

Description of Device Parameters

Proline Promass 500

Coriolis flowmeter
PROFINET with Ethernet-APL

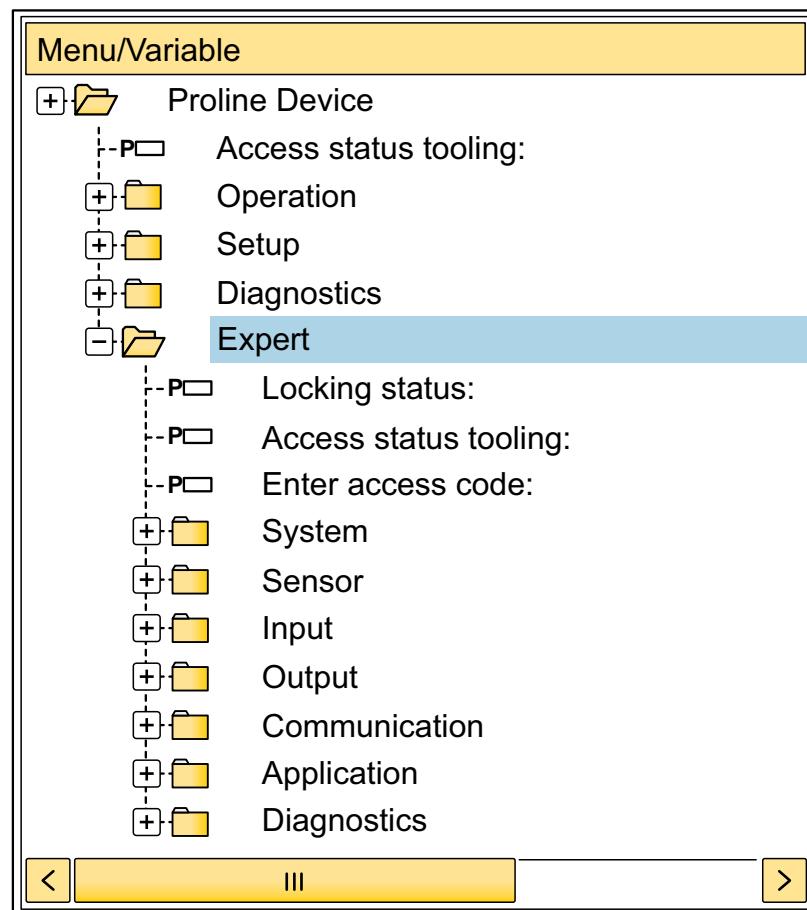


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1 About this document

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

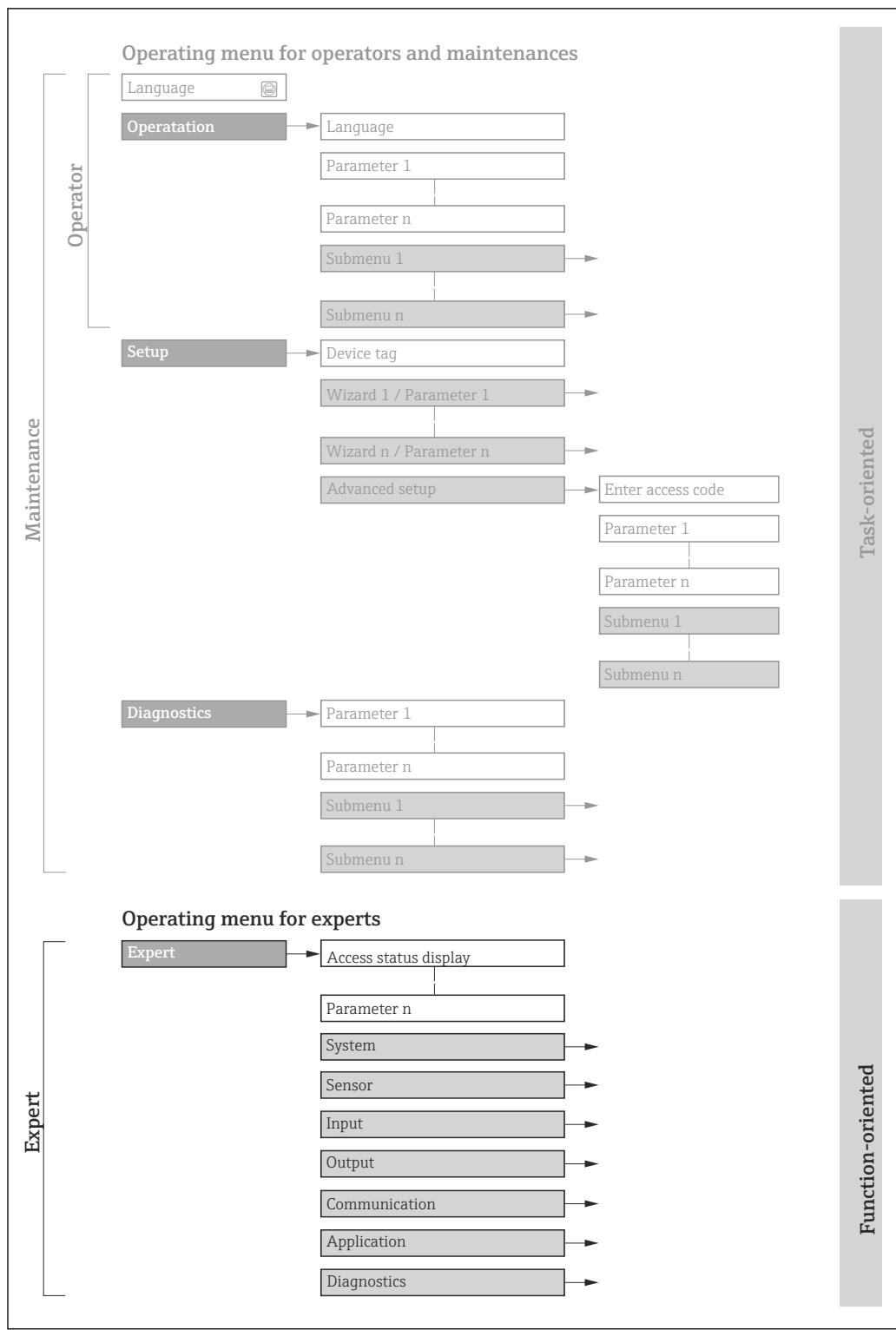
1.2 Target group

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 (→  9), which is displayed when the "**Maintenance**" user role is enabled.



1 Sample graphic for the schematic layout of the operating menu



Additional information regarding:

- The arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu with a brief description: Operating Instructions → 8
- Operating concept of the operating menus: Operating Instructions → 8

1.3.2 Structure of a parameter description

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

Complete parameter name

Write-protected parameter = 

Navigation

-  Navigation path to the parameter via the local display (direct access code) or web browser
-  Navigation path to the parameter via the operating tool
The names of the menus, submenus and parameters are abbreviated to the form in which they appear on the display and in the operating tool.

Prerequisite

The parameter is only available under these specific conditions

Description

Description of the parameter function

Selection

List of the individual options for the parameter

- Option 1
- Option 2

User entry

Parameter entry range

User interface

Display value/data of the parameter

Factory setting

Default setting ex works

Additional information

Additional explanations (e.g. in examples):

- On individual options
- On display values/data
- On the input range
- On the factory setting
- On the parameter function

1.4 Symbols used

1.4.1 Symbols for certain types of information

Symbol	Meaning
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
 A0028662	Operation via local display
 A0028663	Operation via operating tool
 A0028665	Write-protected parameter

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

Measuring device	Documentation code
Promass A 500 (8A5C**-...)	BA02121D
Promass E 500	BA02124D
Promass F 500	BA02119D
Promass H 500	BA02125D
Promass I 500	BA02126D
Promass O 500	BA02127D
Promass P 500	BA02128D
Promass Q 500	BA02129D
Promass S 500	BA02130D
Promass X 500	BA02131D

1.5.2 Supplementary device-dependent documentation

Special Documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD02769D
Heartbeat Technology	SD02732D
Concentration measurement	SD02736D
Petroleum	SD02740D
Viscosity measurement Promass I	SD02742D
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.

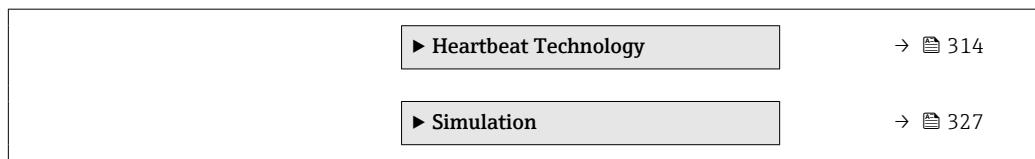
Navigation

Expert

Expert	
Direct access (0106)	→ 13
Locking status (0004)	→ 14
User role (0005)	→ 15
Enter access code (0003)	→ 15
▶ System	→ 15
▶ Display	→ 19
▶ Configuration backup	→ 39
▶ Diagnostic handling	→ 42
▶ Administration	→ 55
▶ Sensor	→ 61
▶ Measured values	→ 61
▶ System units	→ 94
▶ Process parameters	→ 103
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▶ Relay output 1 to n	→ 195
▶ Communication	→ 202
▶ Physical block	→ 203
▶ Application relation	→ 209
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▶ Web server	→ 220
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▶ Application	→ 231
Reset all totalizers (2806)	→ 231
▶ Totalizer 1 to n	→ 232
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▶ Petroleum	→ 257
▶ Application specific calculations	→ 266
▶ Medium index	→ 272
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▶ Diagnostic list	→ 277
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▶ Main electronic module + I/O module 1	→ 285
▶ Sensor electronic module (ISEM)	→ 286
▶ I/O module 2	→ 287
▶ I/O module 3	→ 288
▶ I/O module 4	→ 289
▶ Display module	→ 292
▶ Data logging	→ 293
▶ Min/max values	→ 302



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	→ 15
▶ Sensor	→ 61
▶ I/O configuration	→ 150
▶ Input	→ 152
▶ Output	→ 158
▶ Communication	→ 202
▶ Analog inputs	→ 222
▶ Analog outputs	→ 226
▶ Application	→ 231
▶ Diagnostics	→ 274

Direct access



Navigation

Expert → Direct access (0106)

Description

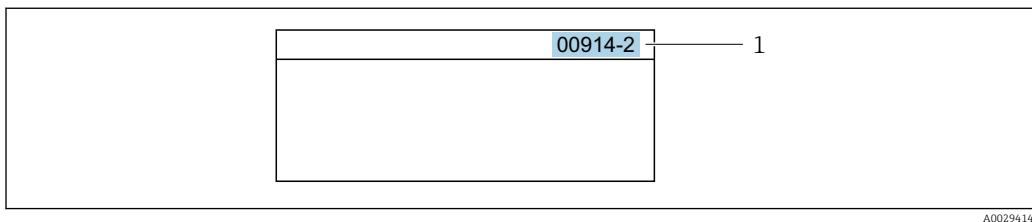
Use this function to enter the access code to enable direct access to the desired parameter via the local display. A parameter number is assigned to each parameter for this purpose.

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

A0029414

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
- 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).
Temporarily locked	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset, etc.). Once the internal processing has been completed, the parameters can be changed once again.

