

Description of Device Parameters

Proline Promass 300

Coriolis flowmeter
Modbus RS485

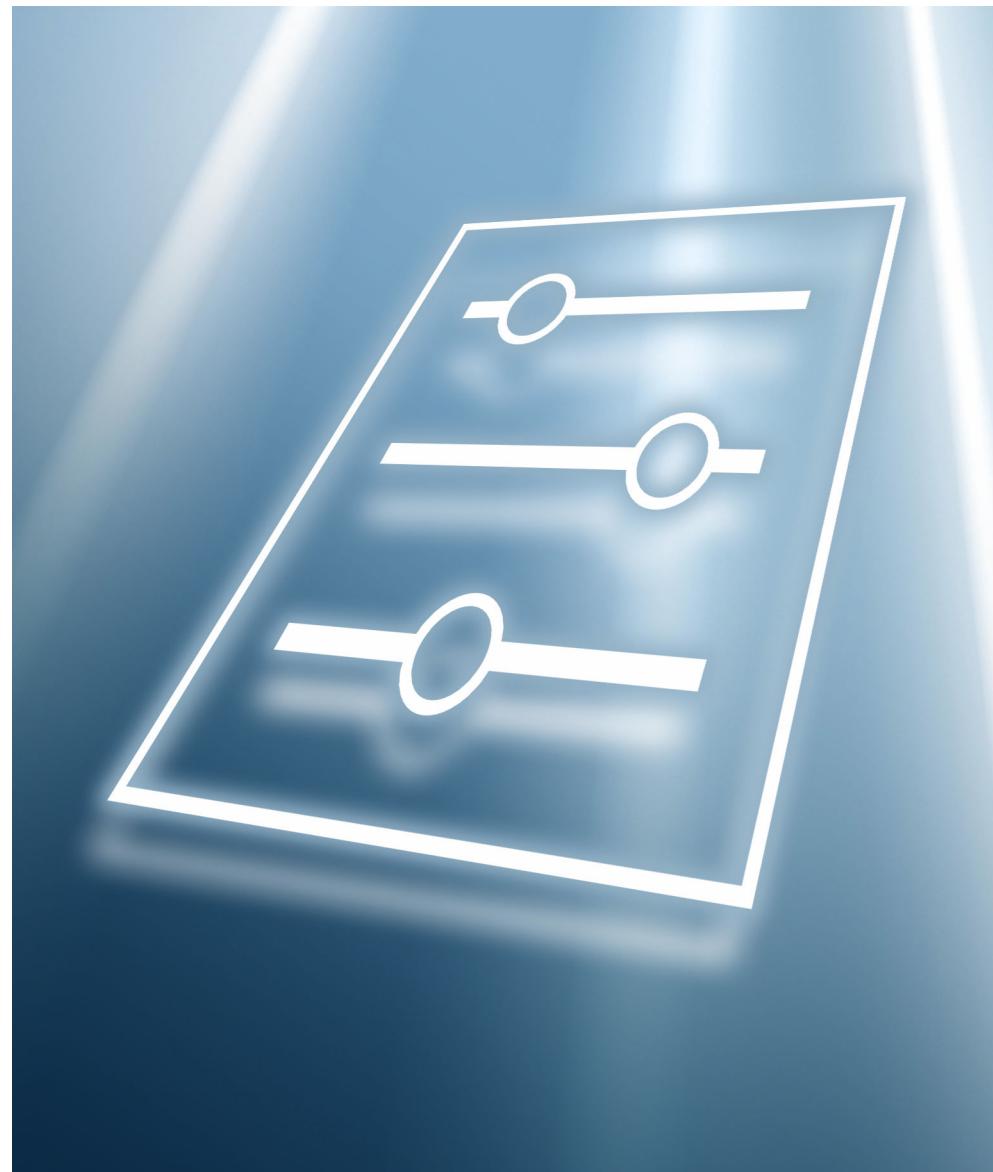


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1 About this document

1.1 Document function

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

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

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

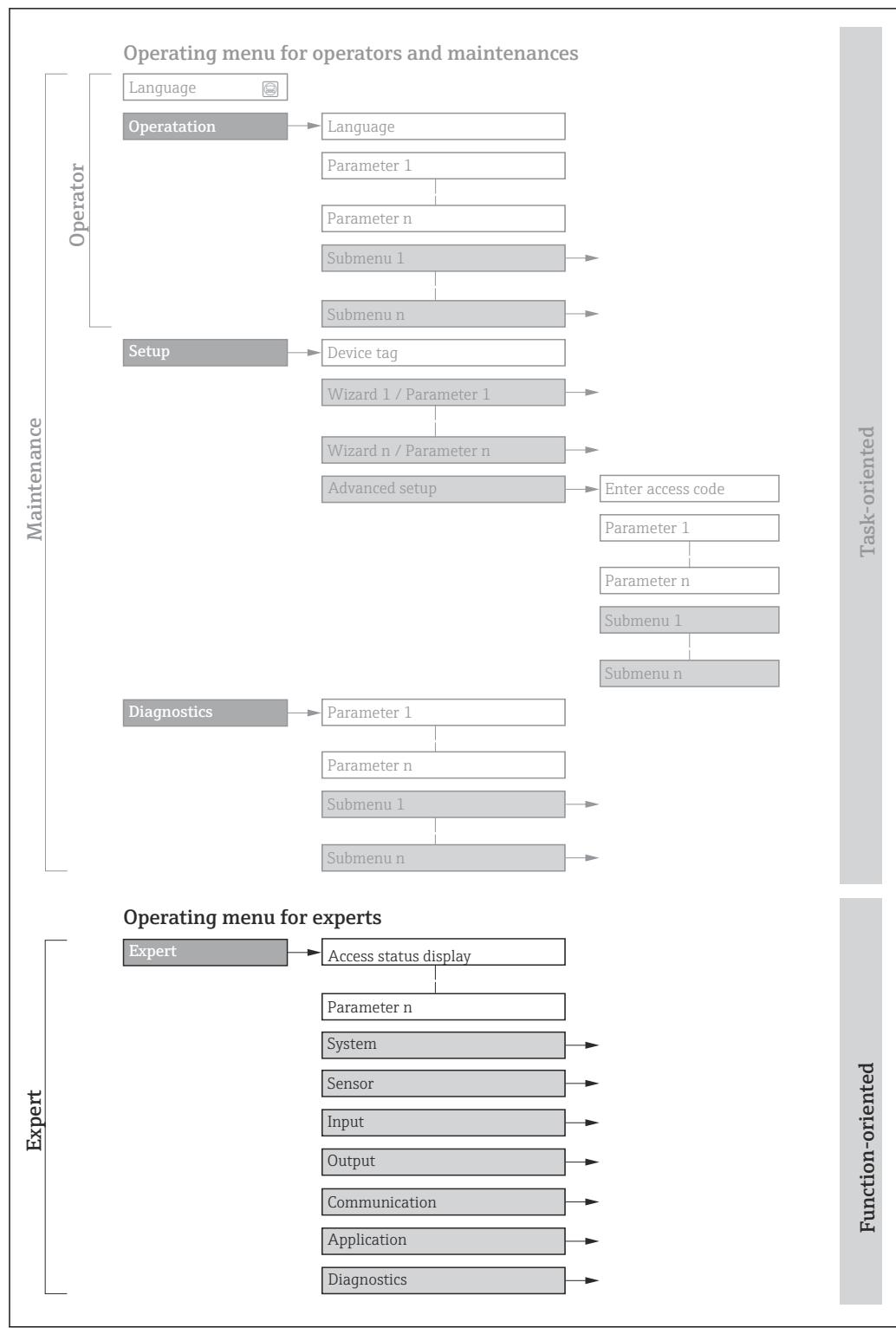
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

The document lists the submenus and their parameters according to the structure from the **Expert** menu (→ 10), 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 <ul style="list-style-type: none"> ▪ 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): <ul style="list-style-type: none"> ▪ 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
Promass A 300 (8A3B**-...)	BA01493D
Promass A 300 (8A3C**-...)	BA01842D
Promass E 300	BA01495D
Promass F 300	BA01496D
Promass H 300	BA01497D
Promass I 300	BA01498D
Promass O 300	BA01499D
Promass P 300	BA01500D
Promass Q 300	BA01501D
Promass S 300	BA01502D
Promass X 300	BA01503D

1.5.2 Supplementary device-dependent documentation

Special Documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Remote display and operating module DKK001	SD01763D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD01663D
Heartbeat Technology	SD01697D
Concentration measurement	SD01707D
Petroleum	SD02098D
Petroleum & locking function	SD02501D
Viscosity measurement Promass I	SD01721D
Custody transfer (counter for liquids other than water)	SD01689D
Custody transfer (counter for gas)	SD02463D
Custody transfer (counter for gas, in accordance with the German Measurement and Calibration Ordinance (Mess- und Eichverordnung))	SD02581D

Contents	Documentation code
Advanced density function	SD02354D
Overrun measurement	SD02342D

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)	→ 13
Locking status (0004)	→ 14
User role (0005)	→ 15
Enter access code (0003)	→ 15
► System	→ 16
► Display	→ 16
► Configuration backup	→ 35
► Diagnostic handling	→ 38
► Administration	→ 52
► Sensor	→ 58
► Measured values	→ 59
► System units	→ 90
► Process parameters	→ 100
► Calculated values	→ 116
► Measurement mode	→ 109
► External compensation	→ 112
► Sensor adjustment	→ 119
► Calibration	→ 138
► Testpoints	→ 140
► I/O configuration	→ 149
I/O module 1 to n terminal numbers (3902-1 to n)	→ 150

I/O module 1 to n information (3906-1 to n)	→ 150
I/O module 1 to n type (3901-1 to n)	→ 151
Apply I/O configuration (3907)	→ 151
I/O alteration code (2762)	→ 151
► Input	→ 152
► Current input 1 to n	→ 152
► Status input 1 to n	→ 155
► Output	→ 157
► Current output 1 to n	→ 158
► Pulse/frequency/switch output 1 to n	→ 172
► Relay output 1 to n	→ 193
► Double pulse output	→ 200
► Communication	→ 205
► Modbus configuration	→ 206
► Modbus information	→ 211
► Modbus data map	→ 212
► Web server	→ 212
► WLAN settings	→ 215
► Application	→ 222
Reset all totalizers (2806)	→ 223
► Totalizer 1 to n	→ 223
► Viscosity	→ 228
► Concentration	→ 228
► Custody transfer	→ 228

▶ Petroleum	→ 228
▶ Application specific calculations	→ 229
▶ Medium index	→ 235
▶ Diagnostics	→ 237
Actual diagnostics (0691)	→ 238
Previous diagnostics (0690)	→ 239
Operating time from restart (0653)	→ 240
Operating time (0652)	→ 240
▶ Diagnostic list	→ 240
▶ Event logbook	→ 244
▶ Custody transfer logbook	→ 246
▶ Device information	→ 247
▶ Main electronic module + I/O module 1	→ 250
▶ Sensor electronic module (ISEM)	→ 251
▶ I/O module 2	→ 252
▶ I/O module 3	→ 253
▶ Display module	→ 256
▶ Data logging	→ 257
▶ Min/max values	→ 266
▶ Heartbeat Technology	→ 276
▶ Simulation	→ 289

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)	→ 13
Locking status (0004)	→ 14
User role (0005)	→ 15
Enter access code (0003)	→ 15
▶ System	→ 16
▶ Sensor	→ 58
▶ I/O configuration	→ 149
▶ Input	→ 152
▶ Output	→ 157
▶ Communication	→ 205
▶ Application	→ 222
▶ Diagnostics	→ 237

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.

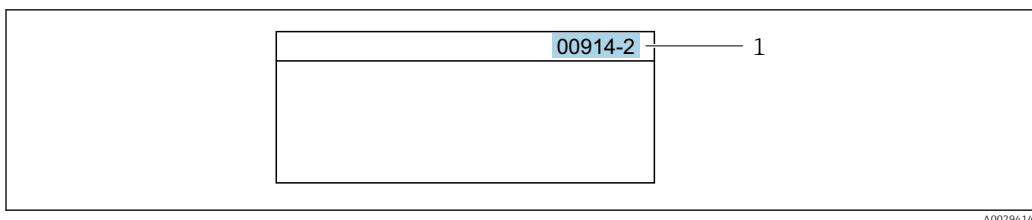
User entry

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 - defined parameters
- 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 (→  15) 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).
CT active - all parameters (priority 2)	 Only available for Promass F, O, Q and X. The DIP switch for custody transfer mode is activated on the PCB board. Locks the parameters that are relevant for custody transfer and also parameters that are predefined by Endress+Hauser and are not relevant for custody transfer (e.g. on local display or operating tool).  For detailed information on custody transfer mode, see the Special Documentation for the device →  8

Options	Description
CT active - defined parameters (priority 3)	 Only available for Promass F, O, Q and X. The DIP switch for the custody transfer mode is activated on the PCB board. Only locks the parameters that are relevant for custody transfer (e.g. on the local display or operating tool).  For detailed information on custody transfer mode, see the Special Documentation for the device → 图 8
Temporarily locked (priority 4)	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	<ul style="list-style-type: none"> ▪ Maintenance ▪ Service
Factory setting	Maintenance
Additional information	<p><i>Description</i></p> <p> Access authorization can be modified via the Enter access code parameter (→ 图 15).</p> <p> If additional write protection is active, this restricts the current access authorization even further.</p> <p><i>User interface</i></p> <p> 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 → 图 8</p>

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	→ 16
▶ Configuration backup	→ 35
▶ Diagnostic handling	→ 38
▶ Administration	→ 52

3.1.1 "Display" submenu

Navigation

Expert → System → Display

▶ Display	
Display language (0104)	→ 17
Format display (0098)	→ 18
Value 1 display (0107)	→ 20
0% bargraph value 1 (0123)	→ 22
100% bargraph value 1 (0125)	→ 23
Decimal places 1 (0095)	→ 23
Value 2 display (0108)	→ 23
Decimal places 2 (0117)	→ 24
Value 3 display (0110)	→ 24
0% bargraph value 3 (0124)	→ 25
100% bargraph value 3 (0126)	→ 25
Decimal places 3 (0118)	→ 26
Value 4 display (0109)	→ 26
Decimal places 4 (0119)	→ 27

Value 5 display (0145)	→ 27
Decimal places 5 (0149)	→ 28
Value 6 display (0146)	→ 29
Decimal places 6 (0150)	→ 29
Value 7 display (0147)	→ 30
Decimal places 7 (0151)	→ 30
Value 8 display (0148)	→ 31
Decimal places 8 (0152)	→ 31
Display interval (0096)	→ 32
Display damping (0094)	→ 33
Header (0097)	→ 33
Header text (0112)	→ 34
Separator (0101)	→ 34
Contrast display (0105)	→ 35
Backlight (0111)	→ 35

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)

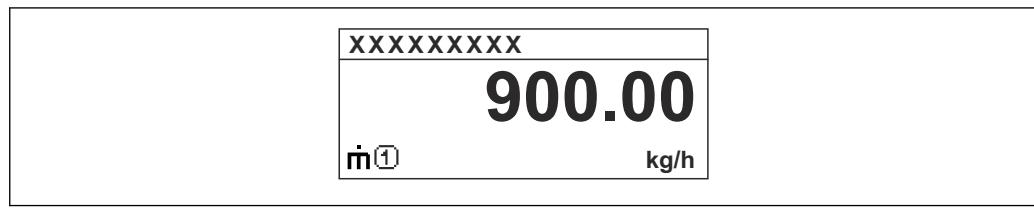
Factory setting	English (alternatively, the ordered language is preset in the device)
------------------------	---

Format display

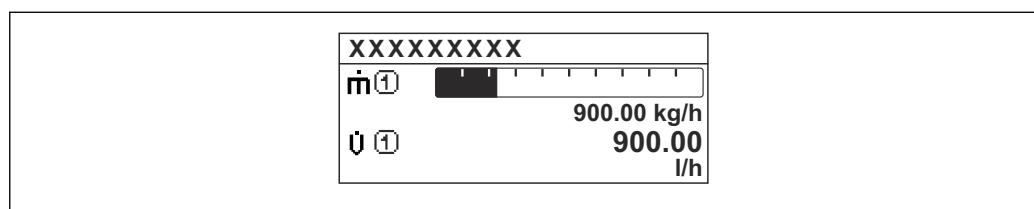
Navigation	  Expert → System → Display → Format display (0098)
Prerequisite	A local display is provided.
Description	Use this function to select how the measured value is shown on the local display.
Selection	<ul style="list-style-type: none"> ■ 1 value, max. size ■ 1 bargraph + 1 value ■ 2 values ■ 1 value large + 2 values ■ 4 values
Factory setting	1 value, max. size
Additional information	<p>Description</p> <p>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.</p> <p> ■ The Value 1 display parameter (→  20)...Value 8 display parameter (→  31) are used to specify which measured values are shown on the local display and in what order.</p> <p>■ 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 (→  32).</p> <p>Custody transfer mode</p> <p> Only available for Promass F, O, Q and X.</p> <ul style="list-style-type: none"> ■ Once the measuring device has been enabled for custody transfer mode, depending on the custody transfer approval selected the display can switch between showing the relevant information and the custody transfer counter. ■ In addition, a padlock symbol appears in the header of the display (). <p> For detailed information on custody transfer mode, see the Special Documentation for the device →  8</p>

Possible measured values shown on the local display:

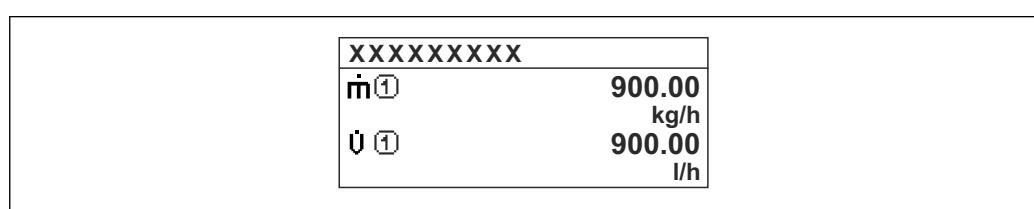
"1 value, max. size" option



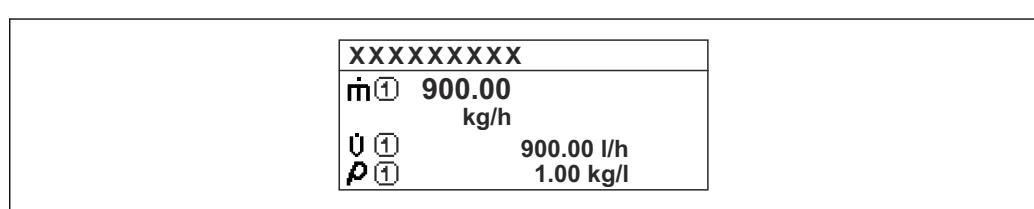
"1 bargraph + 1 value" option



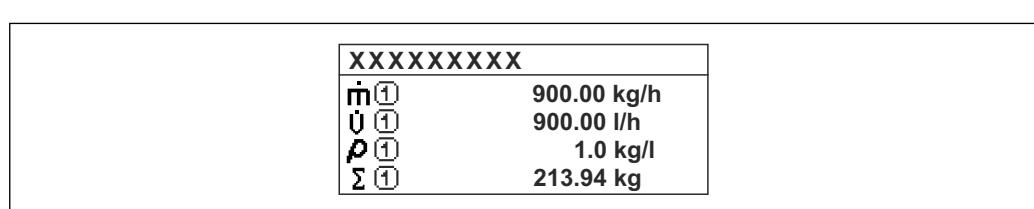
"2 values" option



"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
- Dynamic viscosity *
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- Totalizer 1
- Totalizer 2
- Totalizer 3
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Reference density alternative *
- Weighted density average *
- Weighted temperature average *
- 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 *
- 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 *

* Visibility depends on order options or device settings

- Raw value mass flow
- Exciter current 0 *
- Exciter current 1 *
- Oscillation damping 0
- Oscillation damping 1 *
- Oscillation damping fluctuation 0 *
- Oscillation damping fluctuation 1 *
- Oscillation frequency 0 *
- Oscillation frequency 1 *
- Frequency fluctuation 0 *
- Frequency fluctuation 1 *
- Oscillation amplitude 0 *
- Oscillation amplitude 1 *
- Signal asymmetry
- Torsion signal asymmetry *
- 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

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 (→ 18) is used to specify how many measured values are displayed simultaneously and how.

Custody transfer mode

 Only available for Promass F, O, Q and X.

* Visibility depends on order options or device settings

Once the measuring device has been enabled for custody transfer mode, depending on the custody transfer approval selected the display can switch to show the relevant information.

 For detailed information on custody transfer mode, see the Special Documentation for the device → [8](#)

Dependency

 The unit of the displayed measured value is taken from the **System units** submenu (→ [90](#)).

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 (→ [18](#)) 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 (→ [90](#)).

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 → 300
Additional information	<i>Description</i> The Format display parameter (→ 18) 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 (→ 90).

Decimal places 1

Navigation	Expert → System → Display → Decimal places 1 (0095)
Prerequisite	A measured value is specified in the Value 1 display parameter (→ 20).
Description	Use this function to select the number of decimal places for measured value 1.
Selection	<ul style="list-style-type: none"><input type="checkbox"/> X<input type="checkbox"/> X.X<input type="checkbox"/> X.XX<input type="checkbox"/> X.XXX<input type="checkbox"/> X.XXXX<input type="checkbox"/> X.XXXXX<input type="checkbox"/> 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 (→ 20)

Factory setting None

Additional information *Description*

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

 The **Format display** parameter (→ 18) 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 (→ 90).

Decimal places 2



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

Prerequisite A measured value is specified in the **Value 2 display** parameter (→ 23).

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 *Description*

 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 (→ 20)

Factory setting	None
Additional information	<p><i>Description</i></p> <p>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.</p> <p> The Format display parameter (→ 18) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Selection</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→ 90).</p>

0% bargraph value 3



Navigation	  Expert → System → Display → 0% bargraph 3 (0124)
Prerequisite	A selection was made in the Value 3 display parameter (→ 24).
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	<p><i>Description</i></p> <p> The Format display parameter (→ 18) is used to specify that the measured value is to be displayed as a bar graph.</p> <p><i>User entry</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→ 90).</p>

100% bargraph value 3



Navigation	  Expert → System → Display → 100% bargraph 3 (0126)
Prerequisite	A selection was made in the Value 3 display parameter (→ 24).
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 (→ 18) 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 (→ 90).

Decimal places 3**Navigation**

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

Prerequisite

A measured value is specified in the **Value 3 display** parameter (→ 24).

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

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 (→ 20)

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 (→ 18) 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 (→ 90).

Custody transfer mode

 Only available for Promass F, O, Q and X.

Once the measuring device has been enabled for custody transfer mode, depending on the custody transfer approval selected the display can switch to showing the custody transfer counter.

 For detailed information on custody transfer mode, see the Special Documentation for the device → 8

Decimal places 4**Navigation**

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

Prerequisite

A measured value is specified in the **Value 4 display** parameter (→ 26).

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 (→ 20)
Factory setting	None
Additional information	<p><i>Description</i></p> <p>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.</p> <p>i The Format display parameter (→ 18) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Selection</i></p> <p>i The unit of the displayed measured value is taken from the System units submenu (→ 90).</p> <p><i>Custody transfer mode</i></p> <p>i Only available for Promass F, O, Q and X.</p> <p>Once the measuring device has been enabled for custody transfer mode, depending on the custody transfer approval selected the display can switch to showing the custody transfer counter.</p> <p>i For detailed information on custody transfer mode, see the Special Documentation for the device → 8</p>
Decimal places 5	

Navigation	  Expert → System → Display → Decimal places 5 (0149)
Prerequisite	A measured value is specified in the Value 5 display parameter (→ 27).
Description	Use this function to select the number of decimal places for measured value 5.
Selection	<ul style="list-style-type: none"><input type="checkbox"/> X<input type="checkbox"/> X.X<input type="checkbox"/> X.XX<input type="checkbox"/> X.XXX<input type="checkbox"/> X.XXXX<input type="checkbox"/> X.XXXXX<input type="checkbox"/> X.XXXXXX
Factory setting	X.XX
Additional information	<p><i>Description</i></p> <p>i This setting does not affect the accuracy of the device for measuring or calculating the value.</p>

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 (→ 20)
Factory setting	None
Additional information	<p><i>Description</i></p> <p>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.</p> <p> The Format display parameter (→ 18) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Selection</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→ 90).</p> <p><i>Custody transfer mode</i></p> <p> Only available for Promass F, O, Q and X.</p> <p>Once the measuring device has been enabled for custody transfer mode, depending on the custody transfer approval selected the display can switch to showing the custody transfer counter.</p> <p> For detailed information on custody transfer mode, see the Special Documentation for the device → 8</p>

Decimal places 6

Navigation	Expert → System → Display → Decimal places 6 (0150)
Prerequisite	A measured value is specified in the Value 6 display parameter (→ 29).
Description	Use this function to select the number of decimal places for measured value 6.
Selection	<ul style="list-style-type: none"> <input type="checkbox"/> X <input type="checkbox"/> X.X <input type="checkbox"/> X.XX <input type="checkbox"/> X.XXX <input type="checkbox"/> X.XXXX <input type="checkbox"/> X.XXXXX <input type="checkbox"/> 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 (→  20)
Factory setting	None
Additional information	<p><i>Description</i></p> <p>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.</p> <p> The Format display parameter (→  18) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Selection</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→  90).</p> <p><i>Custody transfer mode</i></p> <p> Only available for Promass F, O, Q and X.</p> <p>Once the measuring device has been enabled for custody transfer mode, depending on the custody transfer approval selected the display can switch to showing the custody transfer counter.</p> <p> For detailed information on custody transfer mode, see the Special Documentation for the device →  8</p>

Decimal places 7

Navigation	  Expert → System → Display → Decimal places 7 (0151)
Prerequisite	A measured value is specified in the Value 7 display parameter (→  30).
Description	Use this function to select the number of decimal places for measured value 7.
Selection	<ul style="list-style-type: none"> <input type="checkbox"/> X <input type="checkbox"/> X.X <input type="checkbox"/> X.XX <input checked="" type="checkbox"/> X.XXX

- X.XXXX
- X.XXXXX
- 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 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 (→  20)

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 (→  18) 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 (→  90).

Custody transfer mode

-  Only available for Promass F, O, Q and X.

Once the measuring device has been enabled for custody transfer mode, depending on the custody transfer approval selected the display can switch to showing the custody transfer counter.

-  For detailed information on custody transfer mode, see the Special Documentation for the device →  8

Decimal places 8



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

Prerequisite A measured value is specified in the **Value 8 display** parameter (→  31).

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*Description*

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

-  ■ The **Value 1 display** parameter (→ 20)...**Value 8 display** parameter (→ 31) 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 (→ 18).

Custody transfer mode

-  Only available for Promass F, O, Q and X.

Once the measuring device has been enabled for custody transfer mode, depending on the custody transfer approval selected the display can switch between showing the relevant information and the custody transfer counter.

-  For detailed information on custody transfer mode, see the Special Documentation for the device → 8

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 *User entry*

Use this function to enter a time constant (PT1 element¹⁾) 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

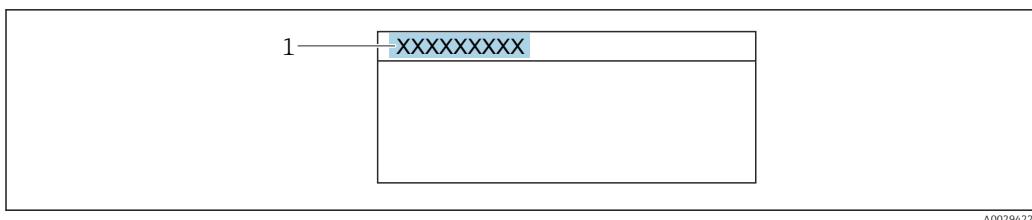
- Device tag
- Free text

Factory setting Device tag

Additional information *Description*

The header text only appears during normal operation.

1) proportional transmission behavior with first order delay



A0029422

1 Position of the header text on the display

Selection

- Device tag
Is defined in the **Device tag** parameter (→ 247).
- Free text
Is defined in the **Header text** parameter (→ 34).

Header text



Navigation

Expert → System → Display → Header text (0112)

Prerequisite

The **Free text** option is selected in the **Header** parameter (→ 33).

Description

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

User entry

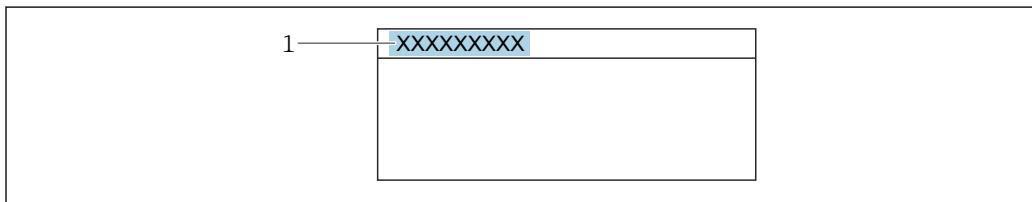
Max. 12 characters, such as letters, numbers or special characters (e.g. @, %, /)

Factory setting

Additional information

Description

The header text only appears during normal operation.



A0029422

1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator



Navigation

Expert → System → Display → Separator (0101)

Prerequisite

A local display is provided.

Description Use this function to select the decimal separator.

Selection

- . (point)
- , (comma)

Factory setting . (point)

Contrast display

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

Prerequisite A local display is provided.

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

User entry 20 to 80 %

Factory setting Depends on the display

Backlight

Navigation  Expert → System → Display → Backlight (0111)

Prerequisite One of the following conditions is met:

- Order code for "Display; operation", option **F** "4-line, illum.; touch control"
- Order code for "Display; operation", option **G** "4-line, illum.; touch control +WLAN"
- 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

► Configuration backup

Operating time (0652)

→  36

Last backup (2757)	→ 36
Configuration management (2758)	→ 36
Backup state (2759)	→ 37
Comparison result (2760)	→ 37

Operating time

Navigation Expert → System → Config. backup → Operating time (0652)

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

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

Additional information *User interface*

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

Last backup

Navigation Expert → System → Config. backup → Last backup (2757)

Description Displays the time since a backup copy of the data was last saved to the device memory.

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

Configuration management



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

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

Selection

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

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*

i The comparison is started via the **Compare** option in the **Configuration management** parameter (→ 36).

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.

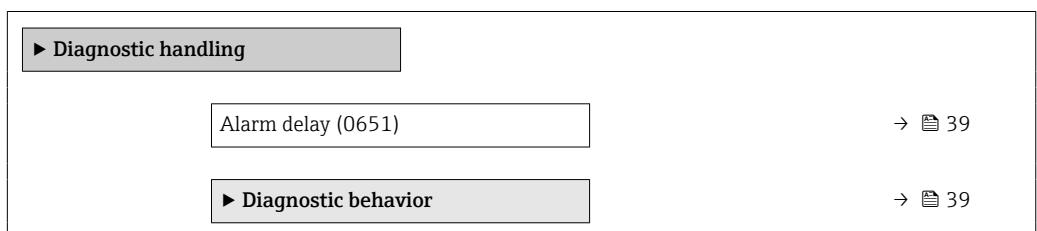
HistoROM

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



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
- 915 Viscosity out of specification
- 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 (→ 39).

