navigation	  Expert → Communication → Web server → DHCP client (7212)
Description	Use this function to activate and deactivate the DHCP client functionality.

9) Media Access Control

Selection	■ Off ■ On
Factory setting	On
Additional information	Effect If the DHCP client functionality of the web server is selected, the IP address (→ ⓘ 190), Subnet mask (→ ⓘ 190) and Default gateway (→ ⓘ 190) are set automatically. ⓘ ▪ Identification is via the MAC address of the measuring device. ▪ The IP address (→ ⓘ 190) in the IP address parameter (→ ⓘ 190) is ignored as long as the DHCP client parameter (→ ⓘ 189) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ ⓘ 190) in the parameter of the same name is only used if the DHCP client parameter (→ ⓘ 189) is inactive.

IP address

ⓘ

Navigation	ⓘ ⓘ Expert → Communication → Web server → IP address (7209)
Description	Display or enter the IP address of the Web server integrated in the measuring device.
User entry	4 octet: 0 to 255 (in the particular octet)
Factory setting	192.168.1.212

Subnet mask

ⓘ

Navigation	ⓘ ⓘ Expert → Communication → Web server → Subnet mask (7211)
Description	Display or enter the subnet mask.
User entry	4 octet: 0 to 255 (in the particular octet)
Factory setting	255.255.255.0

Default gateway

ⓘ

Navigation	ⓘ ⓘ Expert → Communication → Web server → Default gateway (7210)
Description	Display or enter the Default gateway (→ ⓘ 190).
User entry	4 octet: 0 to 255 (in the particular octet)
Factory setting	0.0.0.0

Web server functionality

Navigation

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

Description

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

Selection

- Off
- HTML Off
- On

Factory setting

On

Additional information

Description

 Once disabled, the Web server functionality can only be enabled again via the local display, the FieldCare operating tool or the DeviceCare operating tool.

Selection

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

Login page

Navigation

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

Description

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

Selection

- Without header
- With header

Factory setting

With header

3.6.5 "WLAN settings" wizard

Navigation  Expert → Communication → WLAN settings

▶ WLAN settings

WLAN (2702)

→  192

WLAN mode (2717)	→  193
SSID name (2714)	→  193
Network security (2705)	→  193
Security identification (2718)	→  194
User name (2715)	→  194
WLAN password (2716)	→  194
WLAN IP address (2711)	→  195
WLAN MAC address (2703)	→  195
WLAN subnet mask (2709)	→  195
WLAN MAC address (2703)	→  195
WLAN passphrase (2706)	→  195
WLAN MAC address (2703)	→  195
Assign SSID name (2708)	→  196
SSID name (2707)	→  196
2.4 GHz WLAN channel (2704)	→  196
Select antenna (2713)	→  197
Connection state (2722)	→  197
Received signal strength (2721)	→  197
WLAN IP address (2711)	→  195
Gateway IP address (2719)	→  198
IP address domain name server (2720)	→  198

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

- WLAN access point
- WLAN Client

Factory setting WLAN access point

SSID name

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

Prerequisite The client is activated.

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

User entry –

Factory setting –

Network security

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

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

Selection

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

Factory setting WPA2-PSK

* Visibility depends on order options or device settings

Additional information*Selection*

- Unsecured
Access the WLAN connection without identification.
- WPA2-PSK
Access the WLAN connection with a network key.
- EAP-PEAP with MSCHAPv2
Access the WLAN connection with a password-based authentication protocol.
- EAP-PEAP MSCHAPv2 no server authentic.
Access the WLAN connection with a password-based protocol without server authentication.
- EAP-TLS
Access the WLAN connection with a certificate-based, two-way authentication of the client and network.

Security identification**Navigation**
 Expert → Communication → WLAN settings → Sec. identific. (2718)
Description

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

User interface

- Trusted issuer certificate
- Device certificate
- Device private key

User name**Navigation**
 Expert → Communication → WLAN settings → User name (2715)
Description

Use this function to enter the username of the WLAN network.

User entry

–

Factory setting

–

WLAN password**Navigation**
 Expert → Communication → WLAN settings → WLAN password (2716)
Description

Use this function to enter the WLAN password for the WLAN network.

User entry

–

Factory setting

–

WLAN IP address



Navigation	 Expert → Communication → WLAN settings → WLAN IP address (2711)
Description	Use this function to enter the IP address of the measuring device's WLAN connection.
User entry	4 octet: 0 to 255 (in the particular octet)
Factory setting	192.168.1.212

WLAN MAC address

Navigation	 Expert → Communication → WLAN settings → WLAN MAC address (2703)
Description	Displays the MAC ¹⁰⁾ address of the measuring device.
User interface	Unique 12-digit character string comprising letters and numbers
Factory setting	Each measuring device is given an individual address.
Additional information	<i>Example</i> 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 (→  193).
Description	Use this function to enter the network key.

¹⁰⁾ Media Access Control

User entry 8 to 32-digit character string comprising numbers, letters and special characters (without spaces)

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

Assign SSID name

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

Description Use this function to select which name is used for the SSID ¹¹⁾.

Selection

- Device tag
- User-defined

Factory setting User-defined

Additional information *Selection*

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

SSID name

Navigation   Expert → Communication → WLAN settings → SSID name (2707)

Prerequisite

- The **User-defined** option is selected in the **Assign SSID name** parameter (→  196).
- The **WLAN access point** option is selected in the **WLAN mode** parameter (→  193).

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_Cubemass_300_A802000)

2.4 GHz WLAN channel

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

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

User entry 1 to 11

¹¹⁾ Service Set Identifier

Factory setting 6

Additional information *Description*



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

Select antenna



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

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

Selection

- External antenna
- Internal antenna

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

Received signal 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 address

Navigation	 Expert → Communication → WLAN settings → Gateway IP addr. (2719)
Description	Use this function to enter the IP address of the gateway.
User interface	Character string comprising numbers, letters and special characters
Factory setting	192.168.1.212

IP address domain name server

Navigation	 Expert → Communication → WLAN settings → IP address DNS (2720)
Description	Use this function to enter the IP address of the domain name server.
User interface	Character string comprising numbers, letters and special characters
Factory setting	192.168.1.212

3.7 "Application" submenu

Navigation

 Expert → Application

▶ Application

Reset all totalizers (2806)

→  198

▶ Totalizer

→  199

Reset all totalizers

Navigation	 Expert → Application → Reset all tot. (2806)
Description	Use this function to reset all totalizers to the value 0 and restart the totaling process. This deletes all the flow values previously 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 totalized.

3.7.1 "Totalizer 1 to n" submenu*Navigation*
 Expert → Application → Totalizer 1 to n

► Totalizer 1 to n		
Assign process variable (0914-1 to n)	→	 199
Unit totalizer 1 to n (0915-1 to n)	→	 200
Totalizer operation mode (0908-1 to n)	→	 201
Control Totalizer 1 to n (0912-1 to n)	→	 202
Preset value 1 to n (0913-1 to n)	→	 202
Failure mode (0901-1 to n)	→	 203

Assign process variable**Navigation**
 Expert → Application → Totalizer 1 to n → Assign variable (0914-1 to n)
Description

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

Selection

- Off
- Mass flow
- Volume flow
- Corrected volume flow *
- Target mass flow *
- Carrier mass flow *
- Target volume flow *
- Carrier volume flow *
- Target corrected volume flow *
- Carrier corrected volume flow *
- Raw value mass flow

* Visibility depends on order options or device settings

Factory setting Mass flow

Additional information Description

 If the option selected is changed, the device resets the totalizer to 0.

Selection

If the **Off** option is selected, only the **Assign process variable** parameter (→  199) is still displayed in the **Totalizer 1 to n** submenu. All other parameters in the submenu are hidden.

Unit totalizer 1 to n

Navigation  Expert → Application → Totalizer 1 to n → Unit totalizer 1 to n (0915-1 to n)

Prerequisite A process variable is selected in the **Assign process variable** parameter (→  199) of the **Totalizer 1 to n** submenu.

Description Use this function to select the process variable unit for the Totalizer 1 to n (→  199).

Selection

SI units	US units
■ g [*]	■ oz [*]
■ kg [*]	■ lb [*]
■ t [*]	■ STon [*]

* Visibility depends on order options or device settings

or

SI units	US units	Imperial units
■ cm ³ [*]	■ af [*]	■ gal (imp) [*]
■ dm ³ [*]	■ ft ³ [*]	■ Mgal (imp) [*]
■ m ³ [*]	■ Mft ³ [*]	■ bbl (imp;oil) [*]
■ ml [*]	■ Mft ³ [*]	
■ l [*]	■ fl oz (us) [*]	
■ hl [*]	■ gal (us) [*]	
■ Ml Mega [*]	■ kgal (us) [*]	
	■ Mgal (us) [*]	
	■ bbl (us;oil) [*]	
	■ bbl (us;tank) [*]	

* Visibility depends on order options or device settings

or

US units	Imperial units
■ bbl (us;liq.) [*]	■ bbl (imp;beer) [*]
■ bbl (us;beer) [*]	

* Visibility depends on order options or device settings

or

SI units

- Nl^*
- Nhl^*
- Nm^3^*
- Sl^*
- Sm^3^*

US units

- Sft^3^*
- MSft^3^*
- MMSft^3^*
- Sgal (us)^*
- Sbbl (us;liq.)^*
- Sbbl (us;oil)^*

Imperial units

- Sgal (imp)^*

* Visibility depends on order options or device settings

or

Other units

- None^*

* Visibility depends on order options or device settings

Factory setting

Depends on country:

- 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 (→ 69).

Selection

The selection is dependent on the process variable selected in the **Assign process variable** parameter (→ 199).

Totalizer operation mode**Navigation**

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

Prerequisite

A process variable is selected in the **Assign process variable** parameter (→ 199) of the **Totalizer 1 to n** submenu.

Description

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

Selection

- Net
- Forward
- Reverse

Factory setting

Net

Additional information*Selection*

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

Control Totalizer 1 to n

Navigation	 Expert → Application → Totalizer 1 to n → Control Tot. 1 to n (0912–1 to n)
Prerequisite	A process variable is selected in the Assign process variable parameter (→  199) of the Totalizer 1 to n submenu.
Description	Use this function to select the control of totalizer value 1-3.
Selection	■ Totalize ■ Reset + hold * ■ Preset + hold * ■ Reset + totalize ■ Preset + totalize * ■ Hold *
Factory setting	Totalize
Additional information	<i>Selection</i>

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 ¹⁾	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 ¹⁾	The totalizer is set to the defined start value in the Preset value parameter and the totaling process is restarted.
Hold	Totalizing is stopped.

1) Visible depending on the order options or device settings

Preset value 1 to n

Navigation	 Expert → Application → Totalizer 1 to n → Preset value 1 to n (0913–1 to n)
Prerequisite	A process variable is selected in the Assign process variable parameter (→  199) of the Totalizer 1 to n submenu.
Description	Use this function to enter a start value for the Totalizer 1 to n.
User entry	Signed floating-point number
Factory setting	Country-specific: ■ 0 kg ■ 0 lb

* Visibility depends on order options or device settings

Additional information*User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 200).

Example

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

Failure mode**Navigation**

Expert → Application → Totalizer 1 to n → Failure mode (0901–1 to n)

Prerequisite

A process variable is selected in the **Assign process variable** parameter (→ 199) of the **Totalizer 1 to n** submenu.

Description

Use this function to select how a totalizer behaves in the event of a device alarm.

Selection

- Hold
- Continue
- Last valid value + continue

Factory setting

Hold

Additional information*Description*

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

Selection

- Stop
The totalizer is stopped in the event of a device alarm.
- Actual value
The totalizer continues to count based on the actual (current) 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 → 8

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 →  8

Navigation  Expert → Application → Petroleum

▶ Petroleum

3.7.4 "Application specific calculations" submenu

 Only available if "Application-specific calculations" has been ordered.

Navigation  Expert → Application → Appl.spec. calc.

▶ Application specific calculations

▶ Application-specific parameters

→  204

▶ Process variables

→  207

"Application-specific parameters" submenu

 Only available if "Application-specific calculations" has been ordered.

Navigation  Expert → Application → Appl.spec. calc. → Appl.spec.param.

▶ Application-specific parameters

Parameter 0 (6358)

→  205

Parameter 1 (6359)

→  205

Parameter 2 (6360)

→  205

Parameter 3 (6361)

Parameter 4 (6345)

Parameter 5 (6346)

Parameter 6 (6347)

Parameter 7 (6348)

Parameter 8 (6349)

Parameter 9 (6350)

Parameter 0 	
Navigation	  Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 0 (6358)
Description	Enter application specific value 0 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0
Parameter 1 	
Navigation	  Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 1 (6359)
Description	Enter application specific value 1 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0
Parameter 2 	
Navigation	  Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 2 (6360)
Description	Enter application specific value 2 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0
Parameter 3 	
Navigation	  Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 3 (6361)
Description	Enter application specific value 3 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 4



Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 4 (6345)
Description	Enter application specific value 4 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 5



Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 5 (6346)
Description	Enter application specific value 5 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 6



Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 6 (6347)
Description	Enter application specific value 6 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 7



Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 7 (6348)
Description	Enter application specific value 7 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 8		
Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 8 (6349)	
Description	Enter application specific value 8 for application specific calculation.	
User entry	Signed floating-point number	
Factory setting	0	

Parameter 9		
Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 9 (6350)	
Description	Enter application specific value 9 for application specific calculation.	
User entry	Signed floating-point number	
Factory setting	0	

"Process variables" submenu

Only available if "Application-specific calculations" has been ordered.

Navigation Expert → Application → Appl.spec. calc. → Process variab.

► Process variables

Application specific input 0 (6366)

→ 207

Application specific input 1 (6367)

→ 208

Application specific output 0 (6364)

→ 209

Application specific output 1 (6365)

→ 209

Application specific input 0	
Navigation	Expert → Application → Appl.spec. calc. → Process variab. → Spec. input 0 (6366)
Description	Shows the application specific input value 0 used for the application specific calculation.

User interface Signed floating-point number

Factory setting 0

Fail-safe type application specific 0

Navigation  Expert → Application → Appl.spec. calc. → Process variab. → FSTypeAppSpec 0 (2098)

Description Use this function to select the failsafe mode for the application-specific input value 0.

Selection

- Fail-safe value
- Fallback value
- Off

Factory setting Off

Fail-safe value application specific 0



Navigation  Expert → Application → Appl.spec. calc. → Process variab. → FSValueAppSpec 0 (2099)

Description Use this function to enter the failsafe value for the application-specific input value 0.

User entry Signed floating-point number

Factory setting 0

Application specific input 1

Navigation  Expert → Application → Appl.spec. calc. → Process variab. → Spec. input 1 (6367)

Description Shows the application specific input value 1 used for the application specific calculation.

User interface Signed floating-point number

Factory setting 0

Fail-safe type application specific 1

Navigation	  Expert → Application → Appl.spec. calc. → Process variab. → FSTypeAppSpec 1 (2100)
Description	Use this function to select the failsafe mode for the application-specific input value 1.
Selection	■ Fail-safe value ■ Fallback value ■ Off
Factory setting	Off

Fail-safe value application specific 1



Navigation	  Expert → Application → Appl.spec. calc. → Process variab. → FSValueAppSpec 1 (65535)
Description	Use this function to enter the failsafe value for the application-specific input value 1.
User entry	Signed floating-point number
Factory setting	0

Application specific output 0

Navigation	  Expert → Application → Appl.spec. calc. → Process variab. → Spec. output 0 (6364)
Description	Shows the calculated application specific output value 0.
User interface	Signed floating-point number
Factory setting	0

Application specific output 1

Navigation	  Expert → Application → Appl.spec. calc. → Process variab. → Spec. output 1 (6365)
Description	Shows the calculated specific output value 1.
User interface	Signed floating-point number
Factory setting	0

3.7.5 "Medium index" submenu

The following additional parameters and settings are part of the Gas Fraction Handler function. Due to its use of two operating frequencies (MFT - Multi-Frequency-Technology), Promass Q can provide additional diagnostic information about entrained gas that is suspended in the process liquid and the measured density is > 400 kg/m³. The gas typically occurs in viscous liquids in the form of microbubbles or small bubbles.

Navigation  Expert → Application → Medium index

► Medium index

Inhomogeneous medium index (6368)

→  211

Cut off inhomogeneous wet gas (6375)

→  210

Cut off inhomogeneous liquid (6374)

→  210

Suspended bubbles index (6376)

→  212

Cut off suspended bubbles (6370)

→  211

Cut off inhomogeneous wet gas

Navigation	 Expert → Application → Medium index → Cut off inh. gas (6375)
Description	Enter cut off value for wet gas applications. Below this value the 'Inhomogeneous medium index' is set to 0.
User entry	Positive floating-point number
Factory setting	0.25
Additional information	This parameter is used for wet gas applications. If the 'Index inhomogeneous medium' drops below this value and the measured density is < 400 kg/m³, the 'Index inhomogeneous medium' is reported as zero.

Cut off inhomogeneous liquid

Navigation	 Expert → Application → Medium index → Cut off liquid (6374)
Description	Enter cut off value for liquid applications. Below this value the 'Inhomogeneous medium index' is set to 0.
User entry	Positive floating-point number
Factory setting	0.05

Additional information	This parameter is used for entrained gas in liquid applications or for solids in liquid applications. If the 'Index inhomogeneous medium' drops below this value and the measured density is $< 400 \text{ kg/m}^3$, the 'Index inhomogeneous medium' is reported as zero.
-------------------------------	---

Inhomogeneous medium index

Navigation	 Expert → Application → Medium index → InhomogMedIndex (6368)
Description	Shows the degree of inhomogeneity of the medium.
User interface	Signed floating-point number
Additional information	■ The 'Index inhomogeneous medium' diagnostic indicates the overall scale of two-phase flow associated with free bubbles. ■ If the liquid does not contain entrained gas, the value is 0. For very high levels of gas content (e.g. associated with slug flow), the value is over 10. ■ The diagnostic index generally increases with an increasing gas volume content. The index will not saturate with an excessive second phase. ■ Although the index shows a qualitative correlation to the severity of gas entrainment, it should not be understood on a one-to-one basis as the gas volume content. ■ The 'Index inhomogeneous medium' is reproducible under the same entrained gas conditions and can help to better understand the process conditions and the level of gas entrainment in relative terms. ■ Similarly, the diagnostic index can also be used to describe the relative share of solids in a liquid application or the relative share of a liquid phase in a wet gas application.

Cut off suspended bubbles



Navigation	 Expert → Application → Medium index → Cut off bubbles (6370)
Prerequisite	The parameter is only available for Promass Q.
Description	Enter the cut off value for suspended bubbles. Below this value the 'Index for suspended bubbles' is set to 0.
User entry	Positive floating-point number
Factory setting	0.05
Additional information	This parameter is used for gas entrained in liquid applications in the form of suspended bubbles. If the 'Index inhomogeneous medium' drops below this value, the 'Index inhomogeneous medium' is reported as zero.

Suspended bubbles index

Navigation	 Expert → Application → Medium index → SuspBubblesIndex (6376)
Prerequisite	The diagnostic index is only available for Promass Q.
Description	Shows the relative amount of suspended bubbles in the medium.
User interface	Signed floating-point number
Additional information	■ This diagnostic index value describes the relative amount of microbubbles or small suspended bubbles in a process medium. ■ If there is no entrained gas in the form of suspended bubbles in a liquid, the value is 0 or nearly 0, and for very high levels of suspended gas the value exceeds 10. ■ The diagnostic index generally increases with increasing gas volumes, but the scaling is not linear in relation to the percentage gas content. ■ The index will not saturate with an excessive second phase. ■ The 'Index inh. medium' can help to better understand the process conditions and the level of gas entrainment in relative terms, but the index values cannot be interpreted on an absolute basis.

3.8 "Diagnostics" submenu

Navigation  Expert → Diagnostics

► Diagnostics		
Actual diagnostics (0691)	→ 	213
Previous diagnostics (0690)	→ 	214
Operating time from restart (0653)	→ 	215
Operating time (0652)	→ 	215
► Diagnostic list	→ 	215
► Event logbook	→ 	219
► Device information	→ 	221
► Main electronic module + I/O module 1	→ 	225
► Sensor electronic module (ISEM)	→ 	226
► I/O module 2	→ 	227

► I/O module 3	→ 228
► Display module	→ 230
► Data logging	→ 231
► Min/max values	→ 241
► Heartbeat Technology	→ 247
► Simulation	→ 260

Actual diagnostics

Navigation	Expert → Diagnostics → Actual diagnos. (0691)
Prerequisite	A diagnostic event has occurred.
Description	Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.
User interface	Symbol for diagnostic behavior, diagnostic code and short message.
Additional information	<i>Display</i> Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→ 215). Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key. <i>Example</i> For the display format: ⊗F271 Main electronic failure

Timestamp

Navigation	Expert → Diagnostics → Timestamp
Description	Displays the operating time when the current diagnostic message occurred.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

Additional information*Display*

The diagnostic message can be viewed via the **Actual diagnostics** parameter (→ 213).

Example

For the display format:

24d12h13m00s

Previous diagnostics

Navigation

Expert → Diagnostics → Prev.diagnostics (0690)

Prerequisite

Two diagnostic events have already occurred.

Description

Displays the diagnostic message that occurred before the current message.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information*Display*

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

Example

For the display format:

⊗F271 Main electronic failure

Timestamp

Navigation

Expert → Diagnostics → Timestamp

Description

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

User interface

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

Additional information*Display*

The diagnostic message can be viewed via the **Previous diagnostics** parameter (→ 214).

Example

For the display format:

24d12h13m00s

Operating time from restart

Navigation	 Expert → Diagnostics → Time fr. restart (0653)
Description	Use this function to display the time the device has been in operation since the last device restart.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

Operating time

Navigation	 Expert → Diagnostics → Operating time (0652)
Description	Use this function to display the length of time the device has been in operation.
User interface	Days (d), hours (h), minutes (m) and seconds (s)
Additional information	<i>User interface</i> 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)	→	 215
Diagnostics 2 (0693)	→	 216
Diagnostics 3 (0694)	→	 217
Diagnostics 4 (0695)	→	 218
Diagnostics 5 (0696)	→	 219

Diagnostics 1

Navigation	 Expert → Diagnostics → Diagnostic list → Diagnostics 1 (0692)
Description	Displays the current diagnostics message with the highest priority.

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information *Display*



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

Examples

For the display format:

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

Timestamp 1

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 (→ 215).

Example

For the display format:

24d12h13m00s

Diagnostics 2

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 2 (0693)

Description Displays the current diagnostics message with the second-highest priority.