User role

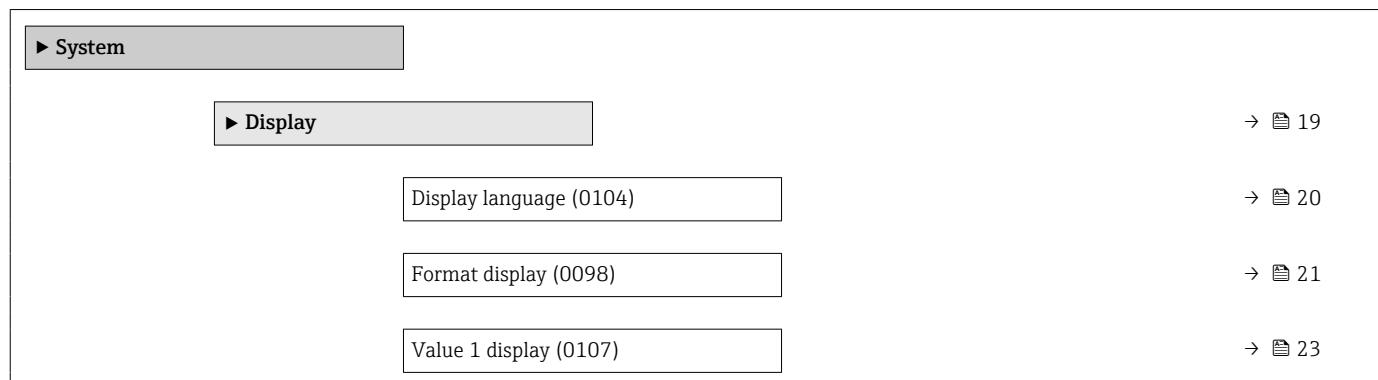
Navigation	 Expert → User role (0005)
Description	Displays the access authorization to the parameters via the local display, Web browser or operating tool.
User interface	<ul style="list-style-type: none"> ▪ Maintenance ▪ Service
Factory setting	Maintenance
Additional information	<p><i>Description</i></p> <p> Access authorization can be modified via the Enter access code parameter (→ 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 → 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



0% bargraph value 1 (0123)	→ 25
100% bargraph value 1 (0125)	→ 25
Decimal places 1 (0095)	→ 26
Value 2 display (0108)	→ 26
Decimal places 2 (0117)	→ 27
Value 3 display (0110)	→ 27
0% bargraph value 3 (0124)	→ 28
100% bargraph value 3 (0126)	→ 28
Decimal places 3 (0118)	→ 29
Value 4 display (0109)	→ 29
Decimal places 4 (0119)	→ 30
Display interval (0096)	→ 36
Display damping (0094)	→ 37
Header (0097)	→ 37
Header text (0112)	→ 38
Separator (0101)	→ 38
Contrast display (0105)	→ 39
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► Diagnostic handling

→ 42

Alarm delay (0651)

→ 43

► Diagnostic behavior

→ 43

**Assign behavior of diagnostic no. 140
(0708)**

→ 45

**Assign behavior of diagnostic no. 046
(0709)**

→ 45

**Assign behavior of diagnostic no. 142
(0778)**

→ 46

**Assign behavior of diagnostic no. 144
(0731)**

→ 46

**Assign behavior of diagnostic no. 374
(0710)**

→ 46

**Assign behavior of diagnostic no. 302
(0739)**

→ 47

**Assign behavior of diagnostic no. 304
(0635)**

→ 47

**Assign behavior of diagnostic no. 441
(0657)**

→ 47

**Assign behavior of diagnostic no. 442
(0658)**

→ 48

**Assign behavior of diagnostic no. 443
(0659)**

→ 48

**Assign behavior of diagnostic no. 444
(0740)**

→ 49

**Assign behavior of diagnostic no. 830
(0800)**

→ 49

**Assign behavior of diagnostic no. 831
(0641)**

→ 50

**Assign behavior of diagnostic no. 832
(0681)**

→ 50

**Assign behavior of diagnostic no. 833
(0682)**

→ 50

**Assign behavior of diagnostic no. 834
(0700)**

→ 51

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Assign behavior of diagnostic no. 912 (0703)	→ 52
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Transmitter identifier (2765)	→ 58
Activate SW option (0029)	→ 59
Software option overview (0015)	→ 60

3.1.1 "Display" submenu

Navigation

Setup → Advanced setup → Display

Navigation

Expert → System → Display

► Display	
Format display (0098)	→ 21
Value 1 display (0107)	→ 23
0% bargraph value 1 (0123)	→ 25
100% bargraph value 1 (0125)	→ 25
Decimal places 1 (0095)	→ 26
Value 2 display (0108)	→ 26
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Value 3 display (0110)	→ 27
0% bargraph value 3 (0124)	→ 28
100% bargraph value 3 (0126)	→ 28
Decimal places 3 (0118)	→ 29
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Decimal places 5 (0149)	→ 32

Value 6 display (0146)	→ 32
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Value 7 display (0147)	→ 33
0% bargraph value 7 (0154)	→ 34
100% bargraph value 7 (0156)	→ 34
Decimal places 7 (0151)	→ 35
Value 8 display (0148)	→ 35
Decimal places 8 (0152)	→ 36
Display language (0104)	→ 20
Display interval (0096)	→ 36
Display damping (0094)	→ 37
Header (0097)	→ 37
Header text (0112)	→ 38
Separator (0101)	→ 38
Backlight (0111)	→ 39

Display language

Navigation

- Expert → System → Display → Display language (0104)
 Setup → Advanced setup → 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)
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Format display

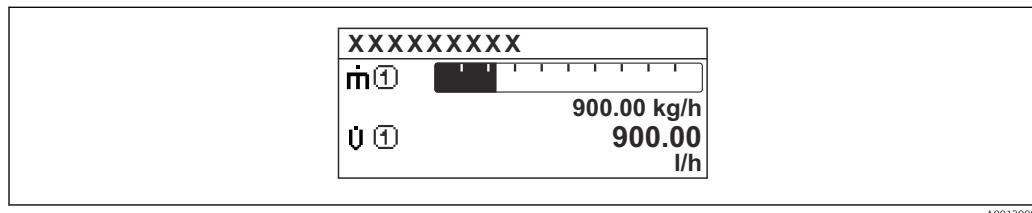
Navigation	  Expert → System → Display → Format display (0098)   Setup → Advanced setup → Display → Format display (0098)
Prerequisite	A local display is provided.
Description	Use this function to select how the measured value is shown on the local display.
Selection	<ul style="list-style-type: none">■ 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><i>Description</i></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 (→ 23)...Value 8 display parameter (→ 35) 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 (→ 36).</p>

Possible measured values shown on the local display:

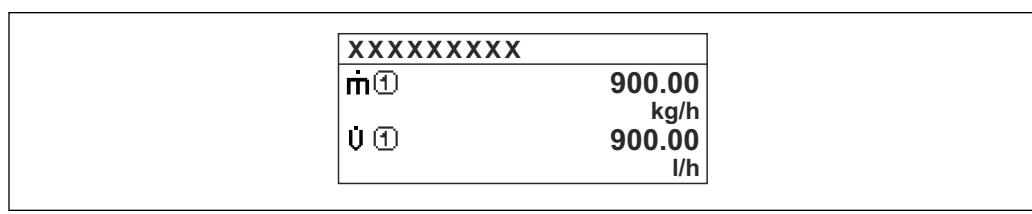
"1 value, max. size" option



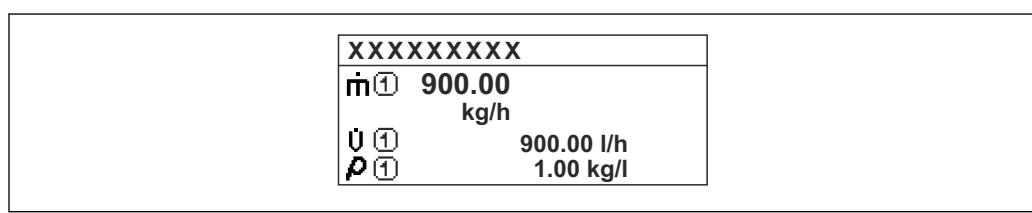
"1 bargraph + 1 value" option



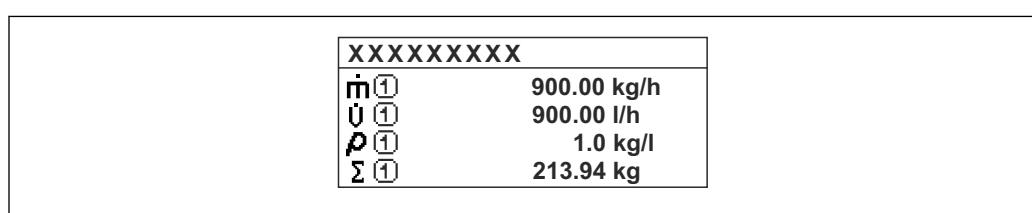
"2 values" option



"1 value large + 2 values" option



"4 values" option



Value 1 display**Navigation**

Expert → System → Display → Value 1 display (0107)

Setup → Advanced setup → 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

* Visibility depends on order options or device settings

- Suspended bubbles index *
- HBSI *
- 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 (→ 21) 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 (→ 94).

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.

* Visibility depends on order options or device settings

0% bargraph value 1



Navigation	Expert → System → Display → 0% bargraph 1 (0123)
	Setup → Advanced setup → 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: <ul style="list-style-type: none">■ 0 kg/h■ 0 lb/min
Additional information	<i>Description</i> The Format display parameter (→ 21) 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 (→ 94).

100% bargraph value 1



Navigation	Expert → System → Display → 100% bargraph 1 (0125)
	Setup → Advanced setup → 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 → 360
Additional information	<i>Description</i> The Format display parameter (→ 21) 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 (→ 94).

Decimal places 1



Navigation

- ◀ ▶ Expert → System → Display → Decimal places 1 (0095)
- ◀ ▶ Setup → Advanced setup → Display → Decimal places 1 (0095)

Prerequisite

A measured value is specified in the **Value 1 display** parameter (→ 23).

Description

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

Selection

- X
- X.X
- X.XX
- X.XXX
- X.XXXX
- X.XXXXX
- X.XXXXXX

Factory setting

X.XX

Additional information

Description

- 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)
- ◀ ▶ Setup → Advanced setup → 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 (→ 23)

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 (→ 21) 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 (→ 94).

Decimal places 2

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

Setup → Advanced setup → Display → Decimal places 2 (0117)

Prerequisite A measured value is specified in the **Value 2 display** parameter (→ [26](#)).

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)

Setup → Advanced setup → 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 (→ [23](#))

Factory setting None

Additional information *Description*

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

The **Format display** parameter (→ [21](#)) 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 (→ [94](#)).

0% bargraph value 3



Navigation

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

Setup → Advanced setup → Display → 0% bargraph 3 (0124)

Prerequisite

A selection was made in the **Value 3 display** parameter (→ 27).

Description

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

User entry

Signed floating-point number

Factory setting

Country-specific:

- 0 kg/h
- 0 lb/min

Additional information

Description

The **Format display** parameter (→ 21) 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 (→ 94).

100% bargraph value 3



Navigation

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

Setup → Advanced setup → Display → 100% bargraph 3 (0126)

Prerequisite

A selection was made in the **Value 3 display** parameter (→ 27).

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 (→ 21) 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 (→ 94).

Decimal places 3

Navigation Expert → System → Display → Decimal places 3 (0118)
 Setup → Advanced setup → Display → Decimal places 3 (0118)

Prerequisite A measured value is specified in the **Value 3 display** parameter (→ [27](#)).

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)
 Setup → Advanced setup → 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 (→ [23](#))

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 (→ [21](#)) 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 (→ [94](#)).

Decimal places 4



Navigation

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

Setup → Advanced setup → Display → Decimal places 4 (0119)

Prerequisite

A measured value is specified in the **Value 4 display** parameter (→ 29).

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

Setup → Advanced setup → 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 (→ 23)

Factory setting

None

Additional information

Description

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

The **Format display** parameter (→ 21) 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 (→ 94).

0% bargraph value 5



Navigation	Setup → Advanced setup → Display → 0% bargraph 5 (0153)
Prerequisite	An option was selected in the Value 5 display parameter (→ 30).
Description	Use this function to enter the 0% bar graph value to be shown on the display for the measured value 5.
User entry	Signed floating-point number
Factory setting	Depends on country: ■ 0 kg/h ■ 0 lb/min
Additional information	<i>Description</i> The Format display parameter (→ 21) 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 (→ 94).

100% bargraph value 5



Navigation	Setup → Advanced setup → Display → 100% bargraph 5 (0155)
Prerequisite	An option was selected in the Value 5 display parameter (→ 30).
Description	Use this function to enter the 100% bar graph value to be shown on the display for the measured value 5.
User entry	Signed floating-point number
Factory setting	0
Additional information	<i>Description</i> The Format display parameter (→ 21) 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 (→ 94).

Decimal places 5



Navigation

Setup → Advanced setup → Display → Decimal places 5 (0149)

Prerequisite

A measured value is specified in the **Value 5 display** parameter (→ [30](#)).

Description

Use this function to select the number of decimal places for measured value 5.

Selection

- X
- X.X
- X.XX
- X.XXX
- X.XXXX
- X.XXXXX
- X.XXXXXX

Factory setting

X.XX

Additional information

Description

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

Value 6 display



Navigation

Setup → Advanced setup → 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 (→ [23](#))

Factory setting

None

Additional information

Description

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

The **Format display** parameter (→ [21](#)) 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 (→ [94](#)).

Decimal places 6



Navigation	Setup → Advanced setup → Display → Decimal places 6 (0150)
Prerequisite	A measured value is specified in the Value 6 display parameter (→ 32).
Description	Use this function to select the number of decimal places for measured value 6.
Selection	<ul style="list-style-type: none">■ X■ X.X■ X.XX■ X.XXX■ X.XXXX■ X.XXXXX■ X.XXXXXX
Factory setting	X.XX
Additional information	<i>Description</i> This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 7 display



Navigation	Setup → Advanced setup → 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 (→ 23)
Factory setting	None
Additional information	<i>Description</i> If several measured values are displayed at once, the measured value selected here will be the seventh value to be displayed. The value is only displayed during normal operation. The Format display parameter (→ 21) is used to specify how many measured values are displayed simultaneously and how. <i>Selection</i> The unit of the displayed measured value is taken from the System units submenu (→ 94).

0% bargraph value 7



Navigation

Setup → Advanced setup → Display → 0% bargraph 7 (0154)

Prerequisite

An option was selected in the **Value 7 display** parameter (→ [33](#)).

Description

Use this function to enter the 0% bar graph value to be shown on the display for the measured value 7.

User entry

Signed floating-point number

Factory setting

Depends on country:

- 0 kg/h
- 0 lb/min

Additional information

Description

The **Format display** parameter (→ [21](#)) 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 (→ [94](#)).

100% bargraph value 7



Navigation

Setup → Advanced setup → Display → 100% bargraph 7 (0156)

Prerequisite

An option was selected in the **Value 7 display** parameter (→ [33](#)).