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 (→ 244) (Event list submenu (→ 245})) 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)	→ 42
Assign behavior of diagnostic no. 046 (0709)	→ 42
Assign behavior of diagnostic no. 142 (0647)	→ 42
Assign behavior of diagnostic no. 144 (0731)	→ 43
Assign behavior of diagnostic no. 374 (0710)	→ 43
Assign behavior of diagnostic no. 302 (0739)	→ 43
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Assign behavior of diagnostic no. 441 (0657)	→ 44
Assign behavior of diagnostic no. 442 (0658)	→ 44
Assign behavior of diagnostic no. 443 (0659)	→ 45
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Assign behavior of diagnostic no. 830 (0800)	→ 46
Assign behavior of diagnostic no. 831 (0641)	→ 46
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Assign behavior of diagnostic no. 862 (0679)	→ 49
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Assign behavior of diagnostic no. 944 (0732)	→ 51
Assign behavior of diagnostic no. 948 (0744)	→ 52
Assign behavior of diagnostic no. 984 (0646)	→ 52

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Alarm
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Alarm
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Alarm
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only

Factory setting Warning

Additional information  For a detailed description of the options available: → [39](#)

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: → [39](#)

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: → [39](#)

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: → [39](#)

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: → [39](#)

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Off
Additional information	 For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 39

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	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only

Factory setting Warning

Additional information  For a detailed description of the options available: → [39](#)

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: → [39](#)

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: → [39](#)

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: → [39](#)

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

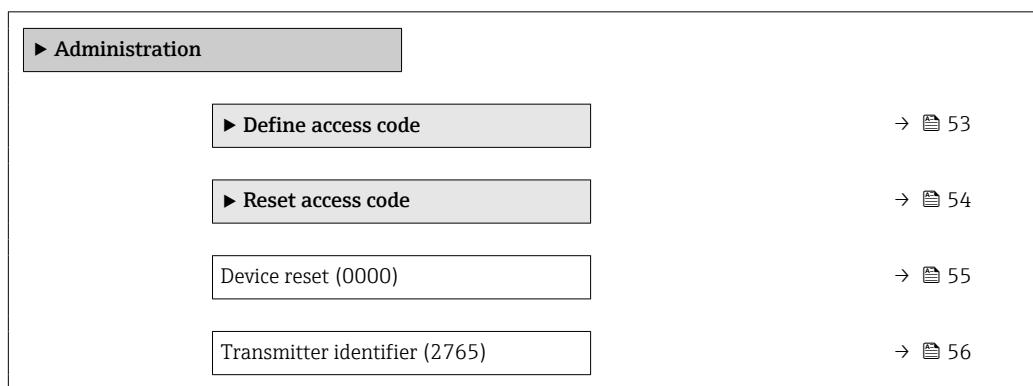
Factory setting

Warning

3.1.4 "Administration" submenu

Navigation

Expert → System → Administration



Activate SW option (0029)	→ 56
Software option overview (0015)	→ 57

"Define access code" wizard

The **Define access code** wizard (→ 53) 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	→ 53
Confirm access code	→ 54

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 (→ 15).

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

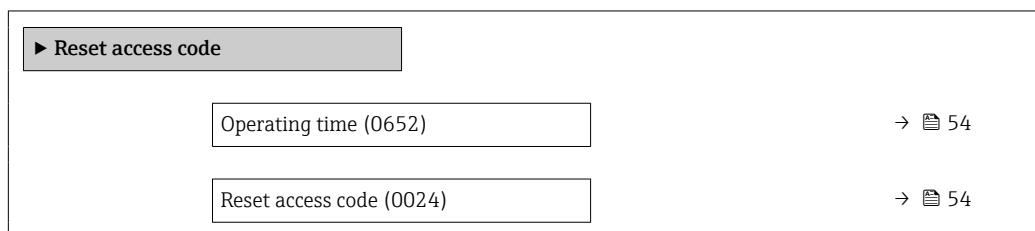
Enter the defined release code a second time to confirm the release code.

User entry

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

"Reset access code" submenu*Navigation*

Expert → System → Administration → Reset acc. code

**Operating time****Navigation**

Expert → System → Administration → Reset acc. code → Operating time (0652)

Description

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

User interface

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

Additional information*User interface*

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

Reset access code**Navigation**

Expert → System → Administration → Reset acc. code → Reset acc. code (0024)

Description

Use this function to enter a reset code to reset the user-specific 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*Description*

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

User entry

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

NOTE!

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

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

- ▶ Before you enter a new activation code, make a note of the current activation code .
- ▶ Enter the new activation code provided by Endress+Hauser when the new software option was ordered.
- ▶ Once the activation code has been entered, check if the new software option is displayed in the **Software option overview** parameter (→ 57).
 - ↳ 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 (→ 57).

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 *
- Petroleum *
- Concentration *
- Viscosity/Hydrocarbon viscosity monitor. *
- Custody transfer *
- Application specific calculations *
- Heartbeat Monitoring *
- Heartbeat Verification *
- 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" and option EE "Special density"

"Viscosity" option

-  Only available for Promass I.

* Visibility depends on order options or device settings

Order code for "Application package", option EG "Viscosity"

"Custody transfer" option

The measuring device has an approval for custody transfer measurement.

i Detailed information on the national and international approvals for custody transfer that are currently available can be supplied by your Endress+Hauser sales organization.

"Petroleum" option

i Only available for Promass E, F, O, Q and X.

Order code for "Application package", option EJ "Petroleum"

"Extended density function" option

i Only available for Promass Q DN25 to DN100.

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

Option "Premium density + Extended density function"

i Only available for Promass Q DN25.

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	→ 59
▶ System units	→ 90
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▶ Calculated values	→ 116
▶ Measurement mode	→ 109
▶ External compensation	→ 112
▶ Sensor adjustment	→ 119
▶ Calibration	→ 138
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3.2.1 "Measured values" submenu

Navigation

Expert → Sensor → Measured val.

► Measured values	
► Process variables	→ 59
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► Input values	→ 84
► Output values	→ 86

"Process variables" submenu

Navigation

Expert → Sensor → Measured val. → Process variab.

► Process variables	
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Water corrected volume flow	→ 79
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Weighted temperature average	→ 81
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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 (→ 91)

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*Description*

The volume flow is calculated from the mass flow currently measured and the density currently measured.

Dependency

 The unit is taken from the **Volume flow unit** parameter (→ [92](#))

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*Dependency*

 The unit is taken from the **Corrected volume flow unit** parameter (→ [95](#))

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*Dependency*

 The unit is taken from the **Density unit** parameter (→ [96](#))

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 (→ [97](#))

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	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  99)

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	<i>Dependency</i>  The unit is taken from the Pressure unit parameter (→  99)

Dynamic viscosity

Navigation	  Expert → Sensor → Measured val. → Process variab. → Dynam. viscosity (1854)
Prerequisite	For the following order code: "Application package", option EG "Viscosity"  The software options currently enabled are displayed in the Software option overview parameter (→  57).
Description	Displays the dynamic viscosity that is currently calculated.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Dynamic viscosity unit parameter.

Kinematic viscosity

Navigation	  Expert → Sensor → Measured val. → Process variab. → Kinematic visc. (1857)
Prerequisite	For the following order code: "Application package", option EG "Viscosity"
	 The software options currently enabled are displayed in the Software option overview parameter (→  57).
Description	Displays the kinematic viscosity that is currently calculated.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>
	 The unit is taken from the Kinematic viscosity unit parameter (0578).

Temp. compensated dynamic viscosity

Navigation	  Expert → Sensor → Measured val. → Process variab. → TempCompDynVisc (1872)
Prerequisite	For the following order code: "Application package", option EG "Viscosity"
	 The software options currently enabled are displayed in the Software option overview parameter (→  57).
Description	Displays the temperature compensation that is currently calculated for the viscosity.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>
	 The unit is taken from the Dynamic viscosity unit parameter.

Temp. compensated kinematic viscosity

Navigation	  Expert → Sensor → Measured val. → Process variab. → TempCompKinVisc (1863)
Prerequisite	For the following order code: "Application package", option EG "Viscosity"
	 The software options currently enabled are displayed in the Software option overview parameter (→  57).
Description	Displays the temperature compensation that is currently calculated for the kinetic viscosity.
User interface	Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Kinematic viscosity unit** parameter (0578).

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 (→ 57).

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 (→ 57).

Description

Displays the mass flow that is currently measured for the target medium.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 91)

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 (→ 57).
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 (→ 91)

Target corrected volume flow

Navigation	 Expert → Sensor → Measured val. → Process variab. → Targ.corr.vol.fl (1893)
Prerequisite	With the following conditions: <ul style="list-style-type: none">▪ 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 (→ 57).
Description	Displays the corrected volume flow that is currently measured for the target fluid.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Volume flow unit parameter (→ 92)

Carrier corrected volume flow

Navigation	 Expert → Sensor → Measured val. → Process variab. → Carr.corr.vol.fl (1894)
Prerequisite	With the following conditions: <ul style="list-style-type: none">▪ 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 (→ 57).
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 (→ 92)

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 (→ 57).

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 (→ 92)

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 (→ 57).

Description Use this function to display the volume flow currently measured for the carrier medium.

User interface Signed floating-point number

Additional information *Dependency*



The unit is taken from the **Volume flow unit** parameter (→ 92)

CTL**Navigation**  Expert → Sensor → Measured val. → Process variab. → CTL (4191)**Prerequisite**

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).**Description**

Displays the correction factor which represents the effect of temperature on the fluid. This is used to convert the measured volume flow and the measured density to values at reference temperature.

User interface

Positive floating-point number

Factory setting

–

CPL**Navigation**  Expert → Sensor → Measured val. → Process variab. → CPL (4192)**Prerequisite**

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).**Description**

Displays the correction factor which represents the effect of pressure on the fluid. This is used to convert the measured volume flow and the measured density to values at reference pressure.

User interface

Positive floating-point number

Factory setting

–

CTPL**Navigation**  Expert → Sensor → Measured val. → Process variab. → CTPL (4193)**Prerequisite**

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the combined correction factor which represents the effect of temperature and pressure on the fluid. This is used to convert the measured volume flow and the measured density to values at reference temperature and reference pressure.

User interface Positive floating-point number

Factory setting –

S&W volume flow

Navigation   Expert → Sensor → Measured val. → Process variab. → S&W volume flow (4161)

Prerequisite For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the S&W volume flow which is calculated from the measured total volume flow minus the net volume flow.

Dependency

The unit is taken from: **Volume flow unit** parameter (→  92)

User interface Signed floating-point number

Factory setting –

Additional information  The unit is taken from the **Volume flow unit** parameter (→  92)

S&W correction value

Navigation   Expert → Sensor → Measured val. → Process variab. → S&W correction (4194)

Prerequisite For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **S&W input mode** parameter, the **External value** option or the **Current input 1...** **n** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Shows the correction value for sediment and water.

User interface Positive floating-point number

Factory setting –

Reference density alternative

Navigation	  Expert → Sensor → Measured val. → Process variab. → Ref.dens.altern. (4168)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter, the API referenced correction option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→ 57).</p>
Description	Displays the fluid density at the alternative reference temperature. <i>Dependency</i> The unit is taken from: Reference density unit parameter (→ 97)
User interface	Signed floating-point number
Factory setting	–
Additional information	 The unit is taken from the Reference density unit parameter (→ 97)

GSV flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → GSV flow (4157)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter, the API referenced correction option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→ 57).</p>
Description	Displays the measured total volume flow, corrected to the reference temperature and the reference pressure. <i>Dependency</i> The unit is taken from: Corrected volume flow unit parameter (→ 95)
User interface	Signed floating-point number
Factory setting	–
Additional information	 The unit is taken from the Corrected volume flow unit parameter (→ 95)

GSV flow alternative

Navigation  Expert → Sensor → Measured val. → Process variab. → GSVa (4158)

Prerequisite For the following order code:
 ■ "Application package", option **EJ** "Petroleum"
 ■ In the **Petroleum mode** parameter, the **API referenced correction** option is selected.
 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the measured total volume flow, corrected to the alternative reference temperature and the alternative reference pressure.

Dependency

The unit is taken from: **Corrected volume flow unit** parameter (→  95)

User interface Signed floating-point number

Factory setting –

Additional information  The unit is taken from the **Corrected volume flow unit** parameter (→  95)

NSV flow

Navigation  Expert → Sensor → Measured val. → Process variab. → NSV flow (4159)

Prerequisite For the following order code:
 ■ "Application package", option **EJ** "Petroleum"
 ■ In the **Petroleum mode** parameter, the **API referenced correction** option is selected.
 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the net volume flow which is calculated from the measured total volume flow minus the value for sediment & water and minus the shrinkage.

Dependency

The unit is taken from: **Corrected volume flow unit** parameter (→  95)

User interface Signed floating-point number

Factory setting –

Additional information  The unit is taken from the **Corrected volume flow unit** parameter (→  95)

NSV flow alternative

Navigation	  Expert → Sensor → Measured val. → Process variab. → NSVa (4160)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter, the API referenced correction option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  57).</p>
Description	Displays the net volume flow which is calculated from the measured alternative total volume minus the value for sediment & water and minus the shrinkage. <i>Dependency</i> The unit is taken from: Corrected volume flow unit parameter (→  95)
User interface	Signed floating-point number
Factory setting	–
Additional information	 The unit is taken from the Corrected volume flow unit parameter (→  95)

Oil CTL

Navigation	  Expert → Sensor → Measured val. → Process variab. → Oil CTL (4175)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter, the Net oil & water cut option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  57).</p>
Description	Displays the correction factor which represents the effect of temperature on the oil. This is used to convert the measured oil volume flow and the measured oil density to values at reference temperature.
User interface	Positive floating-point number
Factory setting	–

Oil CPL

Navigation   Expert → Sensor → Measured val. → Process variab. → Oil CPL (4177)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description

Displays the correction factor which represents the effect of pressure on the oil. This is used to convert the measured oil volume flow and the measured oil density to values at reference pressure.

User interface Positive floating-point number

Factory setting –

Oil CTPL

Navigation   Expert → Sensor → Measured val. → Process variab. → Oil CTPL (4176)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description

Displays the combined correction factor which represents the effect of temperature and pressure on the oil. This is used to convert the measured oil volume flow and the measured oil density to values at reference temperature and reference pressure.

User interface Positive floating-point number

Factory setting –

Water CTL

Navigation   Expert → Sensor → Measured val. → Process variab. → Water CTL (4172)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the correction factor which represents the effect of temperature on the water. This is used to convert the measured water volume flow and the measured water density to values at reference temperature.

User interface Positive floating-point number

Factory setting –

CTL alternative

Navigation   Expert → Sensor → Measured val. → Process variab. → CTL alternative (4174)

Prerequisite For the following order code:
■ "Application package", option **EJ** "Petroleum"
■ In the **Petroleum mode** parameter, the **API referenced correction** option is selected.
 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the correction factor which represents the effect of temperature on the fluid. This is used to convert the measured volume flow and the measured density to values at the alternative reference temperature.

User interface Positive floating-point number

Factory setting –

CPL alternative

Navigation   Expert → Sensor → Measured val. → Process variab. → CPL alternative (4197)

Prerequisite For the following order code:
■ "Application package", option **EJ** "Petroleum"
■ In the **Petroleum mode** parameter, the **API referenced correction** option is selected.
 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the correction factor which represents the effect of pressure on the fluid. This is used to convert the measured volume flow and the measured density to values at the alternative reference pressure.

User interface Positive floating-point number

Factory setting –

Oil reference density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Oil ref. density (4195)
Prerequisite	For the following order code: <ul style="list-style-type: none">■ "Application package", option EJ "Petroleum"■ In the Petroleum mode parameter, the Net oil & water cut option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  57).</p>
Description	Shows the oil density at the reference temperature.
User interface	Signed floating-point number
Factory setting	–
Additional information	<i>Dependency</i>  The unit is taken from the Reference density unit parameter (→  97)

Water reference density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Water ref. dens. (4196)
Prerequisite	For the following order code: <ul style="list-style-type: none">■ "Application package", option EJ "Petroleum"■ In the Petroleum mode parameter, the Net oil & water cut option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  57).</p>
Description	Shows the water density at the reference temperature.
User interface	Signed floating-point number
Factory setting	–
Additional information	<i>Dependency</i>  The unit is taken from: Water reference density unit parameter

Oil density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Oil density (4169)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter, the Net oil & water cut option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  57).</p>
Description	Displays the density of the oil currently measured.
User interface	Signed floating-point number
Factory setting	–
Additional information	<i>Dependency</i>  The unit is taken from: Oil density unit parameter

Water density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Water density (4170)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter, the Net oil & water cut option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  57).</p>
Description	Displays the density of the water currently measured.
User interface	Signed floating-point number
Factory setting	–
Additional information	<i>Dependency</i>  The unit is taken from: Water density unit parameter

Density 2

Navigation   Expert → Sensor → Measured val. → Process variab. → Density 2 (1905)

Prerequisite

For the following order code:

- "Application package", option **EH** "Extended density function"
- "Application package", option **EI** "Premium density"

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Shows the density currently measured in the second density unit specified.

User interface Signed floating-point number

Water cut

Navigation   Expert → Sensor → Measured val. → Process variab. → Water cut (4171)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the percentage water volume flow in relation to the total volume flow of the fluid.

User interface 0 to 100 %

Factory setting –

Oil volume flow

Navigation   Expert → Sensor → Measured val. → Process variab. → Oil volume flow (4178)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter, the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

Description Displays the currently calculated volume flow of the oil.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→  77)
- The unit is taken from: **Volume flow unit** parameter (→  92)

User interface Signed floating-point number

Factory setting

–

Additional information*Dependency*The unit is taken from the **Volume flow unit** parameter (→ 92)

Oil corrected volume flow

Navigation

Expert → Sensor → Measured val. → Process variab. → Oil corr.vol.fl. (4179)

Prerequisite

For the following order code:

- "Application package", option EJ "Petroleum"
- In the **Petroleum mode** parameter, the **Net oil & water cut** option is selected.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 57).**Description**

Displays the currently calculated volume flow of the oil, calculated to values at reference temperature and reference pressure.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→ 77)
- The unit is taken from: **Corrected volume flow unit** parameter (→ 95)

User interface

Signed floating-point number

Factory setting

–

Additional informationThe unit is taken from the **Corrected volume flow unit** parameter (→ 95)

Oil mass flow

Navigation

Expert → Sensor → Measured val. → Process variab. → Oil mass flow (4180)

Prerequisite

For the following order code:

- "Application package", option EJ "Petroleum"
- In the **Petroleum mode** parameter, the **Net oil & water cut** option is selected.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 57).**Description**

Displays the currently calculated mass flow of the oil.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→ 77)
- The unit is taken from: **Mass flow unit** parameter (→ 91)

User interface

Signed floating-point number

Factory setting

–

Additional information*Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 91)

Water volume flow**Navigation**

Expert → Sensor → Measured val. → Process variab. → Water vol. flow (4181)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
 - In the **Petroleum mode** parameter, the **Net oil & water cut** option is selected.
- The software options currently enabled are displayed in the **Software option overview** parameter (→ 57).

Description

Displays the currently calculated volume flow of the water.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→ 77)
- The unit is taken from: **Volume flow unit** parameter (→ 92)

User interface

Signed floating-point number

Factory setting

–

Additional information*Dependency*

The unit is taken from the **Volume flow unit** parameter (→ 92)

Water corrected volume flow**Navigation**

Expert → Sensor → Measured val. → Process variab. → Water corr.v.fl. (4182)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
 - In the **Petroleum mode** parameter, the **Net oil & water cut** option is selected.
- The software options currently enabled are displayed in the **Software option overview** parameter (→ 57).

Description

Displays the currently calculated volume flow of the water, calculated to values at reference temperature and reference pressure.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→ 77)
- The unit is taken from: **Corrected volume flow unit** parameter (→ 95)

User interface

Signed floating-point number

Factory setting

–

Additional information

The unit is taken from the **Corrected volume flow unit** parameter (→ 95)

Water mass flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → Water mass flow (4183)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter, the Net oil & water cut option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→ 57).</p>
Description	Displays the currently calculated mass flow of the water. Dependency: <ul style="list-style-type: none">▪ Based on the value displayed in the Water cut parameter (→ 77)▪ The unit is taken from: Mass flow unit parameter (→ 91)
User interface	Signed floating-point number
Factory setting	–
Additional information	<i>Dependency</i> <p> The unit is taken from the Mass flow unit parameter (→ 91)</p>

Weighted density average

Navigation	  Expert → Sensor → Measured val. → Process variab. → Density average (4184)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ "Application package", option EM "Petroleum + Locking function" <p> The software options currently enabled are displayed in the Software option overview parameter (→ 57).</p>
Description	Displays the weighted average for the density since the last time the density averages were reset. Dependency: <ul style="list-style-type: none">▪ The unit is taken from: Density unit parameter (→ 96)▪ The value is reset to NaN (Not a Number) via the Reset weighted averages parameter
User interface	Signed floating-point number
Factory setting	–
Additional information	<i>Dependency</i> <p> ▪ The unit is taken from: Density unit parameter (→ 96) ▪ The value is reset to NaN (Not a Number) via the Reset weighted averages parameter</p>

Weighted temperature average

Navigation	  Expert → Sensor → Measured val. → Process variab. → Temp. average (4185)
Prerequisite	<p>For the following order code:</p> <ul style="list-style-type: none"> ▪ "Application package", option EJ "Petroleum" ▪ "Application package", option EM "Petroleum + Locking function" <p> The software options currently enabled are displayed in the Software option overview parameter (→  57).</p>
Description	<p>Displays the weighted average for the temperature since the last time the temperature averages were reset.</p> <p>Dependency:</p> <ul style="list-style-type: none"> ▪ The unit is taken from: Temperature unit parameter (→  99) ▪ The value is reset to NaN (Not a Number) via the Reset weighted averages parameter
User interface	Signed floating-point number
Factory setting	–
Additional information	<p><i>Dependency</i></p> <p> ▪ The unit is taken from: Temperature unit parameter (→  99)</p> <p>▪ The value is reset to NaN (Not a Number) via the Reset weighted averages parameter</p>

Time period signal (TPS)

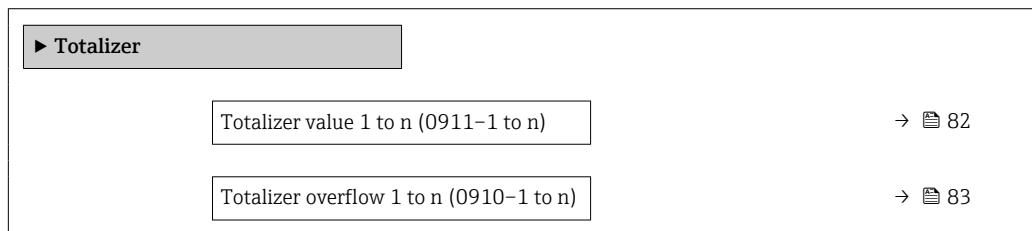
Navigation	  Expert → Sensor → Measured val. → Process variab. → TPS (1903)
Prerequisite	<p>For the following order code:</p> <ul style="list-style-type: none"> ▪ "Application package", option EH "Extended density function" ▪ "Application package", option EI "Premium density" <p> The software options currently enabled are displayed in the Software option overview parameter (→  57).</p>
Description	Shows the time period signal (TPS) currently calculated. Corresponds to the measured density.
User interface	Positive floating-point number

Time period signal frequency (TPS)

Navigation	  Expert → Sensor → Measured val. → Process variab. → TPS frequency (1904)
Prerequisite	For the following order code: <ul style="list-style-type: none">■ "Application package", option EH "Extended density function"■ "Application package", option EI "Premium density" <p> The software options currently enabled are displayed in the Software option overview parameter (→ 57).</p>
Description	Shows the frequency of the time period signal (TPS) currently calculated. Corresponds to the measured density.
User interface	0 to 10 000 Hz

"Totalizer" submenu

Navigation   Expert → Sensor → Measured val. → Totalizer



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 (→ 223) 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 (→ 227).

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 (→ 226).

 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 224).

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 (→ 223) 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 (→ 224).

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 m³

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)

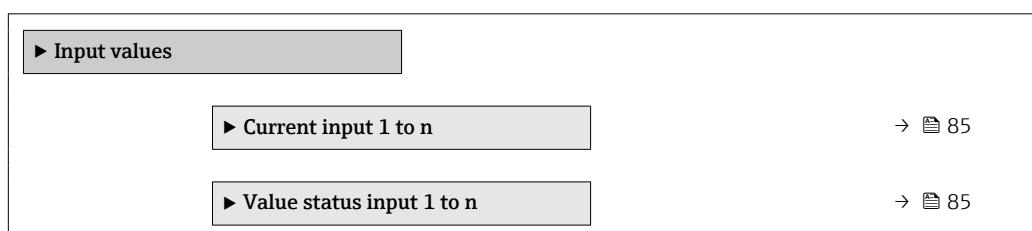
Description Shows the status of the totalizer value reported to the controller for further processing (Hex).

User interface 0 to 255

Factory setting 128

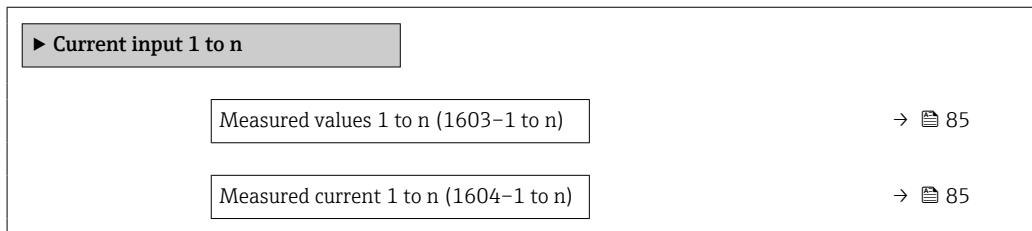
"Input values" submenu

Navigation  Expert → Sensor → Measured val. → Input values



*"Current input 1 to n" submenu**Navigation*

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

**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

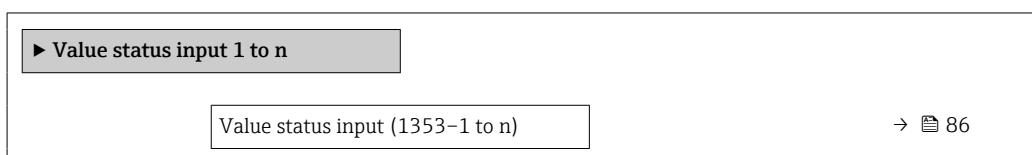
Displays the current value of the current input.

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**Navigation**

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

Description

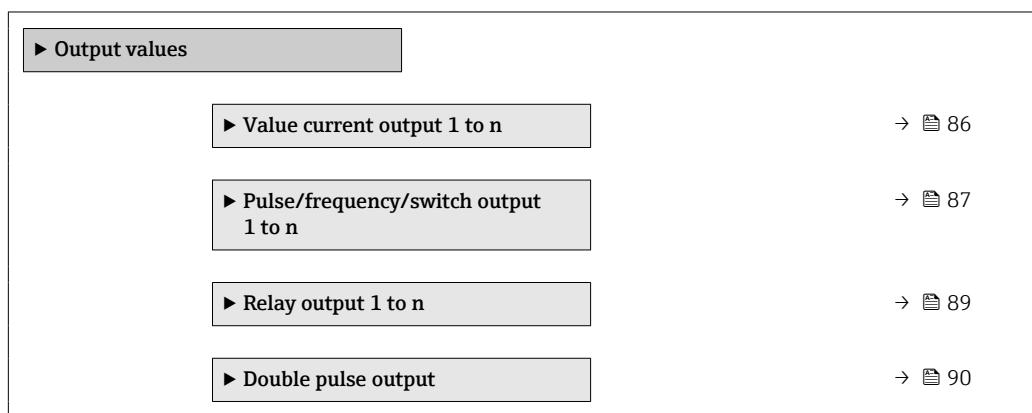
Displays the current input signal level.

User interface

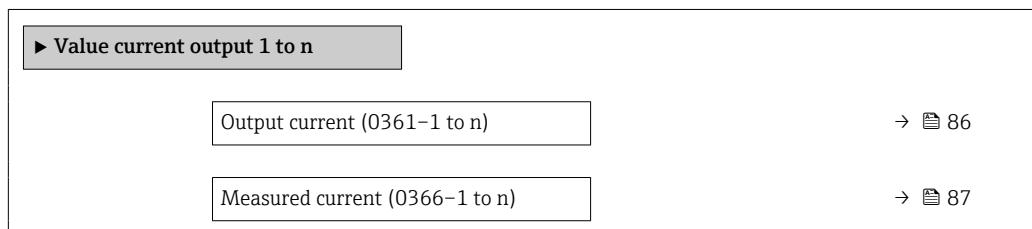
- High
- Low

"Output values" submenu*Navigation*

 Expert → Sensor → Measured val. → Output values

*"Value current output 1 to n" submenu**Navigation*

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

**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)

→ 87

Pulse output 1 to n (0456–1 to n)

→ 87

Switch state (0461–1 to n)

→ 88

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 (→ 174), 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

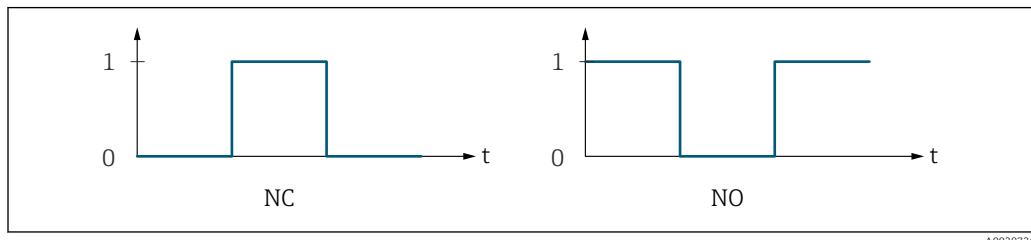
Navigation Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Pulse output 1 to n (0456–1 to n)

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 174) parameter.

Description Displays the pulse frequency currently output.

User interface	Positive floating-point number
----------------	--------------------------------

Additional information	<p><i>Description</i></p> <ul style="list-style-type: none"> ■ 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 (→ 193) 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 (→ 178)) can be configured.

Switch state

Navigation	Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Switch state (0461-1 to n)
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Prerequisite	The Switch option is selected in the Operating mode parameter (→ 174).
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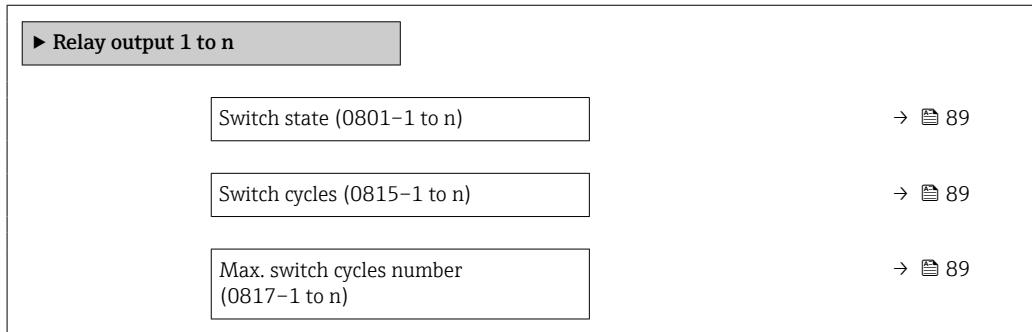
Description	Displays the current switch status of the status output.
-------------	--

User interface	<ul style="list-style-type: none"> ■ Open ■ Closed
----------------	--

Additional information	<p><i>User interface</i></p> <ul style="list-style-type: none"> ■ 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

**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**

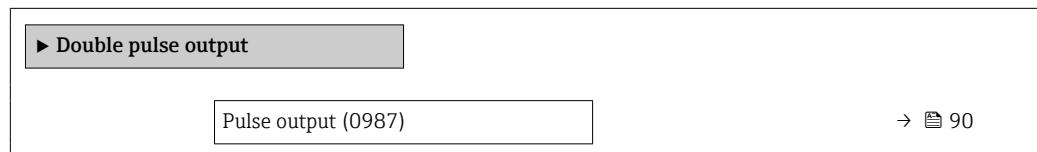
Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Max. cycles no. (0817-1 to n)

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

Pulse output

Navigation Expert → Sensor → Measured val. → Output values → Double pulse out → Pulse output (0987)**Description**

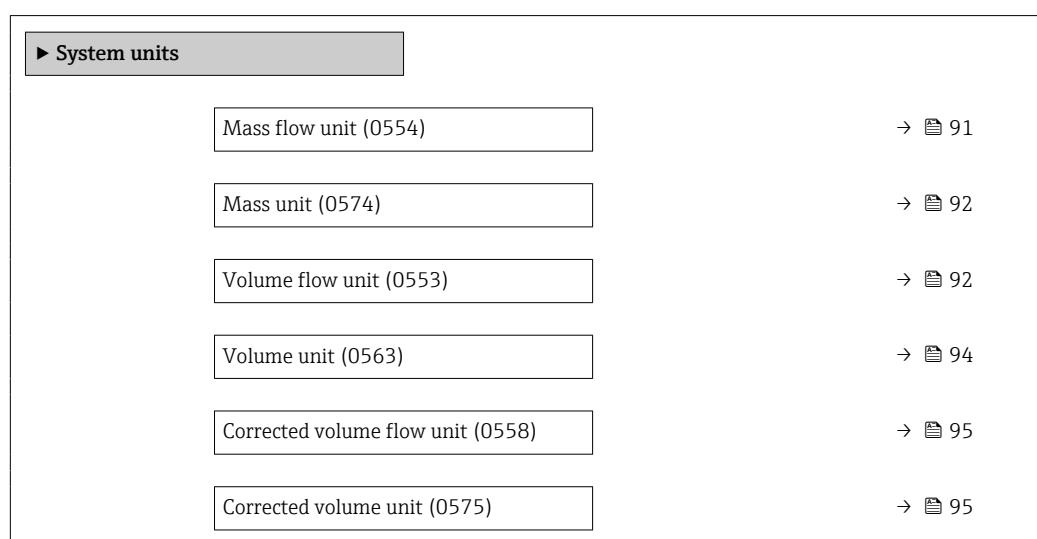
Displays the pulse frequency of the double pulse output which is currently output.