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information *Display*



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

Examples

For the display format:

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

Timestamp 2

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	<i>Display</i>  The diagnostic message can be viewed via the Diagnostics 2 parameter (→  216). <i>Example</i> For the display format: 24d12h13m00s

Diagnostics 3

Navigation	  Expert → Diagnostics → Diagnostic list → Diagnostics 3 (0694)
Description	Displays the current diagnostics message with the third-highest priority.
User interface	Symbol for diagnostic behavior, diagnostic code and short message.
Additional information	<i>Display</i>  Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key. <i>Examples</i> For the display format: ■  F271 Main electronic failure ■  F276 I/O module failure

Timestamp 3

Navigation	 Expert → Diagnostics → Diagnostic list → Timestamp
Description	Displays the operating time when the diagnostic message with the third-highest priority occurred.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

Additional information*Display*

 The diagnostic message can be viewed via the **Diagnostics 3** parameter (→  217).

Example

For the display format:
24d12h13m00s

Diagnostics 4

Navigation

  Expert → Diagnostics → Diagnostic list → Diagnostics 4 (0695)

Description

Displays the current diagnostics message with the fourth-highest priority.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information*Display*

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

Examples

For the display format:

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

Timestamp 4

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 (→  218).

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	<i>Display</i>  Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key. <i>Examples</i> For the display format: ■  F271 Main electronic failure ■  F276 I/O module failure

Timestamp 5

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 (→  219). <i>Example</i> For the display format: 24d12h13m00s

3.8.2 "Event logbook" submenu

Viewing event messages

Event messages are displayed in chronological order. The event history includes both diagnostic events and information events. The symbol in front of the timestamp indicates whether the event has started or ended.

Navigation  Expert → Diagnostics → Event logbook

▶ Event logbook

Filter options (0705)

→ 220

► Event list

→ 220

Filter options

Navigation	Expert → Diagnostics → Event logbook → Filter options (0705)
Description	Use this function to select the category whose event messages are displayed in the event list of the local display.
Selection	■ All ■ Failure (F) ■ Function check (C) ■ Out of specification (S) ■ Maintenance required (M) ■ Information (I)
Factory setting	All
Additional information	<i>Description</i> 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 → 221

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 (→  220).
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 electronic failure  01d04h12min30s <i>HistoROM</i> A HistoROM is a "non-volatile" device memory in the form of an EEPROM.

3.8.3 "Device information" submenu

Navigation  Expert → Diagnostics → Device info

► Device information

Device tag

Serial number

Firmware version

Device name

Order code

→  222

→  222

→  223

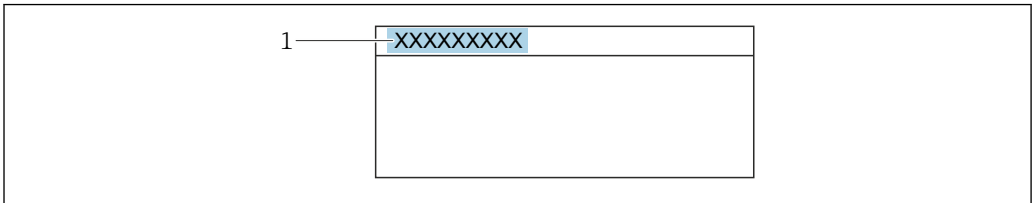
→  223

→  223

Extended order code 1	→ 224
Extended order code 2	→ 224
Extended order code 3	→ 224
ENP version	→ 224

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. It 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



A0029422

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. i The number can be found on the nameplate of the sensor and transmitter.
User interface	Max. 11-digit character string comprising letters and numbers.
Additional information	Description i 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.

Extended order code 1



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

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

User interface Character string

Additional information *Description*
The extended order code indicates the version of all the features of the product structure for the measuring device and thus uniquely identifies the measuring device.
 The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.

Extended order code 2



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

Description Displays the second part of the extended order code.

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→  224)

Extended order code 3



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

Description Displays the third part of the extended order code.

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→  224)

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

Navigation  Expert → Diagnostics 1 → Main elec.+I/O1

► Main electronic module + I/O module 1

Firmware version

→  225

Build no. software

→  225

Bootloader revision

→  225

Firmware version

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

Build no. software

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

Bootloader revision

Navigation	 Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)
Description	Use this function to display the bootloader revision of the software.

User interface

Positive integer

3.8.5 "Sensor electronic module (ISEM)" submenu

Navigation

 Expert → Diagnostics → Sens. electronic

► Sensor electronic module (ISEM)

Firmware version (0072)

→  226

Build no. software (0079)

→  226

Bootloader revision (0073)

→  226

Firmware version

Navigation

 Expert → Diagnostics → Sens. electronic → Firmware version (0072)

Description

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

User interface

Positive integer

Build no. software

Navigation

 Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)

Description

Use this function to display the software build number of the module.

User interface

Positive integer

Bootloader revision

Navigation

 Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

Description

Use this function to display the bootloader revision of the software.

User interface

Positive integer

3.8.6 "I/O module 2" submenu

Navigation  Expert → Diagnostics → I/O module 2

► I/O module 2		
I/O module 2 terminal numbers (3902-2)	→ 	227
Firmware version (0072)	→ 	227
Build no. software (0079)	→ 	227
Bootloader revision (0073)	→ 	228

I/O module 2 terminal numbers

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

Firmware version

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

Build no. software

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

Bootloader revision

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

3.8.7 "I/O module 3" submenu

Navigation  Expert → Diagnostics → I/O module 3

► I/O module 3

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

Firmware version (0072)

Build no. software (0079)

Bootloader revision (0073)

→  228

→  228

→  229

→  229

I/O module 3 terminal numbers

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

Firmware version

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

Build no. software

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

Bootloader revision

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

3.8.8 "I/O module 4" submenu

Navigation  Expert → Diagnostics → I/O module 4

► I/O module 4		
I/O module 4 terminal numbers (3902-4)	→ 	229
Firmware version (0072)	→ 	230
Build no. software (0079)	→ 	230
Bootloader revision (0073)	→ 	230

I/O module 4 terminal numbers

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

Firmware version

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

Build no. software

Navigation	  Expert → Diagnostics → I/O module 4 → Build no. softw. (0079)
Description	Use this function to display the software build number of the module.
User interface	Positive integer

Bootloader revision

Navigation	  Expert → Diagnostics → I/O module 4 → Bootloader rev. (0073)
Description	Use this function to display the bootloader revision of the software.
User interface	Positive integer

3.8.9 "Display module" submenu

Navigation   Expert → Diagnostics → Display module

► Display module

Firmware version (0072)

→  231

Build no. software (0079)

→  231

Bootloader revision (0073)

→  231

Firmware version

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

Build no. software

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

Bootloader revision

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

3.8.10 "Data logging" submenu

Navigation   Expert → Diagnostics → Data logging

► Data logging		
Assign channel 1 (0851)	→	 232
Assign channel 2 (0852)	→	 234
Assign channel 3 (0853)	→	 234
Assign channel 4 (0854)	→	 235
Logging interval (0856)	→	 235
Clear logging data (0855)	→	 236

Data logging (0860)	→ ⓘ 236
Logging delay (0859)	→ ⓘ 236
Data logging control (0857)	→ ⓘ 237
Data logging status (0858)	→ ⓘ 237
Entire logging duration (0861)	→ ⓘ 238
► Display channel 1	→ ⓘ 238
► Display channel 2	→ ⓘ 239
► Display channel 3	→ ⓘ 240
► Display channel 4	→ ⓘ 240

Assign channel 1



Navigation

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

Prerequisite

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

 The software options currently enabled are displayed in the **Software option overview** parameter (→ ⓘ 54).

Description

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

Selection

- Off
- Mass flow
- Volume flow
- Corrected volume flow *
- Density
- Reference density *
- Temperature
- Pressure
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Reference density alternative *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *

* Visibility depends on order options or device settings

- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- Target mass flow *
- Carrier mass flow *
- Concentration *
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Reference density alternative *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- Target volume flow *
- Carrier volume flow *
- Target corrected volume flow *
- Carrier corrected volume flow *
- Application specific output 0 *
- Application specific output 1 *
- Inhomogeneous medium index
- Suspended bubbles index *
- HBSI *
- Raw value mass flow
- Exciter current 0
- Oscillation damping 0
- Oscillation damping fluctuation 0 *
- Oscillation frequency 0
- Frequency fluctuation 0 *
- Signal asymmetry
- Torsion signal asymmetry *
- Carrier pipe temperature *
- Frequency fluctuation 0 *
- Oscillation amplitude *
- Oscillation damping fluctuation 0 *
- Electronics temperature
- Sensor index coil asymmetry
- Test point 0
- Test point 1
- Current output 1 *
- Current output 2 *
- Current output 3 *
- Current output 4 *

Factory setting

Off

* Visibility depends on order options or device settings

Additional information	<i>Description</i> A total of 1000 measured values can be logged. This means: ■ 1000 data points if 1 logging channel is used ■ 500 data points if 2 logging channels are used ■ 333 data points if 3 logging channels are used ■ 250 data points if 4 logging channels are used Once the maximum number of data points is reached, the oldest data points in the data log are cyclically overwritten in such a way that the last 1000, 500, 333 or 250 measured values are always in the log (ring memory principle).  The log contents are cleared if the option selected is changed.
-------------------------------	---

Assign channel 2

Navigation	  Expert → Diagnostics → Data logging → Assign chan. 2 (0852)
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the Software option overview parameter (→  54).
Description	Use this function to select a process variable for the data logging channel.
Selection	For the picklist, see the Assign channel 1 parameter (→  232)
Factory setting	Off

Assign channel 3

Navigation	  Expert → Diagnostics → Data logging → Assign chan. 3 (0853)
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the Software option overview parameter (→  54).
Description	Use this function to select a process variable for the data logging channel.
Selection	For the picklist, see the Assign channel 1 parameter (→  232)
Factory setting	Off

Assign channel 4 	
Navigation	 Expert → Diagnostics → Data logging → Assign chan. 4 (0854)
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the Software option overview parameter (→  54).
Description	Use this function to select a process variable for the data logging channel.
Selection	For the picklist, see the Assign channel 1 parameter (→  232)
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 Software option overview parameter (→  54).
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 data



Navigation	 Expert → Diagnostics → Data logging → Clear logging (0855)
Prerequisite	The Extended HistoROM application package is available.  The software options currently enabled are displayed in the Software option overview parameter (→  54).
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 (→  236), the Not overwriting option is selected.
Description	Use this function to enter the time delay for measured value logging.
User entry	0 to 999 h

Factory setting 0 h

Additional information *Description*

Once data logging has been started with the **Data logging control** parameter (→  237), the device does not save any data for the duration of the delay time entered.

Data logging control

Navigation   Expert → Diagnostics → Data logging → Data log.control (0857)

Prerequisite In the **Data logging** parameter (→  236), the **Not overwriting** option is selected.

Description Use this function to start and stop measured value logging.

Selection

- None
- Delete + start
- Stop

Factory setting None

Additional information *Selection*

- None
Initial measured value logging status.
- Delete + start
All the measured values recorded for all the channels are deleted and measured value logging starts again.
- Stop
Measured value logging is stopped.

Data logging status

Navigation   Expert → Diagnostics → Data logging → Data log. status (0858)

Prerequisite In the **Data logging** parameter (→  236), the **Not overwriting** option is selected.

Description Displays the measured value logging status.

User interface

- Done
- Delay active
- Active
- Stopped

Factory setting Done

Additional information	Selection
	■ Done
	Measured value logging has been performed and completed successfully.
	■ Delay active
	Measured value logging has been started but the logging interval has not yet elapsed.
	■ Active
	The logging interval has elapsed and measured value logging is active.
	■ Stopped
	Measured value logging is stopped.

Entire logging duration

Navigation	Expert → Diagnostics → Data logging → Logging duration (0861)
Prerequisite	In the Data logging parameter (→ 236), the Not overwriting option is selected.
Description	Displays the total logging duration.
User interface	Positive floating-point number
Factory setting	0 s

"Display channel 1" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 1

► Display channel 1

Display channel 1 → 238

Display channel 1

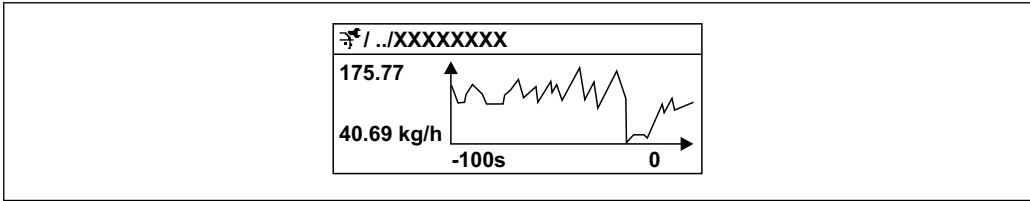
Navigation	Expert → Diagnostics → Data logging → Displ.channel 1
Prerequisite	The Extended HistoROM application package is available. The software options currently enabled are displayed in the Software option overview parameter (→ 54). One of the following options is selected in the Assign channel 1 parameter (→ 232): ■ Mass flow ■ Volume flow ■ Corrected volume flow ■ Target mass flow[*]

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

- Carrier mass flow *
- Density
- Reference density
- Concentration *
- Carrier pipe temperature *
- Electronics temperature
- Current output 1
- Oscillation frequency 0
- Frequency fluctuation 0
- Oscillation amplitude *
- Oscillation damping 0
- Oscillation damping fluctuation 0
- Signal asymmetry
- Exciter current 0

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

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.

"Display channel 2" submenu

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

► Display channel 2

Display channel 2 →  239

Display channel 2

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

Prerequisite A process variable is specified in the **Assign channel 2** parameter.

* Visibility depends on order options or device settings

Description See the **Display channel 1** parameter →  238

"Display channel 3" submenu

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

► Display channel 3

Display channel 3 →  240

Display channel 3

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

Prerequisite A process variable is specified in the **Assign channel 3** parameter.

Description See the **Display channel 1** parameter →  238

"Display channel 4" submenu

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

► Display channel 4

Display channel 4 →  240

Display channel 4

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

Prerequisite A process variable is specified in the **Assign channel 4** parameter.

Description See the **Display channel 1** parameter →  238

3.8.11 "Min/max values" submenu

Navigation  Expert → Diagnostics → Min/max val.

► Min/max values		
Reset min/max values (6151)	→ 	241
► Electronics temperature	→ 	242
► Medium temperature	→ 	243
► Carrier pipe temperature	→ 	243
► Oscillation frequency	→ 	244
► Oscillation amplitude	→ 	245
► Oscillation damping	→ 	246
► Signal asymmetry	→ 	246

Reset min/max values



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 ■ Oscillation amplitude * ■ Oscillation amplitude 1 * ■ Oscillation damping ■ Torsion oscillation damping * ■ Oscillation frequency ■ Torsion oscillation frequency * ■ Signal asymmetry ■ Torsion signal asymmetry *
Factory setting	Cancel

* Visibility depends on order options or device settings

"Electronics temperature" submenu

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

▶ Electronics temperature

Minimum value

→  242

Maximum value

→  242

Minimum value

Navigation	 Expert → Diagnostics → Min/max val. → Electronics temp → Minimum value (6052)
Description	Displays the lowest previously measured temperature value of the main electronics module.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  78)

Maximum value

Navigation	 Expert → Diagnostics → Min/max val. → Electronics temp → Maximum value (6051)
Description	Displays the highest previously measured temperature value of the main electronics module.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  78)

"Medium temperature" submenu

Navigation

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

► Medium temperature

Minimum value (6109)

→  243

Maximum value (6108)

→  243

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	Dependency  The unit is taken from the Temperature unit parameter (→  78)

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 (→  78)

"Carrier pipe temperature" submenu

Navigation

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

► Carrier pipe temperature

Minimum value (6030)

→  244

Maximum value (6029)

→  244

Minimum value

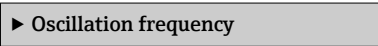
Navigation	 Expert → Diagnostics → Min/max val. → Carr. pipe temp. → Minimum value (6030)
Prerequisite	For the following order code "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the lowest previously measured temperature value of the carrier pipe.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  78)

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	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  78)

"Oscillation frequency" submenu

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

	
Minimum value (6071)	→  245
Maximum value (6070)	→  245

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

"Oscillation amplitude" submenu

Navigation

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

► Oscillation amplitude

Minimum value (6010)

→  245

Maximum value (6009)

→  245

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

"Oscillation damping" submenu

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

► Oscillation damping

Minimum value (6122)

→  246

Maximum value (6121)

→  246

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)

→  247

Maximum value (6014)

→  247

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 "Heartbeat Technology" submenu

 For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring**: Special Documentation for the device →  8

Navigation   Expert → Diagnostics → Heartbeat Techn.

▶ Heartbeat Technology	
▶ Heartbeat base settings	→  247
▶ Performing verification	→  248
▶ Verification results	→  254
▶ Heartbeat Monitoring	→  258
▶ Monitoring results	→  259

"Heartbeat base settings" submenu

Navigation   Expert → Diagnostics → Heartbeat Techn. → Base settings

▶ Heartbeat base settings

Plant operator (2754)	→ 248
Location (2755)	→ 248

Plant operator

- Navigation

Expert → Diagnostics → Heartbeat Techn. → Base settings → Plant operator (2754)
- Description

Use this function to enter the plant operator.
- User entry

Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /)

Location

- Navigation

Expert → Diagnostics → Heartbeat Techn. → Base settings → Location (2755)
- Description

Use this function to enter the location.
- User entry

Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /)

"Performing verification" wizard

Navigation

Expert → Diagnostics → Heartbeat Techn. → Perform.verific.

► Performing verification

Year (2846)	→ 249
Month (2845)	→ 249
Day (2842)	→ 250
Hour (2843)	→ 250
AM/PM (2813)	→ 250
Minute (2844)	→ 251
Verification mode (12105)	→ 251
External device information (12101)	→ 251

Start verification (12127)	→  252
Progress (2808)	→  252
Measured values (12102)	→  252
Output values (12103)	→  253
Status (12153)	→  253
Verification result (12149)	→  254

Year

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Year (2846)
Prerequisite	 Can be edited if Heartbeat Verification is not active.
Description	Use this function to enter the year of recalibration.
User entry	9 to 99
Factory setting	10

Month

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Month (2845)
Prerequisite	 Can be edited if Heartbeat Verification is not active.
Description	Use this function to select the month of recalibration.
Selection	■ January ■ February ■ March ■ April ■ May ■ June ■ July ■ August ■ September ■ October ■ November ■ December
Factory setting	January

Day		
Navigation	 Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Day (2842)	
Prerequisite	 Can be edited if Heartbeat Verification is not active.	
Description	Use this function to enter the day of the month of recalibration.	
User entry	1 to 31 d	
Factory setting	1 d	
Hour		
Navigation	 Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Hour (2843)	
Prerequisite	 Can be edited if Heartbeat Verification is not active.	
Description	Use this function to enter the hour of recalibration.	
User entry	0 to 23 h	
Factory setting	12 h	
AM/PM		
Navigation	 Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → AM/PM (2813)	
Prerequisite	 Can be edited if Heartbeat Verification is not active. The dd.mm.yy hh:mm am/pm option or the mm/dd/yy hh:mm am/pm option is selected in the Date/time format parameter (2812) (→  79).	
Description	Use this function to select the time entry in the morning (AM option) or afternoon (PM option) in the case of 12-hour notation.	
Selection	■ AM ■ PM	
Factory setting	AM	

Minute 	
Navigation	  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Minute (2844)
Prerequisite	 Can be edited if Heartbeat Verification is not active.
Description	Use this function to enter the minutes of recalibration.
User entry	0 to 59 min
Factory setting	0 min
Verification mode 	
Navigation	  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Verificat. mode (12105)
Prerequisite	Can be edited if verification status is not active.
Description	Select verification mode. Standard verification: Verification is performed automatically by the device and without manual checking of external measured variables. Extended verification: Similar to internal verification but with the entry of external measured variables (see also "Measured values" parameter).
Selection	■ Standard verification ■ Extended verification
Factory setting	Standard verification
External device information 	
Navigation	  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Ext. device info (12101)
Prerequisite	With the following conditions: ■ The Extended verification option is selected in the Verification mode parameter (→  251). ■ Can be edited if the verification status is not active.
Description	Record measuring equipment for extended verification.
User entry	Free text entry
Factory setting	–

Start verification



Navigation  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Start verificat. (12127)

Description Start the verification.
To carry out a complete verification, select the selection parameters individually. Once the external measured values have been recorded, verification is started using the **Start** option.

Selection

- Cancel
- Output 1 low value *
- Output 1 high value *
- Output 2 low value *
- Output 2 high value *
- Output 3 low value *
- Output 3 high value *
- Frequency output 1 *
- Pulse output 1 *
- Frequency output 2 *
- Pulse output 2 *
- Double pulse output *
- Start

Factory setting Cancel

Progress

Navigation  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Progress (2808)

Description The progress of the process is indicated.