Description

Use this function to enter the 100% bar graph value to be shown on the display for the measured value 7.

User entry

Signed floating-point number

Factory setting

0

Additional information

Description

The **Format display** parameter (→ [21](#)) 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 (→ [94](#)).

Decimal places 7



Navigation	Setup → Advanced setup → Display → Decimal places 7 (0151)
Prerequisite	A measured value is specified in the Value 7 display parameter (→ 33).
Description	Use this function to select the number of decimal places for measured value 7.
Selection	<ul style="list-style-type: none">■ X■ X.X■ X.XX■ X.XXX■ X.XXXX■ X.XXXXX■ X.XXXXXX
Factory setting	X.XX
Additional information	<i>Description</i> This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 8 display



Navigation	Setup → Advanced setup → 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 (→ 23)
Factory setting	None
Additional information	<i>Description</i> 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 (→ 21) is used to specify how many measured values are displayed simultaneously and how. <i>Selection</i> The unit of the displayed measured value is taken from the System units submenu (→ 94).

Decimal places 8



Navigation

Setup → Advanced setup → Display → Decimal places 8 (0152)

Prerequisite

A measured value is specified in the **Value 8 display** parameter (→ [35](#)).

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)

Setup → Advanced setup → 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 (→ [23](#))...**Value 8 display** parameter (→ [35](#)) 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 (→ [21](#)).

Display damping**Navigation**

Expert → System → Display → Display damping (0094)

Setup → Advanced setup → 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)

Setup → Advanced setup → 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

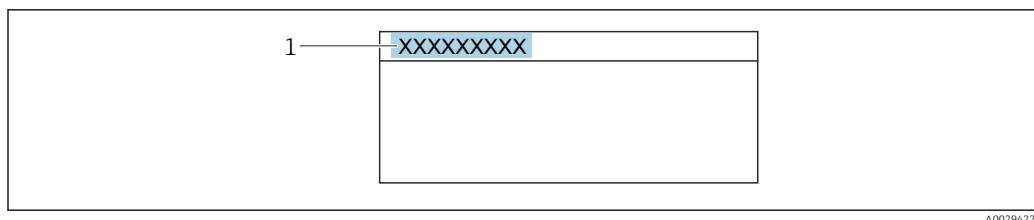
Device tag

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

Free text

Is defined in the **Header text** parameter (→ 38).

Header text



Navigation

Expert → System → Display → Header text (0112)

Setup → Advanced setup → Display → Header text (0112)

Prerequisite

The **Free text** option is selected in the **Header** parameter (→ 37).

Description

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

User entry

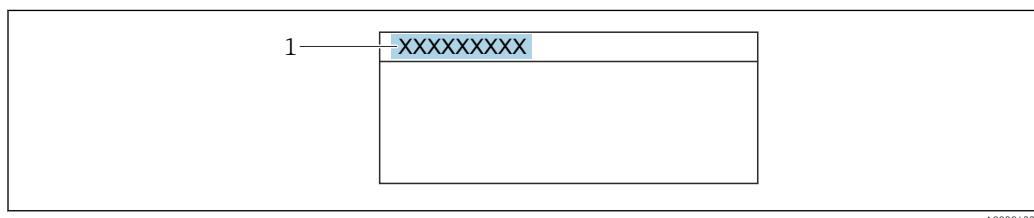
Max. 12 characters, such as letters, numbers or special characters (e.g. @, %, /)

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)

Setup → Advanced setup → 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)

 Setup → Advanced setup → Display → Backlight (0111)

Prerequisite One of the following conditions is met:

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

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

Selection

- Disable
- Enable

Factory setting Enable

3.1.2 "Configuration backup" submenu

Navigation  Expert → System → Config. backup

► Configuration backup

Operating time (0652)

→  40

Last backup (2757)	→ 40
Configuration management (2758)	→ 40
Backup state (2759)	→ 41
Comparison result (2760)	→ 41

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 (→ 40).

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.

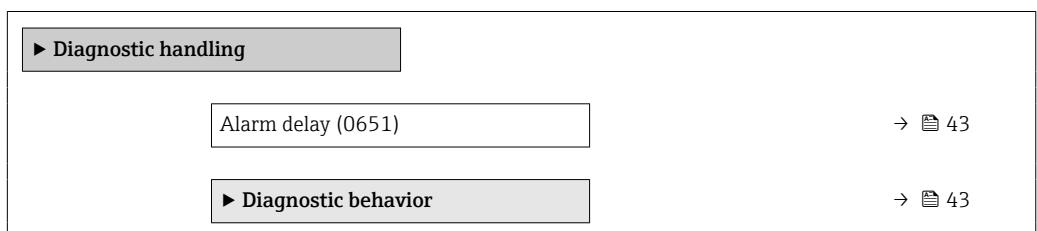
HistoROM

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 (→ 43).



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)

→ 45

Assign behavior of diagnostic no. 046
(0709)

→ 45

Assign behavior of diagnostic no. 142 (0778)	→ 46
Assign behavior of diagnostic no. 144 (0731)	→ 46
Assign behavior of diagnostic no. 374 (0710)	→ 46
Assign behavior of diagnostic no. 302 (0739)	→ 47
Assign behavior of diagnostic no. 304 (0635)	→ 47
Assign behavior of diagnostic no. 441 (0657)	→ 47
Assign behavior of diagnostic no. 442 (0658)	→ 48
Assign behavior of diagnostic no. 443 (0659)	→ 48
Assign behavior of diagnostic no. 444 (0740)	→ 49
Assign behavior of diagnostic no. 830 (0800)	→ 49
Assign behavior of diagnostic no. 831 (0641)	→ 50
Assign behavior of diagnostic no. 832 (0681)	→ 50
Assign behavior of diagnostic no. 833 (0682)	→ 50
Assign behavior of diagnostic no. 834 (0700)	→ 51
Assign behavior of diagnostic no. 835 (0702)	→ 51
Assign behavior of diagnostic no. 842 (0638)	→ 51
Assign behavior of diagnostic no. 862 (0679)	→ 52
Assign behavior of diagnostic no. 912 (0703)	→ 52

Assign behavior of diagnostic no. 913 (0712)	→ 52
Assign behavior of diagnostic no. 915 (0779)	→ 53
Assign behavior of diagnostic no. 941 (0632)	→ 53
Assign behavior of diagnostic no. 942 (0633)	→ 53
Assign behavior of diagnostic no. 943 (0634)	→ 54
Assign behavior of diagnostic no. 944 (0732)	→ 54
Assign behavior of diagnostic no. 948 (0744)	→ 55
Assign behavior of diagnostic no. 984 (0649)	→ 55

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

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 140 (0708)

Description

Use this function to change the diagnostic behavior of the **140 Sensor signal asymmetrical** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Alarm

Additional information

For a detailed description of the options available:

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

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 046 (0709)

Description

Use this function to change the diagnostic behavior of the **046 Sensor limit exceeded** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Alarm

Additional information For a detailed description of the options available:**Assign behavior of diagnostic no. 142 (Sensor index coil asymmetry too high)****Navigation**  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 142 (0778)**Description**

Change behavior of diagnostic event with diagnostic number 142 'Sensor index coil asymmetry too high'.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Logbook entry only

Assign behavior of diagnostic no. 144 (Measurement error too high)**Navigation**  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 144 (0731)**Description**

Change behavior of diagnostic event with diagnostic number 144 'Measurement error too high'.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Alarm

Additional information For a detailed description of the options available:**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:
-------------------------------	--

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:
-------------------------------	--

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

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information For a detailed description of the options available:**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.

DescriptionUse this function to change the diagnostic behavior of the **442 Frequency output 1 to n** diagnostic message.**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information For a detailed description of the options available:**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.

DescriptionUse this function to change the diagnostic behavior of the **443 Pulse output 1 to n** diagnostic message.**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information For a detailed description of the options available:

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:

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

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:

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:

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:

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:

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:

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:

Assign behavior of diagnostic no. 862 (Empty pipe)



Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 862 (0679)

Description

Use this function to change the diagnostic behavior of the **862 Empty pipe** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available:

Assign behavior of diagnostic no. 912 (Medium inhomogeneous)



Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 912 (0703)

Description

Use this function to change the diagnostic behavior of the **912 Medium inhomogeneous** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available:

Assign behavior of diagnostic no. 913 (Medium unsuitable)



Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 913 (0712)

Description

Use this function to change the diagnostic behavior of the **913 Medium unsuitable** diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available:

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



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 915 (0779)
Description	Change behavior of diagnostic event with diagnostic number 915 'Viscosity ouf 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:

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:

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:

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:

Assign behavior of diagnostic no. 948 (Oscillation damping too high)

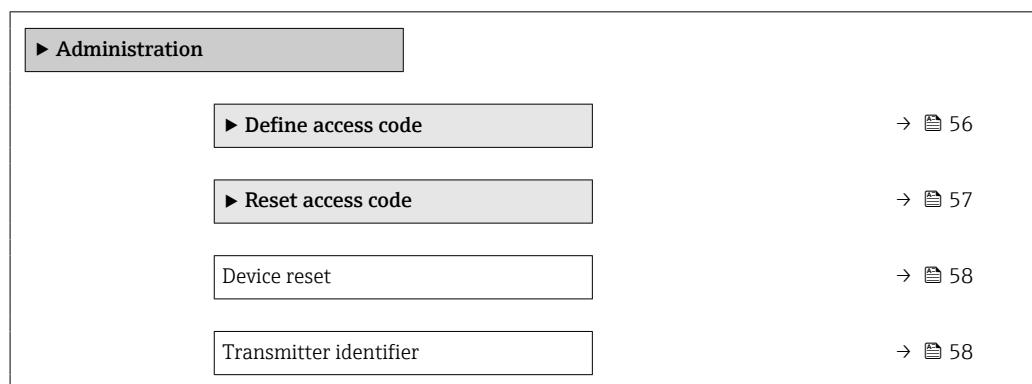
Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 948 (0744)
Description	Use this function to change the diagnostic behavior of the 948 Oscillation damping too high diagnostic message.
Selection	<ul style="list-style-type: none"> ■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available:

Assign behavior of diagnostic no. 984 (Condensation risk)

Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 984 (0649)
Description	Change behavior of diagnostic event with diagnostic number 984 'Condensation risk'.
Selection	<ul style="list-style-type: none"> ■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning

3.1.4 "Administration" submenu*Navigation*

Expert → System → Administration



Activate SW option	→ 59
Software option overview	→ 60

"Define access code" wizard

i The **Define access code** wizard (→ [56](#)) 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	→ 56
Confirm access code	→ 57

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.

i 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](#)).

i 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

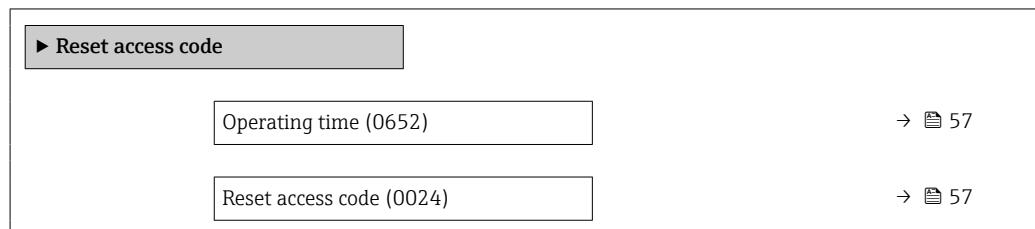
Navigation Expert → System → Administration → Def. access code → Confirm code

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.

Transmitter identifier**Navigation**

Expert → System → Administration → Transm. identif. (2765)

Description

Select transmitter identifier.

* Visibility depends on order options or device settings

User interface	■ Unknown ■ 500 ■ 300
----------------	-----------------------------

Factory setting	Unknown
-----------------	---------

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	<p><i>Description</i></p> <p>If a measuring device was ordered with an additional software option, the activation code is programmed in the device at the factory.</p> <p><i>User entry</i></p> <p> To activate a software option subsequently, please contact your Endress+Hauser sales organization.</p> <p>NOTE!</p> <p>The activation code is linked to the serial number of the measuring device and varies according to the device and software option.</p> <p>If an incorrect or invalid code is entered, this results in the loss of software options that have already been activated.</p> <ul style="list-style-type: none">▶ 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 (→ 60).↳ 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 (→ 60).

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. *
- 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.

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

"Petroleum" option

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

* Visibility depends on order options or device settings

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

"Extended density function" option

 Only available for Promass Q DN25 to DN100.

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

Option "Premium density + Extended density function"

 Only available for Promass Q DN25.

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

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► System units	→  94
► Process parameters	→  103
► Calculated values	→  112
► Measurement mode	→  115
► External compensation	→  119
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3.2.1 "Measured values" submenu

Navigation

 Expert → Sensor → Measured val.

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"Process variables" submenu

Navigation

Expert → Sensor → Measured val. → Process variab.