User interface

Positive floating-point number

Additional information For a detailed description and example: **Pulse output** parameter (→  87)

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units

Density unit (0555)	→ 96
Reference density unit (0556)	→ 97
Density 2 unit (0619)	→ 98
Temperature unit (0557)	→ 99
Pressure unit (0564)	→ 99
Date/time format (2812)	→ 100

Mass flow unit



Navigation

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

Description

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

Selection

SI units

- g/s
- g/min
- g/h
- g/d
- kg/s
- kg/min
- kg/h
- kg/d
- t/s
- t/min
- t/h
- t/d

US units

- oz/s
- oz/min
- oz/h
- oz/d
- lb/s
- lb/min
- lb/h
- lb/d
- STon/s
- STon/min
- STon/h
- STon/d

Factory setting

Country-specific:

- kg/h (DN > 150 (6"): **t/h** option)
- lb/min

Additional information

Effect

The selected unit applies for:

- **Target mass flow** parameter (→ [65](#))
- **Carrier mass flow** parameter (→ [66](#))
- **Mass flow** parameter (→ [61](#))

Selection

For an explanation of the abbreviated units: → [306](#)

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*SI units*

- g
- kg
- t

US units

- oz
- lb
- STon

Factory setting

Country-specific:

- kg (DN > 150 (6"): t option)
- lb

Additional information*Selection*

For an explanation of the abbreviated units: → 306

Customer-specific units 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 (DN > 150 (6") : **m³/h** option)
 ■ gal/min (us)

Additional information*Effect*

The selected unit applies for:
Volume flow parameter (→ 61)

Selection

For an explanation of the abbreviated units: → 306

Customer-specific units

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

Volume unit**Navigation**

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

Description

Use this function to select the unit for the volume.

Selection*SI units*

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

US units

- af
- ft³
- Mft³
- Mft³
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us;oil)
- bbl (us;tank)

Imperial units

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

or

US units

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

Imperial units

- bbl (imp;beer) *

* Visibility depends on order options or device settings

Factory setting

Country-specific:

- l (DN > 150 (6") : **m³** option)
- gal (us)

Additional information*Selection*

For an explanation of the abbreviated units: → 306

Customer-specific units

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*SI units*

- 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

US units

- 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)
- Sbbl/s (us;liq.)
- Sbbl/min (us;liq.)
- Sbbl/h (us;liq.)
- Sbbl/d (us;liq.)
- Sbbl/s (us;oil)
- Sbbl/min (us;oil)
- Sbbl/h (us;oil)
- Sbbl/d (us;oil)

Imperial units

- Sgal/s (imp)
- Sgal/min (imp)
- Sgal/h (imp)
- Sgal/d (imp)

Factory setting

Country-specific:

- Nl/h (DN > 150 (6"): Nm³/h option)
- Sft³/min

Additional information*Result*

The selected unit applies for:

Corrected volume flow parameter (→ 62)

Selection

For an explanation of the abbreviated units: → 306

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	■ Sft ³	Sgal (imp)
	■ Nhl	■ MSft ³	
	■ Nm ³	■ MMSft ³	
	■ Sl	■ Sgal (us)	
	■ Sm ³	■ Sbbl (us;liq.)	
		■ Sbbl (us;oil)	

Factory setting	Country-specific:
	■ NI (DN > 150 (6"): Nm ³ option)
	■ Sft ³

Additional information	<i>Selection</i>
	 For an explanation of the abbreviated units: → 306

Density unit

 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/cm ³	■ lb/ft ³	■ lb/gal (imp)
	■ g/m ³	■ lb/gal (us)	■ lb/bbl (imp;oil)
	■ g/ml	■ lb/bbl (us;oil)	
	■ g/l	■ lb/bbl (us;tank)	
	■ kg/l	■ lb/in ³	
	■ kg/dm ³	■ STon/yd ³	
	■ kg/m ³		
	■ SD4°C		
	■ SD15°C		
	■ SD20°C		
	■ SG4°C		
	■ SG15°C		
	■ SG20°C		

Other units
°API

or

US units
SG60°F *

* Visibility depends on order options or device settings

or

<i>US units</i>	<i>Imperial units</i>
■ lb/bbl (us;liq.) *	lb/bbl (imp;beer) *
■ lb/bbl (us;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 (→ 122)
- **Density setpoint 2** parameter (→ 122)
- **Density** parameter (→ 62)

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: → 306

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/NI
- g/Scm³
- kg/Sm³
- RD15°C
- RD20°C

US units

- lb/Sft³
- RD60°F

Other units

°APIbase

Factory setting

Country-dependent

- kg/NI
- lb/Sft³

Additional information*Result*

The selected unit applies for:

- **External reference density** parameter (→ 117)
- **Fixed reference density** parameter (→ 117)
- **Reference density** parameter (→ 62)

Selection

 For an explanation of the abbreviated units: → 306

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).



For an explanation of the abbreviated units: → [306](#)

Customer-specific units

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

Factory setting

Country-specific:

- °C
- °F

Additional information*Effect*

The selected unit applies for:

- **Maximum value** parameter (→ [268](#))
- **Minimum value** parameter (→ [267](#))
- **Maximum value** parameter (→ [269](#))
- **Minimum value** parameter (→ [268](#))
- **Maximum value** parameter (→ [270](#))
- **Minimum value** parameter (→ [269](#))
- **External temperature** parameter (→ [114](#))
- **Reference temperature** parameter (6222)
- **Temperature** parameter (→ [63](#))
- **Reference temperature** parameter (→ [117](#))

Selection

For an explanation of the abbreviated units: → [306](#)

Pressure unit**Navigation**

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

Description

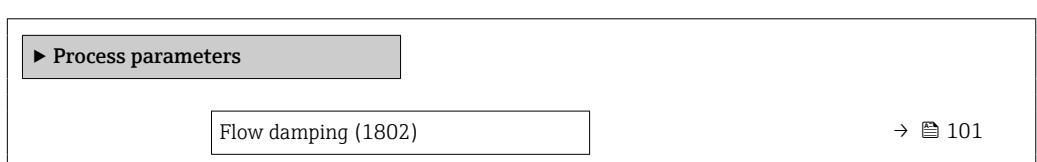
Use this function to select the unit for the pipe pressure.

Selection	<i>SI units</i>	<i>US units</i>
	<ul style="list-style-type: none"> ■ MPa a ■ MPa g ■ kPa a ■ kPa g ■ Pa a ■ Pa g ■ bar ■ bar g 	<ul style="list-style-type: none"> ■ psi a ■ psi g
Factory setting	Country-specific:	
	<ul style="list-style-type: none"> ■ bar a ■ psi a 	
Additional information	<i>Result</i>	
	The unit is taken from:	
	<ul style="list-style-type: none"> ■ Pressure value parameter (→  113) ■ External pressure parameter (→  113) ■ Pressure value parameter (→  63) 	
	<i>Selection</i>	
	 For an explanation of the abbreviated units: →  306	

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	<ul style="list-style-type: none"> ■ 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: →  306	

3.2.3 "Process parameters" submenu

Navigation   Expert → Sensor → Process param.



Density damping (1803)	→ 102
Temperature damping (1822)	→ 102
Flow override (1839)	→ 103
Density limit (4199)	→ 103
► Low flow cut off	→ 103
► Partially filled pipe detection	→ 106

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 element²⁾.

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 → 157
- Low flow cut off → 103
- Totalizers → 223

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*Description*

The damping is performed by a PT1 element³⁾.

User entry

- 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*Description*

The damping is performed by a PT1 element⁴⁾.

User entry

- 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*Description***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 (→ 156).

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)	→ 104
On value low flow cutoff (1805)	→ 104
Off value low flow cutoff (1804)	→ 104
Pressure shock suppression (1806)	→ 105

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	<ul style="list-style-type: none">▪ Off▪ Mass flow▪ Volume flow▪ Corrected volume flow *
Factory setting	Mass flow

On value low flow cutoff



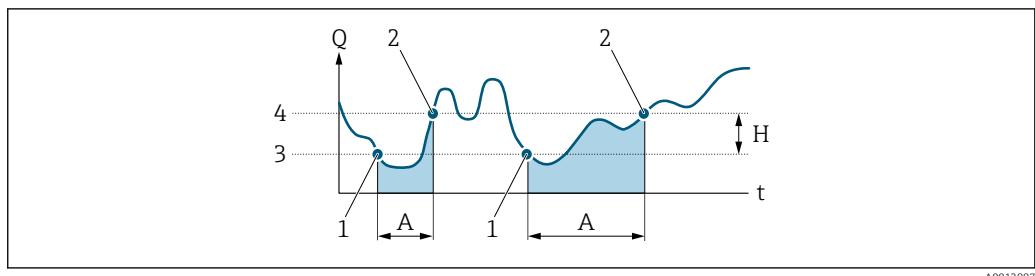
Navigation	Expert → Sensor → Process param. → Low flow cut off → On value (1805)
Prerequisite	A process variable is selected in the Assign process variable parameter (→ 104).
Description	Use this function to enter a switch-on value for low flow cut off. Low flow cut off is activated if the value entered is not equal to 0 → 104.
User entry	Positive floating-point number
Factory setting	Depends on country and nominal diameter → 301
Additional information	<i>Dependency</i> The unit depends on the process variable selected in the Assign process variable parameter (→ 104).

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 (→ 104).
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 → 104.
User entry	0 to 100.0 %
Factory setting	50 %

* Visibility depends on order options or device settings

Additional information*Example*

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

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 (→ 104).

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**

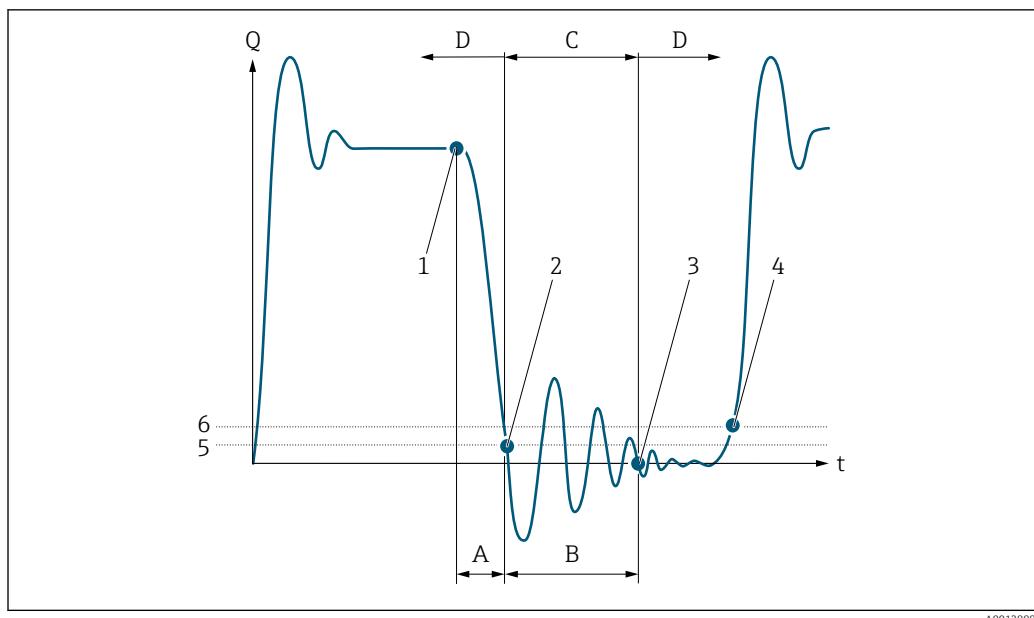
- Prerequisite:
 - Flow rate < on-value of low flow cut off
or
 - Change in the flow direction
- Output values
 - Flow displayed: 0
 - Totalizer: the totalizers are pegged at the last correct value

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)	→ 107
Low value partial filled pipe detection (1861)	→ 107
High value partial filled pipe detection (1858)	→ 107
Response time part. filled pipe detect. (1859)	→ 108
Maximum damping partial filled pipe det. (6040)	→ 108

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	<ul style="list-style-type: none">▪ 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 (→ 107).
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: <ul style="list-style-type: none">▪ 200 kg/m³▪ 12.5 lb/ft³
Additional information	<p><i>User entry</i></p> <p>The lower limit value must be less than the upper limit value defined in the High value partial filled pipe detection parameter (→ 107).</p> <p> The unit depends on the process variable selected in the Assign process variable parameter (→ 107).</p> <p><i>Limit value</i></p> <p> If the displayed value is outside the limit value, the measuring device displays the 862 Partly filled pipe diagnostic message.</p>

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 (→ 107).
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/m ³ ■ 374.6 lb/ft ³
Additional information	<p><i>User entry</i></p> <p>The upper limit value must be greater than the lower limit value defined in the Low value partial filled pipe detection parameter (→ 107).</p> <p> The unit depends on the process variable selected in the Assign process variable parameter (→ 107).</p> <p><i>Limit value</i></p> <p> If the displayed value is outside the limit value, the measuring device displays the 862 Partly filled pipe diagnostic message.</p>

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 (→ 107).
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	<p><i>Description</i></p> <p>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</p>

△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	
MFT (Multi-Frequency Technology)	→ 109
Select medium type	→ 110
Select gas type	→ 110
Reference sound velocity	→ 111
Temperature coefficient sound velocity	→ 111
Gas Fraction Handler	→ 111

MFT (Multi-Frequency Technology)



Navigation

Expert → Sensor → Measurement mode → MFT (6242)

Description

Enable/disable multi-frequency technology to increase the measuring accuracy in the event of microbubbles in the medium.

Selection

- No
- Yes

Factory setting

Yes

Additional information	Multi-frequency technology increases the measuring accuracy in the event of microbubbles in the medium (e.g. when measuring ice-cream, cream cheese, milk, honey, jam, viscous heavy oils, gas-saturated media etc.).
-------------------------------	---

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 (→ 110), 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 (→ 110), 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	<ul style="list-style-type: none">■ 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 (→  235)

3.2.5 "External compensation" submenu

Navigation

 Expert → Sensor → External comp.

 External compensation	
Pressure compensation (6130)	→  112
Pressure value (6059)	→  113
External pressure (6209)	→  113
Temperature correction source (6184)	→  114
External temperature (6080)	→  114
Application specific input source 0 (6401)	→  115
Application specific input source 1 (6402)	→  115

Pressure compensation



Navigation

 Expert → Sensor → External comp. → Pressure compen. (6130)

Description

Use this function to select the type of pressure compensation.

Selection	<ul style="list-style-type: none"> ■ Off ■ Fixed value ■ External value ■ Current input 1 [*] ■ Current input 2 [*]
Factory setting	Off
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ Fixed value A fixed pressure value is used for compensation: Pressure value parameter (→ 113) ■ 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.

Pressure value



Navigation	Expert → Sensor → External comp. → Pressure value (6059)
Prerequisite	In the Pressure compensation parameter (→ 112), 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	<p><i>Dependency</i></p> The unit is taken from the Pressure unit parameter (→ 99)

External pressure

Navigation	Expert → Sensor → External comp. → External press. (6209)
Prerequisite	In the Pressure compensation parameter (→ 112), the External value option or the Current input 1...n option is selected.
Description	Displays the external pressure value.
Additional information	<p><i>Dependency</i></p> The unit is taken from the Pressure unit parameter (→ 99)

* Visibility depends on order options or device settings

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

Additional information *Description*

Use this function to select the type of temperature compensation.

Selection

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

- Internal 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 (→ 114), the **External value** option or the **Current input 1...n** option is selected.

Description Displays the external temperature.

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 99)

Temperature mode

Navigation Expert → Sensor → External comp. → Temperature mode (6341)

Description Select temperature mode for temperature compensation.

* Visibility depends on order options or device settings

Selection	<ul style="list-style-type: none">■ 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	<ul style="list-style-type: none">■ 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	<ul style="list-style-type: none">■ Off■ External value■ Current input 1 [*]■ Current input 2 [*]■ Current input 3 [*]
------------------	---

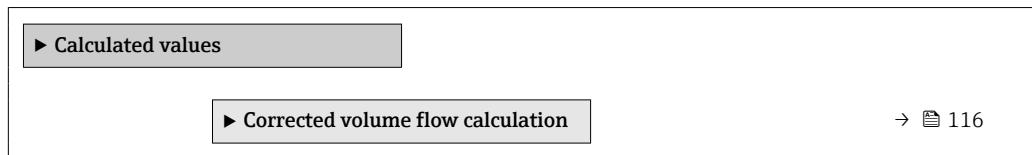
Factory setting	Off
------------------------	-----

* Visibility depends on order options or device settings

3.2.6 "Calculated values" submenu

Navigation

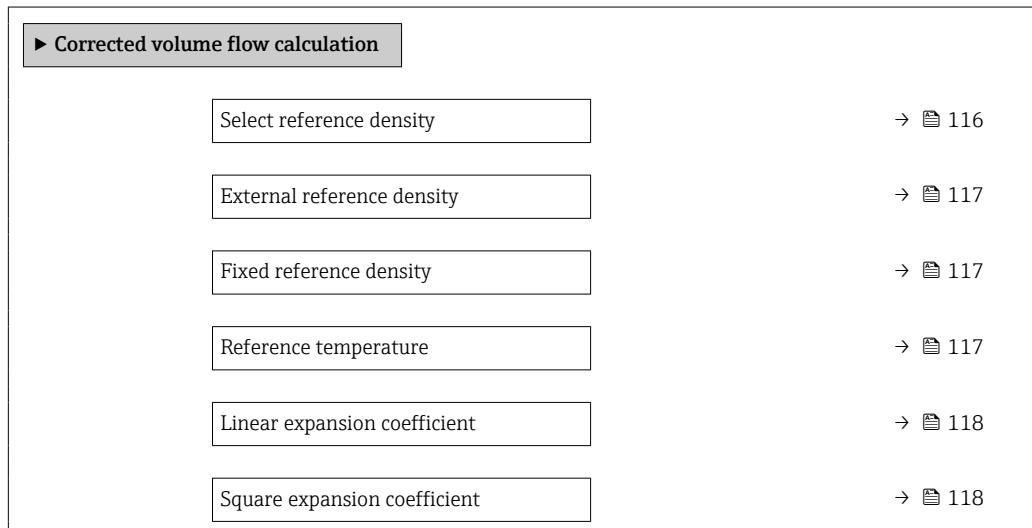
Expert → Sensor → Calculated value



"Corrected volume flow calculation" submenu

Navigation

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



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

Selection

The **Reference density by API table 53** option is suitable only for applications involving LPG⁵⁾, 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

* Visibility depends on order options or device settings

5) liquefied petroleum gas

internally or read into the device from an external source → 112 → 112) 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 (→ 116), 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 (→ 97)

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 (→ 116) 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 (→ 97)

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 (→ 116) 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 *Dependency*

 The unit is taken from the **Temperature unit** parameter (→ 99)

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 (→ 116) 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 (→ 116) 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/K²

3.2.7 "Sensor adjustment" submenu

Navigation

Expert → Sensor → Sensor adjustm.

▶ Sensor adjustment	
Installation direction (1809)	→ 119
Installation angle roll (6282)	→ 120
Installation angle pitch (6236)	→ 120
▶ Density adjustment	→ 121
▶ Extended density adjustment	→ 124
▶ Process variable adjustment	→ 127
▶ Zero verification	→ 132
▶ Zero adjustment	→ 135

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

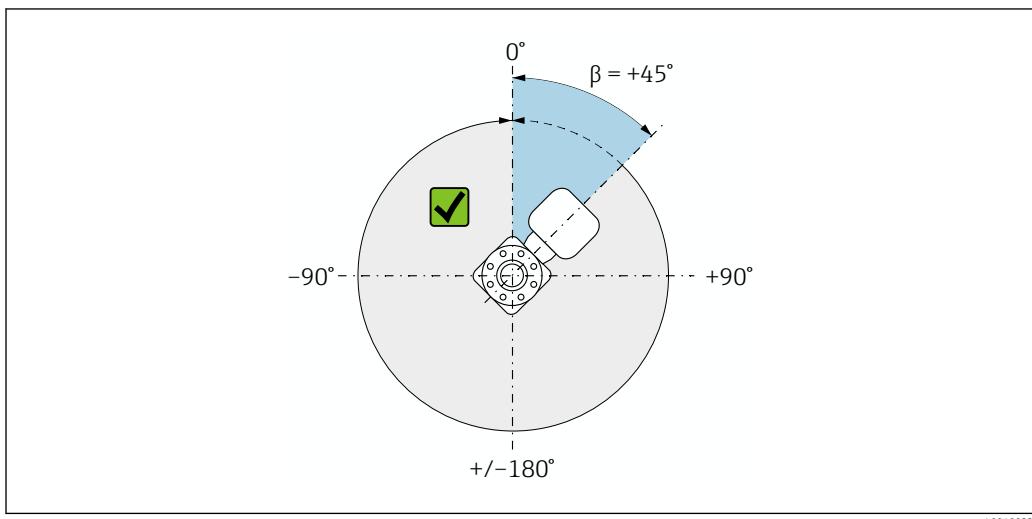
Additional information

Description

Before changing the sign: ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor nameplate.

Installation angle roll

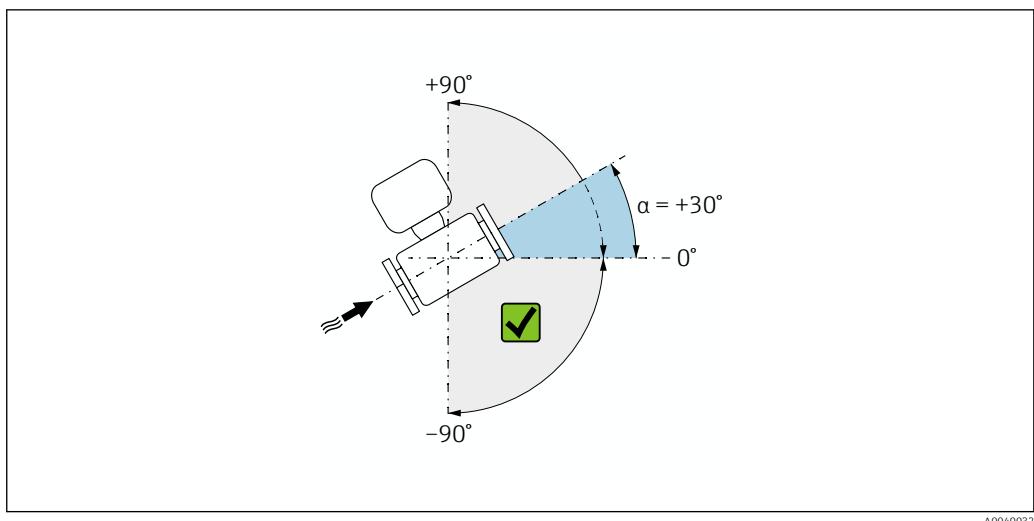
Navigation	Expert → Sensor → Sensor adjustm. → Inst. angle roll (6282)
Prerequisite	Available only with Promass Q.
Description	Use this function to enter the roll angle in degrees to improve measuring accuracy.
User entry	-180 to 180 °
Factory setting	0 °
Additional information	The technically relevant roll angle is the angle shaded gray = -180 to +180 °. Example (blue): Installation of the device with a roll angle $\beta = +45^\circ$



2 Top view in flow direction

Installation angle pitch

Navigation	Expert → Sensor → Sensor adjustm. → Inst.angle pitch (6236)
Prerequisite	Available only with Promass Q.
Description	Use this function to enter the pitch angle in degrees to improve measuring accuracy.
User entry	-90 to +90 °
Factory setting	0 °
Additional information	The technically relevant pitch angle is the angle shaded gray = -90 to +90 °. Example (blue): Installation of the device with a pitch angle $\alpha = +30^\circ$



3 Side view with flow direction from left to right.

"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)	→ 122
Density setpoint 1 (6045)	→ 122
Density setpoint 2 (6046)	→ 122
Execute density adjustment (6041)	→ 123
Progress (2808)	→ 123

Density adjustment factor (6042)	→ 123
Density adjustment offset (6044)	→ 123

Density adjustment mode

Navigation	Expert → Sensor → Sensor adjustm. → Density adjustm. → Adjustment mode (6043)
Description	Displays the method for field density adjustment.
Selection	<ul style="list-style-type: none">▪ 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) (→ 96).
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) (→ 96).
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	<ul style="list-style-type: none"> ■ 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 (→  130)

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 (→ 129)

"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)	→ 124
Linear density factor (5967)	→ 125
Linear temperature factor (5966)	→ 125
Linear pressure factor (5965)	→ 125
Quadratic density factor (5964)	→ 125
Quadratic temperature factor (5963)	→ 126
Quadratic pressure factor (5962)	→ 126
Combined density-temperature factor (5961)	→ 126
Combined density-pressure factor (5971)	→ 126
Combined temperature-pressure factor (5970)	→ 127
Cubic temperature factor (5969)	→ 127

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 (→ 127) do not affect the calculated values, such as concentration, NSV.

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust

► Process variable adjustment

Mass flow offset (1831)

→ 128

Mass flow factor (1832)

→ 128

Volume flow offset (1841)

→ 129

Volume flow factor (1846)

→ 129

Density offset (1848)

→ 129

Density factor (1849)	→ 130
Corrected volume flow offset (1866)	→ 130
Corrected volume flow factor (1867)	→ 130
Reference density offset (1868)	→ 131
Reference density factor (1869)	→ 131
Temperature offset (1870)	→ 131
Temperature factor (1871)	→ 132

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*Description*

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*Description*

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 m³/s.

User entry Signed floating-point number

Factory setting 0 m³/s

Additional information *Description*

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 *Description*

Corrected value = (factor × value) + offset

Density offset

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

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

User entry Signed floating-point number

Factory setting 0 kg/m³

Additional information *Description*

Corrected value = (factor × value) + offset

Density factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

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 Nm³/s.

User entry Signed floating-point number

Factory setting 0 Nm³/s

Additional information *Description*

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 *Description*

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 *Description*

Corrected value = (factor × value) + offset

"Zero verification" wizard

Navigation Expert → Sensor → Sensor adjustm. → ZeroVerification

Zero verification	
Process conditions	→ 132
Progress (2808)	→ 133
Status (6253)	→ 133
Additional information	→ 133
Recommendation: (6000)	→ 134
Root cause (6444)	→ 134
Abort cause	→ 134
Zero point measured (5999)	→ 134
Zero point standard deviation (5996)	→ 135

Process conditions

Navigation Expert → Sensor → Sensor adjustm. → ZeroVerification → Process condit.

Description Ensure process conditions as follows.

Selection	<ul style="list-style-type: none">■ 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	<ul style="list-style-type: none">■ Busy■ Failed■ Done
Factory setting	-

Additional information

Navigation	 Expert → Sensor → Sensor adjustm. → ZeroVerification → Additional info.
Description	Indicate whether to display additional information.
Selection	<ul style="list-style-type: none">■ 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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ 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	→  136
Progress (2808)	→  136
Status (6253)	→  136
Root cause (6444)	→  136
Abort cause	→  137
Root cause (6444)	→  136
Reliability of measured zero point (5982)	→  137
Additional information	→  137
Reliability of measured zero point (5982)	→  137
Zero point measured (5999)	→  137
Zero point standard deviation (5996)	→  138
Select action (5995)	→  138

Process conditions

Navigation	 Expert → Sensor → Sensor adjustm. → Zero adjustment → Process condit.
Description	Ensure process conditions as follows.
Selection	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">■ 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	<ul style="list-style-type: none">■ 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	<ul style="list-style-type: none">■ 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

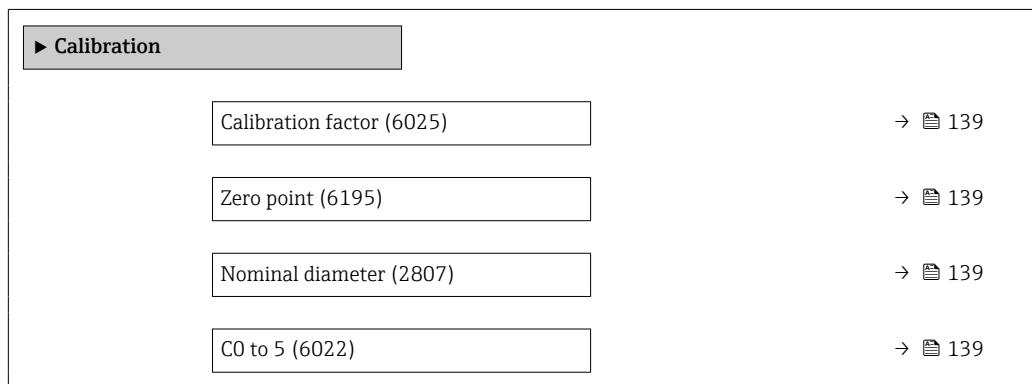
Navigation	Expert → Sensor → Sensor adjustm. → Zero adjustment → ZeroStdDev (5996)
Description	Shows the standard deviation of the zero point measured.
User interface	Positive floating-point number
Factory setting	0

Select action

Navigation	Expert → Sensor → Sensor adjustm. → Zero adjustment → Select action (5995)
Description	Select the zero point value to apply.
Selection	<ul style="list-style-type: none">■ 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



* 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

i The **Testpoints** submenu (→ 140) is used to test the measuring device or the application.

Navigation

Diagnostic → Testpoints

Navigation

Expert → Sensor → Testpoints

► Testpoints	
Raw value mass flow	→ 141
Oscillation frequency 0 to 1	→ 141
Frequency fluctuation 0 to 1	→ 141
Oscillation amplitude 0 to 1	→ 142
Oscillation damping 0 to 1	→ 142
Oscillation damping fluctuation 0 to 1	→ 145
Signal asymmetry 0	→ 145
Torsion signal asymmetry	→ 145
Sensor electronics temperature (ISEM)	→ 146
Carrier pipe temperature	→ 146
Casing pipe temperature	→ 147
Exciter current 0 to 1	→ 147
Test point 0	→ 147
Test point 1	→ 148
Temperature difference measuring tube	→ 148
Temperat. difference meas. tube-carrier	→ 148
Sensor index coil asymmetry	→ 148
Sensor index coil asymmetry reliability	→ 149

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	<p><i>Description</i></p> <p>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.</p> <p><i>Dependency</i></p> <p> The unit is taken from the Mass flow unit parameter (→  91)</p>

Oscillation frequency 0 to 1

Navigation	  Diagnostics → Testpoints → Osc. freq. 0 to 1 (6067)
	  Expert → Sensor → Testpoints → Osc. freq. 0 to 1 (6067)
Prerequisite	<ul style="list-style-type: none">■ 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: <ul style="list-style-type: none">■ 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: <ul style="list-style-type: none">▪ 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	<p><i>Description</i></p> <p>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).</p> <p><i>Limit values</i></p> <p>5 %</p> <p> If the displayed value is outside the limit value, the measuring device displays the following diagnostic messages:<ul style="list-style-type: none">▪ △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<ul style="list-style-type: none">▪ Explanation: The fluctuation (standard deviation) of the amplitude is too high.▪ Possible cause: Air or suspended solids in the medium (multiphase)</p>

Oscillation damping 0 to 1

Navigation	  Diagnostics → Testpoints → Osc. damping 0 to 1 (6038)
	  Expert → Sensor → Testpoints → Osc. damping 0 to 1 (6038)
Prerequisite	<ul style="list-style-type: none">▪ 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 [mm]	DN [in]	Nominal value, air [A/m]	Nominal value, water [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	270
		15	1/2	600	750
		25	1	320	380
		40	1½	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	1½	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	1½	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 [mm]	[in]	Nominal value, air [A/m]	Nominal value, water [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 1 000 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: <ul style="list-style-type: none">■ 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

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.