User interface 0 to 100 %

Measured values



Navigation  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Measured val. (12102)

Prerequisite One of the following options is selected in the **Start verification** parameter (→  252):

- Output 1 low value
- Output 1 high value
- Output 2 low value
- Output 2 high value
- Output 3 low value
- Output 3 high value
- Frequency output 1

* Visibility depends on order options or device settings

- Pulse output 1
- Frequency output 2
- Pulse output 2
- Double pulse output

Description	Use this function to enter the measured values (actual values) for the external measured variables:. ■ Current output: Output current in [mA] ■ Pulse/frequency output: Output frequency in [Hz] ■ Double pulse output: Output frequency in [Hz]
User entry	Signed floating-point number
Factory setting	0

Output values

Navigation	  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Output values (12103)
Description	Displays the simulated output values (target values) for the external measured variables:. ■ Current output: Output current in [mA]. ■ Pulse/frequency output: Output frequency in [Hz].
User interface	Signed floating-point number
Factory setting	-

Status

Navigation	  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Status (12153)
Description	Displays the current status of the verification.
User interface	■ Done ■ Busy ■ Failed ■ Not done

Verification result

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Verific. result (12149)
Description	Displays the overall result of the verification.  Detailed description of results classification:
User interface	■ Not supported ■ Passed ■ Not done ■ Failed
Factory setting	Not done

"Verification results" submenu

Navigation  Expert → Diagnostics → Heartbeat Techn. → Verific. results

► Verification results		
Date/time (manually entered) (12142)	→	 255
Verification ID (12141)	→	 255
Operating time (12126)	→	 255
Verification result (12149)	→	 255
Sensor (12152)	→	 256
HBSI (12167)	→	 256
Sensor electronic module (ISEM) (12151)	→	 256
I/O module (12145)	→	 257
System status (12109)	→	 257

Date/time (manually entered)

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Verific. results → Date/time (12142)
Prerequisite	The verification has been performed.
Description	Date and time.
User interface	dd.mmmm.yyyy; hh:mm
Factory setting	1 January 2010; 12:00

Verification ID

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Verific. results → Verification ID (12141)
Prerequisite	The verification has been performed.
Description	Displays consecutive numbering of the verification results in the measuring device.
User interface	0 to 65 535
Factory setting	0

Operating time

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Verific. results → Operating time (12126)
Prerequisite	The verification has been performed.
Description	Indicates how long the device has been in operation up to the verification.
User interface	Days (d), hours (h), minutes (m), seconds (s)
Factory setting	–

Verification result

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Verific. results → Verific. result (12149)
Description	Displays the overall result of the verification.  Detailed description of results classification:

User interface	■ Not supported ■ Passed ■ Not done ■ Failed
-----------------------	---

Factory setting	Not done
------------------------	----------

Sensor

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Verific. results → Sensor (12152)
-------------------	---

Prerequisite	The Failed option result is shown in the Overall result parameter (→  254).
---------------------	--

Description	Displays the result for the sensor.  Detailed description of results classification:
--------------------	---

User interface	■ Not supported ■ Passed ■ Not done ■ Failed
-----------------------	---

Factory setting	Not done
------------------------	----------

HBSI

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Verific. results → HBSI (12167)
-------------------	---

Prerequisite	In the Overall result parameter (→  254), the Failed option was displayed.
---------------------	---

Description	Displays the relative change in the sensor with all the sensor components.  Detailed description of results classification:
--------------------	--

User interface	■ Not supported ■ Passed ■ Not done ■ Failed
-----------------------	---

Factory setting	Not done
------------------------	----------

Sensor electronic module (ISEM)

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Verific. results → Sens. electronic (12151)
-------------------	---

Prerequisite	The Failed option result is shown in the Overall result parameter (→  254).
---------------------	--

Description Displays the result for the sensor electronics module (ISEM).



Detailed description of results classification:

User interface

- Not supported
- Passed
- Not done
- Failed

Factory setting Not done

I/O module

Navigation Expert → Diagnostics → Heartbeat Techn. → Verific. results → I/O module (12145)

Prerequisite In the **Overall result** parameter (→ 254), the **Failed** option was displayed.

Description Displays the result for I/O module monitoring of the I/O module.

- For current output: Accuracy of the current
- For pulse output: Accuracy of the pulses
- For frequency output: Accuracy of the frequency
- Current input: Accuracy of the current
- Double pulse output: Accuracy of the pulses
- Relay output: Number of switching cycles



Heartbeat Verification does not check the digital inputs and outputs and does not output any result for them.



Detailed description of results classification:

User interface

- Not supported
- Passed
- Not done
- Not plugged
- Failed

Factory setting Not done

System status

Navigation Expert → Diagnostics → Heartbeat Techn. → Verific. results → System status (12109)

Prerequisite The **Failed** option result is shown in the **Overall result** parameter (→ 254).

Description Displays the system condition. Tests the measuring device for active errors.



Detailed description of results classification:

User interface	■ Not supported ■ Passed ■ Not done ■ Failed
----------------	--

Factory setting	Not done
-----------------	----------

"Heartbeat Monitoring" submenu

Navigation  Expert → Diagnostics → Heartbeat Techn. → Heartbeat Mon.

▶ Heartbeat Monitoring

Activate monitoring (12129)

→  258

HBSI cycle time (12110)

→  258

Activate monitoring

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Heartbeat Mon. → Act. monitoring (12129)
------------	--

Description	 Time-controlled HBSI option does not apply for Promass I and Promass Q.
-------------	--

Selection	Time-controlled HBSI
-----------	----------------------

Factory setting	On
-----------------	----

HBSI cycle time

Navigation	 Expert → Diagnostics → Heartbeat Techn. → Heartbeat Mon. → HBSI cycle time (12110)
------------	--

Prerequisite	In the Activate monitoring parameter (→  258), the Time-controlled HBSI option is selected.
--------------	--

Description	Use this function to enter the cycle time for determining the HBSI measured value. The HBSI measured value may only be determined in the configured cycle time in the firmware if the Activate monitoring parameter (→  258) is set to Scheduled HBSI option.
-------------	--

User entry	0.5 to 4 320 h
------------	----------------

Factory setting 12 h

"Monitoring results" submenu

Navigation   Expert → Diagnostics → Heartbeat Techn. → Monitor. results

► Monitoring results

HBSI (12115)

→  259

HBSI value reliability (6380)

→  259

HBSI

Navigation	  Expert → Diagnostics → Heartbeat Techn. → Monitor. results → HBSI (12115)
Description	Displays the relative change of the entire sensor, with all its electrical, mechanical and electromechanical components incorporated in the sensor housing (including the measuring tube, electrodynamic pick-ups, excitation system, cables etc.), in % of the reference value.
User interface	Signed floating-point number
Factory setting	0...4 %

HBSI value reliability

Navigation	  Expert → Diagnostics → Heartbeat Techn. → Monitor. results → HBSI val.reliab. (6380)
Description	Shows the status of the HBSI value. Uncertain or Bad: Due to difficult process conditions over a long time no HBSI value could be determined.
User interface	■ Good ■ Uncertain ■ Bad
Factory setting	Uncertain

3.8.13 "Simulation" submenu

Navigation

 Expert → Diagnostics → Simulation

► Simulation		
Assign simulation process variable (1810)	→ 	261
Process variable value (1811)	→ 	262
Current output 1 to n simulation (0354-1 to n)	→ 	262
Current output value (0355)	→ 	262
Frequency output 1 to n simulation (0472-1 to n)	→ 	263
Frequency output 1 to n value (0473-1 to n)	→ 	263
Pulse output simulation 1 to n (0458-1 to n)	→ 	264
Pulse value 1 to n (0459-1 to n)	→ 	264
Switch output simulation 1 to n (0462-1 to n)	→ 	264
Switch state 1 to n (0463-1 to n)	→ 	265
Relay output 1 to n simulation (0802-1 to n)	→ 	265
Switch state 1 to n (0803-1 to n)	→ 	266
Pulse output simulation (0988)	→ 	266
Pulse value (0989)	→ 	267
Device alarm simulation (0654)	→ 	267
Diagnostic event category (0738)	→ 	268
Diagnostic event simulation (0737)	→ 	268
Current input 1 to n simulation (1608-1 to n)	→ 	268
Value current input 1 to n (1609-1 to n)	→ 	269

Status input 1 to n simulation (1355-1 to n)	→ 269
Input signal level 1 to n (1356-1 to n)	→ 270

Assign simulation process variable



Navigation

Expert → Diagnostics → Simulation → Assign proc.var. (1810)

Description

Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- Mass flow
- Volume flow
- Corrected volume flow *
- Target volume flow *
- Carrier volume flow *
- Target corrected volume flow *
- Carrier corrected volume flow *
- Density
- Reference density *
- Reference density alternative *
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- Temperature
- Concentration *
- Target mass flow *
- Carrier mass flow *
- Time period signal frequency (TPS) *

Factory setting

Off

Additional information

Description



The simulation value of the process variable selected is defined in the **Process variable value** parameter (→ 262).

* Visibility depends on order options or device settings

Process variable value 	
Navigation	 Expert → Diagnostics → Simulation → Proc. var. value (1811)
Prerequisite	A process variable is selected in the Assign simulation process variable parameter (→  261).
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>User entry</i>  The unit of the displayed measured value is taken from the System units submenu (→  69).
Current output 1 to n simulation 	
Navigation	 Expert → Diagnostics → Simulation → Curr.outp 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 current output 1 to n parameter.
	<i>Selection</i> ■ Off Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Current simulation is active.
Current output value 	
Navigation	 Expert → Diagnostics → Simulation → Curr.outp val. (0355)
Prerequisite	In the Current output 1 to n simulation parameter, the On option is selected.

Description	Use this function to enter a current value for the simulation. In this way, users can verify the correct adjustment of the current output and the correct function of downstream switching units.
User entry	3.59 to 22.5 mA
Additional information	<i>Dependency</i> The input range is dependent on the option selected in the Current span parameter (→  137).

Frequency output 1 to n simulation

Navigation	  Expert → Diagnostics → Simulation → Freq.outp 1 to n sim. (0472–1 to n)
Prerequisite	In the Operating mode parameter (→  150), 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	<i>Description</i>  The desired simulation value is defined in the Frequency value 1 to n parameter. <i>Selection</i> ■ Off Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Frequency simulation is active.

Frequency output 1 to n value

Navigation	  Expert → Diagnostics → Simulation → Freq.outp 1 to n val. (0473–1 to n)
Prerequisite	In the Frequency simulation 1 to n parameter, the On option is selected.
Description	Use this function to enter a frequency value for the simulation. In this way, users can verify the correct adjustment of the frequency output and the correct function of downstream switching units.
User entry	0.0 to 12 500.0 Hz

Pulse output simulation 1 to n 	
Navigation	 Expert → Diagnostics → Simulation → Puls.outp.sim. 1 to n (0458–1 to n)
Prerequisite	In the Operating mode parameter (→  150), the Pulse option is selected.
Description	Use this function to switch simulation of the pulse output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	■ Off ■ Fixed value ■ Down-counting value
Factory setting	Off
Additional information	<i>Description</i>  The desired simulation value is defined in the Pulse value 1 to n parameter. <i>Selection</i> ■ Off Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ Fixed value Pulses are continuously output with the pulse width specified in the Pulse width parameter (→  153). ■ Down-counting value The pulses specified in the Pulse value parameter (→  264) are output.
Pulse value 1 to n 	
Navigation	 Expert → Diagnostics → Simulation → Pulse value 1 to n (0459–1 to n)
Prerequisite	In the Pulse output simulation 1 to n parameter, the Down-counting value option is selected.
Description	Use this function to enter a pulse value for the simulation. In this way, users can verify the correct adjustment of the pulse output and the correct function of downstream switching units.
User entry	0 to 65 535
Switch output simulation 1 to n 	
Navigation	 Expert → Diagnostics → Simulation → Switch sim. 1 to n (0462–1 to n)
Prerequisite	In the Operating mode parameter (→  150), 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 state 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 state 1 to n



Navigation	 Expert → Diagnostics → Simulation → Switch state 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 output 1 to n simulation



Navigation	 Expert → Diagnostics → Simulation → Relay out. 1 to n sim (0802–1 to n)
Description	Use this function to switch simulation of the relay output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	■ Off ■ On
Factory setting	Off

Additional information *Description*

The desired simulation value is defined in the **Switch state 1 to n** parameter.

Selection

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

Switch state 1 to n**Navigation**

Expert → Diagnostics → Simulation → Switch state 1 to n (0803–1 to n)

Prerequisite

The **On** option is selected in the **Switch output simulation 1 to n** parameter parameter.

Description

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

Selection

- Open
- Closed

Additional information*Selection*

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

Pulse output simulation**Navigation**

Expert → Diagnostics → Simulation → Puls.outp.sim. (0988)

Description

Use this function to switch simulation of the double pulse output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- Fixed value
- Down-counting value

Factory setting

Off

Additional information*Description*

The desired simulation value is defined in the **Pulse value** parameter (→ 267).

Selection

- Off

Simulation of the double pulse output is switched off. The device is in normal measuring mode or another process variable is being simulated.

- Fixed value

Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (→ 179).

- Down-counting value

The pulses specified in the **Pulse value** parameter (→ 267) are output.

Pulse value**Navigation**

Expert → Diagnostics → Simulation → Pulse value (0989)

Prerequisite

In the **Pulse output simulation** parameter (→ 266), the **Down-counting value** option is selected.

Description

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

User entry

0 to 65 535

Device alarm simulation**Navigation**

Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

Description

Use this function to switch the device alarm on and off.

Selection

- Off
- On

Factory setting

Off

Additional information*Description*

The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Diagnostic event category

Navigation	Expert → Diagnostics → Simulation → Event category (0738)
Description	Use this function to select the category of the diagnostic events that are displayed for the simulation in the Diagnostic event simulation parameter (→ 268).
Selection	■ Sensor ■ Electronics ■ Configuration ■ Process
Factory setting	Process

Diagnostic event simulation

Navigation	Expert → Diagnostics → Simulation → Diag. event sim. (0737)
Description	Use this function to select a diagnostic event for the simulation process that is activated.
Selection	■ Off ■ Diagnostic event picklist (depends on the category selected)
Factory setting	Off
Additional information	<i>Description</i> For the simulation, you can choose from the diagnostic events of the category selected in the Diagnostic event category parameter (→ 268).

Current input 1 to n simulation

Navigation	Expert → Diagnostics → Simulation → Curr.inp 1 to n sim. (1608–1 to n)
Description	Option for switching simulation of the current input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress. The desired simulation value is defined in the Value current input 1 to n parameter.
Selection	■ Off ■ On
Factory setting	Off

Additional information	<i>Selection</i> ■ Off Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Current simulation is active.
Value current input 1 to n 	
Navigation	 Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609–1 to n)
Prerequisite	In the Current input 1 to n simulation parameter, the On option is selected.
Description	Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.
User entry	0 to 22.5 mA
Status input 1 to n simulation 	
Navigation	 Expert → Diagnostics → Simulation → Status inp 1 to n sim (1355–1 to n)
Description	Use this function to switch simulation of the status input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	■ Off ■ On
Factory setting	Off
Additional information	<i>Description</i>  The desired simulation value is defined in the Input signal level parameter (→  270). <i>Selection</i> ■ Off Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Simulation for the status input is active.

Input signal level 1 to n



Navigation	Expert → Diagnostics → Simulation → Signal level 1 to n (1356–1 to n)
Prerequisite	In the Status input simulation parameter (→ 269), 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

4 Country-specific factory settings

4.1 SI units



Not valid for USA and Canada.

4.1.1 System units

Process variable	Unit
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



For detailed information about the full scale value for measuring devices for custody transfer, see the Special Documentation for the device → 8

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

4.1.3 Output current span

Output	Current range
Current output 1...n	4 to 20 mA NAMUR

4.1.4 Pulse value



For detailed information about the pulse value for measuring devices for custody transfer, see the Special Documentation for the device → 8

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

4.1.5 Switch-on point 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]	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

Process variable	Unit
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



For detailed information about the full scale value for measuring devices for custody transfer, see the Special Documentation for the device → 8

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

Output	Current range
Current output 1...n	4 to 20 mA US

4.2.4 Pulse value



For detailed information about the pulse value for measuring devices for custody transfer, see the Special Documentation for the device → 8

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

4.2.5 Switch-on point 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]	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
Reference 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
Corrected volume flow	Nl/s, Nl/min, Nl/h, Nl/d	Normal liter/time unit
	Nm ³ /s, Nm ³ /min, Nm ³ /h, Nm ³ /d	Normal cubic meter/time unit
	Sm ³ /s, Sm ³ /min, Sm ³ /h, Sm ³ /d	Standard cubic meter/time unit
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
Reference 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
Corrected volume 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
Corrected volume 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)

6 Modbus RS485 register information

6.1 Notes

6.1.1 Structure of the register information

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

Navigation: navigation path to the parameter					
Parameter	Register	Data type	Access type	User interface/ Selection/User entry	→ 
Name of parameter	Indicated in decimal numerical format	- Float length = 4 byte - Integer length = 2 byte - String length, depending on parameter	Possible type of access to parameter: - Read access via function codes 03, 04 or 23 - Write access via function codes 06, 16 or 23	Options List of the individual options for the parameter - Option 1 - Option 2 - Option 3 ⁽⁺⁾  ⁽⁺⁾ = Factory setting depends on country, order options or device settings User entry Specific value or input range for the parameter	Page number information and cross-reference to the standard parameter description

NOTICE

If non-volatile device parameters are modified via the MODBUS RS485 function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device.

The number of writes to the EEPROM is technically restricted to a maximum of 1 million.

- Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.
- Avoid constantly writing non-volatile device parameters via the MODBUS RS485.

6.1.2 Address model

The Modbus RS485 register addresses of the measuring device are implemented in accordance with the "Modbus Applications Protocol Specification V1.1".

In addition, systems are used that work with the register address model "Modicon Modbus Protocol Reference Guide (PI-MBUS-300 Rev. J)".

Depending on the function code used, a number is added at the start of the register address with this specification:

- "3" → "Read" access
- "4" → "Write" access

Function code	Access type	Register in accordance with "Modbus Applications Protocol Specification"	Register in accordance with "Modicon Modbus Protocol Reference Guide"
03 04 23	Read	XXXX Example: mass flow = 2007	3XXXX Example: mass flow = 32007
06 16 23	Write	XXXX Example: reset totalizer = 6401	4XXXX Example: reset totalizer = 46401

6.2 Overview of the Expert operating menu

The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.

Expert		
Direct access (0106)		→ 290
Locking status (0004)		→ 290
Access status (0005)		→ 290
Enter access code (0003)		→ 290
System		→ 290
	Display	→ 290
	Display language (0104)	→ 290
	Format display (0098)	→ 290
	Value 1 display (0107)	→ 291
	0% bargraph value 1 (0123)	→ 291
	100% bargraph value 1 (0125)	→ 291
	Decimal places 1 (0095)	→ 291
	Value 2 display (0108)	→ 291
	Decimal places 2 (0117)	→ 291
	Value 3 display (0110)	→ 292
	0% bargraph value 3 (0124)	→ 292
	100% bargraph value 3 (0126)	→ 292
	Decimal places 3 (0118)	→ 292
	Value 4 display (0109)	→ 292
	Decimal places 4 (0119)	→ 292
	Display interval (0096)	→ 292

Display damping (0094)	→  292
Header (0097)	→  292
Header text (0112)	→  292
Separator (0101)	→  292
Contrast display (0105)	→  292
Backlight (0111)	→  292
► Configuration backup	→  292
Operating time (0652)	→  292
Last backup (2757)	→  292
Configuration management (2758)	→  292
Backup state (2759)	→  293
Comparison result (2760)	→  293
► Diagnostic handling	→  293
Alarm delay (0651)	→  293
► Diagnostic behavior	→  293
► Administration	→  295
► Define access code	→  295
► Reset access code	→  295
Device reset (0000)	→  295
Activate SW option (0029)	→  295
Software option overview (0015)	→  295
► Sensor	→  295
► Measured values	→  295
► Process variables	→  295
► Totalizer	→  296

► Input values	→ ⓘ 296
► Output values	→ ⓘ 297
► System units	→ ⓘ 298
Mass flow unit (0554)	→ ⓘ 298
Mass unit (0574)	→ ⓘ 298
Volume flow unit (0553)	→ ⓘ 299
Volume unit (0563)	→ ⓘ 300
Corrected volume flow unit (0558)	→ ⓘ 301
Corrected volume unit (0575)	→ ⓘ 301
Density unit (0555)	→ ⓘ 302
Reference density unit (0556)	→ ⓘ 302
Temperature unit (0557)	→ ⓘ 302
Pressure unit (0564)	→ ⓘ 302
Date/time format (2812)	→ ⓘ 302
► Process parameters	→ ⓘ 303
Flow damping (1802)	→ ⓘ 303
Density damping (1803)	→ ⓘ 303
Temperature damping (1822)	→ ⓘ 303
Flow override (1839)	→ ⓘ 303
► Low flow cut off	→ ⓘ 303
► Partially filled pipe detection	→ ⓘ 303
► Measurement mode	→ ⓘ 304
Select medium (6062)	→ ⓘ 304
Select gas type (6074)	→ ⓘ 304

Reference sound velocity (6147)	→ ⓘ 304
Temperature coefficient sound velocity (6181)	→ ⓘ 304
► External compensation	→ ⓘ 304
Pressure compensation (6130)	→ ⓘ 304
Pressure value (6059)	→ ⓘ 304
External pressure (6209)	→ ⓘ 304
Temperature mode (6184)	→ ⓘ 304
External temperature (6080)	→ ⓘ 304
► Calculated values	→ ⓘ 305
► Corrected volume flow calculation	→ ⓘ 305
► Sensor adjustment	→ ⓘ 305
Installation direction (1809)	→ ⓘ 305
► Process variable adjustment	→ ⓘ 305
► Calibration	→ ⓘ 305
Calibration factor (6025)	→ ⓘ 305
Zero point (6195)	→ ⓘ 305
Nominal diameter (2807)	→ ⓘ 306
C0 to 5 (6022)	→ ⓘ 306
► I/O configuration	→ ⓘ 306
I/O module 1 to n terminal numbers (3902-1 to n)	→ ⓘ 306
I/O module 1 to n information (3906-1 to n)	→ ⓘ 306
I/O module 1 to n type (3901-1 to n)	→ ⓘ 306
Apply I/O configuration (3907)	→ ⓘ 306
Conversion code (2762)	→ ⓘ 306

► Input	→ 306
► Current input 1 to n	→ 306
Terminal number (1611-1 to n)	→ 306
Signal mode (1610-1 to n)	→ 306
Current span (1605-1 to n)	→ 306
0/4 mA value (1606-1 to n)	→ 306
20 mA value (1607-1 to n)	→ 307
Failure mode (1601-1 to n)	→ 307
Failure value (1602-1 to n)	→ 307
► Status input 1 to n	→ 307
Terminal number (1358-1 to n)	→ 307
Assign status input (1352-1 to n)	→ 307
Value status input (1353-1 to n)	→ 307
Active level (1351-1 to n)	→ 307
Response time status input (1354-1 to n)	→ 307
► Output	→ 307
► Current output 1 to n	→ 307
Terminal number (0379-1 to n)	→ 307
Signal mode (0377-1 to n)	→ 307
Assign current output 1 to n (0359-1 to n)	→ 308
Current span (0353-1 to n)	→ 309
Fixed current (0365-1 to n)	→ 309
0/4 mA value (0367-1 to n)	→ 309
20 mA value (0372-1 to n)	→ 309