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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 (→ [94](#))

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 (→ [95](#))

Corrected volume flow

Navigation	 Expert → Sensor → Measured val. → Process variab. → CorrecVolumeFlow (1851)
Description	Displays the corrected volume flow that is currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Corrected volume flow unit parameter (→ 98)

Density

Navigation	 Expert → Sensor → Measured val. → Process variab. → Density (1850)
Description	Displays the density that is currently measured.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Density unit parameter (→ 99)

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	<i>Dependency</i>  The unit is taken from the Reference density unit parameter (→ 100)

Temperature

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

Additional information*Dependency*

The unit is taken from the **Temperature unit** parameter (→ 102)

Pressure

Navigation

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

Description

Displays the fixed or external pressure value.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Pressure unit** parameter (→ 102)

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 (→ 60).

Description

Displays the dynamic viscosity that is currently calculated.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Dynamic viscosity unit** parameter (→ 239).

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 (→ 60).

Description

Displays the kinematic viscosity that is currently calculated.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Kinematic viscosity unit** parameter (0578) (→ 240).

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 (→ 60).

Description

Displays the temperature compensation that is currently calculated for the viscosity.

User interface

Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Dynamic viscosity unit** parameter (→ 239).

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 (→ 60).

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) (→ 240).

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 (→  60).
Description	Displays the concentration that is currently calculated.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Concentration unit parameter (0613) (→  250).

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 (→  60).
Description	Displays the mass flow that is currently measured for the target medium.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Mass flow unit parameter (→  94)

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 (→  60).
Description	Displays the mass flow of the carrier medium that is currently measured.
User interface	Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 94)

Target corrected volume flow

Navigation

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

Prerequisite

With the following conditions:

- Order code for "Application package", option **ED** "Concentration"
- The **Ethanol in water** option or **%mass / %volume** option is selected in the **Liquid type** parameter (→ 245).



The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

Description

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

User interface

Signed floating-point number

Additional information*Dependency*

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

Carrier corrected volume flow

Navigation

Expert → Sensor → Measured val. → Process variab. → Carr.corr.vol.fl (1894)

Prerequisite

With the following conditions:

- Order code for "Application package", option **ED** "Concentration"
- In the **Liquid type** parameter (→ 245), the **Ethanol in water** option or **%mass / %volume** option is selected.



The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

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 (→ 95)

Target volume flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → Target vol. flow (1895)
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 (→ 245).■ The %vol option is selected in the Concentration unit parameter (→ 250). <p> The software options currently enabled are displayed in the Software option overview parameter (→ 60).</p>
Description	Displays the volume flow currently measured for the target medium.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Volume flow unit parameter (→ 95)

Carrier volume flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → Carrier vol. fl. (1896)
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 (→ 245).■ The %vol option is selected in the Concentration unit parameter (→ 250). <p> The software options currently enabled are displayed in the Software option overview parameter (→ 60).</p>
Description	Use this function to display the volume flow currently measured for the carrier medium.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Volume flow unit parameter (→ 95)

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 (→ [258](#)), the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

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 (→ [258](#)), the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

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 (→ [258](#)), the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

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 (→  258), the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  60).

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 (→  95)

User interface Signed floating-point number

Factory setting –

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

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 (→  261), 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 (→  60).

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	<p>For the following order code:</p> <ul style="list-style-type: none"> ▪ "Application package", option EJ "Petroleum" ▪ In the Petroleum mode parameter (→  258), the API referenced correction option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  60).</p>
Description	<p>Displays the fluid density at the alternative reference temperature.</p> <p><i>Dependency</i></p> <p>The unit is taken from: Reference density unit parameter (→  100)</p>
User interface	Signed floating-point number
Factory setting	–
Additional information	 The unit is taken from the Reference density unit parameter (→  100)

GSV flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → GSV flow (4157)
Prerequisite	<p>For the following order code:</p> <ul style="list-style-type: none"> ▪ "Application package", option EJ "Petroleum" ▪ In the Petroleum mode parameter (→  258), the API referenced correction option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  60).</p>
Description	<p>Displays the measured total volume flow, corrected to the reference temperature and the reference pressure.</p> <p><i>Dependency</i></p> <p>The unit is taken from: Corrected volume flow unit parameter (→  98)</p>
User interface	Signed floating-point number
Factory setting	–
Additional information	 The unit is taken from the Corrected volume flow unit parameter (→  98)

GSV flow alternative

Navigation	  Expert → Sensor → Measured val. → Process variab. → GSVa (4158)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter (→  258), the API referenced correction option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  60).</p>
Description	Displays the measured total volume flow, corrected to the alternative reference temperature and the alternative reference pressure. <i>Dependency</i> The unit is taken from: Corrected volume flow unit parameter (→  98)
User interface	Signed floating-point number
Factory setting	–
Additional information	 The unit is taken from the Corrected volume flow unit parameter (→  98)

NSV flow

Navigation	  Expert → Sensor → Measured val. → Process variab. → NSV flow (4159)
Prerequisite	For the following order code: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter (→  258), the API referenced correction option is selected. <p> The software options currently enabled are displayed in the Software option overview parameter (→  60).</p>
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. <i>Dependency</i> The unit is taken from: Corrected volume flow unit parameter (→  98)
User interface	Signed floating-point number
Factory setting	–
Additional information	 The unit is taken from the Corrected volume flow unit parameter (→  98)

NSV flow alternative

Navigation

 Expert → Sensor → Measured val. → Process variab. → NSVa (4160)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter (→ [258](#)), the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

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.

Dependency

The unit is taken from: **Corrected volume flow unit** parameter (→ [98](#))

User interface

Signed floating-point number

Factory setting

–

Additional information

 The unit is taken from the **Corrected volume flow unit** parameter (→ [98](#))

Oil CTL

Navigation

 Expert → Sensor → Measured val. → Process variab. → Oil CTL (4175)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter (→ [258](#)), the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

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 (→ 258), the **Net oil & water cut** option is selected.

i The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

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 (→ 258), the **Net oil & water cut** option is selected.

i The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

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 (→ 258), the **Net oil & water cut** option is selected.

i The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

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 (→ 258), the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

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 (→ 258), the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

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 –

CTPL alternative

Navigation  Expert → Sensor → Measured val. → Process variab. → CTPL alternative (4173)

Prerequisite

For the following order code:

- "Application package", option EJ "Petroleum"
- In the **Petroleum mode** parameter (→  258), the **API referenced correction** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  60).

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 the alternative reference temperature and the alternative reference pressure.

User interface

Positive floating-point number

Factory setting

1

Oil reference density

Navigation  Expert → Sensor → Measured val. → Process variab. → Oil ref. density (4195)

Prerequisite

For the following order code:

- "Application package", option EJ "Petroleum"
- In the **Petroleum mode** parameter (→  258), the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  60).

Description

Shows the oil density at the reference temperature.

User interface

Signed floating-point number

Factory setting

–

Additional information

Dependency

 The unit is taken from the **Reference density unit** parameter (→  100)

Water reference density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Water ref. dens. (4196)
Prerequisite	For the following order code: ■ "Application package", option EJ "Petroleum" ■ In the Petroleum mode parameter (→ 258), the Net oil & water cut option is selected.  The software options currently enabled are displayed in the Software option overview parameter (→ 60).
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 (→ 264)

Oil density

Navigation	  Expert → Sensor → Measured val. → Process variab. → Oil density (4169)
Prerequisite	For the following order code: ■ "Application package", option EJ "Petroleum" ■ In the Petroleum mode parameter (→ 258), the Net oil & water cut option is selected.  The software options currently enabled are displayed in the Software option overview parameter (→ 60).
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 (→ 262)

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 (→  258), the Net oil & water cut option is selected.
	 The software options currently enabled are displayed in the Software option overview parameter (→  60).
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 (→  264)

Density 2

Navigation	  Expert → Sensor → Measured val. → Process variab. → Density 2 (1905)
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"
	 The software options currently enabled are displayed in the Software option overview parameter (→  60).
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: <ul style="list-style-type: none">▪ "Application package", option EJ "Petroleum"▪ In the Petroleum mode parameter (→  258), the API referenced correction option is selected.
	 The software options currently enabled are displayed in the Software option overview parameter (→  60).
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 (→ 258), the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

Description Displays the currently calculated volume flow of the oil.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→ 80)
- The unit is taken from: **Volume flow unit** parameter (→ 95)

User interface Signed floating-point number

Factory setting –

Additional information Dependency

- 
- The unit is taken from the
- Volume flow unit**
- parameter (→ 95)

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 (→ 258), the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

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 (→ 80)
- The unit is taken from: **Corrected volume flow unit** parameter (→ 98)

User interface Signed floating-point number

Factory setting –

Additional information

 The unit is taken from the **Corrected volume flow unit** parameter (→ [98](#))

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 (→ [258](#)), the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

Description

Displays the currently calculated mass flow of the oil.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→ [80](#))
- The unit is taken from: **Mass flow unit** parameter (→ [94](#))

User interface

Signed floating-point number

Factory setting

–

Additional information

Dependency

 The unit is taken from the **Mass flow unit** parameter (→ [94](#))

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 (→ [258](#)), the **Net oil & water cut** option is selected.

 The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

Description

Displays the currently calculated volume flow of the water.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→ [80](#))
- The unit is taken from: **Volume flow unit** parameter (→ [95](#))

User interface

Signed floating-point number

Factory setting

–

Additional information*Dependency*

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

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 (→ 258), the **Net oil & water cut** option is selected.



The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

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 (→ 80)
- The unit is taken from: **Corrected volume flow unit** parameter (→ 98)

User interface

Signed floating-point number

Factory setting

–

Additional information

The unit is taken from the **Corrected volume flow unit** parameter (→ 98)

Water mass flow**Navigation**

Expert → Sensor → Measured val. → Process variab. → Water mass flow (4183)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **Petroleum mode** parameter (→ 258), the **Net oil & water cut** option is selected.



The software options currently enabled are displayed in the **Software option overview** parameter (→ 60).

Description

Displays the currently calculated mass flow of the water.

Dependency:

- Based on the value displayed in the **Water cut** parameter (→ 80)
- The unit is taken from: **Mass flow unit** parameter (→ 94)

User interface

Signed floating-point number

Factory setting

–

Additional information*Dependency*

The unit is taken from the **Mass flow unit** parameter (→ [94](#))

Weighted density average

Navigation

Expert → Sensor → Measured val. → Process variab. → Density average (4184)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- "Application package", option **EM** "Petroleum + Locking function"



The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

Description

Displays the weighted average for the density since the last time the density averages were reset.

Dependency:

- The unit is taken from: **Density 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*Dependency*

- The unit is taken from: **Density unit** parameter (→ [99](#))
- The value is reset to NaN (Not a Number) via the **Reset weighted averages** parameter

Weighted temperature average

Navigation

Expert → Sensor → Measured val. → Process variab. → Temp. average (4185)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- "Application package", option **EM** "Petroleum + Locking function"



The software options currently enabled are displayed in the **Software option overview** parameter (→ [60](#)).

Description

Displays the weighted average for the temperature since the last time the temperature averages were reset.

Dependency:

- The unit is taken from: **Temperature unit** parameter (→ [102](#))
- 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*Dependency*

- The unit is taken from: **Temperature unit** parameter (→ 102)
- The value is reset to NaN (Not a Number) via the **Reset weighted averages** parameter

Time period signal (TPS)**Navigation**

Expert → Sensor → Measured val. → Process variab. → TPS (1903)

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 (→ 60).

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:

- "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 (→ 60).

Description

Shows the frequency of the time period signal (TPS) currently calculated. Corresponds to the measured density.

User interface

0 to 10 000 Hz

"Process variables" submenu

Navigation

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

► **Process variables**

Application specific input 0 (6366)

→ 86

Application specific input 1 (6367)	→ 86
Application specific output 0 (6364)	→ 86
Application specific output 1 (6365)	→ 87

Application specific input 0

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

Application specific input 1

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

Application specific output 0

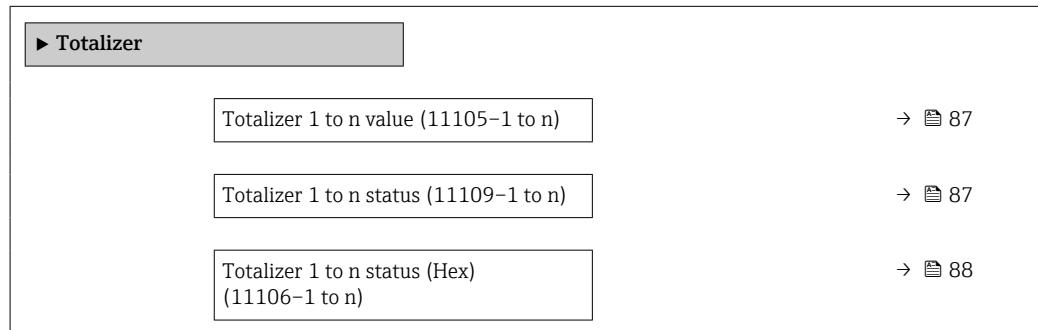
Navigation	Expert → Sensor → Measured val. → Process variab. → Process variab. → Spec. output 0 (6364)
Description	Shows the calculated application specific output value 0.
User interface	Signed floating-point number
Factory setting	0

Application specific output 1

Navigation	  Expert → Sensor → Measured val. → Process variab. → Process variab. → Spec. output 1 (6365)
Description	Shows the calculated specific output value 1.
User interface	Signed floating-point number
Factory setting	0

"Totalizer" submenu

Navigation   Expert → Sensor → Measured val. → Totalizer



Totalizer 1 to n value

Navigation	  Expert → Sensor → Measured val. → Totalizer → Tot. 1 to n value (11105-1 to n)
Description	Shows the totalizer value reported to the controller for further processing.
User interface	Signed floating-point number
Factory setting	0 kg

Totalizer 1 to n status

Navigation	  Expert → Sensor → Measured val. → Totalizer → Tot. 1 to n status (11109-1 to n)
Description	Shows the status of the totalizer value reported to the controller for further processing ('Good', 'Uncertain', 'Bad').