Dependency

 The unit is taken from the **Temperature unit** parameter (→  99)

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:
 - Promass A
 - Promass F
 - Promass H
 - Promass I
 - Promass O
 - Promass P
 - Promass Q
 - Promass S
 - Promass X

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*Limit values*

In thermally insulated sensors, the carrier tube temperature can reach the temperature of the medium.

Dependency

 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**

Diagram: Diagnostics → Testpoints → SensIndCoilAReli (5952)
 Diagram: 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*

Diagram: Expert → Sensor → Supervision

► Supervision

Sensor Index Coil Asymmetry value

Sensor index coil asymmetry**Navigation**

Diagram: 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*

Diagram: Expert → I/O config.

► I/O configuration

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

→ 150

I/O module 1 to n information (3906-1 to n)	→ 150
I/O module 1 to n type (3901-1 to n)	→ 151
Apply I/O configuration (3907)	→ 151
I/O alteration code (2762)	→ 151

I/O module 1 to n terminal numbers

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

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

User interface

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

I/O module 1 to n information

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

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

User interface

- Not plugged
- Invalid
- Not configurable
- Configurable
- MODBUS

Additional information

"Not plugged" option

The I/O module is not plugged in.

"Invalid" option

The I/O module is not plugged correctly.

"Not configurable" option

The I/O module is not configurable.

"Configurable" option

The I/O module is configurable.

"MODBUS" option

The I/O module is configured for Modbus.

I/O module 1 to n type**Navigation**

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

Prerequisite

For the following order code:

- "Output; input 2", option **D** "Configurable I/O initial setting off"
- "Output; input 3", option **D** "Configurable I/O initial setting off"

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*

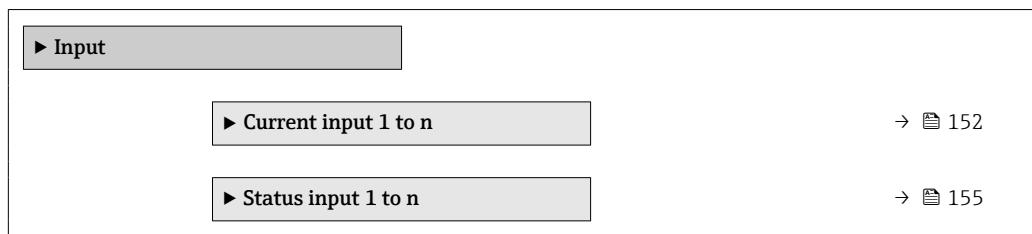
The I/O configuration is changed in the **I/O module type** parameter (→ 151).

* Visibility depends on order options or device settings

3.4 "Input" submenu

Navigation

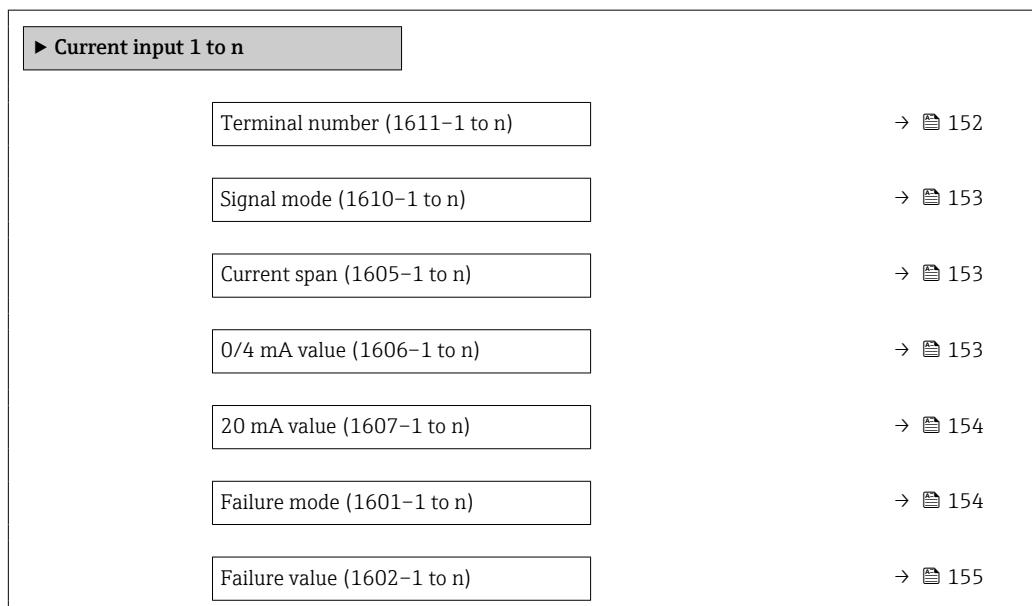
Expert → Input



3.4.1 "Current input 1 to n" submenu

Navigation

Expert → Input → Current input 1 to n



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 (→ 160)

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

* Visibility depends on order options or device settings

Additional information*Current input behavior*

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

- Current span (→ [153](#))
- Failure mode (→ [154](#))

Configuration examples

Pay attention to the configuration examples for **4 mA value** parameter (→ [162](#)).

20 mA value**Navigation**

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

Description

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

User entry

Signed floating-point number

Factory setting

Depends on country and nominal diameter

Additional information*Configuration examples*

Pay attention to the configuration examples for **4 mA value** parameter (→ [162](#)).

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 (→ [153](#)).

Selection

- Alarm
- Last valid value
- Defined value

Factory setting

Alarm

Additional information*Options*

- Alarm
An error message is set.
- Last valid value
The last valid measured value is used.
- Defined value
A user-defined measured value is used (**Failure value** parameter (→ [155](#))).

Failure value**Navigation**

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

Prerequisite

In the **Failure mode** parameter (→ [154](#)), 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)	→ 155
Assign status input (1352-1 to n)	→ 156
Value status input (1353-1 to n)	→ 156
Active level (1351-1 to n)	→ 157
Response time status input (1354-1 to n)	→ 157

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 *

Factory setting

Off

Additional information

Custody transfer mode

Only available for Promass F, O, Q and X.

NOTE!

Before enabling the measuring device for custody transfer mode, make sure that the **Off** option is selected in the Assign status input.

For detailed information on custody transfer mode, see the Special Documentation for the device → 8

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 (→ 103) is activated.

Note on the Flow override (→ 103):

- The Flow override (→ 103) 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.

* Visibility depends on order options or device settings

User interface	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	→ 158
► Pulse/frequency/switch output 1 to n	→ 172
► Relay output 1 to n	→ 193
► Double pulse output	→ 200

3.5.1 "Current output 1 to n" submenu

Navigation

Expert → Output → Curr.output 1 to n

► Current output 1 to n	
Terminal number	→ 158
Signal mode	→ 159
Process variable current output	→ 159
Current range output	→ 160
Fixed current	→ 161
Lower range value output	→ 162
Upper range value output	→ 164
Measuring mode current output	→ 164
Damping current output	→ 169
Failure behavior current output	→ 170
Failure current	→ 171
Output current	→ 171
Measured current	→ 172

Terminal number

Navigation

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

Description

Displays the terminal numbers used by the current output module.

User interface

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

Additional information

"Not used" option

The current output module does not use any terminal numbers.

Signal mode

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

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

Selection

- Active *
- Passive *

Factory setting Active

Process variable current output

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

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

Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry**: Value 1 display parameter (→ 20)

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 *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- Target mass flow *
- Carrier mass flow *
- Concentration *
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- GSV flow *
- GSV flow alternative *

* Visibility depends on order options or device settings

- 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
- Oscillation frequency 1 *
- Frequency fluctuation 0 *
- Oscillation amplitude 0 *
- Oscillation amplitude 1 *
- Frequency fluctuation 1 *
- Oscillation damping 1 *
- Oscillation damping fluctuation 0 *
- Oscillation damping fluctuation 1 *
- Exciter current 1 *
- HBSI *
- Electronics temperature
- 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.

* Visibility depends on order options or device settings

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*

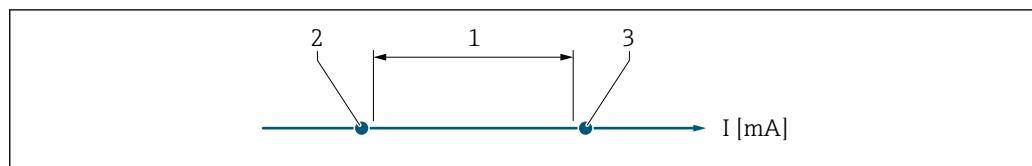
- i**
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 170).
 - If the measured value is outside the measuring range, the **△S441 Current output 1 to n** diagnostic message is displayed.
 - The measuring range is specified via the **Lower range value output** parameter (→ 162) and **Upper range value output** parameter (→ 164).

"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 161).

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
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

- i** 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 (→ 160).

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 (→ 160):

- 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 (→ 159). 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 (→ 164).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 159).

Current output behavior

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

- Current span (→ 160)
- Failure mode (→ 170)

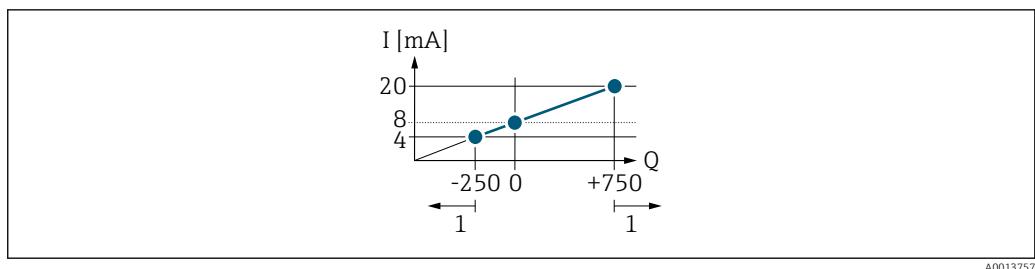
Configuration examples

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 (→ 162) = not equal to zero flow (e.g. -250 m³/h)
- **Upper range value output** parameter (→ 164) = not equal to zero flow (e.g. +750 m³/h)
- Calculated current value = 8 mA at zero flow

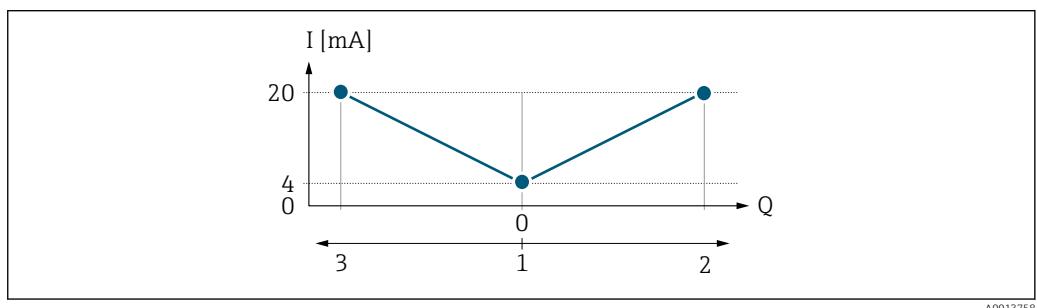
*Q* Flow*I* Current

1 Measuring range is exceeded or undershot

The operational range of the measuring device is defined by the values entered for the **Lower range value output** parameter (→ 162) and **Upper range value output** parameter (→ 164). 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 (→ 162) and **Upper range value output** parameter (→ 164) must have the same algebraic sign. The value for the **Upper range value output** parameter (→ 164) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (→ 164) (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 → 164.

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 (→ 160):

- 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 → 300

Additional information*Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 159). 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 (→ 162).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 159).

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 (→ 164), different algebraic signs cannot be entered for the values for the **Lower range value output** parameter (→ 162) and **Upper range value output** parameter (→ 164). 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 (→ 162).

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 (→ 159):

- 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 *
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- Temperature
- Carrier pipe temperature *
- Electronics temperature
- Oscillation frequency 0
- Oscillation frequency 1 *
- Oscillation amplitude 0 *
- Oscillation amplitude 1 *
- Frequency fluctuation 0
- Frequency fluctuation 1 *
- Oscillation damping 0
- Oscillation damping 1 *
- Oscillation damping fluctuation 0
- Oscillation damping fluctuation 1 *
- Signal asymmetry
- Exciter current 0
- Exciter current 1 *
- HBSI *

 Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry**: Value 1 display parameter (→ 20)

One of the following options is selected in the **Current span** parameter (→ 160):

- 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 (→ 159) is displayed below the parameter.

"Forward flow" option

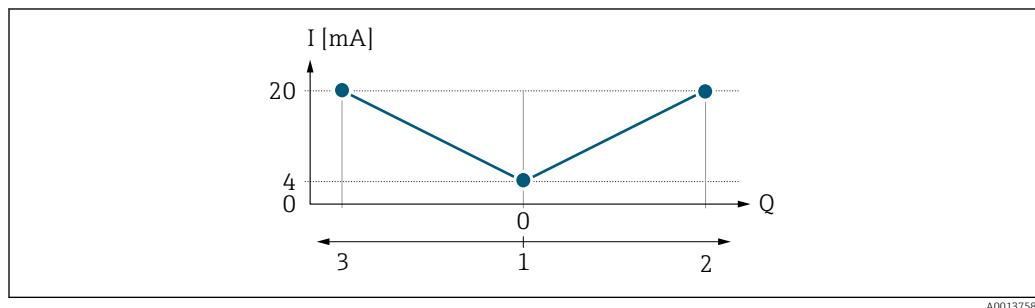
The current output signal is proportional to the process variable assigned. The measuring range is defined by the values that are assigned to the **Lower range value output** parameter (→ 162) and the **Upper range value output** parameter (→ 164).

* Visibility depends on order options or device settings

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

- Both values are defined such that they are not equal to zero flow e.g.:
 - 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 **$\triangle S441$ 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

- 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 (\rightarrow 162) and **Upper range value output** parameter (\rightarrow 164) must have the same algebraic sign.
- The value for the **Upper range value output** parameter (\rightarrow 164) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (\rightarrow 164) (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 **$\triangle S441$ Current output 1 to n** diagnostic message is displayed.

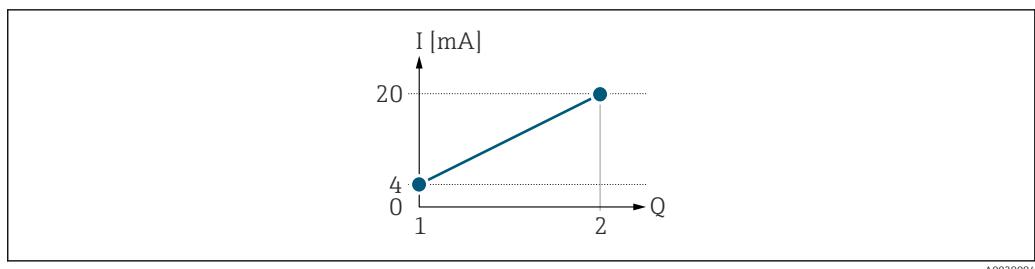
In the event of prolonged and undesired reverse flow, flow values can accumulate in the buffer memory. Due to the configuration of the current output, these values are not factored in, however, i.e. there is no compensation for the reverse flow.

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



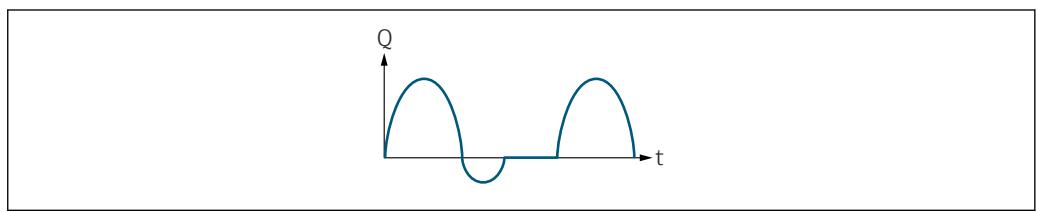
A0028084

Fig 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)

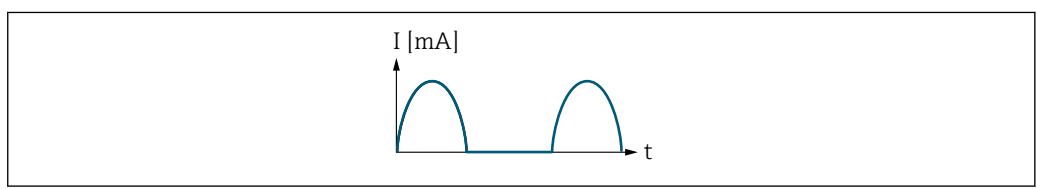
With the following flow response:



A0028091

Fig 5 Flow response Q Flow t TimeWith **Forward flow** option

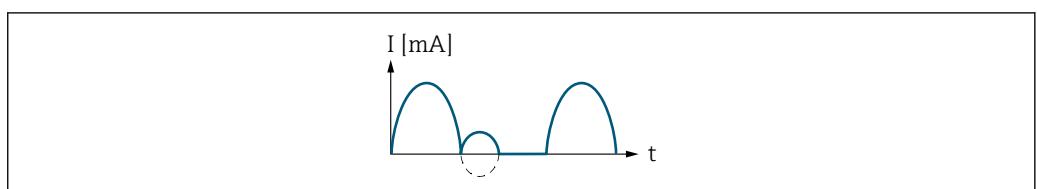
The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output:.



A0028092

 I Current t TimeWith **Forward/Reverse flow** option

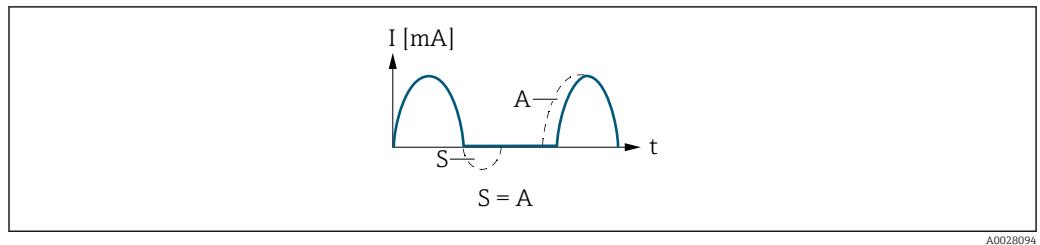
The current output signal is independent of the direction of flow.



A0028093

 I Current t TimeWith **Reverse flow compensation** option

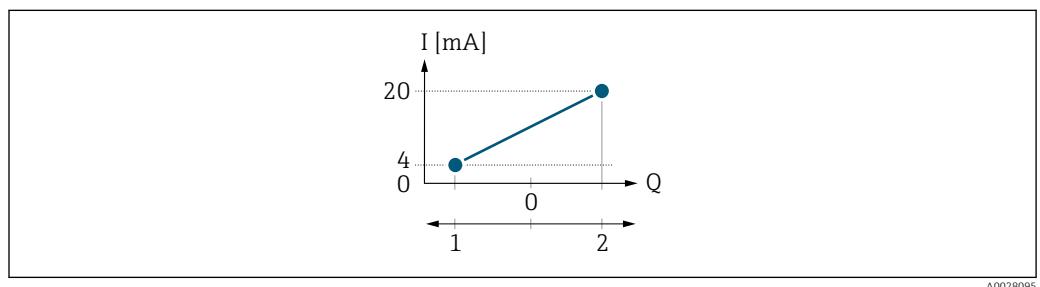
Flow components outside the measuring span are buffered, balanced and output after a maximum delay of 60 s.



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

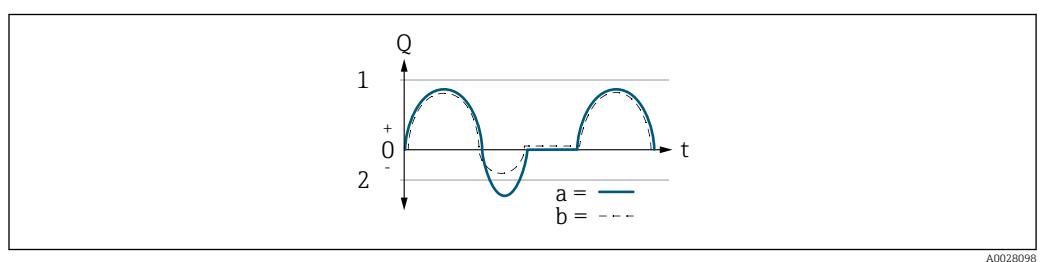
Example 2

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



6 Measuring range
 I Current
 Q Flow
 1 Lower range value (Start of measuring range output)
 2 Upper range value (end of measuring range output)

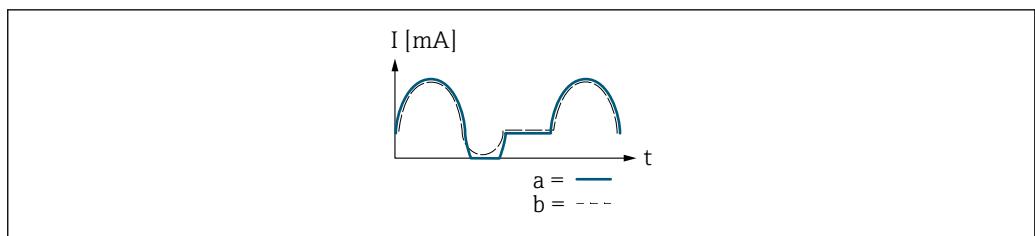
With flow a (\rightarrow) outside, b ($- -$) inside the measuring range



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



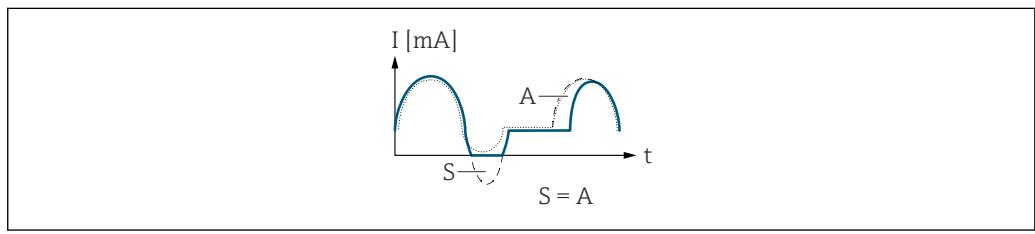
I Current
t Time

With Forward/Reverse flow option

This option cannot be selected here since the values for the **Lower range value output** parameter (→ 162) and **Upper range value output** parameter (→ 164) 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.



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 (→ 159) and one of the following options is selected in the **Current span** parameter (→ 160):

- 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).

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 (→  159) and one of the following options is selected in the **Current span** parameter (→  160):

- 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.

6) proportional transmission behavior with first order delay

Additional information*Description*

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

"Min." option

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

 The signal on alarm level is defined via the **Current span** parameter (→ [160](#)).

"Max." option

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

 The signal on alarm level is defined via the **Current span** parameter (→ [160](#)).

"Last valid value" option

The current output adopts the last measured value that was valid before the device alarm occurred.

"Actual value" option

The current output adopts the measured value on the basis of the current flow measurement; the device alarm is ignored.

"Defined value" option

The current output adopts a defined measured value.

 The measured value is defined via the **Failure current** parameter (→ [171](#)).

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 (→ [170](#)).

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)	→  173
Signal mode (0490-1 to n)	→  174
Operating mode (0469-1 to n)	→  174
Assign pulse output (0460-1 to n)	→  176
Pulse scaling (0455-1 to n)	→  176
Pulse width (0452-1 to n)	→  177
Measuring mode (0457-1 to n)	→  178
Failure mode (0480-1 to n)	→  178
Pulse output 1 to n (0456-1 to n)	→  179
Assign frequency output (0478-1 to n)	→  180
Minimum frequency value (0453-1 to n)	→  181
Maximum frequency value (0454-1 to n)	→  181
Measuring value at minimum frequency (0476-1 to n)	→  182
Measuring value at maximum frequency (0475-1 to n)	→  182

Measuring mode (0479-1 to n)	→ 182
Damping output (0477-1 to n)	→ 184
Failure mode (0451-1 to n)	→ 185
Failure frequency (0474-1 to n)	→ 185
Output frequency (0471-1 to n)	→ 186
Switch output function (0481-1 to n)	→ 186
Assign diagnostic behavior (0482-1 to n)	→ 187
Assign limit (0483-1 to n)	→ 187
Switch-on value (0466-1 to n)	→ 189
Switch-off value (0464-1 to n)	→ 190
Assign flow direction check (0484-1 to n)	→ 190
Assign status (0485-1 to n)	→ 191
Switch-on delay (0467-1 to n)	→ 191
Switch-off delay (0465-1 to n)	→ 191
Failure mode (0486-1 to n)	→ 192
Switch state (0461-1 to n)	→ 192
Invert output signal (0470-1 to n)	→ 193

Terminal number

Navigation

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

Description

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

User interface

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

Additional information

"Not used" option

The pulse/frequency/switch output module does not use any terminal numbers.

Signal mode**Navigation**

Expert → Output → PFS output 1 to n → Signal mode (0490–1 to n)

Description

Use this function to select the signal mode for the pulse/frequency/switch output.

Selection

- Passive
- Active *
- Passive 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.

Selection

- Pulse
- Frequency
- Switch

Factory setting

Pulse

Additional information

"Pulse" option

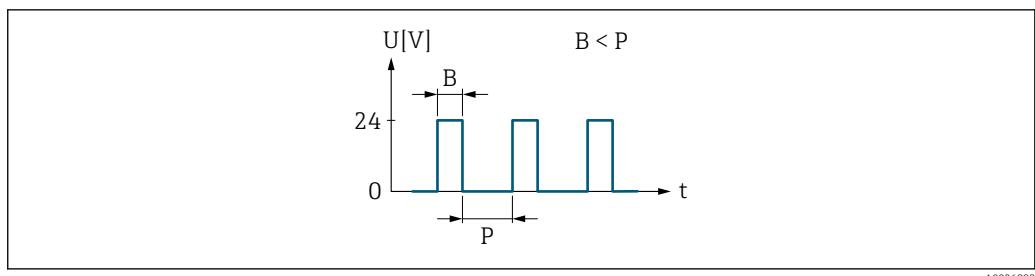
Quantity-dependent pulse with configurable pulse width

- 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

* Visibility depends on order options or device settings



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

B Pulse width entered

P Pauses between the individual pulses

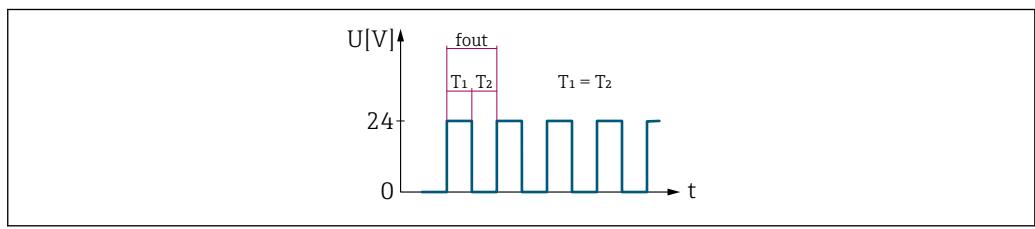
"Frequency" option

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, dynamic viscosity, kinematic viscosity, temperature-compensated dynamic viscosity, temperature-compensated kinematic viscosity, 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



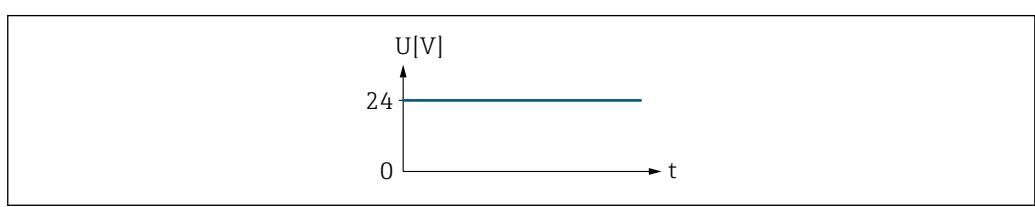
■ 8 Flow-proportional frequency output

"Switch" option

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

Example

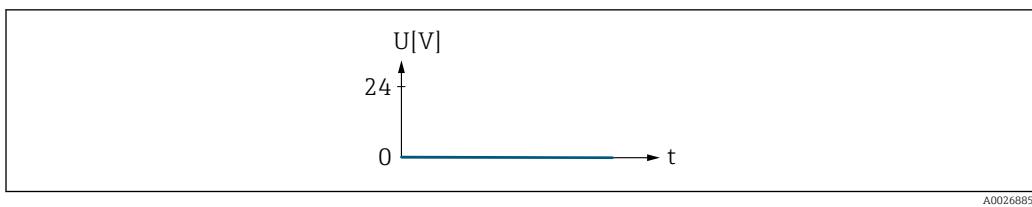
Alarm response without alarm



■ 9 No alarm, high level

Example

Alarm response in case of alarm



10 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 (→ 174).

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 *
- 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 (→ 174) and a process variable is selected in the **Assign pulse output** parameter (→ 176).

Description

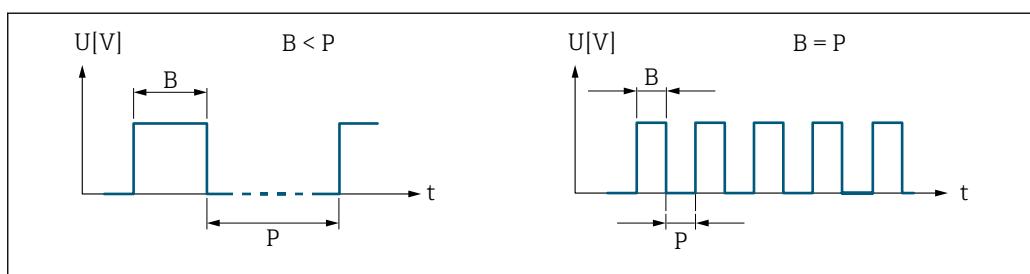
Use this function to enter the value for the measured value that a pulse is equivalent to.

* Visibility depends on order options or device settings

User entry	Positive floating point number
Factory setting	Depends on country and nominal diameter → 301
Additional information	<p><i>User entry</i></p> <p>Weighting of the pulse output with a quantity.</p> <p>The lower the pulse value, the</p> <ul style="list-style-type: none"> ▪ 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 (→ 174) and a process variable is selected in the Assign pulse output parameter (→ 176).
Description	Use this function to enter the duration of the output pulse.
User entry	0.05 to 2 000 ms
Factory setting	100 ms
Additional information	<p><i>Description</i></p> <ul style="list-style-type: none"> ▪ 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 (→ 174), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse output** parameter (→ 176):

- 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

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 (→ 164)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 164)

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 (→ 174) and a process variable is selected in the **Assign pulse output** parameter (→ 176).

Description

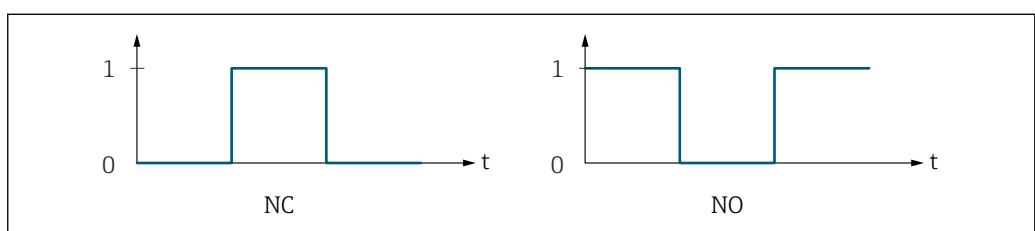
Use this function to select the failure mode of the pulse output in the event of a device alarm.

* Visibility depends on order options or device settings

Selection	<ul style="list-style-type: none"> ▪ Actual value ▪ No pulses
Factory setting	No pulses
Additional information	<p><i>Description</i></p> <p>The dictates of safety render it advisable to ensure that the pulse output shows a predefined behavior in the event of a device alarm.</p> <p><i>Selection</i></p> <ul style="list-style-type: none"> ▪ 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". <p>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.</p>

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 (→ 174) parameter.
Description	Displays the pulse frequency currently output.
User interface	Positive floating-point number
Additional information	<p><i>Description</i></p> <ul style="list-style-type: none"> ▪ 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 (→ [193](#)) 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 (→ [178](#))) 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 (→ 174), the **Frequency** option is selected.