Measuring mode (0351-1 to n)	→  309
Damping output 1 to n (0363-1 to n)	→  309
Failure mode (0364-1 to n)	→  309
Failure current (0352-1 to n)	→  309
Output current 1 to n (0361-1 to n)	→  309
Measured current 1 to n (0366-1 to n)	→  309
► Pulse/frequency/switch output 1 to n	→  309
Terminal number (0492-1 to n)	→  309
Signal mode (0490-1 to n)	→  309
Operating mode (0469-1 to n)	→  309
Assign pulse output 1 to n (0460-1 to n)	→  310
Value per pulse (0455-1 to n)	→  310
Pulse width (0452-1 to n)	→  310
Measuring mode (0457-1 to n)	→  310
Failure mode (0480-1 to n)	→  310
Pulse output 1 to n (0456-1 to n)	→  310
Assign frequency output (0478-1 to n)	→  311
Minimum frequency value (0453-1 to n)	→  311
Maximum frequency value (0454-1 to n)	→  311
Measuring value at minimum frequency (0476-1 to n)	→  311
Measuring value at maximum frequency (0475-1 to n)	→  311
Measuring mode (0479-1 to n)	→  311
Damping output 1 to n (0477-1 to n)	→  311

Failure mode (0451-1 to n)	→  311
Failure frequency (0474-1 to n)	→  311
Output frequency 1 to n (0471-1 to n)	→  312
Switch output function (0481-1 to n)	→  312
Assign diagnostic behavior (0482-1 to n)	→  312
Assign limit (0483-1 to n)	→  312
Switch-on value (0466-1 to n)	→  312
Switch-off value (0464-1 to n)	→  312
Assign flow direction check (0484-1 to n)	→  312
Assign status (0485-1 to n)	→  312
Switch-on delay (0467-1 to n)	→  313
Switch-off delay (0465-1 to n)	→  313
Failure mode (0486-1 to n)	→  313
Switch state 1 to n (0461-1 to n)	→  313
Invert output signal (0470-1 to n)	→  313
► Relay output 1 to n	→  313
Terminal number (0812-1 to n)	→  313
Relay output function (0804-1 to n)	→  313
Assign flow direction check (0808-1 to n)	→  313
Assign limit (0807-1 to n)	→  314
Assign diagnostic behavior (0806-1 to n)	→  314
Assign status (0805-1 to n)	→  314
Switch-off value (0809-1 to n)	→  314

Switch-off delay (0813-1 to n)	→  314
Switch-on value (0810-1 to n)	→  314
Switch-on delay (0814-1 to n)	→  314
Failure mode (0811-1 to n)	→  314
Switch state (0801-1 to n)	→  315
Actual relay state (0816-1 to n)	→  315
► Double pulse output	→  315
Master terminal number (0981)	→  315
Slave terminal number (0990)	→  315
Signal mode (0991)	→  315
Assign pulse output 1 (0982-1)	→  315
Value per pulse (0983)	→  315
Pulse width (0986)	→  315
Phase shift (0992)	→  315
Measuring mode (0984)	→  315
Failure mode (0985)	→  315
Pulse output (0987)	→  316
Invert output signal (0993)	→  316
► Communication	→  316
► Modbus configuration	→  316
Bus address (7112)	→  316
Baudrate (7111)	→  316
Data transfer mode (7115)	→  316
Parity (7122)	→  316
Byte order (7113)	→  316

Telegram delay (7146)	→  316
Failure mode (7116)	→  316
Bus termination (7155)	→  316
Fieldbus writing access (7156)	→  316
► Modbus information	→  316
Device ID (7153)	→  316
Device revision (7154)	→  316
► Modbus data map	→  317
Scan list register 0 to 15 (7114)	→  317
► Web server	→  317
Web server language (7221)	→  317
MAC address (7214)	→  317
IP address (7209)	→  317
Subnet mask (7211)	→  317
Default gateway (7210)	→  317
Web server functionality (7222)	→  317
Login page (7273)	→  317
► Application	→  317
Reset all totalizers (2806)	→  317
► Totalizer 1 to n	→  318
Assign process variable (0914–1 to n)	→  318
Unit totalizer 1 to n (0915–1 to n)	→  318
Totalizer operation mode (0908–1 to n)	→  318
Control Totalizer 1 to n (0912–1 to n)	→  318

Preset value 1 to n (0913–1 to n)	→ ⓘ 319
Failure mode (0901–1 to n)	→ ⓘ 319
► Diagnostics	→ ⓘ 319
Actual diagnostics (0691)	→ ⓘ 319
Previous diagnostics (0690)	→ ⓘ 319
Operating time from restart (0653)	→ ⓘ 319
Operating time (0652)	→ ⓘ 319
► Diagnostic list	→ ⓘ 319
Diagnostics 1 (0692)	→ ⓘ 319
Diagnostics 2 (0693)	→ ⓘ 319
Diagnostics 3 (0694)	→ ⓘ 319
Diagnostics 4 (0695)	→ ⓘ 319
Diagnostics 5 (0696)	→ ⓘ 319
► Event logbook	→ ⓘ 319
Filter options (0705)	→ ⓘ 319
► Device information	→ ⓘ 320
Device tag (0011)	→ ⓘ 320
Serial number (0009)	→ ⓘ 320
Firmware version (0010)	→ ⓘ 320
Device name (0020)	→ ⓘ 320
Order code (0008)	→ ⓘ 320
Extended order code 1 (0023)	→ ⓘ 320
Extended order code 2 (0021)	→ ⓘ 320
Extended order code 3 (0022)	→ ⓘ 320
ENP version (0012)	→ ⓘ 320

► Mainboard module	→ 320
Software revision (0072)	→ 320
► Sensor electronic module (ISEM)	→ 320
Software revision (0072)	→ 320
► I/O module 2	→ 320
I/O module 2 terminal numbers (3902-2)	→ 320
Software revision (0072)	→ 320
► I/O module 3	→ 320
I/O module 3 terminal numbers (3902-3)	→ 320
Software revision (0072)	→ 320
► Display module	→ 321
Software revision (0072)	→ 321
► Min/max values	→ 321
Reset min/max values (6151)	→ 321
► Electronics temperature	→ 321
► Medium temperature	→ 321
► Carrier pipe temperature	→ 321
► Oscillation frequency	→ 321
► Oscillation amplitude	→ 322
► Oscillation damping	→ 322
► Signal asymmetry	→ 322
► Simulation	→ 322
Assign simulation process variable (1810)	→ 322
Process variable value (1811)	→ 322

Status input simulation (1355)	→  323
Input signal level (1356)	→  323
Current input 1 to n simulation (1608-1 to n)	→  323
Value current input 1 to n (1609-1 to n)	→  323
Current output 1 to n simulation (0354-1 to n)	→  323
Value current output 1 to n (0355-1 to n)	→  323
Frequency output simulation 1 to n (0472-1 to n)	→  323
Frequency value 1 to n (0473-1 to n)	→  323
Pulse output simulation 1 to n (0458-1 to n)	→  323
Pulse value 1 to n (0459-1 to n)	→  323
Switch output simulation 1 to n (0462-1 to n)	→  323
Switch state 1 to n (0463-1 to n)	→  323
Relay output 1 to n simulation (0802-1 to n)	→  323
Switch state 1 to n (0803-1 to n)	→  323
Pulse output simulation (0988)	→  323
Pulse value (0989)	→  323
Device alarm simulation (0654)	→  323
Diagnostic event category (0738)	→  323
Diagnostic event simulation (0737)	→  323

6.3 Register information

Navigation: Expert					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Direct access (0106)	3878	Integer	Read / Write	0 to 65 535	12
Locking status (0004)	4918	Integer	Read	256 = Hardware locked 512 = Temporarily locked 32768 = CT active - all parameters	13
Access status (0005)	2178	Integer	Read	1 = Maintenance 2 = Service	14
Enter access code (0003)	2177	Integer	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	14

6.3.1 "System" submenu

"Display" submenu

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Display language (0104)	3673	Integer	Read / Write	0 = English 1 = Deutsch 2 = Français 3 = Español 4 = Italiano 5 = Nederlands 8 = Svenska 11 = 日本語 (Japanese) 12 = Portuguesa 13 = Polski 14 = русский язык (Russian) 15 = čeština (Czech) 16 = 中文 (Chinese) 18 = Türkçe 19 = tiếng Việt (Vietnamese) 20 = 한국어 (Korean)	16
Format display (0098)	3625	Integer	Read / Write	0 = 1 value, max. size 1 = 1 bargraph + 1 value 2 = 2 values 3 = 1 value large + 2 values 4 = 4 values	16

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Value 1 display (0107)	3963	Integer	Read / Write	0 = Mass flow 1 = Volume flow 2 = Corrected volume flow * 3 = Density 4 = Reference density * 5 = Temperature 6 = Totalizer 1 7 = Totalizer 2 8 = Totalizer 3 13 = Target mass flow * 14 = Carrier mass flow * 15 = Concentration * 16 = Pressure 18 = HBSI * 19 = Current output 1 20 = Electronics temperature 21 = Current output 2 * 23 = Carrier pipe temperature * 24 = Oscillation frequency 0 26 = Oscillation amplitude 0 * 28 = Frequency fluctuation 0 * 30 = Oscillation damping 0 32 = Signal asymmetry 33 = Oscillation damping fluctuation 0 * 35 = Exciter current 0 37 = Target corrected volume flow * 38 = Carrier corrected volume flow * 39 = Target volume flow * 40 = Carrier volume flow * 57 = Inhomogeneous medium index 58 = Suspended bubbles index * 59 = Application specific output 0 * 60 = Application specific output 1 * 63 = Test point 0 64 = Test point 1 65 = Sensor index coil asymmetry 66 = Raw value mass flow 67 = Torsion signal asymmetry * 123 = Current output 3 * 124 = Current output 4 * 186 = Time period signal (TPS) * 187 = Time period signal frequency (TPS) * 188 = Density 2 *	19
0% bargraph value 1 (0123)	4136 to 4137	Float	Read / Write	Signed floating-point number	20
100% bargraph value 1 (0125)	4142 to 4143	Float	Read / Write	Signed floating-point number	21
Decimal places 1 (0095)	3365	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx 5 = x.xxxxx 6 = x.xxxxxx	21
Value 2 display (0108)	3964	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  19)	21
Decimal places 2 (0117)	4049	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx 5 = x.xxxxx 6 = x.xxxxxx	22

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Value 3 display (0110)	3966	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  19)	22
0% bargraph value 3 (0124)	4138 to 4139	Float	Read / Write	Signed floating-point number	23
100% bargraph value 3 (0126)	4140 to 4141	Float	Read / Write	Signed floating-point number	23
Decimal places 3 (0118)	4050	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx 5 = x.xxxxx 6 = x.xxxxxx	24
Value 4 display (0109)	3965	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  19)	24
Decimal places 4 (0119)	4051	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx 5 = x.xxxxx 6 = x.xxxxxx	25
Display interval (0096)	3604 to 3605	Float	Read / Write	1 to 10 s	29
Display damping (0094)	3554 to 3555	Float	Read / Write	0.0 to 999.9 s	30
Header (0097)	3624	Integer	Read / Write	0 = Device tag 1 = Free text	30
Header text (0112)	3968 to 3973	String	Read / Write	Max. 12 characters, such as letters, numbers or special characters (e.g. @, %, /)	31
Separator (0101)	3671	Integer	Read / Write	■ . (point) ■ , (comma)	31
Contrast display (0105)	3674 to 3675	Float	Read / Write	20 to 80 %	32
Backlight (0111)	3967	Integer	Read / Write	0 = Disable 1 = Enable	32

* Visibility depends on order options or device settings

"Configuration backup" submenu

Navigation: Expert → System → Configuration backup					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Operating time (0652)	2631	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	33
Last backup (2757)	6430	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	33
Configuration management (2758)	5500	Integer	Read / Write	0 = Cancel 1 = Execute backup 2 = Restore * 4 = Clear backup data 5 = Compare *	33

Navigation: Expert → System → Configuration backup					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Backup state (2759)	5502	Integer	Read	1 = Backup in progress 2 = Restoring in progress 4 = Delete in progress 5 = Compare in progress 6 = Restoring failed 7 = Backup failed 251 = None	34
Comparison result (2760)	5514	Integer	Read	0 = Settings identical 1 = Settings not identical 2 = No backup available 3 = Check not done 4 = Backup settings corrupt 5 = Dataset incompatible	34

* Visibility depends on order options or device settings

"Diagnostic handling" submenu

Navigation: Expert → System → Diagnostic handling					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Alarm delay (0651)	6808 to 6809	Float	Read / Write	0 to 60 s	36

"Diagnostic behavior" submenu

Navigation: Expert → System → Diagnostic handling → Diagnostic behavior					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign behavior of diagnostic no. 046 (0709)	2756	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	39
Assign behavior of diagnostic no. 140 (0708)	2757	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	39
Assign behavior of diagnostic no. 144 (0731)	2081	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	40
Assign behavior of diagnostic no. 374 (0710)	2755	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	40
Assign behavior of diagnostic no. 441 (0657)	4742	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	41
Assign behavior of diagnostic no. 442 (0658)	4919	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	41
Assign behavior of diagnostic no. 443 (0659)	5000	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	42

Navigation: Expert → System → Diagnostic handling → Diagnostic behavior					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign behavior of diagnostic no. 444 (0740)	5120	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	42
Assign behavior of diagnostic no. 543 (0643)	2362	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	42
Assign behavior of diagnostic no. 830 (0800)	6805	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	43
Assign behavior of diagnostic no. 831 (0641)	6806	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	43
Assign behavior of diagnostic no. 832 (0681)	2759	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	44
Assign behavior of diagnostic no. 833 (0682)	2762	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	44
Assign behavior of diagnostic no. 834 (0700)	2761	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	44
Assign behavior of diagnostic no. 835 (0702)	2760	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	45
Assign behavior of diagnostic no. 862 (0679)	6441	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	46
Assign behavior of diagnostic no. 912 (0703)	2758	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	46
Assign behavior of diagnostic no. 913 (0712)	2754	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	46
Assign behavior of diagnostic no. 944 (0732)	2082	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	48
Assign behavior of diagnostic no. 948 (0744)	5179	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	49

"Administration" submenu

Navigation: Expert → System → Administration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Device reset (0000)	6817	Integer	Read / Write	0 = Cancel 1 = Restart device 2 = To delivery settings 25 = Restore S-DAT backup *	52
Activate SW option (0029)	2795	Integer	Read / Write	Max. 10-digit string consisting of numbers.	53
Software option overview (0015)	2902	Integer	Read	1 = Extended HistoROM * 4 = Concentration * 16 = Extended density function 64 = Viscosity/Hydrocarbon viscosity monitor. 128 = Custody transfer 1024 = Application specific calculations 16384 = Heartbeat Monitoring * 32768 = Heartbeat Verification *	54

* Visibility depends on order options or device settings

"Define access code" wizard

Navigation: Expert → System → Administration → Define access code					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Define access code	8677 to 8684	String	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	50
Confirm access code	8685 to 8692	String	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	51

"Reset access code" submenu

Navigation: Expert → System → Administration → Reset access code					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Operating time (0652)	2631	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	51
Reset access code (0024)	8880 to 8895	String	Read / Write	Character string comprising numbers, letters and special characters	51

6.3.2 "Sensor" submenu**"Measured values" submenu****"Process variables" submenu**

Navigation: Expert → Sensor → Measured values → Process variables					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Mass flow (1838)	2007 to 2008	Float	Read	Signed floating-point number	56
Volume flow (1847)	2009 to 2010	Float	Read	Signed floating-point number	57
Corrected volume flow (1851)	2011 to 2012	Float	Read	Signed floating-point number	57
Density (1850)	2013 to 2014	Float	Read	Signed floating-point number	57

Navigation: Expert → Sensor → Measured values → Process variables					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Reference density (1852)	2015 to 2016	Float	Read	Signed floating-point number	57
Temperature (1853)	2017 to 2018	Float	Read	Signed floating-point number	58
Pressure value (6129)	2089 to 2090	Float	Read	Signed floating-point number	58
Concentration (1887)	2598 to 2599	Float	Read	Signed floating-point number	58
Target mass flow (1864)	2797 to 2798	Float	Read	Signed floating-point number	59
Carrier mass flow (1865)	2799 to 2800	Float	Read	Signed floating-point number	59

"Totalizer" submenu

Navigation: Expert → Sensor → Measured values → Totalizer					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Totalizer value 1 to n (0911–1 to n)	1: 2610 to 2611 2: 2810 to 2811 3: 3010 to 3011	Float	Read	Signed floating-point number	61
Totalizer overflow 1 to n (0910–1 to n)	1: 2612 to 2613 2: 2812 to 2813 3: 3012 to 3013	Float	Read	Integer with sign	62

*"Input values" submenu**"Current input 1 to n" submenu*

Navigation: Expert → Sensor → Measured values → Input values → Current input 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Measured values 1 to n (1603–1 to n)	1: 6151 to 6152 2: 6153 to 6154 3: 6155 to 6156	Float	Read	Signed floating-point number	64
Measured current 1 to n (1604–1 to n)	1: 6131 to 6132 2: 6133 to 6134 3: 6135 to 6136	Float	Read	0 to 22.5 mA	64

"Value status input 1 to n" submenu

Navigation: Expert → Sensor → Measured values → Input values → Value status input 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Value status input (1353–1 to n)	1: 2746 2: 4699 3: 4700	Integer	Read	0 = Low 1 = High	65

*"Output values" submenu**"Value current output 1 to n" submenu*

Navigation: Expert → Sensor → Measured values → Output values → Value current output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Output current 1 to n (0361–1 to n)	1: 5931 to 5932 2: 5933 to 5934 3: 5935 to 5936	Float	Read	0 to 22.5 mA	65
Measured current 1 to n (0366–1 to n)	1: 5779 to 5780 2: 5781 to 5782 3: 5783 to 5784	Float	Read	0 to 30 mA	66

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

Navigation: Expert → Sensor → Measured values → Output values → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Output frequency 1 to n (0471–1 to n)	1: 3462 to 3463 2: 3464 to 3465 3: 9910 to 9911	Float	Read	0.0 to 12 500.0 Hz	66
Switch state 1 to n (0461–1 to n)	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed	67

"Relay output 1 to n" submenu

Navigation: Expert → Sensor → Measured values → Output values → Relay output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Switch state (0801–1 to n)	1: 3518 2: 3519 3: 9875	Integer	Read	1 = Open 6 = Closed	68
Switch cycles (0815–1 to n)	1: 7625 2: 7627 3: 7629	Integer	Read	Positive integer	68
Max. switch cycles number (0817–1 to n)	1: 21919 2: 21921 3: 21923	Integer	Read	Positive integer	68

"Double pulse output" submenu

Navigation: Expert → Sensor → Measured values → Output values → Double pulse output					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Pulse output (0987)	7041 to 7042	Float	Read	Positive floating-point number	69

"System units" submenu

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Mass flow unit (0554)	2101	Integer	Read / Write	0 = g/s 1 = g/min 2 = g/h 3 = g/d 4 = kg/s 5 = kg/min 6 = kg/h⁽⁺⁾ 7 = kg/d 8 = t/s 9 = t/min 10 = t/h 11 = t/d 12 = oz/s 13 = oz/min 14 = oz/h 15 = oz/d 16 = lb/s 17 = lb/min 18 = lb/h 19 = lb/d 20 = STon/s 21 = STon/min 22 = STon/h 23 = STon/d	70
Mass unit (0574)	2102	Integer	Read / Write	50 = g 51 = kg⁽⁺⁾ 52 = t 53 = oz 54 = lb 55 = STon	71

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Volume flow unit (0553)	2103	Integer	Read / Write	0 = cm ³ /s 1 = cm ³ /min 2 = cm ³ /h 3 = cm ³ /d 4 = dm ³ /s 5 = dm ³ /min 6 = dm ³ /h 7 = dm ³ /d 8 = m ³ /s 9 = m ³ /min 10 = m ³ /h 11 = m ³ /d 12 = ml/s 13 = ml/min 14 = ml/h 15 = ml/d 16 = l/s 17 = l/min 18 = l/h⁽⁺⁾ 19 = l/d 20 = hl/s 21 = hl/min 22 = hl/h 23 = hl/d 24 = Ml/s 25 = Ml/min 26 = Ml/h 27 = Ml/d 32 = af/s 33 = af/min 34 = af/h 35 = af/d 36 = ft ³ /s 37 = ft ³ /min 38 = ft ³ /h 39 = ft ³ /d 40 = fl oz/s (us) 41 = fl oz/min (us) 42 = fl oz/h (us) 43 = fl oz/d (us) 44 = gal/s (us) 45 = gal/min (us) 46 = gal/h (us) 47 = gal/d (us) 48 = Mgal/s (us) 49 = Mgal/min (us) 50 = Mgal/h (us) 51 = Mgal/d (us) 52 = bbl/s (us;liq.) [*] 53 = bbl/min (us;liq.) [*] 54 = bbl/h (us;liq.) [*] 55 = bbl/d (us;liq.) [*] 56 = bbl/s (us;beer) [*] 57 = bbl/min (us;beer) [*] 58 = bbl/h (us;beer) [*] 59 = bbl/d (us;beer) [*] 60 = bbl/s (us;oil) 61 = bbl/min (us;oil) 62 = bbl/h (us;oil) 63 = bbl/d (us;oil) 64 = bbl/s (us;tank) 65 = bbl/min (us;tank) 66 = bbl/h (us;tank) 67 = bbl/d (us;tank) 68 = gal/s (imp) 69 = gal/min (imp) 70 = gal/h (imp)	71

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
				71 = gal/d (imp) 72 = Mgal/s (imp) 73 = Mgal/min (imp) 74 = Mgal/h (imp) 75 = Mgal/d (imp) 76 = bbl/s (imp;beer) * 77 = bbl/min (imp;beer) * 78 = bbl/h (imp;beer) * 79 = bbl/d (imp;beer) * 80 = bbl/s (imp;oil) 81 = bbl/min (imp;oil) 82 = bbl/h (imp;oil) 83 = bbl/d (imp;oil) 88 = kgal/s (us) 89 = kgal/min (us) 90 = kgal/h (us) 91 = kgal/d (us) 92 = MMft ³ /s 93 = MMft ³ /min 94 = MMft ³ /h 96 = Mft ³ /d 97 = kft ³ /s 98 = kft ³ /min 99 = kft ³ /h 100 = kft ³ /d	
Volume unit (0563)	2104	Integer	Read / Write	0 = cm ³ 1 = dm ³ 2 = m ³ 3 = ml 4 = l ⁽⁺⁾ 5 = hl 6 = Ml Mega 8 = af 9 = ft ³ 10 = fl oz (us) 11 = gal (us) 12 = Mgal (us) 13 = bbl (us;liq.) * 14 = bbl (us;beer) * 15 = bbl (us;oil) 16 = bbl (us;tank) 17 = gal (imp) 18 = Mgal (imp) 19 = bbl (imp;beer) * 20 = bbl (imp;oil) 22 = kgal (us) 23 = Mft ³ 111 = Mft ³	73