User interface	<ul style="list-style-type: none"> ■ Good ■ Uncertain ■ Bad
-----------------------	--

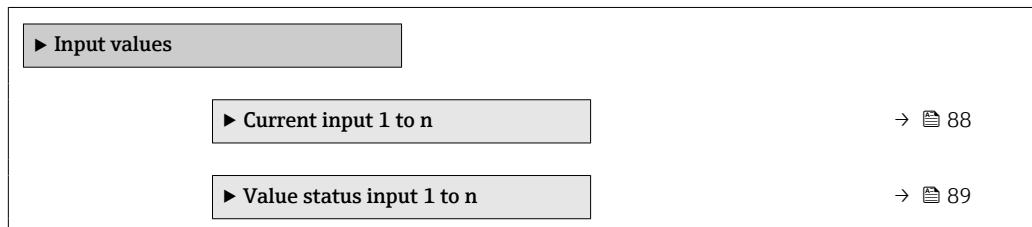
Factory setting	Good
------------------------	------

Totalizer 1 to n status (Hex)

Navigation	 Expert → Sensor → Measured val. → Totalizer → Status 1 to n (Hex) (11106-1 to n)
Description	Shows the status of the totalizer value reported to the controller for further processing (Hex).
User interface	0 to 255
Factory setting	128

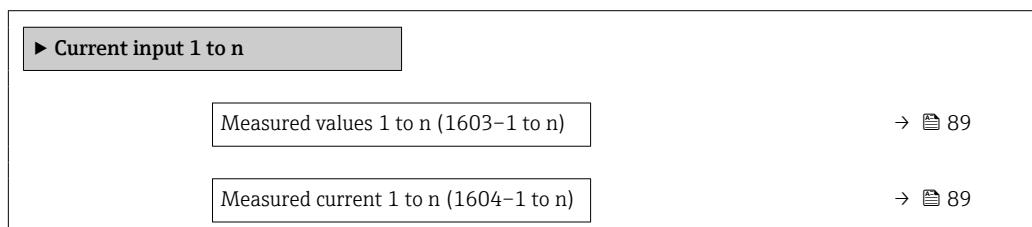
"Input values" submenu

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

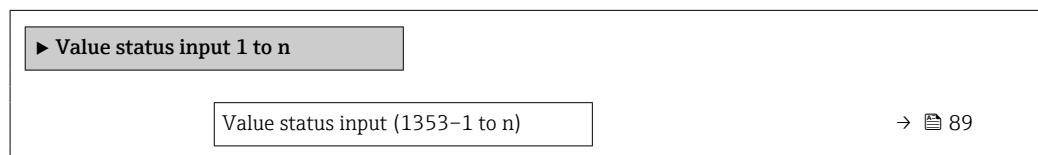
Navigation  Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measur. curr. 1 to n (1604–1 to n)

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)

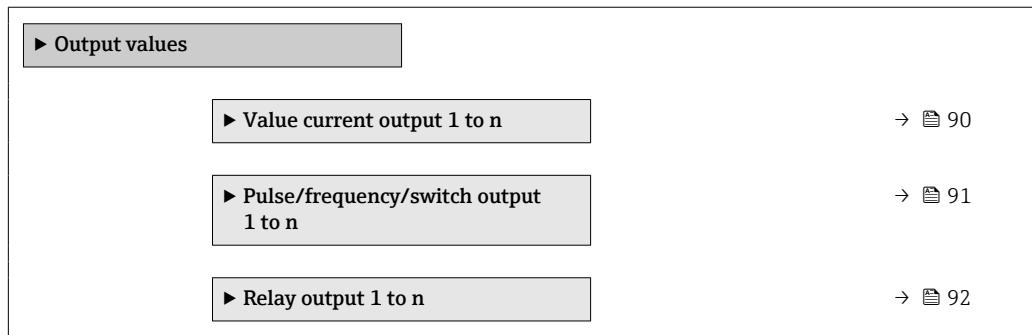
Description Displays the current input signal level.

User interface

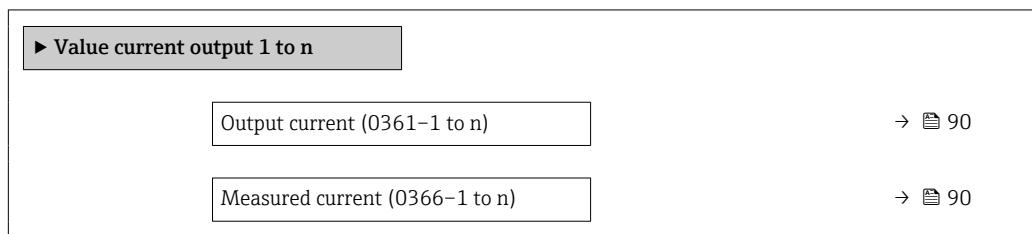
- High
- Low

"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.

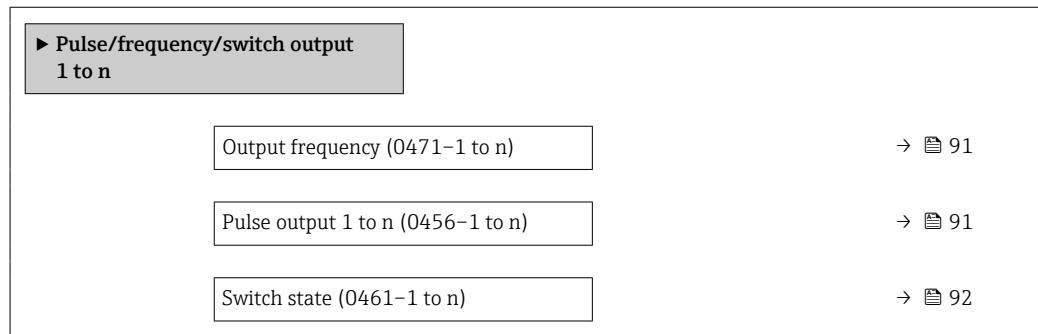
User interface

0 to 30 mA

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

Navigation

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



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 (→ 175), 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 (→ 175) parameter.

Description

Displays the pulse frequency currently output.

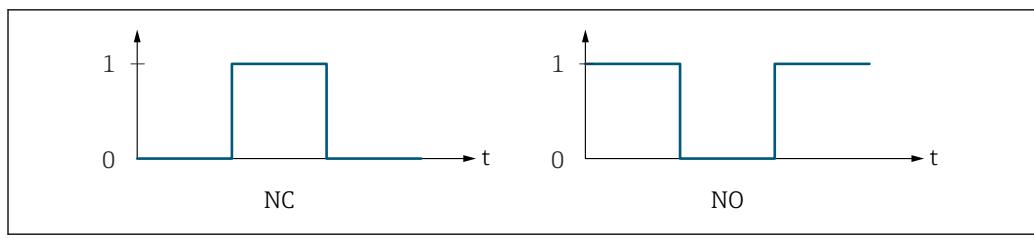
User interface

Positive floating-point number

Additional information

Description

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



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

The output behavior can be reversed via the **Invert output signal** parameter (→ 195) 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 (→ 179)) can be configured.

Switch state

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 175).

Description Displays the current switch status of the status output.

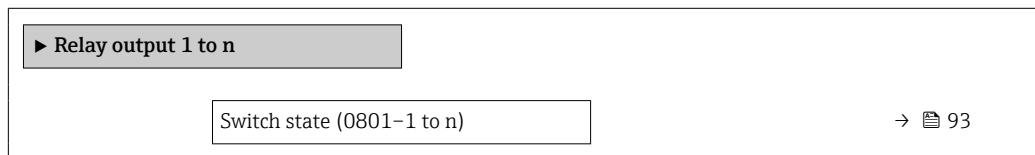
- Open
- Closed

Additional information *User interface*

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

"Relay output 1 to n" submenu

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



Switch cycles (0815-1 to n)	→ 93
Max. switch cycles number (0817-1 to n)	→ 93

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	<ul style="list-style-type: none">■ Open■ Closed
Additional information	<i>User interface</i> <ul style="list-style-type: none">■ Open The relay output is not conductive.■ Closed The relay output is conductive.

Switch cycles

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

Max. switch cycles number

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

3.2.2 "System units" submenu

Navigation

Expert → Sensor → System units

► System units	
Mass flow unit (0554)	→ 94
Mass unit (0574)	→ 95
Volume flow unit (0553)	→ 95
Volume unit (0563)	→ 97
Corrected volume flow unit (0558)	→ 98
Corrected volume unit (0575)	→ 98
Density unit (0555)	→ 99
Reference density unit (0556)	→ 100
Density 2 unit (0619)	→ 101
Temperature unit (0557)	→ 102
Pressure unit (0564)	→ 102
Date/time format (2812)	→ 103

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 (→ 68)
- **Carrier mass flow** parameter (→ 68)
- **Mass flow** parameter (→ 64)

Selection For an explanation of the abbreviated units: → 366**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: → 366**Volume flow unit****Navigation** Expert → Sensor → System units → Volume flow unit (0553)**Description**

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

Selection

<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
■ cm ³ /s	■ af/s	■ gal/s (imp)
■ cm ³ /min	■ af/min	■ gal/min (imp)
■ cm ³ /h	■ af/h	■ gal/h (imp)
■ cm ³ /d	■ af/d	■ gal/d (imp)
■ dm ³ /s	■ ft ³ /s	■ Mgal/s (imp)
■ dm ³ /min	■ ft ³ /min	■ Mgal/min (imp)
■ dm ³ /h	■ ft ³ /h	■ Mgal/h (imp)
■ dm ³ /d	■ ft ³ /d	■ Mgal/d (imp)
■ m ³ /s	■ kft ³ /s	■ bbl/s (imp;oil)
■ m ³ /min	■ kft ³ /min	■ bbl/min (imp;oil)
■ m ³ /h	■ kft ³ /h	■ bbl/h (imp;oil)
■ m ³ /d	■ kft ³ /d	■ bbl/d (imp;oil)
■ ml/s	■ MMft ³ /s	
■ ml/min	■ MMft ³ /min	
■ ml/h	■ MMft ³ /h	
■ ml/d	■ Mft ³ /d	
■ l/s	■ fl oz/s (us)	
■ l/min	■ fl oz/min (us)	
■ l/h	■ fl oz/h (us)	
■ l/d	■ fl oz/d (us)	
■ hl/s	■ gal/s (us)	
■ hl/min	■ gal/min (us)	
■ hl/h	■ gal/h (us)	
■ hl/d	■ gal/d (us)	
■ Ml/s	■ Mgal/s (us)	
■ Ml/min	■ Mgal/min (us)	
■ Ml/h	■ Mgal/h (us)	
■ Ml/d	■ 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)	

or

<i>US units</i>	<i>Imperial units</i>
■ bbl/s (us;liq.) *	■ bbl/s (imp;beer) *
■ bbl/min (us;liq.) *	■ bbl/min (imp;beer) *
■ bbl/h (us;liq.) *	■ bbl/h (imp;beer) *
■ bbl/d (us;liq.) *	■ bbl/d (imp;beer) *
■ bbl/s (us;beer) *	
■ bbl/min (us;beer) *	
■ bbl/h (us;beer) *	
■ bbl/d (us;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 (→ 64)*Selection*

 For an explanation of the abbreviated units: → 366

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: → 366

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*

- NI/s
- NI/min
- NI/h
- NI/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:

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

Additional information*Result*

The selected unit applies for:

Corrected volume flow parameter (→ 65)

Selection

For an explanation of the abbreviated units: → 366

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>
	<ul style="list-style-type: none"> ■ Nl ■ Nhl ■ Nm³ ■ Sl ■ Sm³ 	<ul style="list-style-type: none"> ■ Sft³ ■ MSft³ ■ MMSft³ ■ Sgal (us) ■ Sbbl (us;liq.) ■ Sbbl (us;oil) 	Sgal (imp)
Factory setting	Country-specific:		
	<ul style="list-style-type: none"> ■ Nl (DN > 150 (6"): Nm³ option) ■ Sft³ 		
Additional information	<i>Selection</i>		
	 For an explanation of the abbreviated units: → 366		

Density unit



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

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

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	<ul style="list-style-type: none"> ■ g/cm³ ■ g/m³ ■ g/ml ■ g/l ■ kg/l ■ kg/dm³ ■ kg/m³ ■ SG4°C ■ SG15°C ■ SG20°C 	<ul style="list-style-type: none"> ■ lb/ft³ ■ lb/gal (us) ■ lb/bbl (us;oil) ■ lb/bbl (us;tank) ■ lb/in³ ■ STon/yd³ 	<ul style="list-style-type: none"> ■ lb/gal (imp) ■ lb/bbl (imp;oil)
	<i>Other units</i>		
	[*] API		

or

US units
SG60°F ^{*}

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

or

<i>US units</i>	<i>Imperial units</i>
<ul style="list-style-type: none"> ■ lb/bbl (us;liq.) [*] ■ lb/bbl (us;beer) [*] 	<ul style="list-style-type: none"> ■ lb/bbl (imp;beer) [*]