Description

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

Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry**: Value 1 display parameter (→ 20)

Selection

- Off
- Mass flow
- Volume flow
- Corrected volume flow *
- Density
- Reference density *
- Time period signal frequency (TPS) *
- Temperature
- Pressure
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- 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 *
- 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 *
- Exciter current 1 *
- Oscillation damping 0

* Visibility depends on order options or device settings

- Oscillation damping 1 *
- Oscillation damping fluctuation 0 *
- Oscillation damping fluctuation 1 *
- Oscillation frequency 0
- Oscillation frequency 1 *
- Frequency fluctuation 0 *
- Frequency fluctuation 1 *
- Oscillation amplitude 0 *
- Oscillation amplitude 1 *
- 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 (→ 174) and a process variable is selected in the **Assign frequency output** parameter (→ 180).

Description Use this function to enter the minimum frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 0.0 Hz

Maximum frequency value



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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 174) and a process variable is selected in the **Assign frequency output** parameter (→ 180).

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

* Visibility depends on order options or device settings

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 (→ 174) and a process variable is selected in the **Assign frequency output** parameter (→ 180).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Dependency*

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 180).

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 (→ 174) and a process variable is selected in the **Assign frequency output** parameter (→ 180).

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 (→ 180).

Measuring mode



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

Prerequisite In the **Operating mode** parameter (→ 174), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→ 180):
■ Mass flow
■ Volume flow
■ Corrected volume flow

- Target mass flow *
- Carrier mass flow *
- Density
- Reference density
- Concentration *
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- Temperature
- Carrier pipe temperature *
- Electronics temperature
- Oscillation frequency 0 *
- Oscillation frequency 1 *
- Frequency fluctuation 0
- Frequency fluctuation 1 *
- Oscillation amplitude 0 *
- Oscillation amplitude 1 *
- Oscillation damping 0
- Oscillation damping 1 *
- Oscillation damping fluctuation 0
- Oscillation damping fluctuation 1 *
- Signal asymmetry
- Exciter current 0
- Exciter current 1 *

 Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry**: Value 1 display parameter (→ 20)

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

Additional information

Selection

 For a detailed description of the options available, see the **Measuring mode** parameter (→ 164)

Examples

 For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 164)

* Visibility depends on order options or device settings

Damping output**Navigation**

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

Prerequisite

In the **Operating mode** parameter (→ 174), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→ 180):

- Mass flow
- Volume flow
- Corrected volume flow
- Target mass flow *
- Carrier mass flow *
- Density
- Reference density
- Concentration *
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- Temperature
- Carrier pipe temperature *
- Electronics temperature
- Oscillation frequency 0
- Oscillation frequency 1 *
- Frequency fluctuation 0
- Frequency fluctuation 1 *
- Oscillation amplitude 0 *
- Oscillation amplitude 1 *
- Oscillation damping 0
- Oscillation damping 1 *
- Oscillation damping fluctuation 0
- Oscillation damping fluctuation 1 *
- Signal asymmetry
- Exciter current 0
- Exciter current 1 *

Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry**: Value 1 display parameter (→ 20)

Description

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

User entry

0 to 999.9 s

Factory setting

0.0 s

Additional information

User entry

Use this function to enter a time constant (PT1 element⁷⁾) 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).

* Visibility depends on order options or device settings

7) proportional transmission behavior with first order delay

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 (→ 174) and a process variable is selected in the **Assign frequency output** parameter (→ 180).

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 (→ 185) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.
- 0 Hz
In the event of a device alarm, the frequency output is "switched off".

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

Failure frequency



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

Prerequisite In the **Operating mode** parameter (→ 174), the **Frequency** option is selected, in the **Assign frequency output** parameter (→ 180) a process variable is selected, and in the **Failure mode** parameter (→ 185), 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 (→ 174), 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 (→ 174).

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 Selection

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

Assign diagnostic behavior



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

Prerequisite

- In the **Operating mode** parameter (→ 174), the **Switch** option is selected.
- In the **Switch output function** parameter (→ 186), 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 *Description*

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

Selection

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

Assign limit



Navigation Expert → Output → PFS output 1 to n → Assign limit (0483–1 to n)

Prerequisite

- In the **Operating mode** parameter (→ 174), the **Switch** option is selected.
- In the **Switch output function** parameter (→ 186), 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 *

* Visibility depends on order options or device settings

- 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 *
- Dynamic viscosity *
- Concentration *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- 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

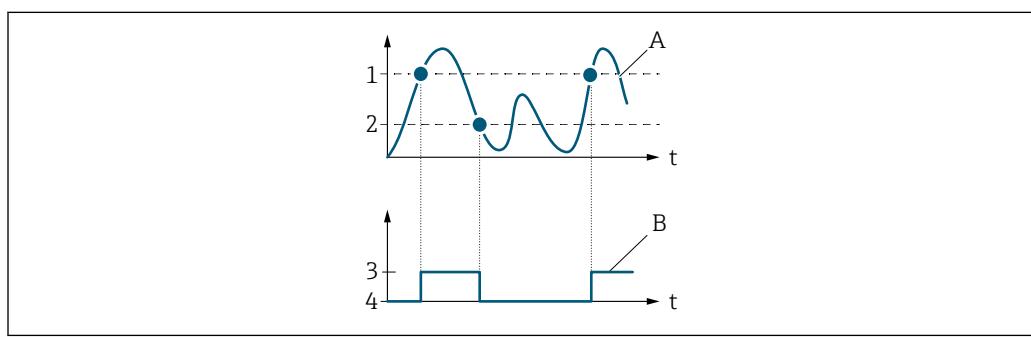
Volume flow

Additional information

Description

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

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



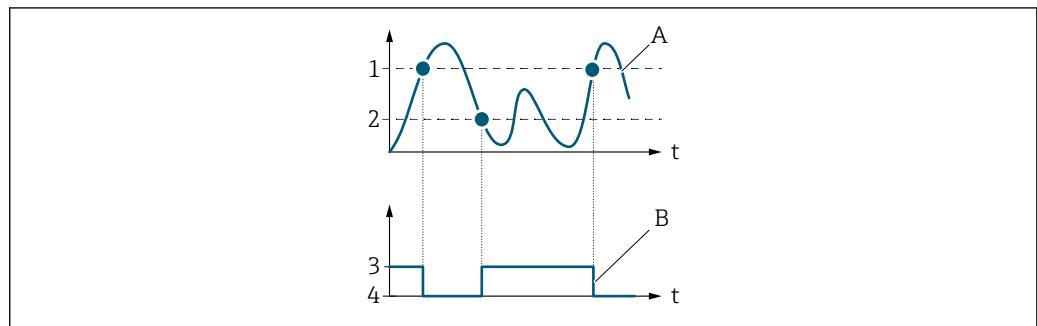
A0026891

- | | |
|---|-------------------------|
| 1 | <i>Switch-on value</i> |
| 2 | <i>Switch-off value</i> |
| 3 | <i>Conductive</i> |
| 4 | <i>Non-conductive</i> |
| A | <i>Process variable</i> |
| B | <i>Status output</i> |

* Visibility depends on order options or device settings

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

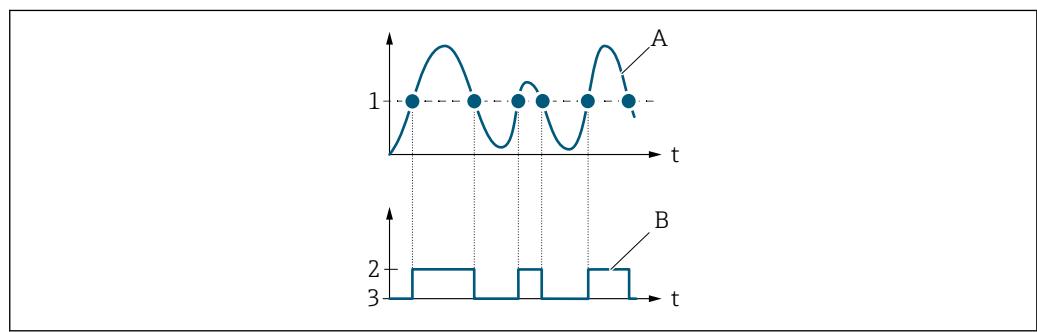
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive



- 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



- 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 (→ 174).
- The **Limit** option is selected in the **Switch output function** parameter (→ 186).

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	<p><i>Description</i></p> <p>Use this function to enter the limit value for the switch-on value (process variable > switch-on value = closed, conductive).</p> <p> When using a hysteresis: Switch-on value > Switch-off value.</p> <p><i>Dependency</i></p> <p> The unit depends on the process variable selected in the Assign limit parameter (→ 187).</p>

Switch-off value



Navigation	  Expert → Output → PFS output 1 to n → Switch-off value (0464-1 to n)
Prerequisite	<ul style="list-style-type: none"> ■ The Switch option is selected in the Operating mode parameter (→ 174). ■ The Limit option is selected in the Switch output function parameter (→ 186).
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	<p><i>Description</i></p> <p>Use this function to enter the limit value for the switch-off value (process variable < switch-off value = open, non-conductive).</p> <p> When using a hysteresis: Switch-on value > Switch-off value.</p> <p><i>Dependency</i></p> <p> The unit depends on the process variable selected in the Assign limit parameter (→ 187).</p>

Assign flow direction check



Navigation	  Expert → Output → PFS output 1 to n → Assign dir.check (0484-1 to n)
Prerequisite	<ul style="list-style-type: none"> ■ The Switch option is selected in the Operating mode parameter (→ 174). ■ The Flow direction check option is selected in the Switch output function parameter (→ 186).
Description	Use this function to select a process variable for monitoring the flow direction.

Selection	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ The Switch option is selected in the Operating mode parameter (→ 174). ■ The Status option is selected in the Switch output function parameter (→ 186).
Description	Use this function to select a device status for the switch output.
Selection	<ul style="list-style-type: none"> ■ Partially filled pipe detection ■ Low flow cut off
Factory setting	Partially filled pipe detection
Additional information	<p><i>Selection</i></p> <p>If empty pipe detection or low flow cut off are active, the output is conductive. Otherwise, the switch output is non-conductive.</p>

Switch-on delay

Navigation	Expert → Output → PFS output 1 to n → Switch-on delay (0467-1 to n)
Prerequisite	<ul style="list-style-type: none"> ■ The Switch option is selected in the Operating mode parameter (→ 174). ■ The Limit option is selected in the Switch output function parameter (→ 186).
Description	Use this function to enter a delay time for switching on the switch output.
User entry	0.0 to 100.0 s
Factory setting	0.0 s

Switch-off delay

Navigation	Expert → Output → PFS output 1 to n → Switch-off delay (0465-1 to n)
Prerequisite	<ul style="list-style-type: none"> ■ The Switch option is selected in the Operating mode parameter (→ 174). ■ The Limit option is selected in the Switch output function parameter (→ 186).

* Visibility depends on order options or device settings

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 (→ 174).

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

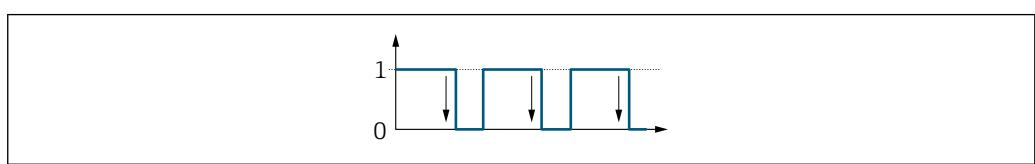
Factory setting

No

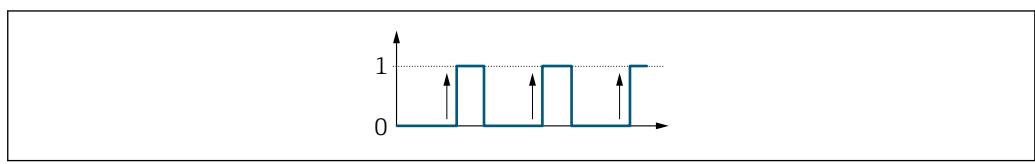
Additional information

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)	→ 194
Relay output function (0804–1 to n)	→ 194
Assign flow direction check (0808–1 to n)	→ 195
Assign limit (0807–1 to n)	→ 195
Assign diagnostic behavior (0806–1 to n)	→ 196
Assign status (0805–1 to n)	→ 197

Switch-off value (0809-1 to n)	→ 197
Switch-off delay (0813-1 to n)	→ 198
Switch-on value (0810-1 to n)	→ 198
Switch-on delay (0814-1 to n)	→ 199
Failure mode (0811-1 to n)	→ 199
Switch state (0801-1 to n)	→ 199
Powerless relay status (0816-1 to n)	→ 200

Terminal number

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

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

User interface

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

Additional information

"Not used" option

The relay output module does not use any terminal numbers.

Relay output function



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

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

Selection

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

Factory setting

Closed

Additional information*Selection*

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

Assign flow direction check**Navigation**

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

Prerequisite

The **Flow direction check** option is selected in the **Relay output function** parameter (→ 194).

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 (→ 194).

Description

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

Selection

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

* Visibility depends on order options or device settings

- 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 *
- Dynamic viscosity *
- Concentration *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- 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 (→ 194), the **Diagnostic behavior** option is selected.

Description

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

Selection

- Alarm
- Alarm or warning
- Warning

* Visibility depends on order options or device settings

Factory setting Alarm

Additional information *Description*

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

Selection

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

Assign status



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

Prerequisite In the **Relay output function** parameter (→ 194), 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 (→ 194), 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*Description*

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

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

Dependency

 The unit is dependent on the process variable selected in the **Assign limit** parameter (→ 195).

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 (→ 194), 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 (→ 194).

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*Description*

Use this function to enter the limit value for the switch-on value (process variable > switch-on value = closed, conductive).

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

Dependency

 The unit is dependent on the process variable selected in the **Assign limit** parameter (→ 195).

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 (→ 194), 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 *Selection*

▪ Actual status

In the event of a device alarm, faults are ignored and the current behavior of the input value is output by the relay output. The **Actual status** option behaves in the same way as the current input value.

▪ Open

In the event of a device alarm, the relay output's transistor is set to **non-conductive**.

▪ Closed

In the event of a device alarm, the relay output's transistor is set to **conductive**.

Switch 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)	→ 201
Slave terminal number (0990)	→ 201
Signal mode (0991)	→ 201
Assign pulse output (0982)	→ 202
Value per pulse (0983)	→ 202
Pulse width (0986)	→ 203
Phase shift (0992)	→ 203
Measuring mode (0984)	→ 203

Failure mode (0985)	→ 204
Pulse output (0987)	→ 205
Invert output signal (0993)	→ 205

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	<ul style="list-style-type: none"> ■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3)
Additional information	<p><i>"Not used" option</i></p> <p>The double pulse output does not use any terminal numbers.</p>

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	<ul style="list-style-type: none"> ■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3)
Additional information	<p><i>"Not used" option</i></p> <p>The double pulse output does not use any terminal numbers.</p>

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	<ul style="list-style-type: none"> ■ 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 →  301

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 (→ 177)

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 *Selection*

- 90°
Phase shift by a quarter period.
- 180°
Phase shift by a half period, which is equivalent to a phase reversal.

Measuring mode

Navigation Expert → Output → Double pulse out → Measuring mode (0984)

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

Selection

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

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 (→ 164)

Examples

 For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 164)

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 (→  87)

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

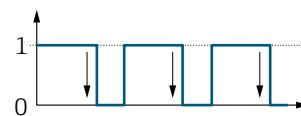
Factory setting

No

Additional information

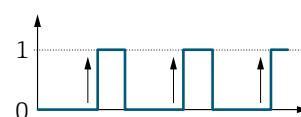
Selection

No option (passive - negative)



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Yes option (passive - positive)

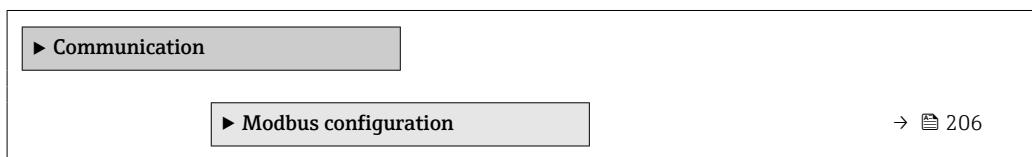


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3.6 "Communication" submenu

Navigation

 Expert → Communication



► Modbus information	→ 211
► Modbus data map	→ 212
► Web server	→ 212

3.6.1 "Modbus configuration" submenu

Navigation

Expert → Communication → Modbus config.

► Modbus configuration	
Bus address (7112)	→ 206
Baudrate (7111)	→ 207
Data transfer mode (7115)	→ 207
Parity (7122)	→ 207
Byte order (7113)	→ 208
Telegram delay (7146)	→ 209
Failure mode (7116)	→ 209
Bus termination (7155)	→ 210
Fieldbus writing access (7156)	→ 210

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 extensive knowledge and significant programming efforts. Endress+Hauser introduced the **Byte order** parameter (→ 208) 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 (→ 208).

The bytes are transmitted depending on the selection in the **Byte order** parameter (→ 208):

FLOAT				
	Sequence			
Options	1.	2.	3.	4.
1 - 0 - 3 - 2 *	Byte 1 (MMMMMM)	Byte 0 (MMMMMM)	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMM)
0 - 1 - 2 - 3	Byte 0 (MMMMMM)	Byte 1 (MMMMMM)	Byte 2 (EMMMMM)	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					
	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	<p><i>Options</i></p> <ul style="list-style-type: none">▪ NaN value The device outputs the NaN value⁸⁾.▪ Last valid value The device outputs the last valid measured value before the fault occurred. <p>i This effect of this parameter depends on the option selected in the Assign diagnostic behavior parameter.</p>

Bus termination

Navigation	  Expert → Communication → Modbus config. → Bus termination (7155)
Description	Displays whether the terminating resistor is enabled or disabled.
User interface	<ul style="list-style-type: none">▪ Off▪ On
Factory setting	Off
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none">▪ Off The terminating resistor is disabled.▪ On The terminating resistor is enabled. <p>i For detailed information about enabling the terminating resistor, see the Operating Instructions for the device, "Enabling the terminating resistor" section →  8</p>

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	<ul style="list-style-type: none">▪ 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.



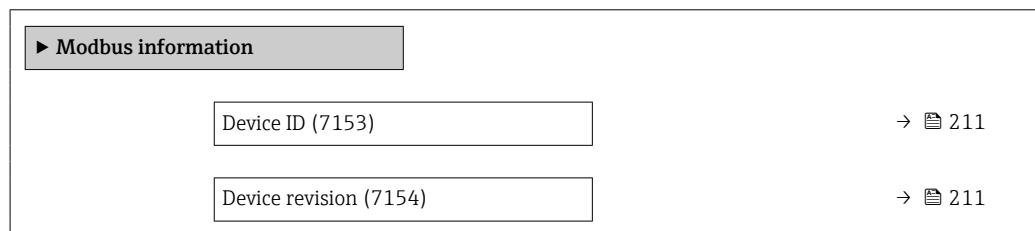
This does not affect cyclic measured value transmission to the higher-order system, which is always guaranteed.

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

**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) → 212

Scan list register 0 to 15



Navigation

Navigation icon 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) → 213

MAC address (7214) → 213

DHCP client (7212) → 213

IP address (7209) → 214

Subnet mask (7211) → 214

Default gateway (7210) → 214

Web server functionality (7222) → 215

Login page (7273) → 215

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	<ul style="list-style-type: none"> ■ 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	<p><i>Example</i></p> <p>For the display format 00:07:05:10:01:5F</p>

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	<ul style="list-style-type: none">▪ Off▪ On
Factory setting	On
Additional information	<p><i>Effect</i></p> <p>If the DHCP client functionality of the web server is selected, the IP address (→ 214), Subnet mask (→ 214) and Default gateway (→ 214) are set automatically.</p> <p>i ▪ Identification is via the MAC address of the measuring device. ▪ The IP address (→ 214) in the IP address parameter (→ 214) is ignored as long as the DHCP client parameter (→ 213) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ 214) in the parameter of the same name is only used if the DHCP client parameter (→ 213) is inactive.</p>

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 (→ 214).
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	<ul style="list-style-type: none"> ▪ The Web server is completely disabled. ▪ Port 80 is locked.
HTML Off	The HTML version of the Web server is not available.
On	<ul style="list-style-type: none"> ▪ 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	→ 216
WLAN (2702)	

WLAN mode (2717)	→ 217
SSID name (2714)	→ 217
Network security (2705)	→ 217
Security identification (2718)	→ 218
User name (2715)	→ 218
WLAN password (2716)	→ 218
WLAN IP address (2711)	→ 219
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WLAN subnet mask (2709)	→ 219
WLAN MAC address (2703)	→ 219
WLAN passphrase (2706)	→ 219
WLAN MAC address (2703)	→ 219
Assign SSID name (2708)	→ 220
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2.4 GHz WLAN channel (2704)	→ 220
Select antenna (2713)	→ 221
Connection state (2722)	→ 221
Received signal strength (2721)	→ 221
WLAN IP address (2711)	→ 219
Gateway IP address (2719)	→ 222
IP address domain name server (2720)	→ 222

WLAN**Navigation**

Expert → Communication → WLAN settings → WLAN (2702)

Description

Use this function to enable and disable the WLAN connection.

Selection	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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 MAC¹⁰⁾ address of the measuring device.

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

Factory setting Each measuring device is given an individual address.

Additional information *Example*

For the display format

00:07:05:10:01:5F

WLAN subnet mask

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

Description Use this function to enter the subnet mask.

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

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 (→ 217).

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 SSID¹¹⁾.

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 (→ 220).
- The **WLAN access point** option is selected in the **WLAN mode** parameter (→ 217).

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

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

Factory setting EH_device designation_last 7 digits of the serial number (e.g.
EH_Promass_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	<i>Description</i>
-------------------------------	--------------------



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

Select antenna



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

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

Selection	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ 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)

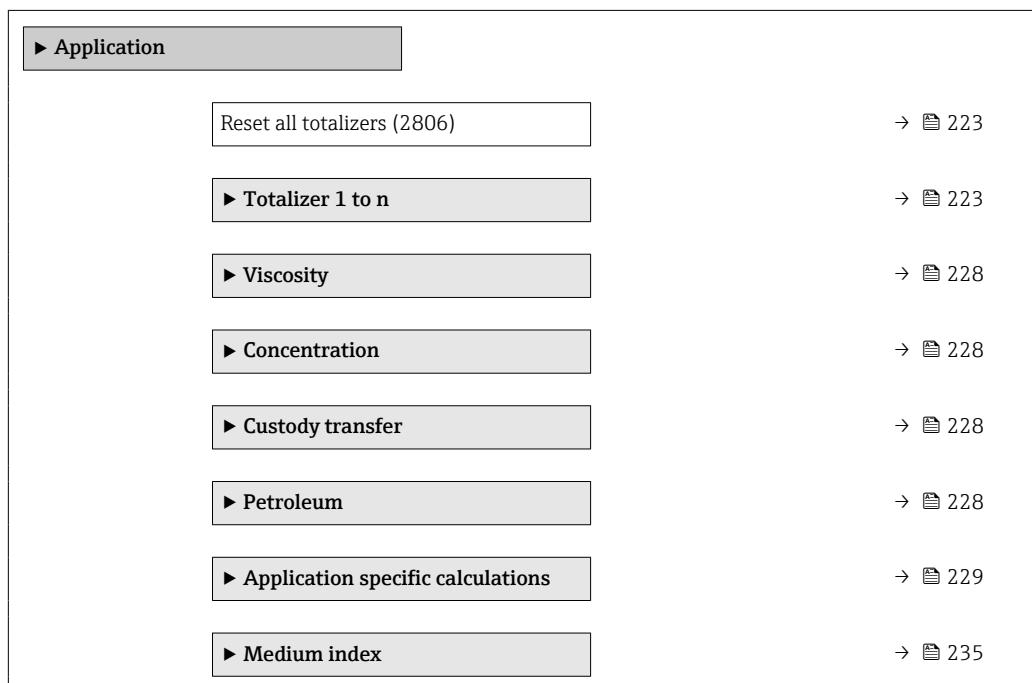
Description Use this function to enter the IP address of the domain name server.

User interface Character string comprising numbers, letters and special characters

Factory setting 192.168.1.212

3.7 "Application" submenu

Navigation  Expert → Application



The screenshot shows a menu structure for the "Application" submenu. At the top, there is a header bar with the title "► Application". Below this, a list of items is displayed in a grid format, each with a description and a page number:

Reset all totalizers (2806)	→  223
► Totalizer 1 to n	→  223
► Viscosity	→  228
► Concentration	→  228
► Custody transfer	→  228
► Petroleum	→  228
► Application specific calculations	→  229
► Medium index	→  235

Reset all totalizers**Navigation**
  Expert → Application → Reset all tot. (2806)
Description

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

Selection

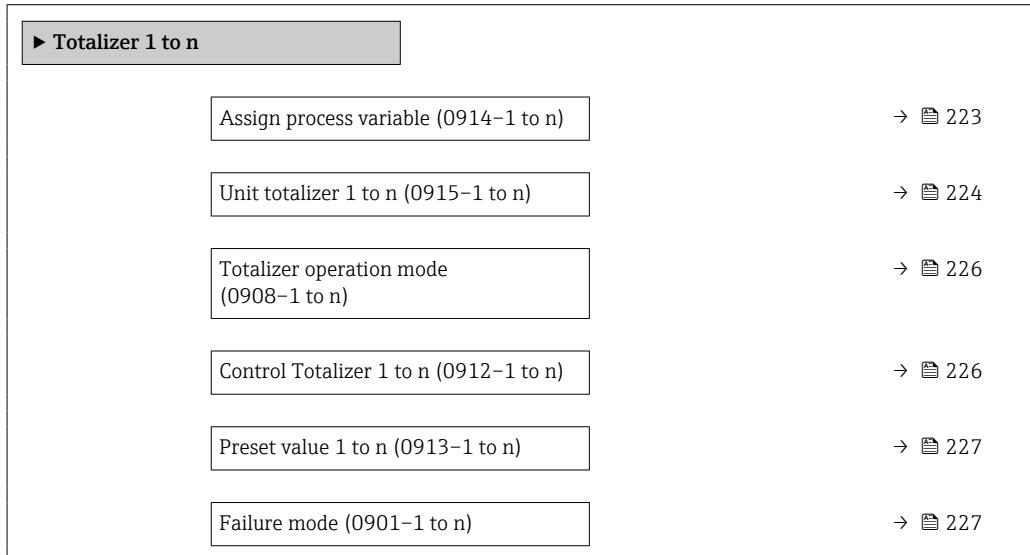
- Cancel
- Reset + totalize

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
**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 *
- 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 *
- Raw value mass flow

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 (→ 223) 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 (→ 223) of the **Totalizer 1 to n** submenu.

Description

Use this function to select the process variable unit for the Totalizer 1 to n (→ 223).

Selection*SI units*

- g *
- kg *
- t

US units

- oz *
- lb *
- STon *

* Visibility depends on order options or device settings

or

* Visibility depends on order options or device settings

<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
■ cm ³ *	■ af*	■ gal (imp)*
■ dm ³ *	■ ft ³ *	■ Mgal (imp)*
■ m ³ *	■ 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

<i>US units</i>	<i>Imperial units</i>
■ bbl (us;liq.)*	■ bbl (imp;beer)*
■ bbl (us;beer)*	

* Visibility depends on order options or device settings

or

<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
■ Nl*	■ Sft ³ *	Sgal (imp)*
■ Nhl*	■ MSft ³ *	
■ Nm ³ *	■ MMSft ³ *	
■ Sl*	■ Sgal (us)*	
■ Sm ³ *	■ Sbbl (us;liq.)*	
	■ Sbbl (us;oil)*	

* Visibility depends on order options or device settings

or

<i>Other units</i>
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 (→ 290).

Selection

The selection is dependent on the process variable selected in the **Assign process variable** parameter (→ 223).

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 (→ 223) 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 (→ 223) 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

Selection

Options	Description
Totalize	The totalizer is started or continues running.
Reset + hold	The totaling process is stopped and the totalizer is reset to 0.
Preset + hold ¹⁾	The totaling process is stopped and the totalizer is set to its defined start value from the Preset value parameter.

* Visibility depends on order options or device settings

Options	Description
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 (→ 223) 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
Additional information	<p><i>User entry</i></p> <p> The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 224).</p> <p><i>Example</i></p> <p>This configuration is suitable for applications such as iterative filling processes with a fixed batch quantity.</p>

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 (→ 223) 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	<ul style="list-style-type: none"> ■ 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 "Viscosity" submenu



Only available for Promass I.



For detailed information on the parameter descriptions for the **Viscosity** application package, refer to the Special Documentation for the device → [8](#)

Navigation

Expert → Application → Viscosity

► Viscosity

3.7.3 "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

3.7.4 "Custody transfer" submenu



Only available for Promass F, O, Q and X.



For detailed information on the parameter descriptions for custody transfer measurement, see the Special Documentation for the device → [8](#)

Navigation

Expert → Application → Custody transfer

► Custody transfer

3.7.5 "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

3.7.6 "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 →  229 ▶ Process variables →  232

"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) →  230 Parameter 1 (6359) →  230 Parameter 2 (6360) →  230 Parameter 3 (6361) →  230 Parameter 4 (6345) →  231 Parameter 5 (6346) →  231 Parameter 6 (6347) →  231 Parameter 7 (6348) →  231 Parameter 8 (6349) →  232 Parameter 9 (6350) →  232

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.

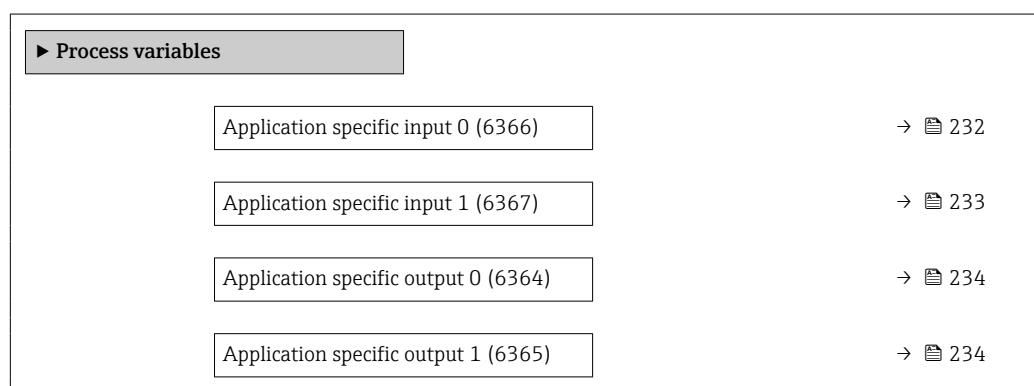
User entry Signed floating-point number

Factory setting 0

"Process variables" submenu

Only available if "Application-specific calculations" has been ordered.

Navigation Expert → Application → Appl.spec. calc. → Process variab.

**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	<ul style="list-style-type: none">▪ 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

3.7.7 "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 $> 400 \text{ kg/m}^3$. The gas typically occurs in viscous liquids in the form of microbubbles or small bubbles.

Navigation

Expert → Application → Medium index

Option	Page
Inhomogeneous medium index (6368)	→ 236
Cut off inhomogeneous wet gas (6375)	→ 235
Cut off inhomogeneous liquid (6374)	→ 235
Suspended bubbles index (6376)	→ 237
Cut off suspended bubbles (6370)	→ 236

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 $< 400 \text{ kg/m}^3$, 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 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	<ul style="list-style-type: none">■ 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)	→  238
Previous diagnostics (0690)	→  239
Operating time from restart (0653)	→  240
Operating time (0652)	→  240
► Diagnostic list	→  240
► Event logbook	→  244
► Custody transfer logbook	→  246
► Device information	→  247
► Main electronic module + I/O module 1	→  250
► Sensor electronic module (ISEM)	→  251

► I/O module 2	→ 252
► I/O module 3	→ 253
► Display module	→ 256
► Data logging	→ 257
► Min/max values	→ 266
► Heartbeat Technology	→ 276
► Simulation	→ 289

Actual diagnostics

Navigation

Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite

A diagnostic event has occurred.

Description

Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Display

Additional pending diagnostic messages can be viewed in the **Diagnostic list** submenu (→ 240).