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Corrected volume flow unit (0558)	2105	Integer	Read / Write	0 = NI/s 1 = NI/min 2 = NI/h⁽⁺⁾ 3 = NI/d 4 = Nm ³ /s 5 = Nm ³ /min 6 = Nm ³ /h 7 = Nm ³ /d 8 = Sm ³ /s 9 = Sm ³ /min 10 = Sm ³ /h 11 = Sm ³ /d 12 = Sft ³ /s 13 = Sft ³ /min 14 = Sft ³ /h 15 = Sft ³ /d 16 = Sgal/s (us) 17 = Sgal/min (us) 18 = Sgal/h (us) 19 = Sgal/d (us) 20 = Sbbl/s (us;liq.) 21 = Sbbl/min (us;liq.) 22 = Sbbl/h (us;liq.) 23 = Sbbl/d (us;liq.) 24 = Sgal/s (imp) 25 = Sgal/min (imp) 26 = Sgal/h (imp) 27 = Sgal/d (imp) 28 = MMSft ³ /s 29 = MMSft ³ /min 30 = MMSft ³ /h 31 = MMSft ³ /d 32 = Sbbl/s (us;oil) 33 = Sbbl/min (us;oil) 34 = Sbbl/h (us;oil) 35 = Sbbl/d (us;oil) 36 = Nhl/s 37 = Nhl/min 38 = Nhl/h 39 = Nhl/d 40 = Sl/s 41 = Sl/min 42 = Sl/h 43 = Sl/d 44 = MSft ³ /s 45 = MSft ³ /min 46 = MSft ³ /h 47 = MSft ³ /D	74
Corrected volume unit (0575)	2106	Integer	Read / Write	100 = NI⁽⁺⁾ 101 = Nm ³ 102 = Sm ³ 103 = Sft ³ 104 = Sl 105 = Sgal (us) 106 = Sbbl (us;liq.) 107 = Sgal (imp) 108 = Sbbl (us;oil) 109 = MMSft ³ 110 = Nhl 112 = MSft ³	74

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Density unit (0555)	2107	Integer	Read / Write	0 = g/cm ³ 2 = kg/dm ³ 3 = kg/l⁽⁺⁾ 4 = kg/m ³ 5 = SD4°C 6 = SD15°C 7 = SD20°C 8 = SG4°C 9 = SG15°C 10 = SG20°C 11 = lb/ft ³ 12 = lb/gal (us) 13 = lb/bbl (us;liq.) * 14 = lb/bbl (us;beer) * 15 = lb/bbl (us;oil) 16 = lb/bbl (us;tank) 17 = lb/gal (imp) 18 = lb/bbl (imp;beer) * 19 = lb/bbl (imp;oil) 21 = g/m ³ 22 = g/ml 23 = °API 24 = SG60°F * 97 = g/l 98 = lb/in ³ 99 = STon/yd ³	75
Reference density unit (0556)	2108	Integer	Read / Write	0 = g/Scm ³ 1 = kg/Nl⁽⁺⁾ 2 = kg/Nm ³ 3 = kg/Sm ³ 4 = lb/Sft ³ 5 = °APIbase 6 = RD15°C 7 = RD20°C 8 = RD60°F	76
Temperature unit (0557)	2109	Integer	Read / Write	0 = °C⁽⁺⁾ 1 = K 2 = °F 3 = °R	78
Pressure unit (0564)	2130	Integer	Read / Write	0 = bar 1 = psi a 2 = bar g 3 = psi g 4 = Pa a 5 = kPa a 6 = MPa a 7 = Pa g 8 = kPa g 9 = MPa g	78
Date/time format (2812)	2150	Integer	Read / Write	0 = dd.mm.yy hh:mm 1 = mm/dd/yy hh:mm am/pm 2 = dd.mm.yy hh:mm am/pm 3 = mm/dd/yy hh:mm	79

* Visibility depends on order options or device settings

"Process parameters" submenu

Navigation: Expert → Sensor → Process parameters					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Flow damping (1802)	5510 to 5511	Float	Read / Write	0 to 100.0 s	80
Density damping (1803)	5508 to 5509	Float	Read / Write	0 to 999.9 s	81
Temperature damping (1822)	5127 to 5128	Float	Read / Write	0 to 999.9 s	81
Flow override (1839)	5503	Integer	Read / Write	0 = Off 1 = On	82

"Low flow cut off" submenu

Navigation: Expert → Sensor → Process parameters → Low flow cut off					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign process variable (1837)	5101	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow *	83
On value low flow cutoff (1805)	5138 to 5139	Float	Read / Write	Positive floating-point number	83
Off value low flow cutoff (1804)	5104 to 5105	Float	Read / Write	0 to 100.0 %	83
Pressure shock suppression (1806)	5140 to 5141	Float	Read / Write	0 to 100 s	84

* Visibility depends on order options or device settings

"Partially filled pipe detection" submenu

Navigation: Expert → Sensor → Process parameters → Partially filled pipe detection					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign process variable (1860)	5106	Integer	Read / Write	0 = Off 4 = Density 5 = Calculated reference density	86
Low value partial filled pipe detection (1861)	5110 to 5111	Float	Read / Write	Signed floating-point number	86
High value partial filled pipe detection (1858)	5112 to 5113	Float	Read / Write	Signed floating-point number	86
Response time part. filled pipe detect. (1859)	5108 to 5109	Float	Read / Write	0 to 100 s	87
Maximum damping partial filled pipe det. (6040)	2414 to 2415	Float	Read / Write	Positive floating-point number	87

"Measurement mode" submenu

Navigation: Expert → Sensor → Measurement mode					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Select medium (6062)	2442	Integer	Read / Write	0 = Liquid 1 = Gas 2 = Other	88
Select gas type (6074)	5229	Integer	Read / Write	0 = Air 1 = Nitrogen N2 2 = Argon Ar 3 = Helium He 4 = Carbon dioxide CO2 5 = Oxygen O2 6 = Methane CH4 7 = Ammonia NH3 9 = Hydrogen H2 10 = Ethane C2H6 11 = Propane C3H8 12 = Butane C4H10 13 = Chlorine Cl2 14 = Hydrogen chloride HCl 15 = Carbon monoxide CO 16 = Nitrous oxide N2O 17 = Nitrogen oxide NOx 18 = Hydrogen sulfide H2S 19 = Sulfur hexafluoride SF6 20 = Propylene C3H6 21 = Ozone O3 22 = Other 23 = Ethylene C2H4 110 = Methane CH4 + 10% Hydrogen H2 120 = Methane CH4 + 20% Hydrogen H2 130 = Methane CH4 + 30% Hydrogen H2	89
Reference sound velocity (6147)	7413 to 7414	Float	Read / Write	1 to 99 999.9999 m/s	89
Temperature coefficient sound velocity (6181)	7411 to 7412	Float	Read / Write	Positive floating point number	90

"External compensation" submenu

Navigation: Expert → Sensor → External compensation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Pressure compensation (6130)	5184	Integer	Read / Write	0 = Off 1 = Fixed value 2 = External value 11 = Current input 1 * 12 = Current input 2 *	91
Pressure value (6059)	5185 to 5186	Float	Read / Write	Positive floating-point number	92
External pressure (6209)	2440 to 2441	Float	Read / Write		92
Temperature mode (6184)	5515	Integer	Read / Write	0 = Internal measured value 1 = External value 11 = Current input 1 * 12 = Current input 2 * 13 = Current input 3 *	92
External temperature (6080)	2507 to 2508	Float	Read / Write		93

* Visibility depends on order options or device settings

"Calculated values" submenu*"Corrected volume flow calculation" submenu*

Navigation: Expert → Sensor → Calculated values → Corrected volume flow calculation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Corrected volume flow calculation (1812)	5129	Integer	Read / Write	0 = Calculated reference density 1 = Fixed reference density 11 = Current input 1 * 12 = Current input 2 *	95
External reference density (6198)	2509 to 2510	Float	Read / Write	Floating point number with sign	95
Fixed reference density (1814)	5130 to 5131	Float	Read / Write	Positive floating-point number	96
Reference temperature (1816)	5136 to 5137	Float	Read / Write	-273.15 to 99 999 °C	96
Linear expansion coefficient (1817)	5132 to 5133	Float	Read / Write	Signed floating-point number	97
Square expansion coefficient (1818)	5134 to 5135	Float	Read / Write	Signed floating-point number	97

* Visibility depends on order options or device settings

"Sensor adjustment" submenu

Navigation: Expert → Sensor → Sensor adjustment					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Installation direction (1809)	5501	Integer	Read / Write	0 = Forward flow 1 = Reverse flow	98

"Process variable adjustment" submenu

Navigation: Expert → Sensor → Sensor adjustment → Process variable adjustment					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Mass flow offset (1831)	5521 to 5522	Float	Read / Write	Signed floating-point number	105
Mass flow factor (1832)	5519 to 5520	Float	Read / Write	Positive floating-point number	105
Volume flow offset (1841)	5525 to 5526	Float	Read / Write	Signed floating-point number	106
Volume flow factor (1846)	5523 to 5524	Float	Read / Write	Positive floating-point number	106
Density offset (1848)	5529 to 5530	Float	Read / Write	Signed floating-point number	106
Density factor (1849)	5527 to 5528	Float	Read / Write	Positive floating-point number	107
Corrected volume flow offset (1866)	2044 to 2045	Float	Read / Write	Signed floating-point number	107
Corrected volume flow factor (1867)	2076 to 2077	Float	Read / Write	Positive floating-point number	107
Reference density offset (1868)	2046 to 2047	Float	Read / Write	Signed floating-point number	108
Reference density factor (1869)	2042 to 2043	Float	Read / Write	Positive floating-point number	108
Temperature offset (1870)	5533 to 5534	Float	Read / Write	Signed floating-point number	108
Temperature factor (1871)	5531 to 5532	Float	Read / Write	Positive floating-point number	109

"Calibration" submenu

Navigation: Expert → Sensor → Calibration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Calibration factor (6025)	7513 to 7514	Float	Read	Signed floating-point number	116
Zero point (6195)	7527 to 7528	Float	Read / Write	Signed floating-point number	116

Navigation: Expert → Sensor → Calibration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Nominal diameter (2807)	2048 to 2057	String	Read	DNxx / x"	116
C0 to 5 (6022)	0: 7501 to 7502 1: 7503 to 7504 2: 7505 to 7506 3: 7507 to 7508 4: 7509 to 7510 5: 7511 to 7512	Float	Read	Signed floating-point number	116

6.3.3 "I/O configuration" submenu

Navigation: Expert → I/O configuration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
I/O module 1 to n terminal numbers (3902-1 to n)	1: 6541 2: 6542 3: 6543 4: 6544	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	127
I/O module 1 to n information (3906-1 to n)	1: 8659 2: 8660 3: 8661 4: 8662	Integer	Read	1 = MODBUS 2 = Configurable 3 = Not configurable 254 = Not plugged 255 = Invalid	127
I/O module 1 to n type (3901-1 to n)	1: 6417 2: 6418 3: 6419 4: 6420	Integer	Read / Write	0 = Off 1 = Current output * 2 = Current input * 3 = Pulse/frequency/switch output * 4 = Double pulse output * 5 = Status input * 6 = Relay output *	127
Apply I/O configuration (3907)	8665	Integer	Read / Write	0 = Yes 1 = No	128
Conversion code (2762)	6427	Integer	Read / Write	Positive integer	128

* Visibility depends on order options or device settings

6.3.4 "Input" submenu

"Current input 1 to n" submenu

Navigation: Expert → Input → Current input 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Terminal number (1611-1 to n)	1: 6548 2: 6549 3: 6550	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	129
Signal mode (1610-1 to n)	1: 6424 2: 6425 3: 6426	Integer	Read / Write	0 = Passive 2 = Active *	129
Current span (1605-1 to n)	1: 6147 2: 6148 3: 6149	Integer	Read / Write	0 = 4...20 mA (4... 20.5 mA) 1 = 4...20 mA US (3.9...20.8 mA) 2 = 4...20 mA NE (3.8...20.5 mA) (+) 3 = 0...20 mA (0... 20.5 mA)	130
0/4 mA value (1606-1 to n)	1: 6111 to 6112 2: 6113 to 6114 3: 6115 to 6116	Float	Read / Write	Signed floating-point number	130

Navigation: Expert → Input → Current input 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
20 mA value (1607-1 to n)	1: 6119 to 6120 2: 6121 to 6122 3: 6123 to 6124	Float	Read / Write	Signed floating-point number	131
Failure mode (1601-1 to n)	1: 6159 2: 6160 3: 6161	Integer	Read / Write	1 = Last valid value 2 = Alarm 6 = Defined value	131
Failure value (1602-1 to n)	1: 6163 to 6164 2: 6165 to 6166 3: 6167 to 6168	Float	Read / Write	Signed floating-point number	131

* Visibility depends on order options or device settings

"Status input 1 to n" submenu

Navigation: Expert → Input → Status input 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Terminal number (1358-1 to n)	1: 6554 2: 6555 3: 6556	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	132
Assign status input (1352-1 to n)	1: 2506 2: 4687 3: 4688	Integer	Read / Write	0 = Off 1 = Flow override 2 = Reset all totalizers 3 = Reset totalizer 1 4 = Reset totalizer 2 5 = Reset totalizer 3 10 = Zero adjustment 100 = Reset weighted averages * 140 = Reset weighted averages + totalizer 3 *	132
Value status input (1353-1 to n)	1: 2746 2: 4699 3: 4700	Integer	Read	0 = Low 1 = High	133
Active level (1351-1 to n)	1: 2530 2: 4690 3: 4691	Integer	Read / Write	0 = Low 1 = High	133
Response time status input (1354-1 to n)	1: 3404 to 3405 2: 5753 to 5754 3: 5755 to 5756	Float	Read / Write	5 to 200 ms	133

* Visibility depends on order options or device settings

6.3.5 "Output" submenu

"Current output 1 to n" submenu

Navigation: Expert → Output → Current output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Terminal number (0379-1 to n)	1: 6545 2: 6546 3: 6547	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	135
Signal mode (0377-1 to n)	1: 6421 2: 6422 3: 6423	Integer	Read / Write	0 = Passive * 2 = Active *	135

Navigation: Expert → Output → Current output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign current output 1 to n (0359–1 to n)	1: 5927 2: 5928 3: 5929	Integer	Read / Write	0 = Off * 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow * 4 = Density 5 = Reference density * 7 = Temperature 8 = Oscillation amplitude 0 * 9 = Signal asymmetry 14 = Torsion signal asymmetry * 23 = Carrier pipe temperature * 25 = Raw value mass flow 32 = Exciter current 0 39 = Electronics temperature 48 = Oscillation frequency 0 63 = Oscillation damping 0 66 = Pressure 67 = Oscillation damping fluctuation 0 * 67 = Oscillation damping fluctuation 0 * 68 = Frequency fluctuation 0 * 68 = Frequency fluctuation 0 * 73 = Concentration * 74 = Target mass flow * 75 = Carrier mass flow * 78 = Carrier volume flow * 79 = Carrier corrected volume flow * 80 = Application specific output 0 * 82 = Application specific output 1 * 83 = Oil density * 83 = Oil density * 84 = Water density * 84 = Water density * 86 = GSV flow * 86 = GSV flow * 87 = GSV flow alternative * 87 = GSV flow alternative * 88 = Oil mass flow * 88 = Oil mass flow * 89 = Water mass flow * 89 = Water mass flow * 90 = NSV flow * 90 = NSV flow * 91 = NSV flow alternative * 91 = NSV flow alternative * 92 = S&W volume flow * 92 = S&W volume flow * 93 = Reference density alternative * 93 = Reference density alternative * 94 = Oil corrected volume flow * 94 = Oil corrected volume flow * 95 = Water corrected volume flow * 95 = Water corrected volume flow * 96 = Target corrected volume flow * 97 = Target volume flow * 99 = Oil volume flow * 99 = Oil volume flow * 101 = Water cut * 101 = Water cut * 102 = Water volume flow * 102 = Water volume flow * 184 = Inhomogeneous medium index 185 = Suspended bubbles index * 194 = Test point 0 195 = Test point 1 197 = Sensor index coil asymmetry	135

Navigation: Expert → Output → Current output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Current span (0353-1 to n)	1: 5923 2: 5924 3: 5925	Integer	Read / Write	0 = 4...20 mA (4... 20.5 mA) 1 = 4...20 mA US (3.9...20.8 mA) 2 = 4...20 mA NE (3.8...20.5 mA) 3 = 0...20 mA (0... 20.5 mA) 4 = Fixed value	137
Fixed current (0365-1 to n)	1: 5987 to 5988 2: 5989 to 5990 3: 5991 to 5992	Float	Read / Write	0 to 22.5 mA	138
0/4 mA value (0367-1 to n)	1: 6195 to 6196 2: 6197 to 6198 3: 6199 to 6200	Float	Read / Write	Signed floating-point number	138
20 mA value (0372-1 to n)	1: 5915 to 5916 2: 5917 to 5918 3: 5919 to 5920	Float	Read / Write	Signed floating-point number	140
Measuring mode (0351-1 to n)	1: 5899 2: 5900 3: 5901	Integer	Read / Write	0 = Forward flow 2 = Reverse flow compensation 13 = Forward/Reverse flow *	141
Damping output 1 to n (0363-1 to n)	1: 5903 to 5904 2: 5905 to 5906 3: 5907 to 5908	Float	Read / Write	0.0 to 999.9 s	146
Failure mode (0364-1 to n)	1: 5911 2: 5912 3: 5913	Integer	Read / Write	0 = Min. 1 = Max. 4 = Actual value 5 = Last valid value 6 = Fixed value	147
Failure current (0352-1 to n)	1: 5979 to 5980 2: 5981 to 5982 3: 5983 to 5984	Float	Read / Write	0 to 22.5 mA	148
Output current 1 to n (0361-1 to n)	1: 5931 to 5932 2: 5933 to 5934 3: 5935 to 5936	Float	Read	3.59 to 22.5 mA	148
Measured current 1 to n (0366-1 to n)	1: 5779 to 5780 2: 5781 to 5782 3: 5783 to 5784	Float	Read	0 to 30 mA	148

* Visibility depends on order options or device settings

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

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Terminal number (0492-1 to n)	1: 6551 2: 6552 3: 6553	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	150
Signal mode (0490-1 to n)	1: 6235 2: 6236 3: 6237	Integer	Read / Write	0 = Passive 2 = Active * 3 = Passive NE	150
Operating mode (0469-1 to n)	1: 4479 2: 4480 3: 9907	Integer	Read / Write	0 = Pulse 1 = Switch 12 = Frequency	150

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign pulse output 1 to n (0460-1 to n)	1: 2461 2: 2462 3: 4685	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow * 74 = Target mass flow * 75 = Carrier mass flow * 78 = Carrier volume flow * 79 = Carrier corrected volume flow * 86 = GSV flow * 87 = GSV flow alternative * 88 = Oil mass flow * 89 = Water mass flow * 90 = NSV flow * 91 = NSV flow alternative * 92 = S&W volume flow * 94 = Oil corrected volume flow * 95 = Water corrected volume flow * 96 = Target corrected volume flow * 97 = Target volume flow * 99 = Oil volume flow * 102 = Water volume flow *	152
Value per pulse (0455-1 to n)	1: 3034 to 3035 2: 3036 to 3037 3: 4714 to 4715	Float	Read / Write	Positive floating point number	153
Pulse width (0452-1 to n)	1: 2836 to 2837 2: 2838 to 2839 3: 4702 to 4703	Float	Read / Write	0.05 to 2 000 ms	153
Measuring mode (0457-1 to n)	1: 2394 2: 2395 3: 4683	Integer	Read / Write	0 = Forward flow 1 = Reverse flow 2 = Reverse flow compensation 13 = Forward/Reverse flow	154
Failure mode (0480-1 to n)	1: 2948 2: 2949 3: 4708	Integer	Read / Write	0 = Actual value 1 = No pulses	155
Pulse output 1 to n (0456-1 to n)	1: 3082 to 3083 2: 3084 to 3085 3: 4718 to 4719	Float	Read	Positive floating-point number	156

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign frequency output (0478-1 to n)	1: 2614 2: 2615 3: 9915	Integer	Read / Write	0 = Off 0 = Mass flow 1 = Volume flow 2 = Corrected volume flow * 3 = Density 4 = Reference density * 5 = Temperature 13 = Target mass flow * 14 = Carrier mass flow * 15 = Concentration * 16 = Pressure 18 = HBSI * 19 = Carrier pipe temperature * 20 = Electronics temperature 24 = Oscillation frequency 0 26 = Oscillation amplitude 0 * 28 = Frequency fluctuation 0 * 30 = Oscillation damping 0 32 = Signal asymmetry 33 = Oscillation damping fluctuation 0 * 35 = Exciter current 0 37 = Target corrected volume flow * 38 = Carrier corrected volume flow * 39 = Target volume flow * 40 = Carrier volume flow * 57 = Inhomogeneous medium index 58 = Suspended bubbles index * 59 = Application specific output 0 * 60 = Application specific output 1 * 63 = Test point 0 64 = Test point 1 65 = Sensor index coil asymmetry 66 = Raw value mass flow 67 = Torsion signal asymmetry * 187 = Time period signal frequency (TPS) *	156
Minimum frequency value (0453-1 to n)	1: 3526 to 3527 2: 3528 to 3529 3: 5767 to 5768	Float	Read / Write	0.0 to 10 000.0 Hz	157
Maximum frequency value (0454-1 to n)	1: 2996 to 2997 2: 2998 to 2999 3: 4710 to 4711	Float	Read / Write	0.0 to 10 000.0 Hz	158
Measuring value at minimum frequency (0476-1 to n)	1: 5887 to 5888 2: 5889 to 5890 3: 5891 to 5892	Float	Read / Write	Signed floating-point number	158
Measuring value at maximum frequency (0475-1 to n)	1: 3514 to 3515 2: 3516 to 3517 3: 5759 to 5760	Float	Read / Write	Signed floating-point number	158
Measuring mode (0479-1 to n)	1: 2922 2: 2923 3: 4706	Integer	Read / Write	0 = Forward flow 2 = Reverse flow compensation 13 = Forward/Reverse flow	159
Damping output 1 to n (0477-1 to n)	1: 3522 to 3523 2: 3524 to 3525 3: 5763 to 5764	Float	Read / Write	0 to 999.9 s	160
Failure mode (0451-1 to n)	1: 2367 2: 2368 3: 4681	Integer	Read / Write	0 = Actual value 1 = 0 Hz 2 = Defined value	161
Failure frequency (0474-1 to n)	1: 3510 to 3511 2: 3512 to 3513 3: 9908 to 9909	Float	Read / Write	0.0 to 12 500.0 Hz	162