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

Factory setting	Country-specific: ■ kg/l ■ lb/ft ³
Additional information	<p><i>Effect</i></p> <p>The selected unit applies for:</p> <ul style="list-style-type: none"> ■ Density setpoint 1 parameter (→ 132) ■ Density setpoint 2 parameter (→ 132) ■ Density parameter (→ 65) <p><i>Selection</i></p> <ul style="list-style-type: none"> ■ 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). <p> For an explanation of the abbreviated units: → 366</p>

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	<table border="0"> <tr> <td><i>SI units</i></td> <td><i>US units</i></td> <td><i>Other units</i></td> </tr> <tr> <td>■ kg/Nm³</td> <td>■ lb/Sft³</td> <td>°APIbase</td> </tr> <tr> <td>■ kg/Nl</td> <td>■ RD60°F</td> <td></td> </tr> <tr> <td>■ g/Scm³</td> <td></td> <td></td> </tr> <tr> <td>■ kg/Sm³</td> <td></td> <td></td> </tr> <tr> <td>■ RD15°C</td> <td></td> <td></td> </tr> <tr> <td>■ RD20°C</td> <td></td> <td></td> </tr> </table>	<i>SI units</i>	<i>US units</i>	<i>Other units</i>	■ kg/Nm ³	■ lb/Sft ³	°APIbase	■ kg/Nl	■ RD60°F		■ g/Scm ³			■ kg/Sm ³			■ RD15°C			■ RD20°C			
<i>SI units</i>	<i>US units</i>	<i>Other units</i>																					
■ kg/Nm ³	■ lb/Sft ³	°APIbase																					
■ kg/Nl	■ RD60°F																						
■ g/Scm ³																							
■ kg/Sm ³																							
■ RD15°C																							
■ RD20°C																							
Factory setting	Country-dependent																						
	<ul style="list-style-type: none"> ■ kg/Nl ■ lb/Sft³ 																						
Additional information	<p><i>Result</i></p> <p>The selected unit applies for:</p> <ul style="list-style-type: none"> ■ External reference density parameter (→ 113) ■ Fixed reference density parameter (→ 113) ■ Reference density parameter (→ 65) <p><i>Selection</i></p> <p> For an explanation of the abbreviated units: → 366</p>																						

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
- SG4°C
- SG15°C
- SG20°C

Other units

°API

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)

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: → 366

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 (→ 304)
- **Minimum value** parameter (→ 303)
- **Maximum value** parameter (→ 306)
- **Minimum value** parameter (→ 306)
- **Maximum value** parameter (→ 308)
- **Minimum value** parameter (→ 307)
- **External temperature** parameter (→ 121)
- **Reference temperature** parameter (6222) (→ 238)
- **Temperature** parameter (→ 65)
- **Reference temperature** parameter (→ 114)

Selection

For an explanation of the abbreviated units: → 366

Pressure unit**Navigation**

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

Description

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

Selection*SI units*

- MPa a
- MPa g
- kPa a
- kPa g
- Pa a
- Pa g
- bar
- bar g

US units

- psi a
- psi g

Factory setting

Country-specific:

- bar a
- psi a

Additional information*Result*

The unit is taken from:

- **Pressure value** parameter (→ 120)
- **External pressure** parameter (→ 120)
- **Pressure value** parameter (→ 66)

Selection

 For an explanation of the abbreviated units: → 366

Date/time format**Navigation**

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

Description

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

Selection

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

Factory setting

dd.mm.yy hh:mm

Additional information*Selection*

 For an explanation of the abbreviated units: → 366

3.2.3 "Process parameters" submenu

Navigation

 Expert → Sensor → Process param.

▶ Process parameters	
Flow damping (1802)	→ 104
Density damping (1803)	→ 104
Temperature damping (1822)	→ 105
Flow override (1839)	→ 105
Density limit (4199)	→ 106
▶ Low flow cut off	→ 106
▶ Partially filled pipe detection	→ 109

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 → 158
- Low flow cut off → 106
- Totalizers

Density damping



Navigation

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

Description

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

User entry

0 to 999.9 s

Factory setting

0 s

2) Proportional behavior with first-order lag

Additional information*Description*

The damping is performed by a PT1 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).

Flow override**Navigation**

Expert → Sensor → Process param. → Flow override (1839)

Description

Use this function to select whether to interrupt the evaluation of measured values. This is useful for the cleaning processes of a pipeline, for example.

Selection

- Off
- On

Factory setting

Off

3) Proportional behavior with first-order lag

4) Proportional behavior with first-order lag

Additional information**Description****Flow override is active**

- The **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

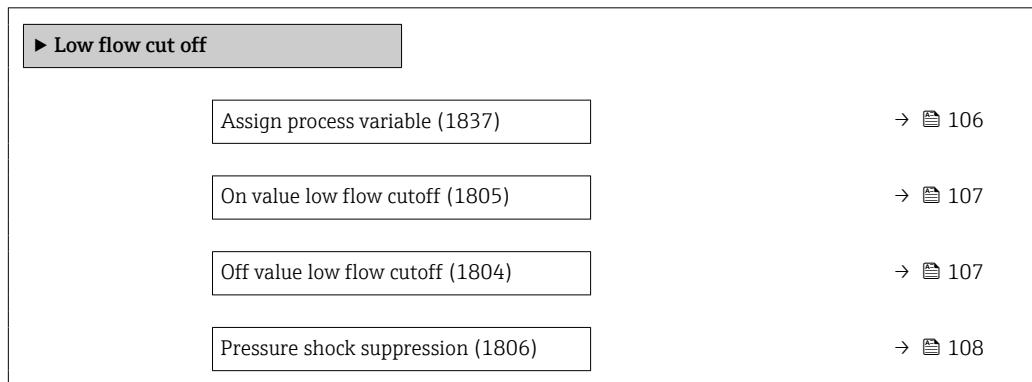
Positive floating-point number

Factory setting

0 kg/l

"Low flow cut off" submenu**Navigation**

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

**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 (→ 106).
---------------------	--

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 → 107.
--------------------	---

User entry	Positive floating-point number
-------------------	--------------------------------

Factory setting	Depends on country and nominal diameter → 361
------------------------	--

Additional information	<i>Dependency</i>
	The unit depends on the process variable selected in the Assign process variable parameter (→ 106).

Off value low flow cutoff



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

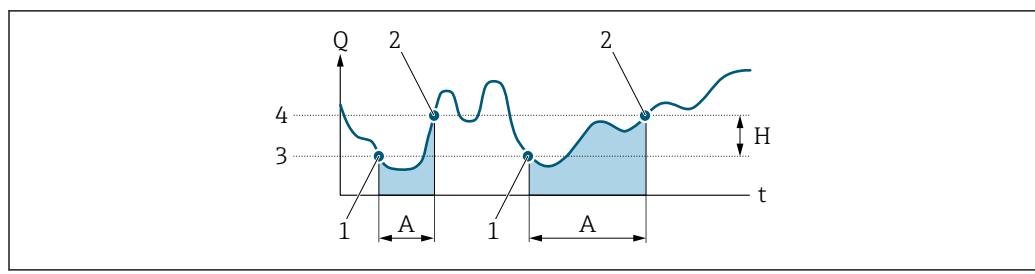
Prerequisite	A process variable is selected in the Assign process variable parameter (→ 106).
---------------------	--

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 → 107.
--------------------	---

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 (→ 106).

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**

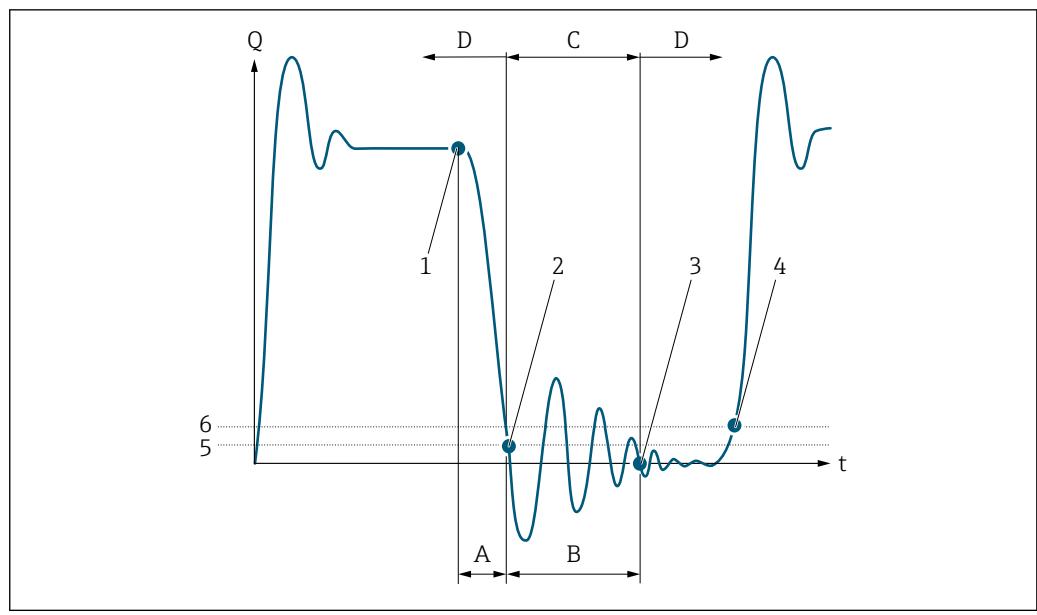
- Prerequisite:
 - Flow rate < on-value of low flow cut off
or
 - Change in the flow direction
- Output values
 - Flow displayed: 0
 - Totalizer: the totalizers are pegged at the last correct value

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)	→ 110
Low value partial filled pipe detection (1861)	→ 110
High value partial filled pipe detection (1858)	→ 110
Response time part. filled pipe detect. (1859)	→ 111
Maximum damping partial filled pipe det. (6040)	→ 111

Assign process variable



Navigation

Expert → Sensor → Process param. → Partial pipe det → Assign variable (1860)

Description

Use this function to select a process variable to detect empty or partially filled measuring tubes.

For gas measurement: Deactivate monitoring due to low gas density.

Selection

- Off
- Density
- Calculated reference density

Factory setting

Off

Low value partial filled pipe detection



Navigation

Expert → Sensor → Process param. → Partial pipe det → Low value (1861)

Prerequisite

A process variable is selected in the **Assign process variable** parameter (→ 110).

Description

Use this function to enter a lower limit value to enable detection of empty or partially filled measuring tubes. If the measured density falls below this value, monitoring is enabled.

User entry

Signed floating-point number

Factory setting

Depends on country:

- 200 kg/m³
- 12.5 lb/ft³

Additional information

User entry

The lower limit value must be less than the upper limit value defined in the **High value partial filled pipe detection** parameter (→ 110).

i The unit depends on the process variable selected in the **Assign process variable** parameter (→ 110).

Limit value

i If the displayed value is outside the limit value, the measuring device displays the **862 Partly filled pipe** diagnostic message.

High value partial filled pipe detection



Navigation

Expert → Sensor → Process param. → Partial pipe det → High value (1858)

Prerequisite

A process variable is selected in the **Assign process variable** parameter (→ 110).

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	<i>User entry</i> The upper limit value must be greater than the lower limit value defined in the Low value partial filled pipe detection parameter (→ 110).  The unit depends on the process variable selected in the Assign process variable parameter (→ 110).
	<i>Limit value</i>  If the displayed value is outside the limit value, the measuring device displays the 862 Partly filled pipe diagnostic message.

Response time part. filled pipe detect.



Navigation	  Expert → Sensor → Process param. → Partial pipe det → Response time (1859)
Prerequisite	A process variable is selected in the Assign process variable parameter (→ 110).
Description	Use this function to enter the minimum time (hold time) the signal must be present before diagnostic message S962 "Pipe only partly filled" is triggered in the event of a partially filled or empty measuring pipe.
User entry	0 to 100 s
Factory setting	1 s

Maximum damping partial filled pipe det.