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 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
(→ 238).

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
(→ 239).

Example

For the display format:

24d12h13m00s

Operating time from restart

Navigation  Expert → Diagnostics → Time fr. restart (0653)

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

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

Operating time

Navigation  Expert → Diagnostics → Operating time (0652)

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

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

Additional information *User interface*

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

3.8.1 "Diagnostic list" submenu

Navigation  Expert → Diagnostics → Diagnostic list

 Diagnostic list	
Diagnostics 1 (0692)	→  240
Diagnostics 2 (0693)	→  241
Diagnostics 3 (0694)	→  242
Diagnostics 4 (0695)	→  243
Diagnostics 5 (0696)	→  244

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 (→  240).

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 (→  241). <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: <ul style="list-style-type: none">▪  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 (→ 242).

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 (→ 243).

Example

For the display format:

24d12h13m00s

Diagnostics 5

Navigation

 Expert → Diagnostics → Diagnostic list → Diagnostics 5 (0696)

Description

Displays the current diagnostics message with the fifth-highest priority.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information*Display*

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

Examples

For the display format:

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

Timestamp 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*Display*

 The diagnostic message can be viewed via the **Diagnostics 5** parameter (→  244).

Example

For the display format:

24d12h13m00s

3.8.2 "Event logbook" submenu

Viewing event messages

Event messages are displayed in chronological order. The event history includes both diagnostic events and information events. The symbol in front of the timestamp indicates whether the event has started or ended.

Navigation

 Expert → Diagnostics → Event logbook



Filter options (0705)	→ 245
▶ Event list	→ 245

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*Description*

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

"Event list" submenu

The **Event list** submenu is only displayed if operating via the local display.

If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module.

If operating via the Web browser, the event messages can be found directly in the **Event logbook** submenu.

Navigation

Expert → Diagnostics → Event logbook → Event list

▶ Event list	Event list
	→ 246

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 (→  245).

User interface

- For a "Category I" event message
Information event, short message, symbol for event recording and operating time when error occurred
- For a "Category F, C, S, M" event message (status signal)
Diagnostics code, short message, symbol for event recording and operating time when error occurred

Additional information

Description

A maximum of 20 event messages are displayed in chronological order.

If the **Extended HistoROM** application package (order option) is enabled in the device, the event list can contain up to 100 entries .

The following symbols indicate whether an event has occurred or has ended:

-  Occurrence of the event
-  End of the event

Examples

For the display format:

- I1091 Configuration modified
 24d12h13m00s
-  F271 Main electronic failure
 01d04h12min30s

HistoROM

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

3.8.3 "Custody transfer logbook" submenu

 Only available for Promass F, O, Q and X.

 For detailed information on the parameter descriptions for custody transfer measurement, see the Special Documentation for the device →  8

Navigation

  Expert → Diagnostics → Cust.transf.log.

 **Custody transfer logbook**

3.8.4 "Device information" submenu

Navigation

Expert → Diagnostics → Device info

► Device information	
Device tag	→ 247
Serial number	→ 248
Firmware version	→ 248
Device name	→ 248
Order code	→ 248
Extended order code 1	→ 249
Extended order code 2	→ 249
Extended order code 3	→ 249
ENP version	→ 250

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

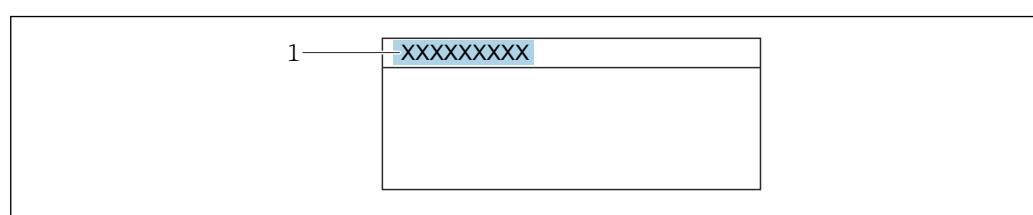
Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).

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.

 The number can be found on the nameplate of the sensor and transmitter.

User interface Max. 11-digit character string comprising letters and numbers.

Additional information *Description*

 **Uses of the serial number**

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

Firmware version

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

Description Displays the device firmware version installed.

User interface Character string in the format xx.yy.zz

Additional information *Display*

 The Firmware version is also located:

- On the title page of the Operating instructions
- On the transmitter nameplate

Device name

Navigation   Expert → Diagnostics → Device info → Device name (0020)

Description Displays the name of the transmitter. It can also be found on the nameplate of the transmitter.

User interface Promass 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 (→ 249)

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 (→ 249)

ENP version

Navigation  Expert → Diagnostics → Device info → ENP version (0012)

Description Displays the version of the electronic nameplate.

User interface Character string

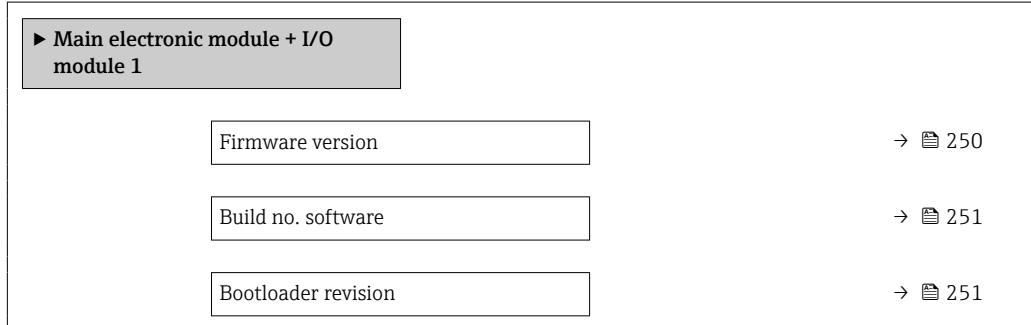
Factory setting 2.02.00

Additional information *Description*

This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.

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

Navigation  Expert → Diagnostics 1 → Main elec.+I/O1



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

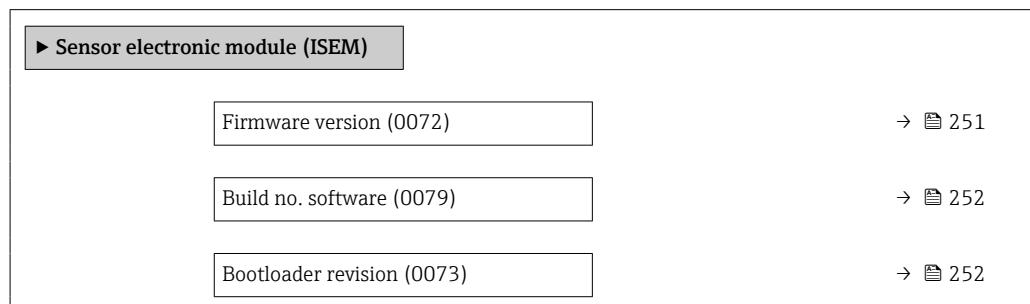
Navigation   Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)

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

User interface Positive integer

3.8.6 "Sensor electronic module (ISEM)" submenu

Navigation   Expert → Diagnostics → Sens. electronic



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

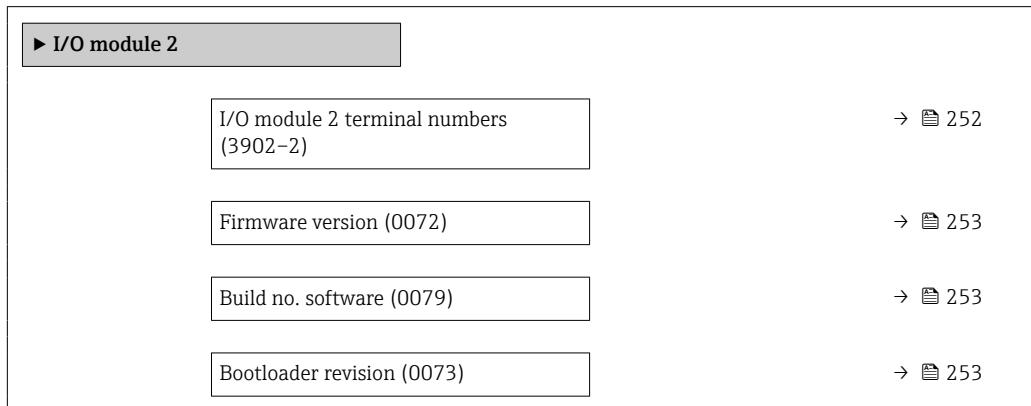
Navigation   Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

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

User interface Positive integer

3.8.7 "I/O module 2" submenu

Navigation   Expert → Diagnostics → I/O module 2



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

3.8.8 "I/O module 3" submenu

Navigation

  Expert → Diagnostics → I/O module 3

► I/O module 3

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

→  254

Firmware version (0072)

→  254

Build no. software (0079)

→  254

Bootloader revision (0073)

→  254

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

3.8.9 "I/O module 4" submenu

Navigation  Expert → Diagnostics → I/O module 4

► I/O module 4

I/O module 4 terminal numbers (3902-4)	→ 255
Firmware version (0072)	→ 255
Build no. software (0079)	→ 255
Bootloader revision (0073)	→ 255

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)

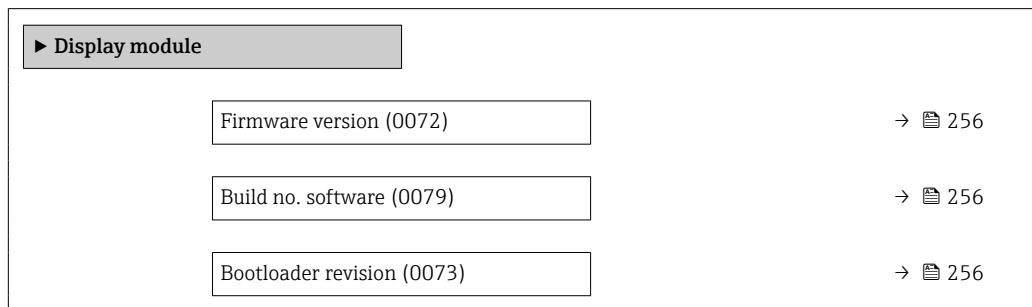
Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.10 "Display module" submenu

Navigation

Expert → Diagnostics → Display module



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

3.8.11 "Data logging" submenu

Navigation

Expert → Diagnostics → Data logging

► Data logging	
Assign channel 1 (0851)	→ 257
Assign channel 2 (0852)	→ 259
Assign channel 3 (0853)	→ 260
Assign channel 4 (0854)	→ 260
Logging interval (0856)	→ 260
Clear logging data (0855)	→ 261
Data logging (0860)	→ 261
Logging delay (0859)	→ 262
Data logging control (0857)	→ 262
Data logging status (0858)	→ 263
Entire logging duration (0861)	→ 263
► Display channel 1	→ 263
► Display channel 2	→ 265
► Display channel 3	→ 265
► Display channel 4	→ 266

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 (→ 57).

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 *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- Target mass flow *
- Carrier mass flow *
- Concentration *
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- 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

* Visibility depends on order options or device settings

- Oscillation damping 0
- Oscillation damping fluctuation 0 *
- Oscillation frequency 0
- Frequency fluctuation 0 *
- Signal asymmetry
- Torsion signal asymmetry *
- Carrier pipe temperature *
- Oscillation frequency 1 *
- Frequency fluctuation 0 *
- Frequency fluctuation 1 *
- Oscillation amplitude *
- Oscillation amplitude 1 *
- Oscillation damping 1 *
- Oscillation damping fluctuation 0 *
- Oscillation damping fluctuation 1 *
- Exciter current 1 *
- 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

Additional information *Description*

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

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

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

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

Assign channel 2



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

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

 The software options currently enabled are displayed in the **Software option overview** parameter (→  57).

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

Selection For the picklist, see the **Assign channel 1** parameter (→  257)

* Visibility depends on order options or device settings

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 (→ 57).

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

Selection For the picklist, see the **Assign channel 1** parameter (→ 257)

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 (→ 57).

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

Selection For the picklist, see the **Assign channel 1** parameter (→ 257)

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 (→ 57).

Description Use this function to enter the logging interval T_{log} for data logging.

User entry 0.1 to 3 600.0 s

Factory setting	1.0 s
-----------------	-------

Additional information*Description*

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time T_{\log} :

- If 1 logging channel is used: $T_{\log} = 1000 \times t_{\log}$
- If 2 logging channels are used: $T_{\log} = 500 \times t_{\log}$
- If 3 logging channels are used: $T_{\log} = 333 \times t_{\log}$
- If 4 logging channels are used: $T_{\log} = 250 \times t_{\log}$

Once this time elapses, the oldest data points in the data log are cyclically overwritten such that a time of T_{\log} always remains in the memory (ring memory principle).

 The log contents are cleared if the length of the logging interval is changed.

Example

If 1 logging channel is used:

- $T_{\log} = 1000 \times 1 \text{ s} = 1000 \text{ s} \approx 15 \text{ min}$
- $T_{\log} = 1000 \times 10 \text{ s} = 10000 \text{ s} \approx 3 \text{ h}$
- $T_{\log} = 1000 \times 80 \text{ s} = 80000 \text{ s} \approx 1 \text{ d}$
- $T_{\log} = 1000 \times 3600 \text{ s} = 3600000 \text{ s} \approx 41 \text{ d}$

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 (→  57).

Description

Use this function to clear the entire logging data.

Selection

- Cancel
- Clear data

Factory setting

Cancel

Additional information*Selection*

- Cancel
The data is not cleared. All the data is retained.
- Clear data
The logging data is cleared. The logging process starts from the beginning.

Data logging**Navigation**

  Expert → Diagnostics → Data logging → Data logging (0860)

Description

Use this function to select the data logging method.

Selection

- Overwriting
- Not overwriting

Factory setting	Overwriting
Additional information	<i>Selection</i> <ul style="list-style-type: none">▪ 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 (→ 261), the Not overwriting option is selected.
Description	Use this function to enter the time delay for measured value logging.
User entry	0 to 999 h
Factory setting	0 h
Additional information	<i>Description</i> <p>Once data logging has been started with the Data logging control parameter (→ 262), the device does not save any data for the duration of the delay time entered.</p>

Data logging control



Navigation	Expert → Diagnostics → Data logging → Data log.control (0857)
Prerequisite	In the Data logging parameter (→ 261), the Not overwriting option is selected.
Description	Use this function to start and stop measured value logging.
Selection	<ul style="list-style-type: none">▪ None▪ Delete + start▪ Stop
Factory setting	None
Additional information	<i>Selection</i> <ul style="list-style-type: none">▪ 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.

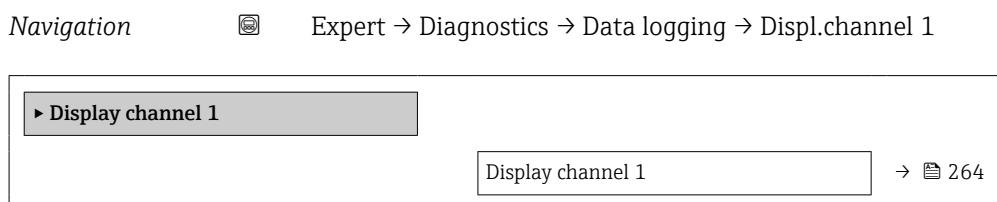
Data logging status

Navigation	 Expert → Diagnostics → Data logging → Data log. status (0858)
Prerequisite	In the Data logging parameter (→ 261), the Not overwriting option is selected.
Description	Displays the measured value logging status.
User interface	<ul style="list-style-type: none"> ■ Done ■ Delay active ■ Active ■ Stopped
Factory setting	Done
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ 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 (→ 261), 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



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 (→  57).

One of the following options is selected in the **Assign channel 1** parameter (→  257):

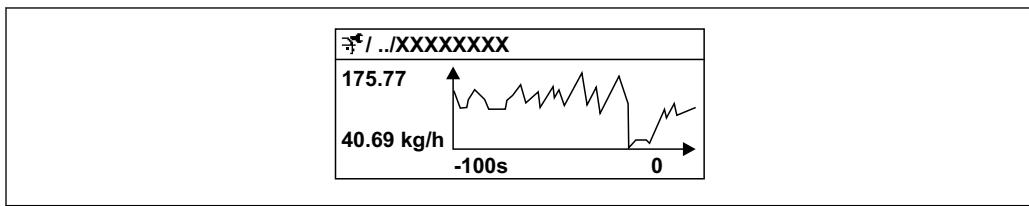
- Mass flow
- Volume flow
- Corrected volume flow
- Target mass flow *
- Carrier mass flow *
- Density
- Reference density *
- Concentration *
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- Carrier pipe temperature
- Electronics temperature
- Current output 1
- Oscillation frequency 0 *
- Oscillation frequency 1 *
- Frequency fluctuation 0
- Frequency fluctuation 1 *
- Oscillation amplitude *
- Oscillation amplitude 1 *
- Oscillation damping 0
- Oscillation damping 1 *
- Oscillation damping fluctuation 0
- Oscillation damping fluctuation 1 *
- Signal asymmetry
- Exciter current 0
- Exciter current 1 *

Description

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

Additional information

Description



 11 Chart of a measured value trend

* Visibility depends on order options or device settings

- 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

Navigation



Expert → Diagnostics → Data logging → Displ.channel 2

Prerequisite

A process variable is specified in the **Assign channel 2** parameter.

Description

See the **Display channel 1** parameter → 264

"Display channel 3" submenu

Navigation



Expert → Diagnostics → Data logging → Displ.channel 3



Display channel 3

Navigation



Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite

A process variable is specified in the **Assign channel 3** parameter.

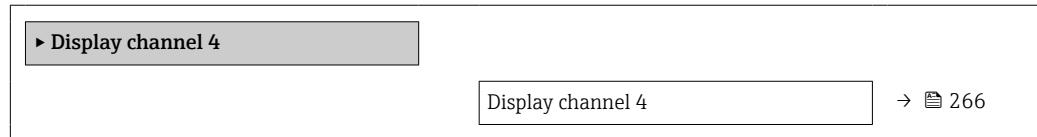
Description

See the **Display channel 1** parameter → 264

"Display channel 4" submenu

Navigation

Expert → Diagnostics → Data logging → Displ.channel 4



Display channel 4

Navigation

Expert → Diagnostics → Data logging → Displ.channel 4

Prerequisite

A process variable is specified in the **Assign channel 4** parameter.

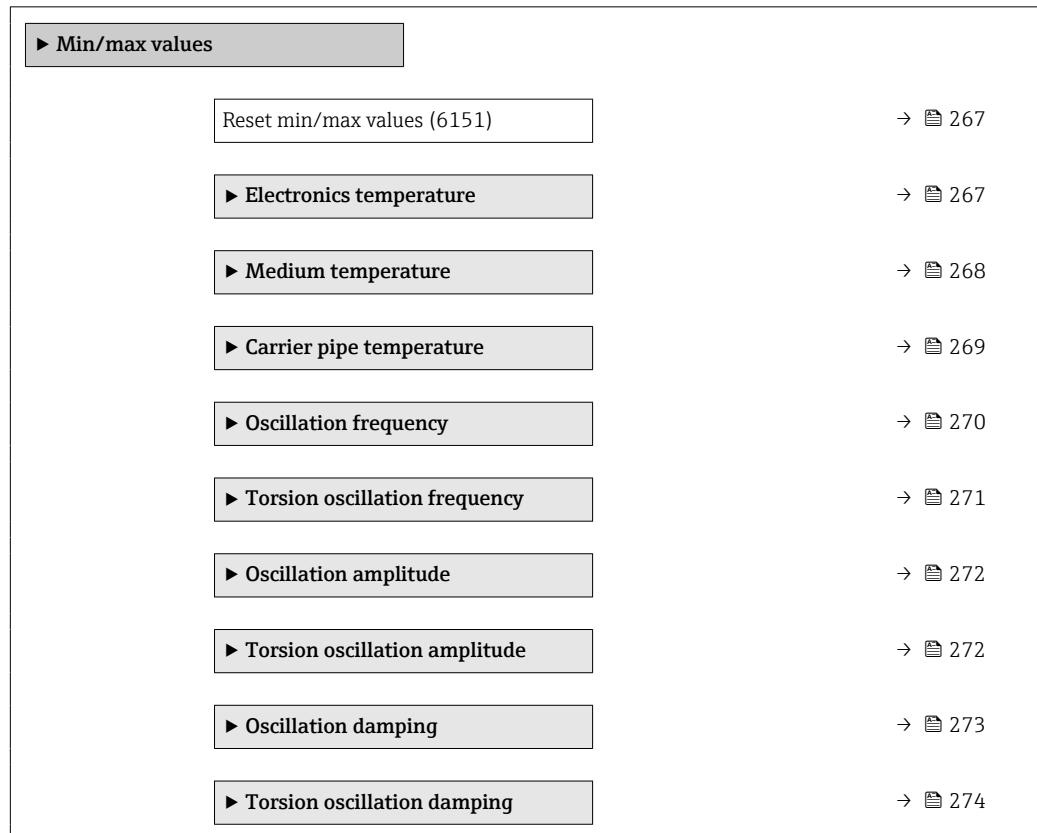
Description

See the **Display channel 1** parameter → [264](#)

3.8.12 "Min/max values" submenu

Navigation

Expert → Diagnostics → Min/max val.



▶ Signal asymmetry	→  275
▶ Torsion signal asymmetry	→  275

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

"Electronics temperature" submenu

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

▶ Electronics temperature	
Minimum value	→  267
Maximum value	→  268

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

* Visibility depends on order options or device settings

Additional information*Dependency*

The unit is taken from the **Temperature unit** parameter (→ 99)

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

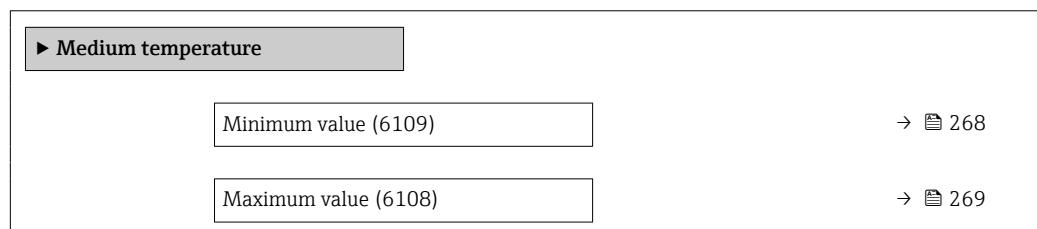
Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Temperature unit** parameter (→ 99)

"Medium temperature" submenu*Navigation*

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



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*

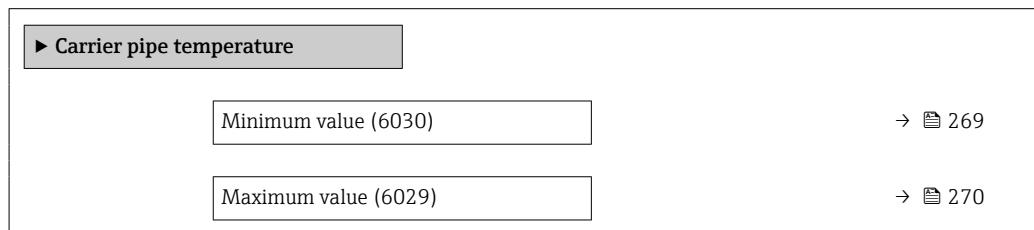
The unit is taken from the **Temperature unit** parameter (→ 99)

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	<p><i>Dependency</i></p>  The unit is taken from the Temperature unit parameter (→ 99)

"Carrier pipe temperature" submenu

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



Minimum value

Navigation	Expert → Diagnostics → Min/max val. → Carr. pipe temp. → Minimum value (6030)
Prerequisite	 Only available for: <ul style="list-style-type: none"> ■ Promass A ■ Promass F ■ Promass H ■ Promass I ■ Promass O ■ Promass P ■ PromassQ ■ Promass S ■ Promass X 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	<p><i>Dependency</i></p>  The unit is taken from the Temperature unit parameter (→ 99)

Maximum value

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

Prerequisite

 Only available for:

- Promass A
- Promass F
- Promass H
- Promass I
- Promass O
- Promass P
- Promass Q
- Promass S
- Promass X

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

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

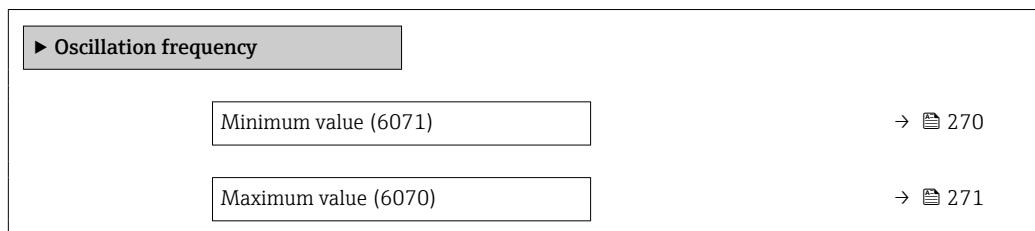
User interface Signed floating-point number

Additional information *Dependency*

 The unit is taken from the **Temperature unit** parameter (→  99)

"Oscillation frequency" submenu

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



Minimum value

Navigation   Expert → Diagnostics → Min/max val. → Oscil. frequency → Minimum value (6071)

Description Displays the lowest previously measured oscillation frequency.

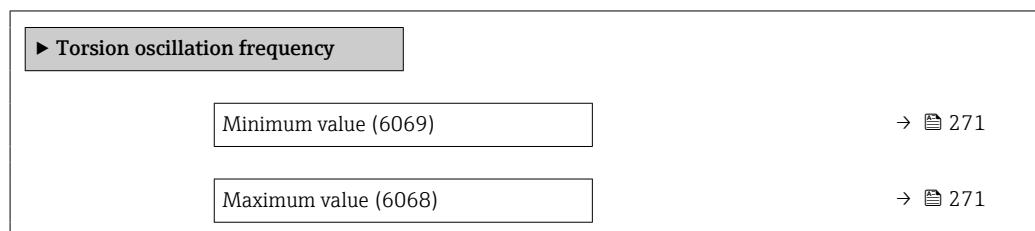
User interface Signed floating-point number

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

"Torsion oscillation frequency" submenu

Navigation Expert → Diagnostics → Min/max val. → Tors.oscil.freq.



Minimum value

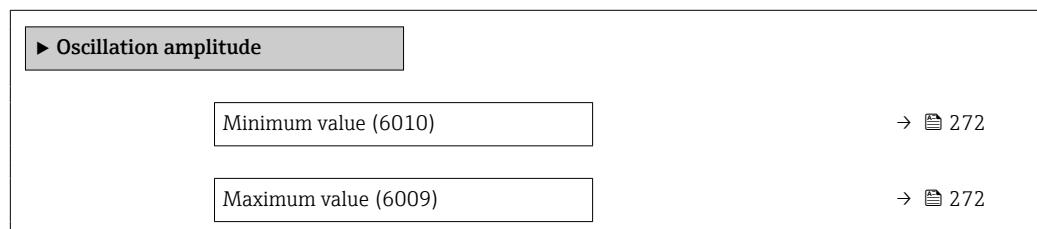
Navigation	Expert → Diagnostics → Min/max val. → Tors.oscil.freq. → Minimum value (6069)
Prerequisite	Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the lowest previously measured torsion oscillation frequency.
User interface	Signed floating-point number

Maximum value

Navigation	Expert → Diagnostics → Min/max val. → Tors.oscil.freq. → Maximum value (6068)
Prerequisite	Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the highest previously measured torsion oscillation frequency.

User interface

Signed floating-point number

"Oscillation amplitude" submenu**Navigation**  Expert → Diagnostics → Min/max val. → Oscil. amplitude

Minimum value**Navigation**  Expert → Diagnostics → Min/max val. → Oscil. amplitude → Minimum value (6010)**Description**

Displays the lowest previously measured oscillation amplitude.

User interface

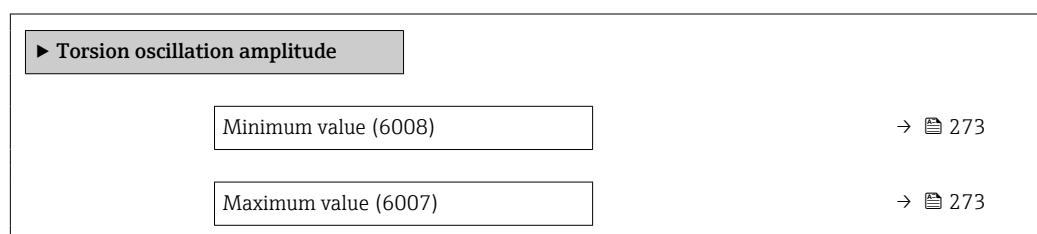
Signed floating-point number

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

"Torsion oscillation amplitude" submenu**Navigation**  Expert → Diagnostics → Min/max val. → Tor. osc. amp.

Minimum value

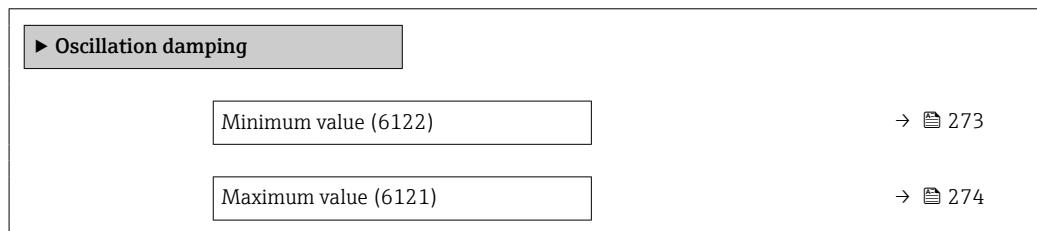
Navigation	Expert → Diagnostics → Min/max val. → Tor. osc. amp. → Minimum value (6008)
Prerequisite	 Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the lowest previously measured torsion oscillation amplitude.
User interface	Signed floating-point number

Maximum value

Navigation	Expert → Diagnostics → Min/max val. → Tor. osc. amp. → Maximum value (6007)
Prerequisite	 Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the highest previously measured torsion oscillation amplitude.
User interface	Signed floating-point number

"Oscillation damping" submenu

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



Minimum value

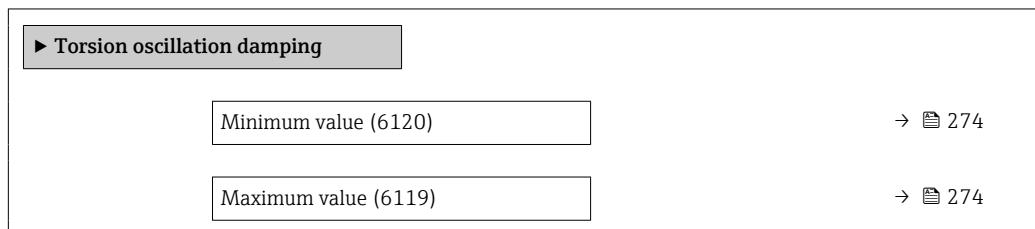
Navigation	Expert → Diagnostics → Min/max val. → Oscil. damping → Minimum value (6122)
Description	Displays the lowest previously measured oscillation damping.
User interface	Signed floating-point number

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

"Torsion oscillation damping" submenu

Navigation   Expert → Diagnostics → Min/max val. → Tors. oscil. damp.



Minimum value

Navigation	  Expert → Diagnostics → Min/max val. → Tors. oscil. damp. → Minimum value (6120)
Prerequisite	 Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the lowest previously measured torsion oscillation damping.
User interface	Signed floating-point number

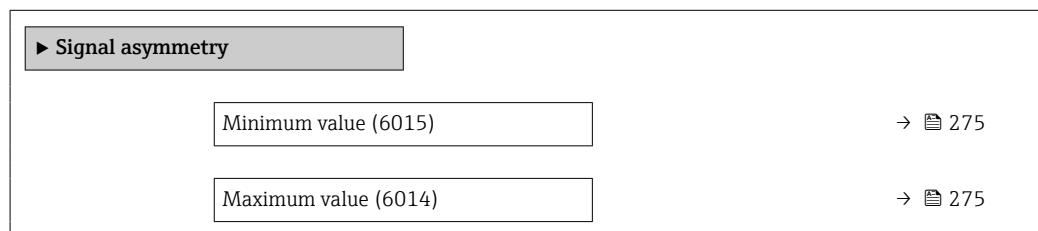
Maximum value

Navigation	  Expert → Diagnostics → Min/max val. → Tors. oscil. damp. → Maximum value (6119)
Prerequisite	 Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the highest previously measured torsion oscillation damping.