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Output frequency 1 to n (0471-1 to n)	1: 3462 to 3463 2: 3464 to 3465 3: 9910 to 9911	Float	Read	0.0 to 12 500.0 Hz	162
Switch output function (0481-1 to n)	1: 3022 2: 3023 3: 9914	Integer	Read / Write	0 = Off 1 = On 2 = Diagnostic behavior 3 = Flow direction check 4 = Limit 5 = Status	162
Assign diagnostic behavior (0482-1 to n)	1: 3096 2: 3097 3: 9913	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	163
Assign limit (0483-1 to n)	1: 3184 2: 3185 3: 4722	Integer	Read / Write	1 = Mass flow 2 = Volume flow 3 = Corrected volume flow * 4 = Density 5 = Reference density * 7 = Temperature 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 66 = Pressure 73 = Concentration * 74 = Target mass flow * 75 = Carrier mass flow * 78 = Carrier volume flow * 79 = Carrier corrected volume flow * 80 = Application specific output 0 * 82 = Application specific output 1 * 83 = Oil density * 84 = Water density * 86 = GSV flow * 87 = GSV flow alternative * 88 = Oil mass flow * 89 = Water mass flow * 90 = NSV flow * 91 = NSV flow alternative * 92 = S&W volume flow * 93 = Reference density alternative * 94 = Oil corrected volume flow * 95 = Water corrected volume flow * 96 = Target corrected volume flow * 97 = Target volume flow * 99 = Oil volume flow * 100 = Oscillation damping 101 = Water cut * 102 = Water volume flow * 184 = Inhomogeneous medium index 185 = Suspended bubbles index *	164
Switch-on value (0466-1 to n)	1: 3242 to 3243 2: 3244 to 3245 3: 4728 to 4729	Float	Read / Write	Signed floating-point number	166
Switch-off value (0464-1 to n)	1: 3234 to 3235 2: 3236 to 3237 3: 4724 to 4725	Float	Read / Write	Signed floating-point number	166
Assign flow direction check (0484-1 to n)	1: 3363 2: 3364 3: 4732	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow *	167
Assign status (0485-1 to n)	1: 3374 2: 3375 3: 4734	Integer	Read / Write	0 = Low flow cut off 1 = Partially filled pipe detection	167

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Switch-on delay (0467-1 to n)	1: 6247 to 6248 2: 6249 to 6250 3: 6251 to 6252	Float	Read / Write	0.0 to 100.0 s	167
Switch-off delay (0465-1 to n)	1: 6239 to 6240 2: 6241 to 6242 3: 6243 to 6244	Float	Read / Write	0.0 to 100.0 s	168
Failure mode (0486-1 to n)	1: 3384 2: 3385 3: 9912	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	168
Switch state 1 to n (0461-1 to n)	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed	168
Invert output signal (0470-1 to n)	1: 2583 2: 2584 3: 9916	Integer	Read / Write	0 = Yes 1 = No	169

* Visibility depends on order options or device settings

"Relay output 1 to n" submenu

Navigation: Expert → Output → Relay output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Terminal number (0812-1 to n)	1: 8278 2: 8279 3: 8280	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	170
Relay output function (0804-1 to n)	1: 2488 2: 2489 3: 9876	Integer	Read / Write	1 = Open 2 = Diagnostic behavior 3 = Flow direction check 4 = Limit 5 = Digital Output 6 = Closed	170
Assign flow direction check (0808-1 to n)	1: 8251 2: 8252 3: 8253	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow *	171

Navigation: Expert → Output → Relay output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign limit (0807-1 to n)	1: 8248 2: 8249 3: 8250	Integer	Read / Write	1 = Mass flow 2 = Volume flow 3 = Corrected volume flow * 4 = Density 5 = Reference density * 7 = Temperature 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 66 = Pressure 73 = Concentration * 74 = Target mass flow * 75 = Carrier mass flow * 78 = Carrier volume flow * 79 = Carrier corrected volume flow * 80 = Application specific output 0 * 82 = Application specific output 1 * 83 = Oil density * 84 = Water density * 86 = GSV flow * 87 = GSV flow alternative * 88 = Oil mass flow * 89 = Water mass flow * 90 = NSV flow * 91 = NSV flow alternative * 92 = S&W volume flow * 93 = Reference density alternative * 94 = Oil corrected volume flow * 95 = Water corrected volume flow * 96 = Target corrected volume flow * 97 = Target volume flow * 99 = Oil volume flow * 100 = Oscillation damping 101 = Water cut * 102 = Water volume flow * 184 = Inhomogeneous medium index 185 = Suspended bubbles index *	171
Assign diagnostic behavior (0806-1 to n)	1: 8245 2: 8246 3: 8247	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	172
Assign status (0805-1 to n)	1: 8272 2: 8273 3: 8274	Integer	Read / Write	0 = Low flow cut off 1 = Partially filled pipe detection	173
Switch-off value (0809-1 to n)	1: 8260 to 8261 2: 8262 to 8263 3: 8264 to 8265	Float	Read / Write	Signed floating-point number	173
Switch-off delay (0813-1 to n)	1: 8254 to 8255 2: 8256 to 8257 3: 8258 to 8259	Float	Read / Write	0.0 to 100.0 s	174
Switch-on value (0810-1 to n)	1: 8233 to 8234 2: 8235 to 8236 3: 8237 to 8238	Float	Read / Write	Signed floating-point number	174
Switch-on delay (0814-1 to n)	1: 8266 to 8267 2: 8268 to 8269 3: 8270 to 8271	Float	Read / Write	0.0 to 100.0 s	175
Failure mode (0811-1 to n)	1: 8242 2: 8243 3: 8244	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	175

Navigation: Expert → Output → Relay output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Switch state (0801-1 to n)	1: 3518 2: 3519 3: 9875	Integer	Read	1 = Open 6 = Closed	175
Actual relay state (0816-1 to n)	1: 7009 2: 7010 3: 7011	Integer	Read / Write	1 = Open 6 = Closed	176

* Visibility depends on order options or device settings

"Double pulse output" submenu

Navigation: Expert → Output → Double pulse output					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Master terminal number (0981)	5838	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	177
Slave terminal number (0990)	5845	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	177
Signal mode (0991)	5949	Integer	Read / Write	0 = Passive 2 = Active * 3 = Passive NE	177
Assign pulse output 1 (0982-1)	5993	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow * 74 = Target mass flow * 75 = Carrier mass flow * 78 = Carrier volume flow * 79 = Carrier corrected volume flow * 86 = GSV flow * 87 = GSV flow alternative * 88 = Oil mass flow * 89 = Water mass flow * 90 = NSV flow * 91 = NSV flow alternative * 92 = S&W volume flow * 94 = Oil corrected volume flow * 95 = Water corrected volume flow * 96 = Target corrected volume flow * 97 = Target volume flow * 99 = Oil volume flow * 102 = Water volume flow *	178
Value per pulse (0983)	7495 to 7496	Float	Read / Write	Signed floating-point number	178
Pulse width (0986)	6998 to 6999	Float	Read / Write	0.5 to 2 000 ms	179
Phase shift (0992)	6089	Integer	Read / Write	0 = 90° 1 = 180°	179
Measuring mode (0984)	6001	Integer	Read / Write	0 = Forward flow 1 = Reverse flow 2 = Reverse flow compensation 13 = Forward/Reverse flow	179
Failure mode (0985)	6009	Integer	Read / Write	0 = Actual value 1 = No pulses	180

Navigation: Expert → Output → Double pulse output					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Pulse output (0987)	7041 to 7042	Float	Read	Positive floating-point number	181
Invert output signal (0993)	6101	Integer	Read / Write	0 = Yes 1 = No	181

* Visibility depends on order options or device settings

6.3.6 "Communication" submenu

"Modbus configuration" submenu

Navigation: Expert → Communication → Modbus configuration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Bus address (7112)	4910	Integer	Read / Write	1 to 247	182
Baudrate (7111)	4912	Integer	Read / Write	0 = 1200 BAUD 1 = 2400 BAUD 2 = 4800 BAUD 3 = 9600 BAUD 4 = 19200 BAUD 5 = 38400 BAUD 6 = 57600 BAUD 7 = 115200 BAUD	183
Data transfer mode (7115)	4913	Integer	Read / Write	0 = RTU 1 = ASCII	183
Parity (7122)	4914	Integer	Read / Write	0 = Even 1 = Odd 2 = None / 2 stop bits 3 = None / 1 stop bit	183
Byte order (7113)	4915	Integer	Read / Write	0 = 0-1-2-3 1 = 3-2-1-0 2 = 2-3-0-1 3 = 1-0-3-2	184
Telegram delay (7146)	4916 to 4917	Float	Read / Write	0 to 100 ms	185
Failure mode (7116)	4920	Integer	Read / Write	1 = Last valid value 255 = NaN value	185
Bus termination (7155)	5774	Integer	Read	0 = Off 1 = On	186
Fieldbus writing access (7156)	6807	Integer	Read / Write	0 = Read + write 1 = Read only	186

"Modbus information" submenu

Navigation: Expert → Communication → Modbus information					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Device ID (7153)	2547	Integer	Read	4-digit hexadecimal number	187
Device revision (7154)	4481	Integer	Read	4-digit hexadecimal number	187

"Modbus data map" submenu

Navigation: Expert → Communication → Modbus data map					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Scan list register 0 to 15 (7114)	0: 5001 1: 5002 2: 5003 3: 5004 4: 5005 5: 5006 6: 5007 7: 5008 8: 5009 9: 5010 10: 5011 11: 5012 12: 5013 13: 5014 14: 5015 15: 5016	Integer	Read / Write	1 to 65535	188

"Web server" submenu

Navigation: Expert → Communication → Web server					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Web server language (7221)	4219	Integer	Read / Write	0 = English 1 = Deutsch 2 = Français 3 = Español 4 = Italiano 5 = Nederlands 8 = Svenska 11 = 日本語 (Japanese) 12 = Portuguesa 13 = Polski 14 = русский язык (Russian) 15 = čeština (Czech) 16 = 中文 (Chinese) 18 = Türkçe 19 = tiếng Việt (Vietnamese) 20 = 한국어 (Korean)	189
MAC address (7214)	4210 to 4218	String	Read	Unique 12-digit character string comprising letters and numbers	189
IP address (7209)	4155 to 4162	String	Read	4 octet: 0 to 255 (in the particular octet)	190
Subnet mask (7211)	4163 to 4170	String	Read	4 octet: 0 to 255 (in the particular octet)	190
Default gateway (7210)	4171 to 4178	String	Read	4 octet: 0 to 255 (in the particular octet)	190
Web server functionality (7222)	4220	Integer	Read / Write	0 = Off 1 = On 2 = HTML Off	191
Login page (7273)	5802	Integer	Read / Write	0 = Without header 1 = With header	191

6.3.7 "Application" submenu

Navigation: Expert → Application					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Reset all totalizers (2806)	2609	Integer	Read / Write	0 = Cancel 1 = Reset + totalize	198

"Totalizer 1 to n" submenu

Navigation: Expert → Application → Totalizer 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign process variable (0914-1 to n)	1: 2601 2: 2801 3: 3001	Integer	Read / Write	0 = Off 0 = Mass flow 1 = Volume flow 2 = Corrected volume flow * 13 = Target mass flow * 14 = Carrier mass flow * 37 = Target corrected volume flow * 38 = Carrier corrected volume flow * 39 = Target volume flow * 40 = Carrier volume flow * 66 = Raw value mass flow	199
Unit totalizer 1 to n (0915-1 to n)	1: 4604 2: 4605 3: 4606	Integer	Read / Write	0 = cm ³ * 1 = dm ³ * 2 = m ³ * 3 = ml * 4 = l * 5 = hl * 6 = Ml Mega * 8 = af * 9 = ft ³ * 10 = fl oz (us) * 11 = gal (us) * 12 = Mgal (us) * 13 = bbl (us;liq.) * 14 = bbl (us;beer) * 15 = bbl (us;oil) * 16 = bbl (us;tank) * 17 = gal (imp) * 18 = Mgal (imp) * 19 = bbl (imp;beer) * 20 = bbl (imp;oil) * 22 = kgal (us) * 23 = Mft ³ * 50 = g * 51 = kg * 52 = t * 53 = oz * 54 = lb * 55 = STon * 100 = Nl * 101 = Nm ³ * 102 = Sm ³ * 103 = Sft ³ * 104 = Sl * 105 = Sgal (us) * 106 = Sbbl (us;liq.) * 107 = Sgal (imp) * 108 = Sbbl (us;oil) * 109 = MMSft ³ * 110 = Nhl * 111 = Mft ³ * 112 = MSft ³ * 251 = None *	200
Totalizer operation mode (0908-1 to n)	1: 2605 2: 2805 3: 3005	Integer	Read / Write	0 = Net 1 = Forward 2 = Reverse	201
Control Totalizer 1 to n (0912-1 to n)	1: 2608 2: 2808 3: 3008	Integer	Read / Write	0 = Totalize 1 = Reset + totalize 2 = Preset + hold * 3 = Reset + hold * 4 = Preset + totalize * 5 = Hold *	202

Navigation: Expert → Application → Totalizer 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Preset value 1 to n (0913–1 to n)	1: 2590 to 2591 2: 2592 to 2593 3: 2594 to 2595	Float	Read / Write	Signed floating-point number	202
Failure mode (0901–1 to n)	1: 2606 2: 2806 3: 3006	Integer	Read / Write	0 = Hold 1 = Continue 2 = Last valid value + continue	203

* Visibility depends on order options or device settings

6.3.8 "Diagnostics" submenu

Navigation: Expert → Diagnostics					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Actual diagnostics (0691)	2732	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	213
Previous diagnostics (0690)	2734	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	214
Operating time from restart (0653)	2624	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	215
Operating time (0652)	--	String	Read		

"Diagnostic list" submenu

Navigation: Expert → Diagnostics → Diagnostic list					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Diagnostics 1 (0692)	2736	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	215
Diagnostics 2 (0693)	2738	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	216
Diagnostics 3 (0694)	2740	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	217
Diagnostics 4 (0695)	2742	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	218
Diagnostics 5 (0696)	2744	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	219

"Event logbook" submenu

Navigation: Expert → Diagnostics → Event logbook					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Filter options (0705)	4596	Integer	Read / Write	0 = Failure (F) 4 = Maintenance required (M) 8 = Function check (C) 12 = Out of specification (S) 16 = Information (I) 255 = All	220

"Device information" submenu

Navigation: Expert → Diagnostics → Device information					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Device tag (0011)	2026 to 2041	String	Read	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).	222
Serial number (0009)	7003 to 7008	String	Read	Max. 11-digit character string comprising letters and numbers.	222
Firmware version (0010)	7277 to 7280	String	Read	Character string in the format xx.yy.zz	223
Device name (0020)	7238 to 7245	String	Read	Cubemass 300/500	223
Order code (0008)	2058 to 2067	String	Read	Character string composed of letters, numbers and certain punctuation marks (e.g. /).	223
Extended order code 1 (0023)	2212 to 2221	String	Read	Character string	224
Extended order code 2 (0021)	2222 to 2231	String	Read	Character string	224
Extended order code 3 (0022)	2232 to 2241	String	Read	Character string	224
ENP version (0012)	4003 to 4010	String	Read	Character string	224

"Mainboard module" submenu

Navigation: Expert → Diagnostics → Mainboard module					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Software revision (0072)	7039	Integer	Read	Positive integer	225

"Sensor electronic module (ISEM)" submenu

Navigation: Expert → Diagnostics → Sensor electronic module (ISEM)					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Software revision (0072)	7039	Integer	Read	Positive integer	226

"I/O module 2" submenu

Navigation: Expert → Diagnostics → I/O module 2					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
I/O module 2 terminal numbers (3902-2)	6542	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	227
Software revision (0072)	7039	Integer	Read	Positive integer	227

"I/O module 3" submenu

Navigation: Expert → Diagnostics → I/O module 3					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
I/O module 3 terminal numbers (3902-3)	6543	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	228
Software revision (0072)	7039	Integer	Read	Positive integer	228

"Display module" submenu

Navigation: Expert → Diagnostics → Display module					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Software revision (0072)	7039	Integer	Read	Positive integer	231

"Min/max values" submenu

Navigation: Expert → Diagnostics → Min/max values					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Reset min/max values (6151)	2525	Integer	Read / Write	0 = Cancel 6 = Oscillation amplitude 1 * 8 = Oscillation amplitude * 9 = Torsion oscillation frequency * 10 = Oscillation damping 11 = Torsion oscillation damping * 12 = Oscillation frequency 13 = Signal asymmetry 14 = Torsion signal asymmetry *	241

* Visibility depends on order options or device settings

"Electronics temperature" submenu

Navigation: Expert → Diagnostics → Min/max values → Electronics temperature					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Minimum value (6052)	2421 to 2422	Float	Read	Signed floating-point number	242
Maximum value (6051)	2419 to 2420	Float	Read	Signed floating-point number	242

"Medium temperature" submenu

Navigation: Expert → Diagnostics → Min/max values → Medium temperature					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Minimum value (6109)	7529 to 7530	Float	Read	Signed floating-point number	243
Maximum value (6108)	7531 to 7532	Float	Read	Signed floating-point number	243

"Carrier pipe temperature" submenu

Navigation: Expert → Diagnostics → Min/max values → Carrier pipe temperature					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Minimum value (6030)	7533 to 7534	Float	Read	Signed floating-point number	244
Maximum value (6029)	7535 to 7536	Float	Read	Signed floating-point number	244

"Oscillation frequency" submenu

Navigation: Expert → Diagnostics → Min/max values → Oscillation frequency					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Minimum value (6071)	2459 to 2460	Float	Read	Signed floating-point number	245
Maximum value (6070)	2468 to 2469	Float	Read	Signed floating-point number	245

"Oscillation amplitude" submenu

Navigation: Expert → Diagnostics → Min/max values → Oscillation amplitude					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Minimum value (6010)	2472 to 2473	Float	Read	Signed floating-point number	245
Maximum value (6009)	2470 to 2471	Float	Read	Signed floating-point number	245

"Oscillation damping" submenu

Navigation: Expert → Diagnostics → Min/max values → Oscillation damping					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Minimum value (6122)	2478 to 2479	Float	Read	Signed floating-point number	246
Maximum value (6121)	2423 to 2424	Float	Read	Signed floating-point number	246

"Signal asymmetry" submenu

Navigation: Expert → Diagnostics → Min/max values → Signal asymmetry					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Minimum value (6015)	2474 to 2475	Float	Read	Signed floating-point number	247
Maximum value (6014)	2476 to 2477	Float	Read	Signed floating-point number	247

"Simulation" submenu

Navigation: Expert → Diagnostics → Simulation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign simulation process variable (1810)	6813	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow * 4 = Density 5 = Reference density * 7 = Temperature 73 = Concentration * 74 = Target mass flow * 75 = Carrier mass flow * 78 = Carrier volume flow * 79 = Carrier corrected volume flow * 83 = Oil density * 84 = Water density * 86 = GSV flow * 87 = GSV flow alternative * 88 = Oil mass flow * 89 = Water mass flow * 90 = NSV flow * 91 = NSV flow alternative * 92 = S&W volume flow * 93 = Reference density alternative * 94 = Oil corrected volume flow * 95 = Water corrected volume flow * 96 = Target corrected volume flow * 97 = Target volume flow * 99 = Oil volume flow * 101 = Water cut * 102 = Water volume flow * 187 = Time period signal frequency (TPS) *	261
Process variable value (1811)	6814 to 6815	Float	Read / Write	Depends on the process variable selected	262

Navigation: Expert → Diagnostics → Simulation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Status input simulation (1355)	2620	Integer	Read / Write	0 = Off 1 = On	269
Input signal level (1356)	2638	Integer	Read / Write	0 = Low 1 = High	270
Current input 1 to n simulation (1608–1 to n)	1: 6127 2: 6128 3: 6129	Integer	Read / Write	0 = Off 1 = On	268
Value current input 1 to n (1609–1 to n)	1: 6139 to 6140 2: 6141 to 6142 3: 6143 to 6144	Float	Read / Write	0 to 22.5 mA	269
Current output 1 to n simulation (0354–1 to n)	1: 5939 2: 5940 3: 5941	Integer	Read / Write	0 = Off 1 = On	262
Value current output 1 to n (0355–1 to n)	1: 5995 to 5996 2: 5997 to 5998 3: 5999 to 6000	Float	Read / Write	3.59 to 22.5 mA	262
Frequency output simulation 1 to n (0472–1 to n)	1: 6203 2: 6204 3: 6205	Integer	Read / Write	0 = Off 1 = On	263
Frequency value 1 to n (0473–1 to n)	1: 6207 to 6208 2: 6209 to 6210 3: 6211 to 6212	Float	Read / Write	0.0 to 12 500.0 Hz	263
Pulse output simulation 1 to n (0458–1 to n)	1: 6215 2: 6216 3: 6217	Integer	Read / Write	0 = Off 1 = Down-counting value 2 = Fixed value	264
Pulse value 1 to n (0459–1 to n)	1: 6219 2: 6220 3: 6221	Integer	Read / Write	0 to 65 535	264
Switch output simulation 1 to n (0462–1 to n)	1: 6223 2: 6224 3: 6225	Integer	Read / Write	0 = Off 1 = On	264
Switch state 1 to n (0463–1 to n)	1: 6227 2: 6228 3: 6229	Integer	Read / Write	1 = Open 6 = Closed	265
Relay output 1 to n simulation (0802–1 to n)	1: 7523 2: 7524 3: 7525	Integer	Read / Write	0 = Off 1 = On	265
Switch state 1 to n (0803–1 to n)	1: 8239 2: 8240 3: 8241	Integer	Read / Write	1 = Open 6 = Closed	266
Pulse output simulation (0988)	5957	Integer	Read / Write	0 = Off 1 = Down-counting value 2 = Fixed value	266
Pulse value (0989)	5973	Integer	Read / Write	0 to 65 535	267
Device alarm simulation (0654)	6812	Integer	Read / Write	0 = Off 1 = On	267
Diagnostic event category (0738)	4261	Integer	Read / Write	0 = Sensor 1 = Electronics 2 = Configuration 3 = Process	268
Diagnostic event simulation (0737)	4259	Integer	Read / Write	■ Off ■ Diagnostic event picklist (depends on the category selected)	268