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

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

User entry

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

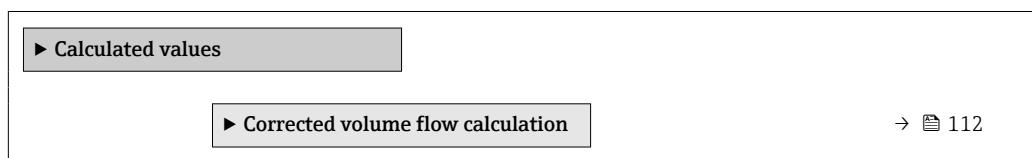
Example

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

3.2.4 "Calculated values" submenu

Navigation

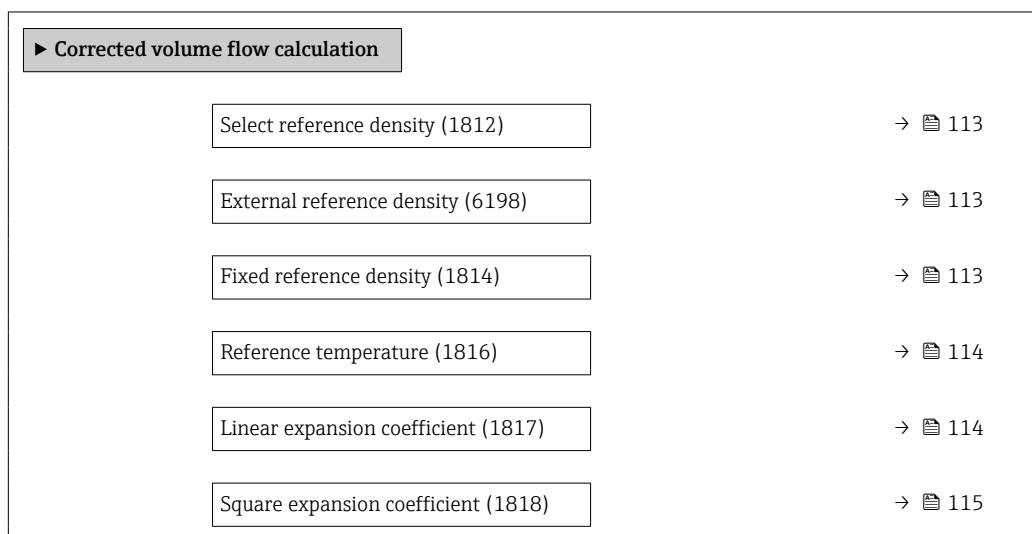
Expert → Sensor → Calculated value



"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	<ul style="list-style-type: none"> ■ Fixed reference density ■ Calculated reference density ■ External reference density ■ Current input 1 * ■ Current input 2 * ■ Current input 3 *
Factory setting	Calculated reference density
Additional information	<p><i>Selection</i></p> <p>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.</p> <p>Selecting this option means that the reference density is used, taking into account the values in table 53 E of API MPMS section 11.2. Temperature measurement (measured internally or read into the device from an external source → 119 → 119) 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.</p>

External reference density

Navigation	Expert → Sensor → Calculated value → Corr. vol.flow. → Ext. ref.density (6198)
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	<p><i>Dependency</i></p> <p> The unit is taken from the Reference density unit parameter (→ 100)</p>

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 (→ 113) parameter.
Description	Use this function to enter a fixed value for the reference density.

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

User entry Positive floating-point number

Factory setting 1 kg/Nl

Additional information *Dependency*

 The unit is taken from the **Reference density unit** parameter (→ 100)

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 (→ 113) 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 (→ 102)

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 (→ 113) 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 (→ 113) 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

3.2.5 "Measurement mode" submenu

Navigation

Expert → Sensor → Measurement mode

Measurement mode	
MFT (Multi-Frequency Technology) (6242)	→ 116
Select medium type (6062)	→ 116
Select gas type (6074)	→ 116
Reference sound velocity (6147)	→ 117
Reference sound velocity	→ 117
Temperature coefficient sound velocity (6181)	→ 117
Temperature coefficient sound velocity	→ 118
Gas Fraction Handler (6377)	→ 118

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 (→ 116), 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

Reference sound velocity



Navigation	Expert → Sensor → Measurement mode → Sound velocity
Prerequisite	In the Select medium type parameter (→ 116), the Other option is selected.
Description	Enter sound velocity of the medium at 0 °C (32 °F).
User entry	Signed floating-point number
Factory setting	1 456 m/s

Temperature coefficient sound velocity



Navigation	Expert → Sensor → Measurement mode → Temp. coeff. SV (6181)
Prerequisite	In the Select gas type parameter (→ 116), 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

Temperature coefficient sound velocity



Navigation Expert → Sensor → Measurement mode → Temp. coeff. SV

Prerequisite In the **Select medium type** parameter (→ 116), the **Other** option is selected.

Description Enter temperature coefficient for the medium sound velocity.

User entry Signed floating-point number

Factory setting 1.3 (m/s)/K

Gas Fraction Handler



Navigation Expert → Sensor → Measurement mode → Gas Frac Handler (6377)

Description Activates the Gas Fraction Handler function for two phase media.

Selection

- Off
- Moderate
- Powerful

Factory setting Moderate

Additional information

- When a second phase is detected, large fluctuations in the flow and density will occur.
- The Gas Fraction Handler stabilizes the output values and enables better readability for operators and easier interpretation by the distributed control system.
- The level of smoothing is adjusted according to the severity of the disturbances introduced by the second phase.

The influence of the disturbances can be configured in two steps via this switch:

- **Off** option: Deactivates the Gas Fraction Handler. When a second phase is present, large fluctuations of flow and density will occur.
- **Moderate** option: Use for applications with low level or intermittent levels of second phase.
- **Powerful** option: Use for applications with very significant levels of second phase.

The Gas Fraction Handler is cumulative to any fixed damping constants applied to flow and density that are set elsewhere in the instrument parameterization.

Additional information in the **Medium index** submenu (→ 272)

3.2.6 "External compensation" submenu

Navigation

Expert → Sensor → External comp.

► External compensation	
Pressure compensation (6130)	→ 119
Pressure value (6059)	→ 120
External pressure (6209)	→ 120
Temperature correction source (6184)	→ 120
External temperature (6080)	→ 121
Application specific input source 0 (6401)	→ 121
Application specific input source 1 (6402)	→ 122

Pressure compensation



Navigation

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

Description

Use this function to select the type of pressure compensation.

Selection

- Off
- Fixed value
- External value
- Current input 1 *
- Current input 2 *
- Current input 3 *

Factory setting

Off

Additional information

Selection

- Fixed value

A fixed pressure value is used for compensation: **Pressure value** parameter (→ 120)

- **Current input 1** option, **Current input 3** option

The pressure value read in via the current input is used for compensation.

* Visibility depends on order options or device settings

Pressure value**Navigation**

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

Prerequisite

In the **Pressure compensation** parameter (→ 119), 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

Dependency

The unit is taken from the **Pressure unit** parameter (→ 102)

External pressure**Navigation**

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

Prerequisite

In the **Pressure compensation** parameter (→ 119), the **External value** option or the **Current input 1...n** option is selected.

Description

Displays the external pressure value.

Additional information

Dependency

The unit is taken from the **Pressure unit** parameter (→ 102)

Temperature correction source**Navigation**

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

Description

Use this function to select the temperature mode.

Selection

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

Factory setting

Internal measured value

* Visibility depends on order options or device settings

Additional information*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, 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 (→ 120), 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 (→ 102)

Application specific input source 0**Navigation**

  Expert → Sensor → External comp. → Spec. source 0 (6401)

Prerequisite

Only if application-specific calculation has been ordered as a special option.

Description

Select source for input value 0 used for the application specific calculation.

Selection

- Off
- External value
- Current input 1 *
- Current input 2 *
- Current input 3 *

Factory setting

Off

* Visibility depends on order options or device settings

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

3.2.7 "Sensor adjustment" submenu

<i>Navigation</i>	Expert → Sensor → Sensor adjustm.
► Sensor adjustment	
Installation direction (1809)	→ 123
Installation angle roll (6282)	→ 123
Installation angle pitch (6236)	→ 124
► Density adjustment	→ 131
► Extended density adjustment	→ 133
► Process variable adjustment	→ 137
► Zero verification	→ 124
► Zero adjustment	→ 127

* Visibility depends on order options or device settings

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 °

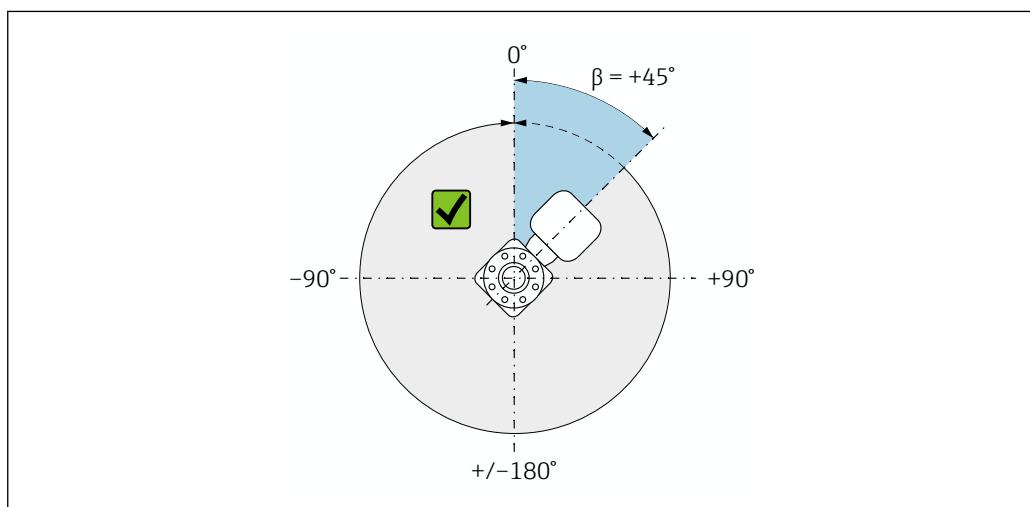
Factory setting

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 $\alpha = +30^\circ$

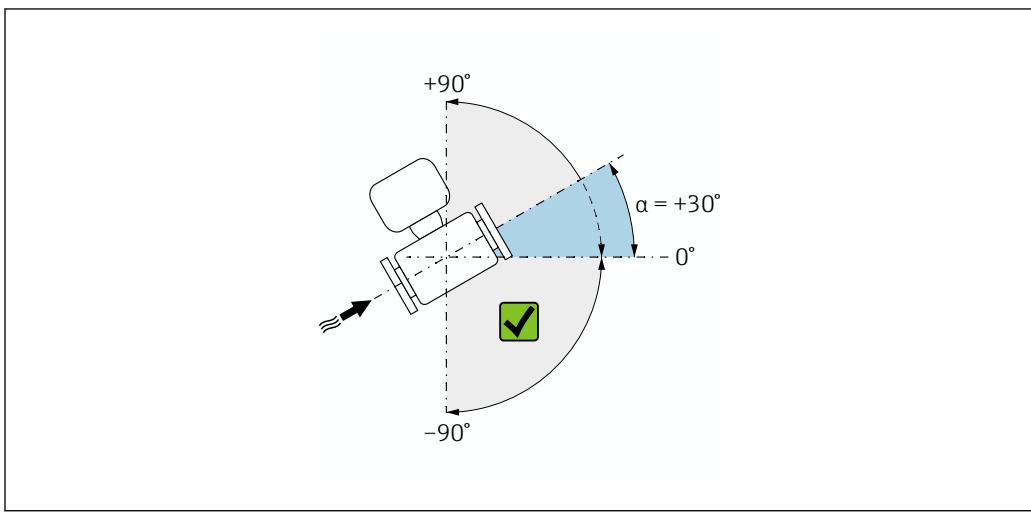


Fig. 3 Side view with flow direction from left to right.

"Zero verification" wizard

Navigation

Expert → Sensor → Sensor adjustm. → ZeroVerification

► Zero verification	
Process conditions	→ 125
Progress (2808)	→ 125
Status (6253)	→ 125
Additional information	→ 126
Recommendation: (6000)	→ 126

Root cause (6444)	→ 126
Abort cause	→ 126
Zero point measured (5999)	→ 127
Zero point standard deviation (5996)	→ 127

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

<i>Navigation</i>	 Expert → Sensor → Sensor adjustm. → Zero adjustment
► Zero adjustment	
Process conditions	→  128
Progress (2808)	→  128
Status (6253)	→  128
Root cause (6444)	→  129
Abort cause	→  129
Root cause (6444)	→  129
Reliability of measured zero point (5982)	→  129
Additional information	→  129
Reliability of measured zero point (5982)	→  129

Zero point measured (5999)	→ 130
Zero point standard deviation (5996)	→ 130
Select action (5995)	→ 130

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">▪ Restore▪ Keep current zero point▪ Apply zero point measured▪ Apply factory zero point[*]
Factory setting	Keep current zero point

* Visibility depends on order options or device settings

"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)	→ 131
Density setpoint 1 (6045)	→ 132
Density setpoint 2 (6046)	→ 132
Execute density adjustment (6041)	→ 132
Progress (2808)	→ 133
Density adjustment factor (6042)	→ 133
Density adjustment offset (6044)	→ 133

Density adjustment mode**Navigation**

Expert → Sensor → Sensor adjustm. → Density adjustm. → Adjustment mode (6043)

Description

Displays the method for field density adjustment.

Selection

- 1 point adjustment
- 2 point adjustment

Factory setting

1 point adjustment

Density setpoint 1

Navigation	 Expert → Sensor → Sensor adjustm. → Density adjustm. → Density setpt 1 (6045)
Description	Displays the existing density value.
User entry	The entry depends on the unit selected in the Density unit parameter (0555) (→  99).
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) (→  99).
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

* Visibility depends on order options or device settings

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 (→  139)

Density adjustment offset

Navigation  Expert → Sensor → Sensor adjustm. → Density adjustm. → Dens. adj offset (6044)

Description Shows the calculated correction offset for the density.