User interface	Signed floating-point number
----------------	------------------------------

"Signal asymmetry" submenu

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



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

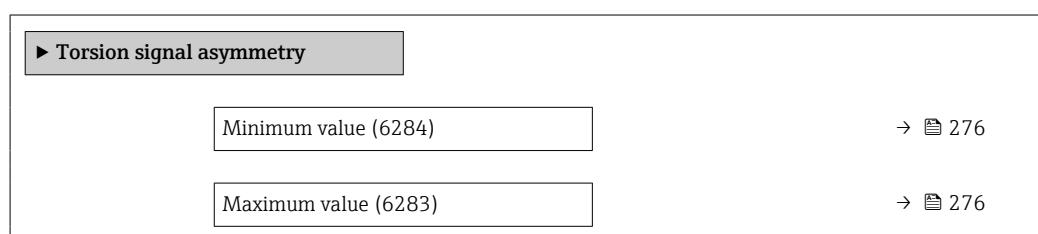
Navigation	Expert → Diagnostics → Min/max val. → Signal asymmetry → Maximum value (6014)
-------------------	---

Description	Displays the highest previously measured signal asymmetry.
--------------------	--

User interface	Signed floating-point number
-----------------------	------------------------------

"Torsion signal asymmetry" submenu

Navigation Expert → Diagnostics → Min/max val. → Tors.sig.asymm.



Minimum value

Navigation	 Expert → Diagnostics → Min/max val. → Tors.sig.asymm. → Minimum value (6284)
Prerequisite	 Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the lowest previously measured torsion signal asymmetry.
User interface	Signed floating-point number

Maximum value

Navigation	 Expert → Diagnostics → Min/max val. → Tors.sig.asymm. → Maximum value (6283)
Prerequisite	 Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the highest previously measured torsion signal asymmetry.
User interface	Signed floating-point number

3.8.13 "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	→  277
 Performing verification	→  277
 Verification results	→  283
 Heartbeat Monitoring	→  287
 Monitoring results	→  288

"Heartbeat base settings" submenu**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Base settings

► Heartbeat base settings	
Plant operator (2754)	→ 277
Location (2755)	→ 277

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)	→ 278
Month (2845)	→ 278
Day (2842)	→ 279
Hour (2843)	→ 279
AM/PM (2813)	→ 279

Minute (2844)	→ 280
Verification mode (12105)	→ 280
External device information (12101)	→ 280
Start verification (12127)	→ 281
Progress (2808)	→ 281
Measured values (12102)	→ 282
Output values (12103)	→ 282
Status (12153)	→ 282
Verification result (12149)	→ 283

Year**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verify. → 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.verify. → 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) (→ 100).
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 (→ 280).
- 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	<ul style="list-style-type: none">■ 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 %

* Visibility depends on order options or device settings

Measured values**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verify. → Measured val. (12102)

Prerequisite

One of the following options is selected in the **Start verification** parameter (→ 281):

- 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

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.verify. → 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.verify. → 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)	→  284
Verification ID (12141)	→  284
Operating time (12126)	→  284
Verification result (12149)	→  284
Sensor (12152)	→  285
HBSI (12167)	→  285
Sensor electronic module (ISEM) (12151)	→  285
I/O module (12145)	→  286
System status (12109)	→  286

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	<ul style="list-style-type: none">■ 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 (→  283).

Description Displays the result for the sensor.

 Detailed description of results classification:

User interface	<ul style="list-style-type: none">■ 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 (→  283), 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	<ul style="list-style-type: none">■ 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 (→  283).

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 (→  283), 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 (→  283).

Description Displays the system condition. Tests the measuring device for active errors.

 Detailed description of results classification:

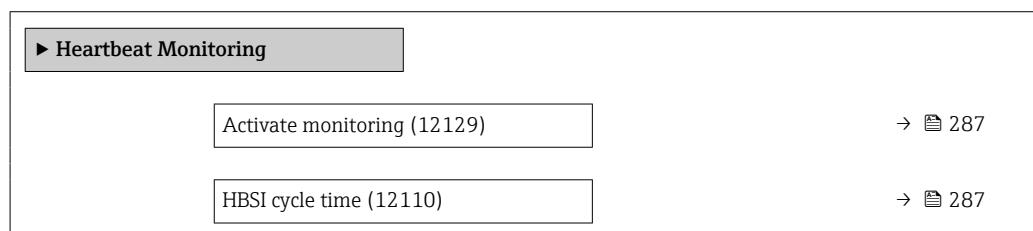
User interface	<ul style="list-style-type: none"> ■ Not supported ■ Passed ■ Not done ■ Failed
----------------	---

Factory setting	Not done
-----------------	----------

"Heartbeat Monitoring" submenu

Navigation

Expert → Diagnostics → Heartbeat Techn. → Heartbeat Mon.



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 (→ 287), the **Time-controlled HBSI** option is selected.

Not available for Promass I.

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 (→ 287) is set to **Scheduled HBSI** option.

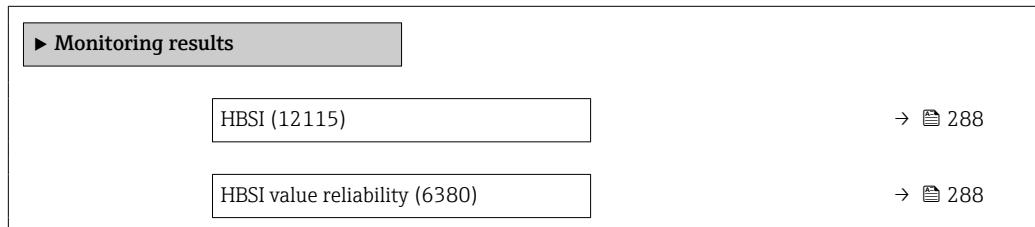
User entry

0.5 to 4 320 h

Factory setting 12 h

"Monitoring results" submenu

Navigation   Expert → Diagnostics → Heartbeat Techn. → Monitor. results



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

3.8.14 "Simulation" submenu

Navigation

Expert → Diagnostics → Simulation

► Simulation	
Assign simulation process variable (1810)	→ 290
Process variable value (1811)	→ 291
Current output 1 to n simulation (0354-1 to n)	→ 291
Current output value (0355)	→ 292
Frequency output 1 to n simulation (0472-1 to n)	→ 292
Frequency output 1 to n value (0473-1 to n)	→ 292
Pulse output simulation 1 to n (0458-1 to n)	→ 293
Pulse value 1 to n (0459-1 to n)	→ 293
Switch output simulation 1 to n (0462-1 to n)	→ 294
Switch state 1 to n (0463-1 to n)	→ 294
Relay output 1 to n simulation (0802-1 to n)	→ 295
Switch state 1 to n (0803-1 to n)	→ 295
Pulse output simulation (0988)	→ 296
Pulse value (0989)	→ 296
Device alarm simulation (0654)	→ 296
Diagnostic event category (0738)	→ 297
Diagnostic event simulation (0737)	→ 297
Current input 1 to n simulation (1608-1 to n)	→ 297
Value current input 1 to n (1609-1 to n)	→ 298

Status input 1 to n simulation (1355-1 to n)	→ 298
Input signal level 1 to n (1356-1 to n)	→ 299

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
- Dynamic viscosity *
- Kinematic viscosity *
- Temp. compensated dynamic viscosity *
- Temp. compensated kinematic viscosity *
- Concentration *
- Target mass flow *
- Carrier mass flow *
- Time period signal frequency (TPS) *

Factory setting

Off

* Visibility depends on order options or device settings

Additional information*Description*

The simulation value of the process variable selected is defined in the **Process variable value** parameter (→ 291).

Process variable value**Navigation**

Expert → Diagnostics → Simulation → Proc. var. value (1811)

Prerequisite

A process variable is selected in the **Assign simulation process variable** parameter (→ 290).

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*User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 90).

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*Description*

The desired simulation value is defined in the **Value current output 1 to n** parameter.

Selection

- Off

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

- On

Current simulation is active.

Current output value**Navigation**

Expert → Diagnostics → Simulation → Curr.outp val. (0355)

Prerequisite

In the **Current output 1 to n simulation** parameter, the **On** option is selected.

Description

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

User entry

3.59 to 22.5 mA

Additional information

Dependency

The input range is dependent on the option selected in the **Current span** parameter (→ [160](#)).

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 (→ [174](#)), the **Frequency** option is selected.

Description

Use this function to switch simulation of the frequency output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Factory setting

Off

Additional information

Description

The desired simulation value is defined in the **Frequency value 1 to n** parameter.

Selection

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

Frequency output 1 to n value**Navigation**

Expert → Diagnostics → Simulation → Freq.outp 1 to n val. (0473–1 to n)

Prerequisite

In the **Frequency 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 (→ 174), 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 *Description*



The desired simulation value is defined in the **Pulse value 1 to n** parameter.

Selection

- Off
Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (→ 177).
- Down-counting value
The pulses specified in the **Pulse value** parameter (→ 293) 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 (→ 174), the **Switch** option is selected.

Description

Use this function to switch simulation of the switch output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Factory setting

Off

Additional information*Description*

The desired simulation value is defined in the **Switch state 1 to n** parameter.

Selection

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

Switch 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*Selection*

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

Relay output 1 to n simulation**Navigation**

Expert → Diagnostics → Simulation → Relay out. 1 to n sim (0802–1 to n)

Description

Use this function to switch simulation of the relay output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

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 (→ 296).

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 (→ 203).
- Down-counting value
The pulses specified in the **Pulse value** parameter (→ 296) are output.

Pulse value**Navigation**

Expert → Diagnostics → Simulation → Pulse value (0989)

Prerequisite

In the **Pulse output simulation** parameter (→ 296), 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 (→ 297).

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 *Description*

For the simulation, you can choose from the diagnostic events of the category selected in the **Diagnostic event category** parameter (→ 297).

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	<ul style="list-style-type: none">▪ Off▪ On
Factory setting	Off
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ Off▪ On
Factory setting	Off
Additional information	<p><i>Description</i></p> <p> The desired simulation value is defined in the Input signal level parameter (→ 299).</p> <p><i>Selection</i></p> <ul style="list-style-type: none">▪ 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 (→ 298), 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	Nl
Corrected volume flow	Nl/h
Density	kg/l
Reference density	kg/Nl
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
8	400
15	1300
15 FB	3600
25	3600
25 FB	9000
40	9000
40 FB	14000
50	14000
50 FB	36000
80	36000
100	60000
150	130 t/h
200	230 t/h

Nominal diameter [mm]	[kg/h]
250	360 t/h
350	650 t/h

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
8	0.1
15	0.1
15 FB	1
25	1
25 FB	1
40	1
40 FB	10
50	10
50 FB	10
80	10
100	10
150	100
200	100
250	100
350	100

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
8	8
15	26

Nominal diameter [mm]	On-value for liquid [kg/h]
15 FB	72
25	72
25 FB	180
40	180
40 FB	300
50	300
50 FB	720
80	720
100	1200
150	2.6 t/h
200	1.15 t/h
250	4.6 t/h
350	13 t/h

Nominal diameter [mm]	On-value for gas [kg/h]
1	0.02
2	0.1
4	0.45
8	2
15	6.5
15 FB	18
25	18
25 FB	45
40	45
40 FB	75
50	75
50 FB	180
80	180
100	300
150	650
200	1.0 t/h
250	1.8 t/h
350	3.25 t/h

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
3/8	15
1/2	50
1/2 FB	130
1	130
1 FB	330
1½	330
1½ FB	550
2	550
2 FB	1300
3	1300
4	2200
6	4800
8	8500
10	13000
14	23500

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]
$\frac{1}{24}$	0.002
$\frac{1}{12}$	0.02
$\frac{1}{8}$	0.02
$\frac{3}{8}$	0.2
$\frac{1}{2}$	0.2
$\frac{1}{2}$ FB	2
1	2
1 FB	2
$1\frac{1}{2}$	2
$1\frac{1}{2}$ FB	20
2	20
2 FB	20
3	20
4	20
6	200
8	200
10	200
14	200

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]
$\frac{1}{24}$	0.003
$\frac{1}{12}$	0.015
$\frac{1}{8}$	0.066
$\frac{3}{8}$	0.3
$\frac{1}{2}$	1
$\frac{1}{2}$ FB	2.6
1	2.6
1 FB	6.6
$1\frac{1}{2}$	6.6
$1\frac{1}{2}$ FB	11
2	11
2 FB	26
3	26
4	44
6	95

Nominal diameter [in]	On-value for liquid [lb/min]
8	165
10	260
14	470

Nominal diameter [in]	On-value for gas [lb/min]
$\frac{1}{24}$	0.001
$\frac{1}{12}$	0.004
$\frac{1}{8}$	0.016
$\frac{3}{8}$	0.075
$\frac{1}{2}$	0.25
$\frac{1}{2}$ FB	0.65
1	0.65
1 FB	1.65
$1\frac{1}{2}$	1.65
$1\frac{1}{2}$ FB	2.75
2	2.75
2 FB	6.5
3	6.5
4	11
6	23.75
8	36.74
10	65
14	117.5

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
Time	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
	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) bbl (imp;beer), bbl (imp;oil)	Gallon, mega gallon Barrel (beer), barrel (petrochemicals)
Volume flow	gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp) Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp) bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)	Gallon/time unit Mega gallon/time unit 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 am, pm	Second, minute, hour, day, year 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	<ul style="list-style-type: none"> ■ Float length = 4 byte ■ Integer length = 2 byte ■ String length, depending on parameter 	Possible type of access to parameter: <ul style="list-style-type: none"> ■ 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 <ul style="list-style-type: none"> ■ 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	
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Locking status (0004)	→ 326
User role (0005)	→ 326
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► System	→ 327
► Display	→ 327
Display language (0104)	→ 327
Format display (0098)	→ 327
Value 1 display (0107)	→ 328
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100% bargraph value 1 (0125)	→ 329
Decimal places 1 (0095)	→ 329
Value 2 display (0108)	→ 329
Decimal places 2 (0117)	→ 329
Value 3 display (0110)	→ 329
0% bargraph value 3 (0124)	→ 329
100% bargraph value 3 (0126)	→ 329
Decimal places 3 (0118)	→ 329
Value 4 display (0109)	→ 329
Decimal places 4 (0119)	→ 329
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Display damping (0094)	→ 330
Header (0097)	→ 330
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► System units	→ 338
Mass flow unit (0554)	→ 338
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→ 343

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→ 343

Density damping (1803)

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Flow override (1839)

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→ 343

► Partially filled pipe detection

→ 343

► Calculated values

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► Corrected volume flow calculation

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► Measurement mode

→ 344

MFT (Multi-Frequency Technology)
(6242)

→ 344

Select medium (6062)

→ 344

Select gas type (6074)

→ 345

Reference sound velocity (6147)

→ 345

Temperature coefficient sound velocity
(6181)

→ 345

Gas Fraction Handler (6377)

→ 345

► External compensation

→ 345

Pressure compensation (6130)

→ 345

Pressure value (6059)

→ 345

External pressure (6209)

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Bootloader revision (0073)	→ 368
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Bootloader revision (0073)	→ 369
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Build no. software (0079)	→ 369
Bootloader revision (0073)	→ 369
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Firmware version (0072)	→ 369
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▶ Medium temperature	→ 372
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▶ Oscillation amplitude	→ 373
▶ Torsion oscillation amplitude	→ 373
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Diagnostic event category (0738)	→ 375
Diagnostic event simulation (0737)	→ 375
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Input signal level 1 to n (1356–1 to n)	→ 375

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	13
Locking status (0004)	4918	Integer	Read	256 = Hardware locked 512 = Temporarily locked 2048 = CT active - defined parameters 32768 = CT active - all parameters	14
User role (0005)	2178	Integer	Read	1 = Maintenance 2 = Service	15
Enter access code (0003)	2177	Integer	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	15

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)	17
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	18

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 0 = GSV flow * 0 = GSV flow alternative * 0 = NSV flow * 0 = NSV flow alternative * 0 = S&W volume flow 0 = Reference density alternative * 0 = Weighted density average * 0 = Weighted temperature average * 0 = Water cut * 0 = Oil density * 0 = Water density * 0 = Oil mass flow * 0 = Water mass flow * 0 = Oil volume flow * 0 = Water volume flow * 0 = Oil corrected volume flow * 0 = Water corrected volume flow * 1 = Volume flow 2 = Corrected volume flow * 3 = Density 4 = Reference density * 5 = Temperature 6 = Totalizer 1 6 = Oscillation amplitude 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 * 24 = Oscillation frequency 0 * 26 = Oscillation amplitude 0 * 28 = Frequency fluctuation 0 * 30 = Oscillation damping 0 31 = Oscillation damping fluctuation 1 * 32 = Signal asymmetry 33 = Exciter current 1 * 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 * 45 = Kinematic viscosity * 46 = Dynamic viscosity * 46 = Dynamic viscosity * 50 = Oscillation frequency 1 * 52 = Frequency fluctuation 1 * 57 = Inhomogeneous medium index 58 = Suspended bubbles index * 59 = Application specific output 0 * 60 = Application specific output 1 * 63 = Test point 0 64 = Oscillation damping 1 * 64 = Test point 1 65 = Sensor index coil asymmetry 66 = Raw value mass flow 67 = Torsion signal asymmetry * 76 = Temp. compensated dynamic viscosity * 77 = Temp. compensated kinematic viscosity *	20

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
				123 = Current output 3 * 124 = Current output 4 * 186 = Time period signal (TPS) * 187 = Time period signal frequency (TPS) 188 = Density 2 *	
0% bargraph value 1 (0123)	4136 to 4137	Float	Read / Write	Signed floating-point number	22
100% bargraph value 1 (0125)	4142 to 4143	Float	Read / Write	Signed floating-point number	23
Decimal places 1 (0095)	3365	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = xxxxx 5 = xxxxx 6 = xxxxxx	23
Value 2 display (0108)	3964	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  20)	23
Decimal places 2 (0117)	4049	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = xxxxx 5 = xxxxx 6 = xxxxxx	24
Value 3 display (0110)	3966	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  20)	24
0% bargraph value 3 (0124)	4138 to 4139	Float	Read / Write	Signed floating-point number	25
100% bargraph value 3 (0126)	4140 to 4141	Float	Read / Write	Signed floating-point number	25
Decimal places 3 (0118)	4050	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = xxxxx 5 = xxxxx 6 = xxxxxx	26
Value 4 display (0109)	3965	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  20)	26
Decimal places 4 (0119)	4051	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = xxxxx 5 = xxxxx 6 = xxxxxx	27
Value 5 display (0145)	9662	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  20)	27
Decimal places 5 (0149)	25507	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = xxxxx 5 = xxxxx 6 = xxxxxx	28
Value 6 display (0146)	9771	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→  20)	29

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Decimal places 6 (0150)	25514	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx 5 = xxxxxx 6 = xxxxxx	29
Value 7 display (0147)	24721	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→ 20)	30
Decimal places 7 (0151)	25515	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx 5 = xxxxxx 6 = xxxxxx	30
Value 8 display (0148)	25506	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→ 20)	31
Decimal places 8 (0152)	25788	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx 5 = xxxxxx 6 = xxxxxx	31
Display interval (0096)	3604 to 3605	Float	Read / Write	1 to 10 s	32
Display damping (0094)	3554 to 3555	Float	Read / Write	0.0 to 999.9 s	33
Header (0097)	3624	Integer	Read / Write	0 = Device tag 1 = Free text	33
Header text (0112)	3968 to 3973	String	Read / Write	Max. 12 characters, such as letters, numbers or special characters (e.g. @, %, /)	34
Separator (0101)	3671	Integer	Read / Write	■ . (point) ■ , (comma)	34
Contrast display (0105)	3674 to 3675	Float	Read / Write	20 to 80 %	35
Backlight (0111)	3967	Integer	Read / Write	0 = Disable 1 = Enable	35

* 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)	36
Last backup (2757)	6430	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	36
Configuration management (2758)	5500	Integer	Read / Write	0 = Cancel 1 = Execute backup 2 = Restore * 4 = Clear backup data 5 = Compare *	36

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	37
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	37

* 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	39

"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	42
Assign behavior of diagnostic no. 140 (0708)	2757	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	42
Assign behavior of diagnostic no. 144 (0731)	2081	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	43
Assign behavior of diagnostic no. 374 (0710)	2755	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	43
Assign behavior of diagnostic no. 302 (0739)	2312	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning	43
Assign behavior of diagnostic no. 862 (0679)	6441	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	49
Assign behavior of diagnostic no. 912 (0703)	2758	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	49

Navigation: Expert → System → Diagnostic handling → Diagnostic behavior					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Assign behavior of diagnostic no. 913 (0712)	2754	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	49
Assign behavior of diagnostic no. 941 (0632)	26758	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	50
Assign behavior of diagnostic no. 942 (0633)	30857	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	50
Assign behavior of diagnostic no. 943 (0634)	30858	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	51
Assign behavior of diagnostic no. 944 (0732)	2082	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	51
Assign behavior of diagnostic no. 948 (0744)	5179	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	52
Assign behavior of diagnostic no. 984 (0644)	6527	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	52
Assign behavior of diagnostic no. 441 (0657)	4742	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	44
Assign behavior of diagnostic no. 442 (0658)	4919	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	44
Assign behavior of diagnostic no. 443 (0659)	5000	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	45
Assign behavior of diagnostic no. 444 (0740)	5120	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	45
Assign behavior of diagnostic no. 543 (0643)	2362	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	45
Assign behavior of diagnostic no. 599 (0635)	4730	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	46
Assign behavior of diagnostic no. 830 (0800)	6805	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	46

Navigation: Expert → System → Diagnostic handling → Diagnostic behavior					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Assign behavior of diagnostic no. 831 (0641)	6806	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	46
Assign behavior of diagnostic no. 832 (0681)	2759	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	47
Assign behavior of diagnostic no. 833 (0682)	2762	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	47
Assign behavior of diagnostic no. 834 (0700)	2761	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	47
Assign behavior of diagnostic no. 835 (0702)	2760	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	48
Assign behavior of diagnostic no. 842 (0638)	9661	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	48

"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 *	55
Transmitter identifier (2765)	4510	Integer	Read	0 = Unknown 1 = 300 2 = 500	56
Activate SW option (0029)	2795	Integer	Read / Write	Max. 10-digit string consisting of numbers.	56
Software option overview (0015)	2902	Integer	Read	1 = Extended HistoROM * 4 = Concentration * 16 = Extended density function * 64 = Viscosity/Hydrocarbon viscosity monitor. 128 = Custody transfer * 256 = Petroleum * 1024 = Application specific calculations * 16384 = Heartbeat Monitoring * 32768 = Heartbeat Verification *	57

* 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	53
Confirm access code	8685 to 8692	String	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	54

"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)	54
Reset access code (0024)	8880 to 8895	String	Read / Write	Character string comprising numbers, letters and special characters	54

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	61
Volume flow (1847)	2009 to 2010	Float	Read	Signed floating-point number	61
Corrected volume flow (1851)	2011 to 2012	Float	Read	Signed floating-point number	62
Density (1850)	2013 to 2014	Float	Read	Signed floating-point number	62
Reference density (1852)	2015 to 2016	Float	Read	Signed floating-point number	62
Temperature (1853)	2017 to 2018	Float	Read	Signed floating-point number	63
Pressure (6129)	2089 to 2090	Float	Read	Signed floating-point number	63
Dynamic viscosity (1854)	2019 to 2020	Float	Read	Signed floating-point number	63
Kinematic viscosity (1857)	2083 to 2084	Float	Read	Signed floating-point number	64
Temp. compensated dynamic viscosity (1872)	2093 to 2094	Float	Read	Signed floating-point number	64
Temp. compensated kinematic viscosity (1863)	2095 to 2096	Float	Read	Signed floating-point number	64
Concentration (1887)	2598 to 2599	Float	Read	Signed floating-point number	65
Target mass flow (1864)	2797 to 2798	Float	Read	Signed floating-point number	65
Carrier mass flow (1865)	2799 to 2800	Float	Read	Signed floating-point number	66
Target corrected volume flow (1893)	25790 to 25791	Float	Read	Signed floating-point number	66
Carrier corrected volume flow (1894)	26447 to 26448	Float	Read	Signed floating-point number	66
Target volume flow (1895)	26449 to 26450	Float	Read	Signed floating-point number	67
Carrier volume flow (1896)	26451 to 26452	Float	Read	Signed floating-point number	67

Navigation: Expert → Sensor → Measured values → Process variables					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
CTL (4191)	26569 to 26570	Float	Read	Positive floating-point number	68
CPL (4192)	26571 to 26572	Float	Read	Positive floating-point number	68
CTPL (4193)	26869 to 26870	Float	Read	Positive floating-point number	68
S&W volume flow (4161)	26495 to 26496	Float	Read	Signed floating-point number	69
S&W correction value (4194)	26939 to 26940	Float	Read	Positive floating-point number	69
Reference density alternative (4168)	26513 to 26514	Float	Read	Signed floating-point number	70
GSV flow (4157)	26311 to 26312	Float	Read	Signed floating-point number	70
GSV flow alternative (4158)	26319 to 26320	Float	Read	Signed floating-point number	71
NSV flow (4159)	26483 to 26484	Float	Read	Signed floating-point number	71
NSV flow alternative (4160)	26490 to 26491	Float	Read	Signed floating-point number	72
Oil CTL (4175)	26531 to 26532	Float	Read	Positive floating-point number	72
Oil CPL (4177)	26537 to 26538	Float	Read	Positive floating-point number	73
Oil CTPL (4176)	26535 to 26536	Float	Read	Positive floating-point number	73
Water CTL (4172)	26523 to 26524	Float	Read	Positive floating-point number	73
CTL alternative (4174)	26529 to 26530	Float	Read	Positive floating-point number	74
CPL alternative (4197)	29199 to 29200	Float	Read	Positive floating-point number	74
Oil reference density (4195)	26941 to 26942	Float	Read	Signed floating-point number	75
Water reference density (4196)	28251 to 28252	Float	Read	Signed floating-point number	75
Oil density (4169)	26515 to 26516	Float	Read	Signed floating-point number	76
Water density (4170)	26519 to 26520	Float	Read	Signed floating-point number	76
Water cut (4171)	26521 to 26522	Float	Read	0 to 100 %	77
Oil volume flow (4178)	26539 to 26540	Float	Read	Signed floating-point number	77
Oil corrected volume flow (4179)	26543 to 26544	Float	Read	Signed floating-point number	78
Oil mass flow (4180)	26545 to 26546	Float	Read	Signed floating-point number	78
Water volume flow (4181)	26547 to 26548	Float	Read	Signed floating-point number	79
Water corrected volume flow (4182)	26551 to 26552	Float	Read	Signed floating-point number	79
Water mass flow (4183)	26553 to 26554	Float	Read	Signed floating-point number	80
Weighted density average (4184)	26555 to 26556	Float	Read	Signed floating-point number	80
Weighted temperature average (4185)	26559 to 26560	Float	Read	Signed floating-point number	81
Time period signal (TPS) (1903)	48176 to 48177	Float	Read	Positive floating-point number	81
Time period signal frequency (TPS) (1904)	48180 to 48181	Float	Read	0 to 10 000 Hz	82

"Process variables" submenu

Navigation: Expert → Sensor → Measured values → Process variables → Process variables					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Application specific input 0 (6366)	--	Float	Read		
Application specific input 1 (6367)	--	Float	Read		

Navigation: Expert → Sensor → Measured values → Process variables → Process variables					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Application specific output 0 (6364)	--	Float	Read		
Application specific output 1 (6365)	--	Float	Read		

"Totalizer" submenu

Navigation: Expert → Sensor → Measured values → Totalizer					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Totalizer value 1 to n (0911-1 to n)	1: 2610 to 2611 2: 2810 to 2811 3: 3010 to 3011	Float	Read	Signed floating-point number	82
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	83

"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	85
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	85

"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	86

"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	86
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	87

"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
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
Switch state 1 to n (0461-1 to n)	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed

"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
Switch cycles (0815-1 to n)	1: 7625 2: 7627 3: 7629	Integer	Read	Positive integer
Max. switch cycles number (0817-1 to n)	1: 21919 2: 21921 3: 21923	Integer	Read	Positive integer

"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

"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	91
Mass unit (0574)	2102	Integer	Read / Write	50 = g 51 = kg⁽⁺⁾ 52 = t 53 = oz 54 = lb 55 = STon	92

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)

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	94

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 = Nl/s 1 = Nl/min 2 = Nl/h⁽⁺⁾ 3 = Nl/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	
Corrected volume unit (0575)	2106	Integer	Read / Write	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 112 = MSft ³	95

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	96
Reference density unit (0556)	2108	Integer	Read / Write	0 = g/Sm 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	97
Density 2 unit (0619)	48288	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	98
Temperature unit (0557)	2109	Integer	Read / Write	0 = °C ⁽⁺⁾ 1 = K 2 = °F 3 = °R	99

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
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	99
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	100

* 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	101
Density damping (1803)	5508 to 5509	Float	Read / Write	0 to 999.9 s	102
Temperature damping (1822)	5127 to 5128	Float	Read / Write	0 to 999.9 s	102
Flow override (1839)	5503	Integer	Read / Write	0 = Off 1 = On	103

"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 *	104
On value low flow cutoff (1805)	5138 to 5139	Float	Read / Write	Positive floating-point number	104
Off value low flow cutoff (1804)	5104 to 5105	Float	Read / Write	0 to 100.0 %	104
Pressure shock suppression (1806)	5140 to 5141	Float	Read / Write	0 to 100 s	105

* 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	107
Low value partial filled pipe detection (1861)	5110 to 5111	Float	Read / Write	Signed floating-point number	107
High value partial filled pipe detection (1858)	5112 to 5113	Float	Read / Write	Signed floating-point number	107

Navigation: Expert → Sensor → Process parameters → Partially filled pipe detection					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Response time part. filled pipe detect. (1859)	5108 to 5109	Float	Read / Write	0 to 100 s	108
Maximum damping partial filled pipe det. (6040)	2414 to 2415	Float	Read / Write	Positive floating-point number	108

"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	→
Select reference density (1812)	5129	Integer	Read / Write	0 = Calculated reference density 1 = Fixed reference density 11 = Current input 1 * 12 = Current input 2 *	116
External reference density (6198)	2509 to 2510	Float	Read	Floating point number with sign	117
Fixed reference density (1814)	5130 to 5131	Float	Read / Write	Positive floating-point number	117
Reference temperature (1816)	5136 to 5137	Float	Read / Write	-273.15 to 99 999 °C	117
Linear expansion coefficient (1817)	5132 to 5133	Float	Read / Write	Signed floating-point number	118
Square expansion coefficient (1818)	5134 to 5135	Float	Read / Write	Signed floating-point number	118

* Visibility depends on order options or device settings

"Measurement mode" submenu

Navigation: Expert → Sensor → Measurement mode					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
MFT (Multi-Frequency Technology) (6242)	6580	Integer	Read / Write	0 = Yes 1 = No	109
Select medium (6062)	2442	Integer	Read / Write	0 = Liquid 1 = Gas 2 = Other	110

Navigation: Expert → Sensor → Measurement mode					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ ↗
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	110
Reference sound velocity (6147)	7413 to 7414	Float	Read / Write	1 to 99 999.9999 m/s	111
Temperature coefficient sound velocity (6181)	7411 to 7412	Float	Read / Write	Positive floating point number	111
Gas Fraction Handler (6377)	34303	Integer	Read / Write	0 = Off 1 = Moderate 2 = Powerful	111

"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 *	112
Pressure value (6059)	5185 to 5186	Float	Read / Write	Positive floating-point number	113
External pressure (6209)	2440 to 2441	Float	Read / Write		113
Temperature correction source (6184)	5515	Integer	Read / Write	0 = Internal measured value 1 = External value 11 = Current input 1 * 12 = Current input 2 * 13 = Current input 3 *	114
External temperature (6080)	2507 to 2508	Float	Read / Write		114

Navigation: Expert → Sensor → External compensation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Application specific input source 0 (6401)	35049	Integer	Read / Write	0 = Off 1 = External value 11 = Current input 1 * 12 = Current input 2 * 13 = Current input 3 *	115
Application specific input source 1 (6402)	35050	Integer	Read / Write	0 = Off 2 = External value 11 = Current input 1 * 12 = Current input 2 * 13 = Current input 3 *	115