* Visibility depends on order options or device settings

Index

0 ... 9

0/4 mA value (Parameter)	130
0% bargraph value 1 (Parameter)	20
0% bargraph value 3 (Parameter)	23
2.4 GHz WLAN channel (Parameter)	196
20 mA value (Parameter)	131
100% bargraph value 1 (Parameter)	21
100% bargraph value 3 (Parameter)	23

A

Abort cause (Parameter)	111, 114
Activate monitoring (Parameter)	258
Activate SW option (Parameter)	53
Active level (Parameter)	133
Actual diagnostics (Parameter)	213
Additional information (Parameter)	110, 114
Administration (Submenu)	49
Alarm delay (Parameter)	36
AM/PM (Parameter)	250
Application (Submenu)	198
Application specific calculations (Submenu)	204
Application specific input 0 (Parameter)	207
Application specific input 1 (Parameter)	208
Application specific input source 0 (Parameter)	93
Application specific input source 1 (Parameter)	94
Application specific output 0 (Parameter)	209
Application specific output 1 (Parameter)	209
Application-specific parameters (Submenu)	204
Apply I/O configuration (Parameter)	128
Assign behavior of diagnostic no. 046 (Parameter) ...	39
Assign behavior of diagnostic no. 140 (Parameter) ...	39
Assign behavior of diagnostic no. 142 (Parameter) ...	39
Assign behavior of diagnostic no. 144 (Parameter) ...	40
Assign behavior of diagnostic no. 302 (Parameter) ...	40
Assign behavior of diagnostic no. 304 (Parameter) ...	41
Assign behavior of diagnostic no. 374 (Parameter) ...	40
Assign behavior of diagnostic no. 441 (Parameter) ...	41
Assign behavior of diagnostic no. 442 (Parameter) ...	41
Assign behavior of diagnostic no. 443 (Parameter) ...	42
Assign behavior of diagnostic no. 444 (Parameter) ...	42
Assign behavior of diagnostic no. 543 (Parameter) ...	42
Assign behavior of diagnostic no. 599 (Parameter) ...	43
Assign behavior of diagnostic no. 830 (Parameter) ...	43
Assign behavior of diagnostic no. 831 (Parameter) ...	43
Assign behavior of diagnostic no. 832 (Parameter) ...	44
Assign behavior of diagnostic no. 833 (Parameter) ...	44
Assign behavior of diagnostic no. 834 (Parameter) ...	44
Assign behavior of diagnostic no. 835 (Parameter) ...	45
Assign behavior of diagnostic no. 842 (Parameter) ...	45
Assign behavior of diagnostic no. 862 (Parameter) ...	46
Assign behavior of diagnostic no. 912 (Parameter) ...	46
Assign behavior of diagnostic no. 913 (Parameter) ...	46
Assign behavior of diagnostic no. 915 (Parameter) ...	47
Assign behavior of diagnostic no. 941 (Parameter) ...	47
Assign behavior of diagnostic no. 942 (Parameter) ...	47
Assign behavior of diagnostic no. 943 (Parameter) ...	48

Assign behavior of diagnostic no. 944 (Parameter) ...	48
Assign behavior of diagnostic no. 948 (Parameter) ...	49
Assign behavior of diagnostic no. 984 (Parameter) ...	49
Assign channel 1 (Parameter)	232
Assign channel 2 (Parameter)	234
Assign channel 3 (Parameter)	234
Assign channel 4 (Parameter)	235
Assign diagnostic behavior (Parameter)	163, 172
Assign flow direction check (Parameter)	167, 171
Assign frequency output (Parameter)	156
Assign limit (Parameter)	164, 171
Assign process variable (Parameter)	83, 86, 199
Assign pulse output (Parameter)	152, 178
Assign simulation process variable (Parameter)	261
Assign SSID name (Parameter)	196
Assign status (Parameter)	167, 173
Assign status input (Parameter)	132

B

Backlight (Parameter)	32
Backup state (Parameter)	34
Baudrate (Parameter)	183
Bootloader revision (Parameter)	225, 226, 228, 229, 230, 231
Build no. software (Parameter)	225, 226, 227, 229, 230, 231
Bus address (Parameter)	182
Bus termination (Parameter)	186
Byte order (Parameter)	184

C

C0 to 5 (Parameter)	116
Calculated values (Submenu)	94
Calibration (Submenu)	115
Calibration factor (Parameter)	116
Carrier corrected volume flow (Parameter)	60
Carrier mass flow (Parameter)	59
Carrier pipe temperature (Parameter)	123
Carrier pipe temperature (Submenu)	243
Carrier volume flow (Parameter)	61
Casing pipe temperature (Parameter)	124
Clear logging data (Parameter)	236
Combined density-pressure factor (Parameter)	103
Combined density-temperature factor (Parameter) ..	103
Combined temperature-pressure factor (Parameter)	104
Communication (Submenu)	181
Comparison result (Parameter)	34
Concentration (Parameter)	58
Concentration (Submenu)	203
Configuration backup (Submenu)	32
Configuration management (Parameter)	33
Confirm access code (Parameter)	51
Connection state (Parameter)	197
Constant offset (Parameter)	101
Contrast display (Parameter)	32
Control Totalizer 1 to n (Parameter)	202

Corrected volume flow (Parameter)	57
Corrected volume flow calculation (Submenu)	94
Corrected volume flow factor (Parameter)	107
Corrected volume flow offset (Parameter)	107
Corrected volume flow unit (Parameter)	74
Corrected volume unit (Parameter)	74
Cubic temperature factor (Parameter)	104
Current input 1 to n (Submenu)	64, 129
Current input 1 to n (Parameter)	268
Current output 1 to n (Submenu)	134
Current output 1 to n simulation (Parameter)	262
Current output value (Parameter)	262
Current range output (Parameter)	137
Current span (Parameter)	130
Cut off inhomogeneous liquid (Parameter)	210
Cut off inhomogeneous wet gas (Parameter)	210
Cut off suspended bubbles (Parameter)	211

D

Damping current output (Parameter)	146
Damping output (Parameter)	160
Data logging (Parameter)	236
Data logging (Submenu)	231
Data logging control (Parameter)	237
Data logging status (Parameter)	237
Data transfer mode (Parameter)	183
Date/time (manually entered) (Parameter)	255
Date/time format (Parameter)	79
Day (Parameter)	250
Decimal places 1 (Parameter)	21
Decimal places 2 (Parameter)	22
Decimal places 3 (Parameter)	24
Decimal places 4 (Parameter)	25
Decimal places 5 (Parameter)	26
Decimal places 6 (Parameter)	27
Decimal places 7 (Parameter)	28
Decimal places 8 (Parameter)	29
Default gateway (Parameter)	190
Define access code (Parameter)	50
Define access code (Wizard)	50
Density (Parameter)	57
Density 2 unit (Parameter)	77
Density adjustment (Wizard)	98
Density adjustment factor (Parameter)	100
Density adjustment mode (Parameter)	99
Density adjustment offset (Parameter)	100
Density damping (Parameter)	81
Density factor (Parameter)	107
Density limit (Parameter)	82
Density offset (Parameter)	106
Density setpoint 1 (Parameter)	99
Density setpoint 2 (Parameter)	99
Density unit (Parameter)	75
Device alarm simulation (Parameter)	267
Device ID (Parameter)	187
Device information (Submenu)	221
Device name (Parameter)	223
Device reset (Parameter)	52
Device revision (Parameter)	187

Device tag (Parameter)	222
DHCP client (Parameter)	189
Diagnostic behavior (Submenu)	36
Diagnostic event category (Parameter)	268
Diagnostic event simulation (Parameter)	268
Diagnostic handling (Submenu)	35
Diagnostic list (Submenu)	215
Diagnostics (Submenu)	212
Diagnostics 1 (Parameter)	215
Diagnostics 2 (Parameter)	216
Diagnostics 3 (Parameter)	217
Diagnostics 4 (Parameter)	218
Diagnostics 5 (Parameter)	219
Direct access	
0/4 mA value	
Current input 1 to n (1606–1 to n)	130
0% bargraph value 1 (0123)	20
0% bargraph value 3 (0124)	23
2.4 GHz WLAN channel (2704)	196
20 mA value	
Current input 1 to n (1607–1 to n)	131
100% bargraph value 1 (0125)	21
100% bargraph value 3 (0126)	23
Activate monitoring (12129)	258
Activate SW option (0029)	53
Active level	
Status input 1 to n (1351–1 to n)	133
Actual diagnostics (0691)	213
Alarm delay (0651)	36
AM/PM (2813)	250
Application specific input 0 (6366)	207
Application specific input 1 (6367)	208
Application specific input source 0 (6401)	93
Application specific input source 1 (6402)	94
Application specific output 0 (6364)	209
Application specific output 1 (6365)	209
Apply I/O configuration (3907)	128
Assign behavior of diagnostic no. 046 (0709)	39
Assign behavior of diagnostic no. 140 (0708)	39
Assign behavior of diagnostic no. 142 (0647)	39
Assign behavior of diagnostic no. 144 (0731)	40
Assign behavior of diagnostic no. 302 (0739)	40
Assign behavior of diagnostic no. 304 (0635)	41
Assign behavior of diagnostic no. 374 (0710)	40
Assign behavior of diagnostic no. 441 (0657)	41
Assign behavior of diagnostic no. 442 (0658)	41
Assign behavior of diagnostic no. 443 (0659)	42
Assign behavior of diagnostic no. 444 (0740)	42
Assign behavior of diagnostic no. 543 (0643)	42
Assign behavior of diagnostic no. 599 (0644)	43
Assign behavior of diagnostic no. 830 (0800)	43
Assign behavior of diagnostic no. 831 (0641)	43
Assign behavior of diagnostic no. 832 (0681)	44
Assign behavior of diagnostic no. 833 (0682)	44
Assign behavior of diagnostic no. 834 (0700)	44
Assign behavior of diagnostic no. 835 (0702)	45
Assign behavior of diagnostic no. 842 (0638)	45
Assign behavior of diagnostic no. 862 (0679)	46
Assign behavior of diagnostic no. 912 (0703)	46

- Assign behavior of diagnostic no. 913 (0712) 46
- Assign behavior of diagnostic no. 915 (0648) 47
- Assign behavior of diagnostic no. 941 (0632) 47
- Assign behavior of diagnostic no. 942 (0633) 47
- Assign behavior of diagnostic no. 943 (0634) 48
- Assign behavior of diagnostic no. 944 (0732) 48
- Assign behavior of diagnostic no. 948 (0744) 49
- Assign behavior of diagnostic no. 984 (0646) 49
- Assign channel 1 (0851) 232
- Assign channel 2 (0852) 234
- Assign channel 3 (0853) 234
- Assign channel 4 (0854) 235
- Assign diagnostic behavior
 - Pulse/frequency/switch output 1 to n (0482–1 to n) 163
 - Relay output 1 to n (0806–1 to n) 172
- Assign flow direction check
 - Pulse/frequency/switch output 1 to n (0484–1 to n) 167
 - Relay output 1 to n (0808–1 to n) 171
- Assign frequency output
 - Pulse/frequency/switch output 1 to n (0478–1 to n) 156
- Assign limit
 - Pulse/frequency/switch output 1 to n (0483–1 to n) 164
 - Relay output 1 to n (0807–1 to n) 171
- Assign process variable
 - Totalizer 1 to n (0914–1 to n) 199
- Assign process variable (1837) 83
- Assign process variable (1860) 86
- Assign pulse output
 - Pulse/frequency/switch output 1 to n (0460–1 to n) 152
- Assign pulse output (0982) 178
- Assign simulation process variable (1810) 261
- Assign SSID name (2708) 196
- Assign status
 - Pulse/frequency/switch output 1 to n (0485–1 to n) 167
 - Relay output 1 to n (0805–1 to n) 173
- Assign status input
 - Status input 1 to n (1352–1 to n) 132
- Backlight (0111) 32
- Backup state (2759) 34
- Baudrate (7111) 183
- Bootloader revision
 - I/O module 2 (0073) 228, 229, 230
 - I/O module 3 (0073) 228, 229, 230
 - I/O module 4 (0073) 228, 229, 230
- Bootloader revision (0073) 225, 226, 231
- Build no. software
 - I/O module 2 (0079) 227, 229, 230
 - I/O module 3 (0079) 227, 229, 230
 - I/O module 4 (0079) 227, 229, 230
- Build no. software (0079) 225, 226, 231
- Bus address (7112) 182
- Bus termination (7155) 186
- Byte order (7113) 184
- CO to 5 (6022) 116
- Calibration factor (6025) 116
- Carrier corrected volume flow (1894) 60
- Carrier mass flow (1865) 59
- Carrier pipe temperature (6027) 123
- Carrier volume flow (1896) 61
- Casing pipe temperature (6411) 124
- Clear logging data (0855) 236
- Combined density-pressure factor (5971) 103
- Combined density-temperature factor (5961) . . 103
- Combined temperature-pressure factor (5970) . . 104
- Comparison result (2760) 34
- Concentration (1887) 58
- Configuration management (2758) 33
- Connection state (2722) 197
- Constant offset (5968) 101
- Contrast display (0105) 32
- Control Totalizer 1 to n (0912–1 to n) 202
- Corrected volume flow (1851) 57
- Corrected volume flow factor (1867) 107
- Corrected volume flow offset (1866) 107
- Corrected volume flow unit (0558) 74
- Corrected volume unit (0575) 74
- Cubic temperature factor (5969) 104
- Current input 1 to n simulation (1608–1 to n) . . 268
- Current output 1 to n simulation (0354–1 to n) . . 262
- Current output value (0355) 262
- Current range output
 - Current output 1 to n (0353–1 to n) 137
- Current span
 - Current input 1 to n (1605–1 to n) 130
- Cut off inhomogeneous liquid (6374) 210
- Cut off inhomogeneous wet gas (6375) 210
- Cut off suspended bubbles (6370) 211
- Damping current output
 - Current output 1 to n (0363–1 to n) 146
- Damping output
 - Pulse/frequency/switch output 1 to n (0477–1 to n) 160
- Data logging (0860) 236
- Data logging control (0857) 237
- Data logging status (0858) 237
- Data transfer mode (7115) 183
- Date/time (manually entered) (12142) 255
- Date/time format (2812) 79
- Day (2842) 250
- Decimal places 1 (0095) 21
- Decimal places 2 (0117) 22
- Decimal places 3 (0118) 24
- Decimal places 4 (0119) 25
- Decimal places 5 (0149) 26
- Decimal places 6 (0150) 27
- Decimal places 7 (0151) 28
- Decimal places 8 (0152) 29
- Default gateway (7210) 190
- Density (1850) 57
- Density 2 unit (0619) 77
- Density adjustment factor (6042) 100
- Density adjustment mode (6043) 99

- Density adjustment offset (6044) 100
- Density damping (1803) 81
- Density factor (1849) 107
- Density limit (4199) 82
- Density offset (1848) 106
- Density setpoint 1 (6045) 99
- Density setpoint 2 (6046) 99
- Density unit (0555) 75
- Device alarm simulation (0654) 267
- Device ID (7153) 187
- Device name (0020) 223
- Device reset (0000) 52
- Device revision (7154) 187
- Device tag (0011) 222
- DHCP client (7212) 189
- Diagnostic event category (0738) 268
- Diagnostic event simulation (0737) 268
- Diagnostics 1 (0692) 215
- Diagnostics 2 (0693) 216
- Diagnostics 3 (0694) 217
- Diagnostics 4 (0695) 218
- Diagnostics 5 (0696) 219
- Direct access (0106) 12
- Display damping (0094) 30
- Display interval (0096) 29
- Display language (0104) 16
- ENP version (0012) 224
- Enter access code (0003) 14
- Entire logging duration (0861) 238
- Exciter current 0 to 1 (6055) 124
- Execute density adjustment (6041) 100
- Extended order code 1 (0023) 224
- Extended order code 2 (0021) 224
- Extended order code 3 (0022) 224
- External device information (12101) 251
- External pressure (6209) 92
- External reference density (6198) 95
- External temperature (6080) 93
- Fail-safe type application specific 0 (2098) 208
- Fail-safe type application specific 1 (2100) 209
- Fail-safe value application specific 0 (2099) 208
- Fail-safe value application specific 1 (65535) ... 209
- Failure behavior current output
 - Current output 1 to n (0364–1 to n) 147
- Failure current
 - Current output 1 to n (0352–1 to n) 148
- Failure frequency
 - Pulse/frequency/switch output 1 to n (0474–1 to n) 162
- Failure mode
 - Current input 1 to n (1601–1 to n) 131
 - Pulse/frequency/switch output 1 to n (0451–1 to n) 161
 - Pulse/frequency/switch output 1 to n (0480–1 to n) 155
 - Pulse/frequency/switch output 1 to n (0486–1 to n) 168
 - Relay output 1 to n (0811–1 to n) 175
 - Totalizer 1 to n (0901–1 to n) 203
- Failure mode (0985) 180
- Failure mode (7116) 185
- Failure value
 - Current input 1 to n (1602–1 to n) 131
- Fieldbus writing access (7156) 186
- Filter options (0705) 220
- Firmware version
 - I/O module 2 (0072) 227, 228, 230
 - I/O module 3 (0072) 227, 228, 230
 - I/O module 4 (0072) 227, 228, 230
- Firmware version (0010) 223
- Firmware version (0072) 225, 226, 231
- Fixed current
 - Current output 1 to n (0365–1 to n) 138
- Fixed reference density (1814) 96
- Flow damping (1802) 80
- Flow override (1839) 82
- Format display (0098) 16
- Frequency fluctuation 0 to 1 (6175) 118
- Frequency output 1 to n simulation (0472–1 to n)
 - 263
- Frequency output 1 to n value (0473–1 to n) ... 263
- Gas Fraction Handler (6377) 90
- Gateway IP address (2719) 198
- HBSI (12115) 259
- HBSI (12167) 256
- HBSI cycle time (12110) 258
- HBSI value reliability (6380) 259
- Header (0097) 30
- Header text (0112) 31
- High value partial filled pipe detection (1858) ... 86
- Hour (2843) 250
- I/O alteration code (2762) 128
- I/O module (12145) 257
- I/O module 1 to n information (3906–1 to n) ... 127
- I/O module 1 to n terminal numbers (3902–1 to n) 127
- I/O module 1 to n type (3901–1 to n) 127
- I/O module 2 terminal numbers (3902–2)
 - 227, 228, 229
- I/O module 3 terminal numbers (3902–3)
 - 227, 228, 229
- I/O module 4 terminal numbers (3902–4)
 - 227, 228, 229
- Inhomogeneous medium index (6368) 211
- Input signal level 1 to n (1356–1 to n) 270
- Installation direction (1809) 98
- Invert output signal
 - Pulse/frequency/switch output 1 to n (0470–1 to n) 169
- Invert output signal (0993) 181
- IP address (7209) 190
- IP address domain name server (2720) 198
- Last backup (2757) 33
- Linear density factor (5967) 102
- Linear expansion coefficient (1817) 97
- Linear pressure factor (5965) 102
- Linear temperature factor (5966) 102
- Location (2755) 248

- Locking status (0004) 13
- Logging delay (0859) 236
- Logging interval (0856) 235
- Login page (7273) 191
- Low value partial filled pipe detection (1861) 86
- Lower range value output
 - Current output 1 to n (0367-1 to n) 138
- MAC address (7214) 189
- Mass flow (1838) 56
- Mass flow factor (1832) 105
- Mass flow offset (1831) 105
- Mass flow unit (0554) 70
- Mass unit (0574) 71
- Master terminal number (0981) 177
- Max. switch cycles number
 - Relay output 1 to n (0817-1 to n) 68
- Maximum damping partial filled pipe det. (6040) . 87
- Maximum frequency value
 - Pulse/frequency/switch output 1 to n (0454-1 to n) 158
- Maximum value (6009) 245
- Maximum value (6014) 247
- Maximum value (6029) 244
- Maximum value (6051) 242
- Maximum value (6070) 245
- Maximum value (6108) 243
- Maximum value (6121) 246
- Measured current
 - Current output 1 to n (0366-1 to n) 148
 - Value current output 1 to n (0366-1 to n) 66
- Measured current 1 to n (1604-1 to n) 64
- Measured values (12102) 252
- Measured values 1 to n (1603-1 to n) 64
- Measuring mode
 - Pulse/frequency/switch output 1 to n (0457-1 to n) 154
 - Pulse/frequency/switch output 1 to n (0479-1 to n) 159
- Measuring mode (0984) 179
- Measuring mode current output
 - Current output 1 to n (0351-1 to n) 141
- Measuring value at maximum frequency
 - Pulse/frequency/switch output 1 to n (0475-1 to n) 158
- Measuring value at minimum frequency
 - Pulse/frequency/switch output 1 to n (0476-1 to n) 158
- Minimum frequency value
 - Pulse/frequency/switch output 1 to n (0453-1 to n) 157
- Minimum value (6010) 245
- Minimum value (6015) 247
- Minimum value (6030) 244
- Minimum value (6052) 242
- Minimum value (6071) 245
- Minimum value (6109) 243
- Minimum value (6122) 246
- Minute (2844) 251
- Month (2845) 249
- Network security (2705) 193
- Nominal diameter (2807) 116
- Off value low flow cutoff (1804) 83
- On value low flow cutoff (1805) 83
- Operating mode
 - Pulse/frequency/switch output 1 to n (0469-1 to n) 150
- Operating time (0652) 33, 51, 215
- Operating time (12126) 255
- Operating time from restart (0653) 215
- Order code (0008) 223
- Oscillation amplitude 0 to 1 (6006) 119
- Oscillation damping 0 to 1 (6038) 119
- Oscillation damping fluctuation 0 to 1 (6172) ... 122
- Oscillation frequency 0 to 1 (6067) 118
- Output current
 - Current output 1 to n (0361-1 to n) 148
 - Value current output 1 to n (0361-1 to n) 65
- Output frequency
 - Pulse/frequency/switch output 1 to n (0471-1 to n) 66, 162
- Output values (12103) 253
- Parameter 0 (6358) 205
- Parameter 1 (6359) 205
- Parameter 2 (6360) 205
- Parameter 3 (6361) 205
- Parameter 4 (6345) 206
- Parameter 5 (6346) 206
- Parameter 6 (6347) 206
- Parameter 7 (6348) 206
- Parameter 8 (6349) 207
- Parameter 9 (6350) 207
- Parity (7122) 183
- Phase shift (0992) 179
- Plant operator (2754) 248
- Powerless relay status
 - Relay output 1 to n (0816-1 to n) 176
- Preset value 1 to n (0913-1 to n) 202
- Pressure (6129) 58
- Pressure compensation (6130) 91
- Pressure shock suppression (1806) 84
- Pressure unit (0564) 78
- Pressure value (6059) 92
- Previous diagnostics (0690) 214
- Process variable current output
 - Current output 1 to n (0359-1 to n) 135
- Process variable value (1811) 262
- Progress (2808) 100, 110, 113, 252
- Pulse output (0987) 69, 181
- Pulse output 1 to n (0456-1 to n) 66, 156
- Pulse output simulation (0988) 266
- Pulse output simulation 1 to n (0458-1 to n) ... 264
- Pulse scaling
 - Pulse/frequency/switch output 1 to n (0455-1 to n) 153
- Pulse value (0989) 267
- Pulse value 1 to n (0459-1 to n) 264

- Pulse width
 - Pulse/frequency/switch output 1 to n (0452–1 to n) 153
- Pulse width (0986) 179
- Quadratic density factor (5964) 102
- Quadratic pressure factor (5962) 103
- Quadratic temperature factor (5963) 103
- Raw value mass flow (6140) 118
- Received signal strength (2721) 197
- Recommendation: (6000) 111
- Reference density (1852) 57
- Reference density factor (1869) 108
- Reference density offset (1868) 108
- Reference density unit (0556) 76
- Reference sound velocity (6147) 89
- Reference temperature (1816) 96
- Relay output 1 to n simulation (0802–1 to n) ... 265
- Relay output function
 - Relay output 1 to n (0804–1 to n) 170
- Reliability of measured zero point (5982) 114
- Reset access code (0024) 51
- Reset all totalizers (2806) 198
- Reset min/max values (6151) 241
- Response time part. filled pipe detect. (1859) 87
- Response time status input
 - Status input 1 to n (1354–1 to n) 133
- Root cause (6444) 111, 113
- Scan list register 0 to 15 (7114) 188
- Security identification (2718) 194
- Select action (5995) 115
- Select antenna (2713) 197
- Select gas type (6074) 89
- Select medium type (6062) 88
- Select reference density (1812) 95
- Sensor (12152) 256
- Sensor electronic module (ISEM) (12151) 256
- Sensor electronics temperature (ISEM) (6053) .. 123
- Sensor index coil asymmetry (5951) 125, 126
- Sensor index coil asymmetry reliability (5952) .. 125
- Separator (0101) 31
- Serial number (0009) 222
- Signal asymmetry 0 (6013) 122
- Signal mode
 - Current input 1 to n (1610–1 to n) 129
 - Current output 1 to n (0377–1 to n) 135
 - Pulse/frequency/switch output 1 to n (0490–1 to n) 150
- Signal mode (0991) 177
- Slave terminal number (0990) 177
- Software option overview (0015) 54
- Square expansion coefficient (1818) 97
- SSID name (2707) 196
- SSID name (2714) 193
- Start verification (12127) 252
- Status (6253) 110, 113
- Status (12153) 253
- Status input 1 to n simulation (1355–1 to n) ... 269
- Subnet mask (7211) 190
- Suspended bubbles index (6376) 212
- Switch cycles
 - Relay output 1 to n (0815–1 to n) 68
- Switch output function
 - Pulse/frequency/switch output 1 to n (0481–1 to n) 162
- Switch output simulation 1 to n (0462–1 to n) .. 264
- Switch state
 - Pulse/frequency/switch output 1 to n (0461–1 to n) 67, 168
 - Relay output 1 to n (0801–1 to n) 68, 175
- Switch state 1 to n (0463–1 to n) 265
- Switch state 1 to n (0803–1 to n) 266
- Switch-off delay
 - Pulse/frequency/switch output 1 to n (0465–1 to n) 168
 - Relay output 1 to n (0813–1 to n) 174
- Switch-off value
 - Pulse/frequency/switch output 1 to n (0464–1 to n) 166
 - Relay output 1 to n (0809–1 to n) 173
- Switch-on delay
 - Pulse/frequency/switch output 1 to n (0467–1 to n) 167
 - Relay output 1 to n (0814–1 to n) 175
- Switch-on value
 - Pulse/frequency/switch output 1 to n (0466–1 to n) 166
 - Relay output 1 to n (0810–1 to n) 174
- System status (12109) 257
- Target corrected volume flow (1893) 59
- Target mass flow (1864) 59
- Target volume flow (1895) 60
- Telegram delay (7146) 185
- Temperature (1853) 58
- Temperature coefficient sound velocity (6181) ... 90
- Temperature correction source (6184) 92
- Temperature damping (1822) 81
- Temperature difference measuring tube (6344) . 125
- Temperature factor (1871) 109
- Temperature mode (6341) 93
- Temperature offset (1870) 108
- Temperature unit (0557) 78
- Terminal number
 - Current input 1 to n (1611–1 to n) 129
 - Current output 1 to n (0379–1 to n) 135
 - Pulse/frequency/switch output 1 to n (0492–1 to n) 150
 - Relay output 1 to n (0812–1 to n) 170
 - Status input 1 to n (1358–1 to n) 132
- Test point 0 (6425) 124
- Test point 1 (6426) 124
- Timestamp 213, 214, 216, 217, 218, 219
- Torsion signal asymmetry (6289) 122
- Totalizer operation mode
 - Totalizer 1 to n (0908–1 to n) 201
- Totalizer overflow 1 to n (0910–1 to n) 62
- Totalizer value 1 to n (0911–1 to n) 61
- Transmitter identifier (2765) 53
- Unit totalizer 1 to n (0915–1 to n) 200

Upper range value output	
Current output 1 to n (0372-1 to n)	140
User name (2715)	194
User role (0005)	14
Value 1 display (0107)	19
Value 2 display (0108)	21
Value 3 display (0110)	22
Value 4 display (0109)	24
Value 5 display (0145)	25
Value 6 display (0146)	26
Value 7 display (0147)	27
Value 8 display (0148)	28
Value current input 1 to n (1609-1 to n)	269
Value per pulse (0983)	178
Value status input	
Status input 1 to n (1353-1 to n)	133
Value status input 1 to n (1353-1 to n)	65
Verification ID (12141)	255
Verification mode (12105)	251
Verification result (12149)	254, 255
Volume flow (1847)	57
Volume flow factor (1846)	106
Volume flow offset (1841)	106
Volume flow unit (0553)	71
Volume unit (0563)	73
Web server functionality (7222)	191
Web server language (7221)	189
WLAN (2702)	192
WLAN IP address (2711)	195
WLAN MAC address (2703)	195
WLAN mode (2717)	193
WLAN passphrase (2706)	195
WLAN password (2716)	194
WLAN subnet mask (2709)	195
Year (2846)	249
Zero point (6195)	116
Zero point measured (5999)	111, 114
Zero point standard deviation (5996)	112, 115
Direct access (Parameter)	12
Display (Submenu)	15
Display channel 1 (Submenu)	238
Display channel 2 (Submenu)	239
Display channel 3 (Submenu)	240
Display channel 4 (Submenu)	240
Display damping (Parameter)	30
Display interval (Parameter)	29
Display language (Parameter)	16
Display module (Submenu)	230
Document	
Explanation of the structure of a parameter	
description	7
Function	5
Structure	5
Symbols used	7
Target group	5
Using the document	5
Document function	5
Double pulse output (Submenu)	69, 176

E

Electronics temperature (Submenu)	242
ENP version (Parameter)	224
Enter access code (Parameter)	14
Entire logging duration (Parameter)	238
Event list (Submenu)	220
Event logbook (Submenu)	219
Exciter current 0 to 1 (Parameter)	124
Execute density adjustment (Parameter)	100
Extended density adjustment (Submenu)	101
Extended order code 1 (Parameter)	224
Extended order code 2 (Parameter)	224
Extended order code 3 (Parameter)	224
External compensation (Submenu)	91
External device information (Parameter)	251
External pressure (Parameter)	92
External reference density (Parameter)	95
External temperature (Parameter)	93

F

Factory settings	271
SI units	271
US units	272
Fail-safe type application specific 0 (Parameter)	208
Fail-safe type application specific 1 (Parameter)	209
Fail-safe value application specific 0 (Parameter)	208
Fail-safe value application specific 1 (Parameter)	209
Failure behavior current output (Parameter)	147
Failure current (Parameter)	148
Failure frequency (Parameter)	162
Failure mode (Parameter)	
.	131, 155, 161, 168, 175, 180, 185, 203
Failure value (Parameter)	131
Fieldbus writing access (Parameter)	186
Filter options (Parameter)	220
Firmware version (Parameter)	
.	223, 225, 226, 227, 228, 230, 231
Fixed current (Parameter)	138
Fixed reference density (Parameter)	96
Flow damping (Parameter)	80
Flow override (Parameter)	82
Format display (Parameter)	16
Frequency fluctuation 0 to 1 (Parameter)	118
Frequency output 1 to n simulation (Parameter)	263
Frequency output 1 to n value (Parameter)	263
Function	
see Parameter	

G

Gas Fraction Handler	
"Medium index" submenu	210
Gas Fraction Handler (Parameter)	90
Gateway IP address (Parameter)	198

H

HBSI (Parameter)	256, 259
HBSI cycle time (Parameter)	258
HBSI value reliability (Parameter)	259
Header (Parameter)	30

Header text (Parameter) 31
 Heartbeat base settings (Submenu) 247
 Heartbeat Monitoring (Submenu) 258
 Heartbeat Technology (Submenu) 247
 High value partial filled pipe detection (Parameter) . . 86
 Hour (Parameter) 250

I

I/O alteration code (Parameter) 128
 I/O configuration (Submenu) 126
 I/O module (Parameter) 257
 I/O module 1 to n information (Parameter) 127
 I/O module 1 to n terminal numbers (Parameter) . . 127
 I/O module 1 to n type (Parameter) 127
 I/O module 2 (Submenu) 227
 I/O module 2 terminal numbers (Parameter)
 227, 228, 229
 I/O module 3 (Submenu) 228
 I/O module 3 terminal numbers (Parameter)
 227, 228, 229
 I/O module 4 (Submenu) 229
 I/O module 4 terminal numbers (Parameter)
 227, 228, 229
 Inhomogeneous medium index (Parameter) 211
 Input (Submenu) 128
 Input signal level 1 to n (Parameter) 270
 Input values (Submenu) 63
 Installation direction (Parameter) 98
 Invert output signal (Parameter) 169, 181
 IP address (Parameter) 190
 IP address domain name server (Parameter) 198

L

Last backup (Parameter) 33
 Linear density factor (Parameter) 102
 Linear expansion coefficient (Parameter) 97
 Linear pressure factor (Parameter) 102
 Linear temperature factor (Parameter) 102
 Location (Parameter) 248
 Locking status (Parameter) 13
 Logging delay (Parameter) 236
 Logging interval (Parameter) 235
 Login page (Parameter) 191
 Low flow cut off (Submenu) 82
 Low value partial filled pipe detection (Parameter) . . 86
 Lower range value output (Parameter) 138

M

MAC address (Parameter) 189
 Main electronic module + I/O module 1 (Submenu) . 225
 Mass flow (Parameter) 56
 Mass flow factor (Parameter) 105
 Mass flow offset (Parameter) 105
 Mass flow unit (Parameter) 70
 Mass unit (Parameter) 71
 Master terminal number (Parameter) 177
 Max. switch cycles number (Parameter) 68
 Maximum damping partial filled pipe det.
 (Parameter) 87

Maximum frequency value (Parameter) 158
 Maximum value (Parameter)
 242, 243, 244, 245, 246, 247
 Measured current (Parameter) 66, 148
 Measured current 1 to n (Parameter) 64
 Measured values (Parameter) 252
 Measured values (Submenu) 55
 Measured values 1 to n (Parameter) 64
 Measurement mode (Submenu) 88
 Measuring mode (Parameter) 154, 159, 179
 Measuring mode current output (Parameter) 141
 Measuring value at maximum frequency (Parameter)
 158
 Measuring value at minimum frequency (Parameter)
 158
 Medium index (Submenu) 210
 Medium temperature (Submenu) 243
 Min/max values (Submenu) 241
 Minimum frequency value (Parameter) 157
 Minimum value (Parameter)
 242, 243, 244, 245, 246, 247
 Minute (Parameter) 251
 Modbus configuration (Submenu) 182
 Modbus data map (Submenu) 188
 Modbus information (Submenu) 187
 Monitoring results (Submenu) 259
 Month (Parameter) 249

N

Network security (Parameter) 193
 Nominal diameter (Parameter) 116

O

Off value low flow cutoff (Parameter) 83
 On value low flow cutoff (Parameter) 83
 Operating mode (Parameter) 150
 Operating time (Parameter) 33, 51, 215, 255
 Operating time from restart (Parameter) 215
 Order code (Parameter) 223
 Oscillation amplitude (Submenu) 245
 Oscillation amplitude 0 to 1 (Parameter) 119
 Oscillation damping (Submenu) 246
 Oscillation damping 0 to 1 (Parameter) 119
 Oscillation damping fluctuation 0 to 1 (Parameter) . . 122
 Oscillation frequency (Submenu) 244
 Oscillation frequency 0 to 1 (Parameter) 118
 Output (Submenu) 134
 Output current (Parameter) 65, 148
 Output frequency (Parameter) 66, 162
 Output values (Parameter) 253
 Output values (Submenu) 65

P

Parameter
 Structure of a parameter description 7
 Parameter 0 (Parameter) 205
 Parameter 1 (Parameter) 205
 Parameter 2 (Parameter) 205
 Parameter 3 (Parameter) 205

Parameter 4 (Parameter)	206
Parameter 5 (Parameter)	206
Parameter 6 (Parameter)	206
Parameter 7 (Parameter)	206
Parameter 8 (Parameter)	207
Parameter 9 (Parameter)	207
Parity (Parameter)	183
Partially filled pipe detection (Submenu)	85
Performing verification (Submenu)	248
Petroleum (Submenu)	204
Phase shift (Parameter)	179
Plant operator (Parameter)	248
Powerless relay status (Parameter)	176
Preset value 1 to n (Parameter)	202
Pressure (Parameter)	58
Pressure compensation (Parameter)	91
Pressure shock suppression (Parameter)	84
Pressure unit (Parameter)	78
Pressure value (Parameter)	92
Previous diagnostics (Parameter)	214
Process conditions (Parameter)	109, 113
Process parameters (Submenu)	79
Process variable adjustment (Submenu)	104
Process variable current output (Parameter)	135
Process variable value (Parameter)	262
Process variables (Submenu)	56, 207
Progress (Parameter)	100, 110, 113, 252
Pulse output (Parameter)	69, 181
Pulse output 1 to n (Parameter)	66, 156
Pulse output simulation (Parameter)	266
Pulse output simulation 1 to n (Parameter)	264
Pulse scaling (Parameter)	153
Pulse value (Parameter)	267
Pulse value 1 to n (Parameter)	264
Pulse width (Parameter)	153, 179
Pulse/frequency/switch output 1 to n (Submenu)	66, 148

Q

Quadratic density factor (Parameter)	102
Quadratic pressure factor (Parameter)	103
Quadratic temperature factor (Parameter)	103

R

Raw value mass flow (Parameter)	118
Received signal strength (Parameter)	197
Recommendation: (Parameter)	111
Reference density (Parameter)	57
Reference density factor (Parameter)	108
Reference density offset (Parameter)	108
Reference density unit (Parameter)	76
Reference sound velocity (Parameter)	89
Reference temperature (Parameter)	96
Relay output 1 to n (Submenu)	68, 169
Relay output 1 to n simulation (Parameter)	265
Relay output function (Parameter)	170
Reliability of measured zero point (Parameter)	114
Reset access code (Parameter)	51
Reset access code (Submenu)	51

Reset all totalizers (Parameter)	198
Reset min/max values (Parameter)	241
Response time part. filled pipe detect. (Parameter) ...	87
Response time status input (Parameter)	133
Root cause (Parameter)	111, 113

S

Scan list register 0 to 15 (Parameter)	188
Security identification (Parameter)	194
Select action (Parameter)	115
Select antenna (Parameter)	197
Select gas type (Parameter)	89
Select medium type (Parameter)	88
Select reference density (Parameter)	95
Sensor (Parameter)	256
Sensor (Submenu)	55
Sensor adjustment (Submenu)	97
Sensor electronic module (ISEM) (Parameter)	256
Sensor electronic module (ISEM) (Submenu)	226
Sensor electronics temperature (ISEM) (Parameter)	123
Sensor index coil asymmetry (Parameter)	125, 126
Sensor index coil asymmetry reliability (Parameter)	125
Separator (Parameter)	31
Serial number (Parameter)	222
Signal asymmetry (Submenu)	246
Signal asymmetry 0 (Parameter)	122
Signal mode (Parameter)	129, 135, 150, 177
Simulation (Submenu)	260
Slave terminal number (Parameter)	177
Software option overview (Parameter)	54
Square expansion coefficient (Parameter)	97
SSID name (Parameter)	193, 196
Start verification (Parameter)	252
Status (Parameter)	110, 113, 253
Status input 1 to n (Submenu)	132
Status input 1 to n simulation (Parameter)	269
Submenu	
Administration	49
Application	198
Application specific calculations	204
Application-specific parameters	204
Calculated values	94
Calibration	115
Carrier pipe temperature	243
Communication	181
Concentration	203
Configuration backup	32
Corrected volume flow calculation	94
Current input 1 to n	64, 129
Current output 1 to n	134
Data logging	231
Device information	221
Diagnostic behavior	36
Diagnostic handling	35
Diagnostic list	215
Diagnostics	212
Display	15
Display channel 1	238
Display channel 2	239

Display channel 3	240
Display channel 4	240
Display module	230
Double pulse output	69, 176
Electronics temperature	242
Event list	220
Event logbook	219
Extended density adjustment	101
External compensation	91
Heartbeat base settings	247
Heartbeat Monitoring	258
Heartbeat Technology	247
I/O configuration	126
I/O module 2	227
I/O module 3	228
I/O module 4	229
Input	128
Input values	63
Low flow cut off	82
Main electronic module + I/O module 1	225
Measured values	55
Measurement mode	88
Medium index	210
Medium temperature	243
Min/max values	241
Modbus configuration	182
Modbus data map	188
Modbus information	187
Monitoring results	259
Oscillation amplitude	245
Oscillation damping	246
Oscillation frequency	244
Output	134
Output values	65
Partially filled pipe detection	85
Performing verification	248
Petroleum	204
Process parameters	79
Process variable adjustment	104
Process variables	56, 207
Pulse/frequency/switch output 1 to n	66, 148
Relay output 1 to n	68, 169
Reset access code	51
Sensor	55
Sensor adjustment	97
Sensor electronic module (ISEM)	226
Signal asymmetry	246
Simulation	260
Status input 1 to n	132
Supervision	126
System	14
System units	69
Testpoints	117
Totalizer	61
Totalizer 1 to n	199
Value current output 1 to n	65
Value status input 1 to n	64
Verification results	254
Web server	188

Subnet mask (Parameter)	190
Supervision (Submenu)	126
Suspended bubbles index (Parameter)	212
Switch cycles (Parameter)	68
Switch output function (Parameter)	162
Switch output simulation 1 to n (Parameter)	264
Switch state (Parameter)	67, 68, 168, 175
Switch state 1 to n (Parameter)	265, 266
Switch-off delay (Parameter)	168, 174
Switch-off value (Parameter)	166, 173
Switch-on delay (Parameter)	167, 175
Switch-on value (Parameter)	166, 174
System (Submenu)	14
System status (Parameter)	257
System units (Submenu)	69

T

Target corrected volume flow (Parameter)	59
Target group	5
Target mass flow (Parameter)	59
Target volume flow (Parameter)	60
Telegram delay (Parameter)	185
Temperat. difference meas. tube-carrier (Parameter)	125
Temperature (Parameter)	58
Temperature coefficient sound velocity (Parameter)	90
Temperature correction source (Parameter)	92
Temperature damping (Parameter)	81
Temperature difference measuring tube (Parameter)	125
Temperature factor (Parameter)	109
Temperature mode (Parameter)	93
Temperature offset (Parameter)	108
Temperature unit (Parameter)	78
Terminal number (Parameter)	129, 132, 135, 150, 170
Test point 0 (Parameter)	124
Test point 1 (Parameter)	124
Testpoints (Submenu)	117
Timestamp (Parameter)	213, 214, 216, 217, 218, 219
Torsion signal asymmetry (Parameter)	122
Totalizer (Submenu)	61
Totalizer 1 to n (Submenu)	199
Totalizer 1 to n status (Hex) (Parameter)	63
Totalizer 1 to n status (Parameter)	63
Totalizer 1 to n value (Parameter)	63
Totalizer operation mode (Parameter)	201
Totalizer overflow 1 to n (Parameter)	62
Totalizer value 1 to n (Parameter)	61
Transmitter identifier (Parameter)	53

U

Unit totalizer 1 to n (Parameter)	200
Upper range value output (Parameter)	140
User name (Parameter)	194
User role (Parameter)	14

V

Value 1 display (Parameter)	19
Value 2 display (Parameter)	21
Value 3 display (Parameter)	22
Value 4 display (Parameter)	24

Value 5 display (Parameter)	25
Value 6 display (Parameter)	26
Value 7 display (Parameter)	27
Value 8 display (Parameter)	28
Value current input 1 to n (Parameter)	269
Value current output 1 to n (Submenu)	65
Value per pulse (Parameter)	178
Value status input (Parameter)	65, 133
Value status input 1 to n (Submenu)	64
Verification ID (Parameter)	255
Verification mode (Parameter)	251
Verification result (Parameter)	254, 255
Verification results (Submenu)	254
Volume flow (Parameter)	57
Volume flow factor (Parameter)	106
Volume flow offset (Parameter)	106
Volume flow unit (Parameter)	71
Volume unit (Parameter)	73

W

Web server (Submenu)	188
Web server functionality (Parameter)	191
Web server language (Parameter)	189
Wizard	
Define access code	50
Density adjustment	98
WLAN settings	191
Zero adjustment	112
Zero verification	109
WLAN (Parameter)	192
WLAN IP address (Parameter)	195
WLAN MAC address (Parameter)	195
WLAN mode (Parameter)	193
WLAN passphrase (Parameter)	195
WLAN password (Parameter)	194
WLAN settings (Wizard)	191
WLAN subnet mask (Parameter)	195

Y

Year (Parameter)	249
----------------------------	-----

Z

Zero adjustment (Wizard)	112
Zero point (Parameter)	116
Zero point measured (Parameter)	111, 114
Zero point standard deviation (Parameter)	112, 115
Zero verification (Wizard)	109



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