* 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	119
Installation angle roll (6282)	2660 to 2661	Float	Read / Write	-180 to 180 °	120
Installation angle pitch (6236)	6529 to 6530	Float	Read / Write	-90 to +90 °	120

"Extended density adjustment" submenu

Navigation: Expert → Sensor → Sensor adjustment → Extended density adjustment					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Combined density-pressure factor (5971)	48173 to 48174	Float	Read	Signed floating-point number	126
Combined density-temperature factor (5961)	48153 to 48154	Float	Read	Signed floating-point number	126
Cubic temperature factor (5969)	48169 to 48170	Float	Read	Signed floating-point number	127
Constant offset (5968)	48167 to 48168	Float	Read	Signed floating-point number	124
Linear density factor (5967)	48165 to 48166	Float	Read	Signed floating-point number	125
Linear temperature factor (5966)	48163 to 48164	Float	Read	Signed floating-point number	125
Linear pressure factor (5965)	48161 to 48162	Float	Read	Signed floating-point number	125
Quadratic density factor (5964)	48159 to 48160	Float	Read	Signed floating-point number	125
Quadratic temperature factor (5963)	48157 to 48158	Float	Read	Signed floating-point number	126
Quadratic pressure factor (5962)	48155 to 48156	Float	Read	Signed floating-point number	126
Combined temperature-pressure factor (5970)	48171 to 48172	Float	Read	Signed floating-point number	127

"Zero verification" wizard

Navigation: Expert → Sensor → Sensor adjustment → Zero verification					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Process conditions	48289	Integer	Read / Write	1 = Tubes are completely filled 2 = Process operational pressure applied 4 = Process and ambient temperatures stable 8 = No-flow conditions (closed valves)	132
Progress (2808)	6797	Integer	Read	0 to 100 %	133
Status (6253)	10237	Integer	Read	2 = Failed 5 = Done 8 = Busy	133
Advanced information	4698	Integer	Read / Write	0 = Show 1 = Hide	133
Recommendation: (6000)	28816	Integer	Read	0 = Adjust zero point 1 = Do not adjust zero point	134
Root cause (6444)	47114	Integer	Read	1 = Zero point too high. Ensure no-flow. 2 = Zero point is unstable. Ensure no-flow. 4 = Fluctuation high. Avoid 2-phase medium.	134
Abort message:	4716	Integer	Read	1 = Check process conditions! 2 = A technical issue has occurred	134
Recommendation: (6000)	28816	Integer	Read	0 = Adjust zero point 1 = Do not adjust zero point	134

"Zero adjustment" wizard

Navigation: Expert → Sensor → Sensor adjustment → Zero adjustment					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Process conditions	48289	Integer	Read / Write	1 = Tubes are completely filled 2 = Process operational pressure applied 4 = Process and ambient temperatures stable 8 = No-flow conditions (closed valves)	136
Progress (2808)	6797	Integer	Read	0 to 100 %	136
Status (6253)	10237	Integer	Read	2 = Failed 5 = Done 8 = Busy	136
Root cause (6444)	47114	Integer	Read	1 = Zero point too high. Ensure no-flow. 2 = Zero point is unstable. Ensure no-flow. 4 = Fluctuation high. Avoid 2-phase medium.	136
Abort message:	4716	Integer	Read	1 = Check process conditions! 2 = A technical issue has occurred	137
Reliability of measured zero (5982)	4701	Integer	Read	0 = Not done 64 = Uncertain 128 = Good	137
Advanced information	4698	Integer	Read / Write	0 = Show 1 = Hide	137

Navigation: Expert → Sensor → Sensor adjustment → Zero adjustment					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Zero point measured (5999)	32651 to 32652	Float	Read	Signed floating-point number	137
Select action (5995)	44669	Integer	Read / Write	1 = Keep current zero point 2 = Apply zero point measured 3 = Apply factory zero point *	138

* Visibility depends on order options or device settings

"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	128
Mass flow factor (1832)	5519 to 5520	Float	Read / Write	Positive floating-point number	128
Volume flow offset (1841)	5525 to 5526	Float	Read / Write	Signed floating-point number	129
Volume flow factor (1846)	5523 to 5524	Float	Read / Write	Positive floating-point number	129
Density offset (1848)	5529 to 5530	Float	Read / Write	Signed floating-point number	129
Density factor (1849)	5527 to 5528	Float	Read / Write	Positive floating-point number	130
Corrected volume flow offset (1866)	2044 to 2045	Float	Read / Write	Signed floating-point number	130
Corrected volume flow factor (1867)	2076 to 2077	Float	Read / Write	Positive floating-point number	130
Reference density offset (1868)	2046 to 2047	Float	Read / Write	Signed floating-point number	131
Reference density factor (1869)	2042 to 2043	Float	Read / Write	Positive floating-point number	131
Temperature offset (1870)	5533 to 5534	Float	Read / Write	Signed floating-point number	131
Temperature factor (1871)	5531 to 5532	Float	Read / Write	Positive floating-point number	132

"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	139
Zero (6195)	7527 to 7528	Float	Read / Write	Signed floating-point number	139
Nominal diameter (2807)	2048 to 2057	String	Read	DNxx / x"	139
CO 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	139

"Testpoints" submenu

Navigation: Expert → Sensor → Testpoints					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Raw value mass flow (6140)	--	Float	Read		
Oscillation frequency 0 to 1 (6067)	--	Float	Read		
Frequency fluctuation 0 to 1 (6175)	--	Float	Read		
Oscillation amplitude 0 to 1 (6006)	--	Float	Read		

Navigation: Expert → Sensor → Testpoints					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Oscillation damping 0 to 1 (6038)	--	Float	Read		
Oscillation damping fluctuation 0 to 1 (6172)	--	Float	Read		
Signal asymmetry 0 (6013)	--	Float	Read		
Torsion signal asymmetry (6289)	--	Float	Read		
Sensor electronics temperature (ISEM) (6053)	--	Float	Read		
Carrier pipe temperature (6027)	--	Float	Read		
Casing pipe temperature (6411)	--	Float	Read		
Exciter current 0 to 1 (6055)	--	Float	Read		
Test point 0 (6425)	--	Float	Read		
Test point 1 (6426)	--	Float	Read		
Temperature difference measuring tube (6344)	--	Float	Read		
Temperat. difference meas. tube-carrier	--	Float	Read		
Sensor index coil asymmetry (5951)	--	Float	Read		
Sensor index coil asymmetry reliability (5952)	--	Integer	Read		

"Supervision" submenu

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)	150
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	150
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 *	151
Apply I/O configuration (3907)	8665	Integer	Read / Write	0 = Yes 1 = No	151
I/O alteration code (2762)	6427	Integer	Read / Write	Positive integer	151

* 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)	152
Signal mode (1610-1 to n)	1: 6424 2: 6425 3: 6426	Integer	Read / Write	0 = Passive 2 = Active *	153
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)	153
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	153
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	154
Failure mode (1601-1 to n)	1: 6159 2: 6160 3: 6161	Integer	Read / Write	1 = Last valid value 2 = Alarm 6 = Defined value	154
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	155

* 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)	155
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 *	156
Value status input (1353-1 to n)	1: 2746 2: 4699 3: 4700	Integer	Read	0 = Low 1 = High	156

Navigation: Expert → Input → Status input 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Active level (1351–1 to n)	1: 2530 2: 4690 3: 4691	Integer	Read / Write	0 = Low 1 = High	157
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	157

* 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)	158
Signal mode (0377–1 to n)	1: 6421 2: 6422 3: 6423	Integer	Read / Write	0 = Passive * 2 = Active *	159

Navigation: Expert → Output → Current output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Process variable current output (0359-1 to n)	1: 5927 2: 5928 3: 5929	Integer	Read / Write	0 = Off * 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow * 4 = Density 5 = Reference density * 6 = Oscillation amplitude 1 * 7 = Temperature 8 = Oscillation amplitude 0 * 9 = Signal asymmetry 14 = Torsion signal asymmetry * 23 = Carrier pipe temperature * 25 = Raw value mass flow 31 = Oscillation damping fluctuation 1 * 32 = Exciter current 0 33 = Exciter current 1 * 39 = Electronics temperature 45 = Kinematic viscosity * 46 = Dynamic viscosity 48 = Oscillation frequency 0 50 = Oscillation frequency 1 * 52 = Frequency fluctuation 1 * 63 = Oscillation damping 0 64 = Oscillation damping 1 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 * 76 = Temp. compensated dynamic viscosity * 77 = Temp. compensated kinematic viscosity * 78 = Carrier volume flow * 79 = Carrier corrected volume flow * 80 = Application specific output 0 * 81 = HBSI * 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 *	159

Navigation: Expert → Output → Current output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
				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	
Current range output (0353-1 to n)	1: 5923 2: 5924 3: 5925	Integer	Read / Write	0 = 4...20 mA (4... 20.5 mA) 1 = 4...20 mA US (3.9...20.8 mA) 2 = 4...20 mA NE (3.8...20.5 mA) 3 = 0...20 mA (0... 20.5 mA) 4 = Fixed value	160
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	161
Lower range value output (0367-1 to n)	1: 6195 to 6196 2: 6197 to 6198 3: 6199 to 6200	Float	Read / Write	Signed floating-point number	162
Upper range value output (0372-1 to n)	1: 5915 to 5916 2: 5917 to 5918 3: 5919 to 5920	Float	Read / Write	Signed floating-point number	164
Measuring mode current output (0351-1 to n)	1: 5899 2: 5900 3: 5901	Integer	Read / Write	0 = Forward flow 2 = Reverse flow compensation 13 = Forward/Reverse flow *	164
Damping current output (0363-1 to n)	1: 5903 to 5904 2: 5905 to 5906 3: 5907 to 5908	Float	Read / Write	0.0 to 999.9 s	169
Failure behavior current output (0364-1 to n)	1: 5911 2: 5912 3: 5913	Integer	Read / Write	0 = Min. 1 = Max. 4 = Actual value 5 = Last valid value 6 = Fixed value	170
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	171
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	171
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	172

* 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)	173
Signal mode (0490-1 to n)	1: 6235 2: 6236 3: 6237	Integer	Read / Write	0 = Passive 2 = Active * 3 = Passive NE	174
Operating mode (0469-1 to n)	1: 4479 2: 4480 3: 9907	Integer	Read / Write	0 = Pulse 1 = Switch 12 = Frequency	174
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 *	176
Pulse scaling (0455-1 to n)	1: 3034 to 3035 2: 3036 to 3037 3: 4714 to 4715	Float	Read / Write	Positive floating point number	176
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	177
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	178
Failure mode (0480-1 to n)	1: 2948 2: 2949 3: 4708	Integer	Read / Write	0 = Actual value 1 = No pulses	178
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	179

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 0 = GSV flow * 0 = GSV flow alternative * 0 = NSV flow * 0 = NSV flow alternative * 0 = S&W volume flow * 0 = Reference density alternative * 0 = Water cut * 0 = Oil density * 0 = Water density * 0 = Oil mass flow 0 = Water mass flow * 0 = Oil volume flow * 0 = Water volume flow * 0 = Oil corrected volume flow * 0 = Water corrected volume flow * 0 = Oscillation frequency 1 * 0 = Frequency fluctuation 1 * 0 = Oscillation amplitude 1 * 1 = Volume flow 2 = Corrected volume flow * 3 = Density 4 = Reference density * 5 = Temperature 8 = Dynamic viscosity * 9 = Kinematic viscosity * 10 = Temp. compensated dynamic viscosity * 11 = Temp. compensated kinematic viscosity * 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 31 = Oscillation damping fluctuation 1 * 32 = Signal asymmetry 33 = Exciter current 1 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 = Oscillation damping 1 * 64 = Test point 1 65 = Sensor index coil asymmetry 66 = Raw value mass flow 67 = Torsion signal asymmetry * 187 = Time period signal frequency (TPS) *	180
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	181

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
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	181
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	182
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	182
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	182
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	184
Failure mode (0451-1 to n)	1: 2367 2: 2368 3: 4681	Integer	Read / Write	0 = Actual value 1 = 0 Hz 2 = Defined value	185
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	185
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	186
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	186
Assign diagnostic behavior (0482-1 to n)	1: 3096 2: 3097 3: 9913	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	187

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
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 45 = Kinematic viscosity * 46 = Dynamic viscosity * 66 = Pressure 73 = Concentration * 74 = Target mass flow * 75 = Carrier mass flow 76 = Temp. compensated dynamic viscosity * 77 = Temp. compensated kinematic viscosity * 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 *	187
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	189
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	190
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 *	190
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	191
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	191
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	191

Navigation: Expert → Output → Pulse/frequency/switch output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Failure mode (0486-1 to n)	1: 3384 2: 3385 3: 9912	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	192
Switch state 1 to n (0461-1 to n)	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed	192
Invert output signal (0470-1 to n)	1: 2583 2: 2584 3: 9916	Integer	Read / Write	0 = Yes 1 = No	193

* 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)	194
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	194
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*	195

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 45 = Kinematic viscosity * 46 = Dynamic viscosity * 66 = Pressure 73 = Concentration * 74 = Target mass flow * 75 = Carrier mass flow 76 = Temp. compensated dynamic viscosity * 77 = Temp. compensated kinematic viscosity * 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 *	195
Assign diagnostic behavior (0806–1 to n)	1: 8245 2: 8246 3: 8247	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	196
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	197
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	197
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	198
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	198
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	199

Navigation: Expert → Output → Relay output 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Failure mode (0811-1 to n)	1: 8242 2: 8243 3: 8244	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	199
Switch state (0801-1 to n)	1: 3518 2: 3519 3: 9875	Integer	Read	1 = Open 6 = Closed	199
Powerless relay status (0816-1 to n)	1: 7009 2: 7010 3: 7011	Integer	Read / Write	1 = Open 6 = Closed	200

* 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)	201
Slave terminal number (0990)	5845	Integer	Read	0 = Not used 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	201
Signal mode (0991)	5949	Integer	Read / Write	0 = Passive 2 = Active * 3 = Passive NE	201
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 *	202
Value per pulse (0983)	7495 to 7496	Float	Read / Write	Signed floating-point number	202
Pulse width (0986)	6998 to 6999	Float	Read / Write	0.5 to 2 000 ms	203
Phase shift (0992)	6089	Integer	Read / Write	0 = 90° 1 = 180°	203
Measuring mode (0984)	6001	Integer	Read / Write	0 = Forward flow 1 = Reverse flow 2 = Reverse flow compensation 13 = Forward/Reverse flow	203
Failure mode (0985)	6009	Integer	Read / Write	0 = Actual value 1 = No pulses	204

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	205
Invert output signal (0993)	6101	Integer	Read / Write	0 = Yes 1 = No	205

* 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	206
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	207
Data transfer mode (7115)	4913	Integer	Read / Write	0 = RTU 1 = ASCII	207
Parity (7122)	4914	Integer	Read / Write	0 = Even 1 = Odd 2 = None / 2 stop bits 3 = None / 1 stop bit	207
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	208
Telegram delay (7146)	4916 to 4917	Float	Read / Write	0 to 100 ms	209
Failure mode (7116)	4920	Integer	Read / Write	1 = Last valid value 255 = NaN value	209
Bus termination (7155)	5774	Integer	Read	0 = Off 1 = On	210
Fieldbus writing access (7156)	6807	Integer	Read / Write	0 = Read + write 1 = Read only	210

"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	211
Device revision (7154)	4481	Integer	Read	4-digit hexadecimal number	211

"Modbus data map" submenu

Navigation: Expert → Communication → Modbus data map					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Scan list register 0 to 15 (7114)	0: 5001 1: 5002 2: 5003 3: 5004 4: 5005 5: 5006 6: 5007 7: 5008 8: 5009 9: 5010 10: 5011 11: 5012 12: 5013 13: 5014 14: 5015 15: 5016	Integer	Read / Write	1 to 65 535	212

"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)	213
MAC address (7214)	4210 to 4218	String	Read	Unique 12-digit character string comprising letters and numbers	213
DHCP client (7212)	21781	Integer	Read / Write	0 = Off 1 = On	213
IP address (7209)	4155 to 4162	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	214
Subnet mask (7211)	4163 to 4170	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	214
Default gateway (7210)	4171 to 4178	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	214
Web server functionality (7222)	4220	Integer	Read / Write	0 = Off 1 = On 2 = HTML Off	215
Login page (7273)	5802	Integer	Read / Write	0 = Without header 1 = With header	215

"WLAN settings" wizard

Navigation: Expert → Communication → WLAN settings					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
WLAN (2702)	6178	Integer	Read / Write	0 = Disable 1 = Enable	216
WLAN mode (2717)	28777	Integer	Read / Write	0 = WLAN access point 1 = WLAN Client	217
SSID name (2714)	28940 to 28955	String	Read / Write	-	217
Network security (2705)	6206	Integer	Read / Write	0 = Unsecured 1 = WPA2-PSK 2 = EAP-PEAP with MSCHAPv2 * 3 = EAP-TLS * 4 = EAP-PEAP MSCHAPv2 no server authentic.	217
Security identification (2718)	28817	Integer	Read	1 = Trusted issuer certificate 2 = Device certificate 4 = Device private key	218
User name (2715)	28956 to 28971	String	Read / Write	-	218
WLAN password (2716)	28972 to 28987	String	Read / Write	-	218
WLAN IP address (2711)	8643 to 8650	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	219
WLAN MAC address (2703)	8602 to 8610	String	Read	Unique 12-digit character string comprising letters and numbers	219
WLAN subnet mask (2709)	8651 to 8658	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	219
WLAN MAC address (2703)	8602 to 8610	String	Read	Unique 12-digit character string comprising letters and numbers	219
WLAN passphrase (2706)	8611 to 8626	String	Read / Write	8 to 32-digit character string comprising numbers, letters and special characters (without spaces)	219
WLAN MAC address (2703)	8602 to 8610	String	Read	Unique 12-digit character string comprising letters and numbers	219
Assign SSID name (2708)	6218	Integer	Read / Write	0 = Device tag 1 = User-defined	220
SSID name (2707)	8627 to 8642	String	Read / Write	Max. 32-digit character string comprising numbers, letters and special characters	220
2.4 GHz WLAN channel (2704)	6182	Integer	Read / Write	1 to 11	220
Select antenna (2713)	6102	Integer	Read / Write	0 = External antenna 1 = Internal antenna	221
Connection state (2722)	29221	Integer	Read	0 = Not connected 1 = Connected	221
Received signal strength (2721)	28818	Integer	Read	0 = Low 1 = High 2 = Medium	221
WLAN IP address (2711)	8643 to 8650	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	219
Gateway IP address (2719)	29227 to 29234	String	Read	Character string comprising numbers, letters and special characters	222
IP address domain name server (2720)	29283 to 29290	String	Read	Character string comprising numbers, letters and special characters	222

* Visibility depends on order options or device settings

6.3.7 "Application" submenu

Navigation: Expert → Application					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Reset all totalizers (2806)	2609	Integer	Read / Write	0 = Cancel 1 = Reset + totalize	223

"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 0 = GSV flow * 0 = GSV flow alternative * 0 = NSV flow * 0 = NSV flow alternative * 0 = S&W volume flow * 0 = Oil mass flow * 0 = Water mass flow * 0 = Oil volume flow * 0 = Water volume flow * 0 = Oil corrected volume flow * 0 = Water corrected volume 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	223
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 = 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 * 111 = Mft ³ * 112 = MSft ³ * 251 = None *	224

Navigation: Expert → Application → Totalizer 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Totalizer operation mode (0908-1 to n)	1: 2605 2: 2805 3: 3005	Integer	Read / Write	0 = Net 1 = Forward 2 = Reverse	226
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 *	226
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	227
Failure mode (0901-1 to n)	1: 2606 2: 2806 3: 3006	Integer	Read / Write	0 = Hold 1 = Continue 2 = Last valid value + continue	227

* Visibility depends on order options or device settings

"Application specific calculations" submenu

"Application-specific parameters" submenu

Navigation: Expert → Application → Application specific calculations → Application-specific parameters					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Parameter 0 (6358)	34273 to 34274	Float	Read / Write	Signed floating-point number	230
Parameter 1 (6359)	34275 to 34276	Float	Read / Write	Signed floating-point number	230
Parameter 2 (6360)	34277 to 34278	Float	Read / Write	Signed floating-point number	230
Parameter 3 (6361)	34279 to 34280	Float	Read / Write	Signed floating-point number	230
Parameter 4 (6345)	34281 to 34282	Float	Read / Write	Signed floating-point number	231
Parameter 5 (6346)	34283 to 34284	Float	Read / Write	Signed floating-point number	231
Parameter 6 (6347)	34285 to 34286	Float	Read / Write	Signed floating-point number	231
Parameter 7 (6348)	34287 to 34288	Float	Read / Write	Signed floating-point number	231
Parameter 8 (6349)	34289 to 34290	Float	Read / Write	Signed floating-point number	232
Parameter 9 (6350)	34291 to 34292	Float	Read / Write	Signed floating-point number	232

"Process variables" submenu

Navigation: Expert → Application → Application specific calculations → Process variables					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Application specific input 0 (6366)	34297 to 34298	Float	Read	Signed floating-point number	232
Application specific input 1 (6367)	34299 to 34300	Float	Read	Signed floating-point number	233
Application specific output 0 (6364)	34293 to 34294	Float	Read	Signed floating-point number	234
Application specific output 1 (6365)	34295 to 34296	Float	Read	Signed floating-point number	234

"Medium index" submenu

Navigation: Expert → Application → Medium index					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Index inhomogeneous medium (6368)	34301 to 34302	Float	Read	Signed floating-point number	236
Cut off inhomogeneous wet gas (6375)	34852 to 34853	Float	Read / Write	Positive floating-point number	235
Cut off inhomogeneous liquid (6374)	34850 to 34851	Float	Read / Write	Positive floating-point number	235
Index suspended bubbles (6376)	34854 to 34855	Float	Read	Signed floating-point number	237
Cut off suspended bubbles (6370)	34858 to 34859	Float	Read / Write	Positive floating-point number	236

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.	238
Previous diagnostics (0690)	2734	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	239
Operating time from restart (0653)	2624	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	240
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.	240
Diagnostics 2 (0693)	2738	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	241
Diagnostics 3 (0694)	2740	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	242
Diagnostics 4 (0695)	2742	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	243
Diagnostics 5 (0696)	2744	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	244

"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	245

"Event list" submenu

"Custody transfer logbook" submenu

"Device information" submenu

Navigation: Expert → Diagnostics → Device information					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Device tag (0011)	2026 to 2041	String	Read	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).	247
Serial number (0009)	7003 to 7008	String	Read	Max. 11-digit character string comprising letters and numbers.	248
Firmware version (0010)	7277 to 7280	String	Read	Character string in the format xx.yy.zz	248
Device name (0020)	7238 to 7245	String	Read	Promass 300/500	248
Order code (0008)	2058 to 2067	String	Read	Character string composed of letters, numbers and certain punctuation marks (e.g. /).	248
Extended order code 1 (0023)	2212 to 2221	String	Read	Character string	249
Extended order code 2 (0021)	2222 to 2231	String	Read	Character string	249
Extended order code 3 (0022)	2232 to 2241	String	Read	Character string	249
ENP version (0012)	4003 to 4010	String	Read	Character string	250

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

Navigation: Expert → Diagnostics → Main electronic module + I/O module 1					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Firmware version (0072)	7039	Integer	Read	Positive integer	250
Build no. software (0079)	2326	Integer	Read	Positive integer	251
Bootloader revision (0073)	2264	Integer	Read	Positive integer	251

"Sensor electronic module (ISEM)" submenu

Navigation: Expert → Diagnostics → Sensor electronic module (ISEM)					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Firmware version (0072)	7039	Integer	Read	Positive integer	251
Build no. software (0079)	2326	Integer	Read	Positive integer	252
Bootloader revision (0073)	2264	Integer	Read	Positive integer	252

"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)	252
Firmware version (0072)	7039	Integer	Read	Positive integer	253

Navigation: Expert → Diagnostics → I/O module 2

Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Build no. software (0079)	2326	Integer	Read	Positive integer	253
Bootloader revision (0073)	2264	Integer	Read	Positive integer	253

"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)	254
Firmware version (0072)	7039	Integer	Read	Positive integer	254
Build no. software (0079)	2326	Integer	Read	Positive integer	254
Bootloader revision (0073)	2264	Integer	Read	Positive integer	254

"Display module" submenu**Navigation: Expert → Diagnostics → Display module**

Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Firmware version (0072)	7039	Integer	Read	Positive integer	256
Build no. software (0079)	2326	Integer	Read	Positive integer	256
Bootloader revision (0073)	2264	Integer	Read	Positive integer	256

"Data logging" submenu

Navigation: Expert → Diagnostics → Data logging					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Assign channel 1 (0851)	2445	Integer	Read / Write	0 = Off 1 = Mass flow 2 = Volume flow 3 = Corrected volume flow * 4 = Density 5 = Reference density * 6 = Oscillation amplitude 1 * 7 = Temperature 8 = Oscillation amplitude * 9 = Signal asymmetry 14 = Torsion signal asymmetry * 23 = Carrier pipe temperature * 25 = Raw value mass flow 31 = Oscillation damping fluctuation 1 * 32 = Exciter current 0 33 = Exciter current 1 * 39 = Electronics temperature 45 = Kinematic viscosity * 46 = Dynamic viscosity * 48 = Oscillation frequency 0 50 = Oscillation frequency 1 * 52 = Frequency fluctuation 1 * 63 = Oscillation damping 0 64 = Oscillation damping 1 * 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 * 76 = Temp. compensated dynamic viscosity * 77 = Temp. compensated kinematic viscosity * 78 = Carrier volume flow * 79 = Carrier corrected volume flow * 80 = Application specific output 0 * 81 = HBSI * 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 *	257

Navigation: Expert → Diagnostics → Data logging					→
Parameter	Register	Data type	Access	Selection / User entry / User interface	
				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 * 121 = Current output 1 * 122 = Current output 2 * 123 = Current output 3 * 124 = Current output 4 * 184 = Inhomogeneous medium index 185 = Suspended bubbles index * 194 = Test point 0 195 = Test point 1 197 = Sensor index coil asymmetry	
Assign channel 2 (0852)	2446	Integer	Read / Write	For the picklist, see the Assign channel 1 parameter (→ 257)	259
Assign channel 3 (0853)	2548	Integer	Read / Write	For the picklist, see the Assign channel 1 parameter (→ 257)	260
Assign channel 4 (0854)	4286	Integer	Read / Write	For the picklist, see the Assign channel 1 parameter (→ 257)	260
Logging interval (0856)	4288 to 4289	Float	Read / Write	0.1 to 3 600.0 s	260
Clear logging data (0855)	4287	Integer	Read / Write	0 = Cancel 2 = Clear data	261
Data logging (0860)	5950	Integer	Read / Write	0 = Overwriting 1 = Not overwriting	261
Logging delay (0859)	5938	Integer	Read / Write	0 to 999 h	262
Data logging control (0857)	5930	Integer	Read / Write	0 = None 1 = Stop 2 = Delete + start	262
Data logging status (0858)	5937	Integer	Read	0 = Done 1 = Stopped 2 = Active 3 = Delay active	263
Entire logging duration (0861)	2827 to 2828	Float	Read	Positive floating-point number	263

* Visibility depends on order options or device settings

*"Display channel 1" submenu**"Display channel 2" submenu**"Display channel 3" submenu**"Display channel 4" submenu***"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 *	267

* 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	267
Maximum value (6051)	2419 to 2420	Float	Read	Signed floating-point number	268

"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	268
Maximum value (6108)	7531 to 7532	Float	Read	Signed floating-point number	269

"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	269
Maximum value (6029)	7535 to 7536	Float	Read	Signed floating-point number	270

"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	270
Maximum value (6070)	2468 to 2469	Float	Read	Signed floating-point number	271

"Torsion oscillation frequency" submenu

Navigation: Expert → Diagnostics → Min/max values → Torsion oscillation frequency				
Parameter	Register	Data type	Access	Selection / User entry / User interface
Minimum value (6069)	2519 to 2520	Float	Read	Signed floating-point number
Maximum value (6068)	2517 to 2518	Float	Read	Signed floating-point number

"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
Maximum value (6009)	2470 to 2471	Float	Read	Signed floating-point number

"Torsion oscillation amplitude" submenu

Navigation: Expert → Diagnostics → Min/max values → Torsion oscillation amplitude				
Parameter	Register	Data type	Access	Selection / User entry / User interface
Minimum value (6008)	2515 to 2516	Float	Read	Signed floating-point number
Maximum value (6007)	2480 to 2481	Float	Read	Signed floating-point number

"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
Maximum value (6121)	2423 to 2424	Float	Read	Signed floating-point number

"Torsion oscillation damping" submenu

Navigation: Expert → Diagnostics → Min/max values → Torsion oscillation damping				
Parameter	Register	Data type	Access	Selection / User entry / User interface
Minimum value (6120)	2523 to 2524	Float	Read	Signed floating-point number
Maximum value (6119)	2521 to 2522	Float	Read	Signed floating-point number

"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
Maximum value (6014)	2476 to 2477	Float	Read	Signed floating-point number

"Torsion signal asymmetry" submenu

Navigation: Expert → Diagnostics → Min/max values → Torsion signal asymmetry					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
Minimum value (6284)	7000 to 7001	Float	Read	Signed floating-point number	276
Maximum value (6283)	6924 to 6925	Float	Read	Signed floating-point number	276

"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 45 = Kinematic viscosity * 46 = Dynamic viscosity * 73 = Concentration * 74 = Target mass flow * 75 = Carrier mass flow * 76 = Temp. compensated dynamic viscosity * 77 = Temp. compensated kinematic viscosity * 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) *	290
Process variable value (1811)	6814 to 6815	Float	Read / Write	Depends on the process variable selected	291
Current output 1 to n simulation (0354-1 to n)	1: 5939 2: 5940 3: 5941	Integer	Read / Write	0 = Off 1 = On	291
Current output value (0355)	5995 to 5996	Float	Read / Write	3.59 to 22.5 mA	292
Frequency output 1 to n simulation (0472-1 to n)	1: 6203 2: 6204 3: 6205	Integer	Read / Write	0 = Off 1 = On	292
Frequency output 1 to n value (0473-1 to n)	1: 6207 to 6208 2: 6209 to 6210 3: 6211 to 6212	Float	Read / Write	0.0 to 12 500.0 Hz	292

Navigation: Expert → Diagnostics → Simulation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→
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	293
Pulse value 1 to n (0459-1 to n)	1: 6219 2: 6220 3: 6221	Integer	Read / Write	0 to 65 535	293
Switch output simulation 1 to n (0462-1 to n)	1: 6223 2: 6224 3: 6225	Integer	Read / Write	0 = Off 1 = On	294
Switch state 1 to n (0463-1 to n)	1: 6227 2: 6228 3: 6229	Integer	Read / Write	1 = Open 6 = Closed	294
Relay output 1 to n simulation (0802-1 to n)	1: 7523 2: 7524 3: 7525	Integer	Read / Write	0 = Off 1 = On	295
Switch state 1 to n (0803-1 to n)	1: 8239 2: 8240 3: 8241	Integer	Read / Write	1 = Open 6 = Closed	295
Pulse output simulation (0988)	5957	Integer	Read / Write	0 = Off 1 = Down-counting value 2 = Fixed value	296
Pulse value (0989)	5973	Integer	Read / Write	0 to 65 535	296
Device alarm simulation (0654)	6812	Integer	Read / Write	0 = Off 1 = On	296
Diagnostic event category (0738)	4261	Integer	Read / Write	0 = Sensor 1 = Electronics 2 = Configuration 3 = Process	297
Diagnostic event simulation (0737)	4259	Integer	Read / Write	■ Off ■ Diagnostic event picklist (depends on the category selected)	297
Current input 1 to n simulation (1608-1 to n)	1: 6127 2: 6128 3: 6129	Integer	Read / Write	0 = Off 1 = On	297
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	298
Status input 1 to n simulation (1355-1 to n)	1: 2620 2: 4693 3: 4694	Integer	Read / Write	0 = Off 1 = On	298
Input signal level 1 to n (1356-1 to n)	1: 2638 2: 4696 3: 4697	Integer	Read / Write	0 = Low 1 = High	299

* Visibility depends on order options or device settings

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