User interface Signed floating-point number

Factory setting 0

Additional information  Manual adjustment of the value: **Density offset** parameter (→  139)

"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)

→  134

Linear density factor (5967)	→ 134
Linear temperature factor (5966)	→ 135
Linear pressure factor (5965)	→ 135
Quadratic density factor (5964)	→ 135
Quadratic temperature factor (5963)	→ 135
Quadratic pressure factor (5962)	→ 136
Combined density-temperature factor (5961)	→ 136
Combined density-pressure factor (5971)	→ 136
Combined temperature-pressure factor (5970)	→ 136
Cubic temperature factor (5969)	→ 137

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/m ³

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/m ³)/°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/m ³)/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/m ³)

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/m ³)/°C ²

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/m ³)/bara ²

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/m ³)/(°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/m^3)/ $^{\circ}\text{C}^3$

"Process variable adjustment" submenu

The adjustments to the offsets and factors in the **Process variable adjustment** submenu (→ 137) do not affect the calculated values, such as concentration, NSV.

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust

► Process variable adjustment	
Mass flow offset (1831)	→ 138
Mass flow factor (1832)	→ 138
Volume flow offset (1841)	→ 138
Volume flow factor (1846)	→ 139
Density offset (1848)	→ 139
Density factor (1849)	→ 139
Corrected volume flow offset (1866)	→ 140
Corrected volume flow factor (1867)	→ 140
Reference density offset (1868)	→ 140
Reference density factor (1869)	→ 141
Temperature offset (1870)	→ 141
Temperature factor (1871)	→ 141

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	<i>Description</i> Corrected value = (factor × value) + offset

Density offset

Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Density offset (1848)
Description	Use this function to enter the zero point shift for the density trim. The density unit on which the shift is based is kg/m ³ .
User entry	Signed floating-point number
Factory setting	0 kg/m ³
Additional information	<i>Description</i> Corrected value = (factor × value) + offset

Density factor

Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Density factor (1849)
Description	Use this function to enter a quantity factor for the density. This multiplication factor is applied over the density range.
User entry	Positive floating-point number
Factory setting	1
Additional information	<i>Description</i> Corrected value = (factor × value) + offset

Corrected volume flow offset**Navigation**

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

Description

Use this function to enter the zero point shift for the corrected volume flow trim. The corrected volume flow unit on which the shift is based is 1 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/Nm³.

User entry

Signed floating-point number

Factory setting

0 kg/Nm³

Additional information*Description*

Corrected value = (factor × value) + offset

Reference density factor

Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Ref.dens. factor (1869)
Description	Use this function to enter a quantity factor (without time) for the reference density. This multiplication factor is applied over the reference density range.
User entry	Positive floating-point number
Factory setting	1
Additional information	<i>Description</i> Corrected value = (factor × value) + offset

Temperature offset

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

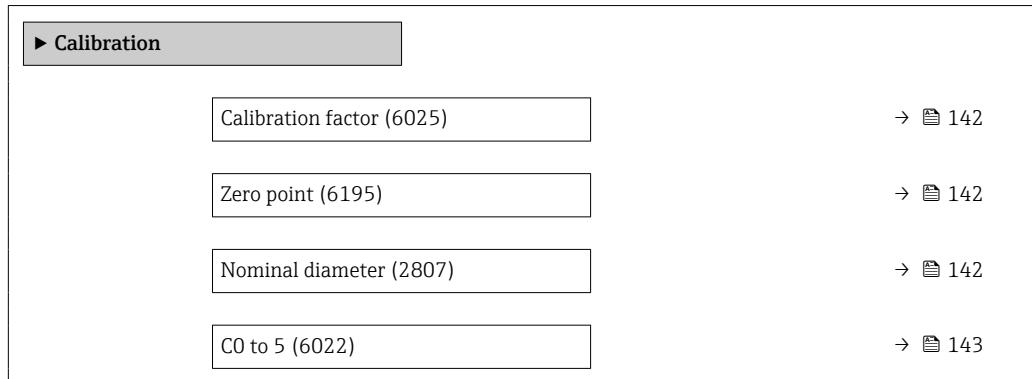
Temperature factor

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

3.2.8 "Calibration" submenu

Navigation

Expert → Sensor → Calibration



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*Description*

The value is also specified on the sensor nameplate.

C0 to 5**Navigation**

Expert → Sensor → Calibration → C0 to 5 (6022)

Description

Displays the current density coefficients C0 to 5 of the sensor.

User interface

Signed floating-point number

Factory setting

Depends on nominal diameter and calibration.

3.2.9 "Testpoints" submenu

The **Testpoints** submenu (→ 143) is used to test the measuring device or the application.

Navigation

Diagnostics → Testpoints

Navigation

Expert → Sensor → Testpoints

► Testpoints	
Raw value mass flow	→ 144
Oscillation frequency 0 to 1	→ 144
Frequency fluctuation 0 to 1	→ 145
Oscillation amplitude 0 to 1	→ 145
Oscillation damping 0 to 1	→ 146
Oscillation damping fluctuation 0 to 1	→ 146
Signal asymmetry 0	→ 146
Torsion signal asymmetry	→ 147
Sensor electronics temperature (ISEM)	→ 147
Carrier pipe temperature	→ 147

Casing pipe temperature	→ 148
Exciter current 0 to 1	→ 148
Test point 0	→ 148
Test point 1	→ 149
Temperature difference measuring tube	→ 149
Temperat. difference meas. tube-carrier	→ 149
Sensor index coil asymmetry	→ 149
Sensor index coil asymmetry reliability	→ 150

Raw value mass flow

Navigation

  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

Description

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.

Dependency

 The unit is taken from the **Mass flow unit** parameter (→ [94](#))

Oscillation frequency 0 to 1

Navigation

  Expert → Sensor → Testpoints → Osc. freq. 0 to 1 (6067)

Prerequisite

- Oscillation frequency 0 is available for all Promass sensors.
- Oscillation frequency 1 is only available for the Promass I and Promass Q sensors.

Description

Shows the current oscillation frequency of the measuring tubes. The frequency depends on the medium density.

User interface

Positive floating point number

Frequency fluctuation 0 to 1

Navigation	 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	 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:</p> <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 ■ Explanation: The fluctuation (standard deviation) of the amplitude is too high. ■ Possible cause: Air or suspended solids in the medium (multiphase)

Oscillation damping 0 to 1

Navigation   Expert → Sensor → Testpoints → Osc. damping 0 to 1 (6038)

Prerequisite

- Oscillation damping 0 is available for all Promass sensors.
- Oscillation damping 1 is only available for the Promass I and Promass Q sensors.

Description Displays the current oscillation damping.

User interface Positive floating-point number

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

Limit values

The damping depends on the transmitter type and model and changes with the type of medium (differences between models: approx. ±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   Expert → Sensor → Testpoints → Osc.damp.fluct0 to 1 (6172)

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

- Tube damping fluctuation 0 is available for all Promass sensors.
- Tube damping fluctuation 1 is only available for the Promass I and Promass Q sensors.

Description Shows the current fluctuation of the oscillation damping.

User interface Signed floating-point number

Signal asymmetry 0

Navigation   Expert → Sensor → Testpoints → Signal asymm. 0 (6013)

Description Displays the relative difference between the oscillation amplitude measured at the inlet and outlet of the sensor.

User interface Signed floating-point number

Additional information*Description*

The measured value is the result of production tolerances of the sensor coils and should remain constant over the life time of a sensor.

Torsion signal asymmetry**Navigation**
  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**
  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 (→  102)
Carrier pipe temperature**Navigation**
  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  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  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  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	 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	 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	 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	 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 Expert → Sensor → Testpoints → SensIndCoilAReli (5952)

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

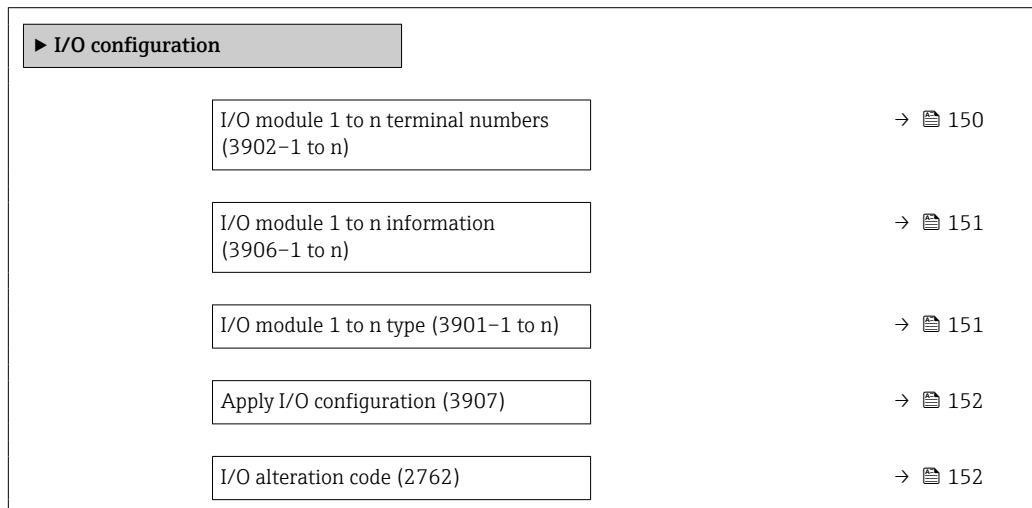
User interface

- Good
- Uncertain
- Bad

Factory setting Bad

3.3 "I/O configuration" submenu

Navigation Expert → I/O config.



I/O module 1 to n terminal numbers

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

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

User interface

- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4)

I/O module 1 to n information

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

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

- User interface**
- Not plugged
 - Invalid
 - Not configurable
 - Configurable
 - PROFINET

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.

The I/O module is configured for .

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"

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

* Visibility depends on order options or device settings

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

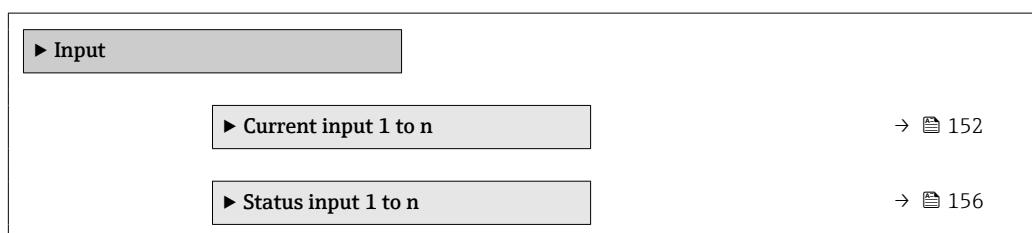
Factory setting 0

Additional information *Description*

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

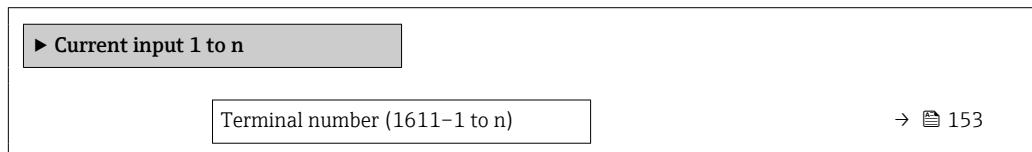
3.4 "Input" submenu

Navigation Expert → Input



3.4.1 "Current input 1 to n" submenu

Navigation Expert → Input → Current input 1 to n



Signal mode (1610-1 to n)	→ 153
Current span (1605-1 to n)	→ 154
0/4 mA value (1606-1 to n)	→ 154
20 mA value (1607-1 to n)	→ 154
Failure mode (1601-1 to n)	→ 155
Failure value (1602-1 to n)	→ 155

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	<ul style="list-style-type: none"> ■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4) *
Additional information	<p>"Not used" option</p> <p>The current input module does not use any terminal numbers.</p>

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	<ul style="list-style-type: none"> ■ Passive ■ Active *
Factory setting	Active

* Visibility depends on order options or device settings

Current span**Navigation**

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

Description

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

Selection

- 4...20 mA (4... 20.5 mA)
- 4...20 mA 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 (→ 161)

0/4 mA value**Navigation**

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

Description

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

User entry

Signed floating-point number

Factory setting

0

Additional information*Current input behavior*

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

- Current span (→ 154)
- Failure mode (→ 155)

Configuration examples

Pay attention to the configuration examples for **4 mA value** parameter (→ 163).

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 (→ 163).

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 (→ 154).

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 (→ 155), 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)	→ 156
Assign status input (1352-1 to n)	→ 156
Value status input (1353-1 to n)	→ 157
Active level (1351-1 to n)	→ 157
Response time status input (1354-1 to n)	→ 158

Terminal number

Navigation

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

Description

Displays the terminal numbers used by the status input module.

User interface

- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

Additional information

"Not used" option

The status input module does not use any terminal numbers.

Assign status input



Navigation

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

Description

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

Selection

- Off
- Reset totalizer 1
- Reset totalizer 2
- Reset totalizer 3
- Reset all totalizers
- Flow override

* Visibility depends on order options or device settings

	<ul style="list-style-type: none"> ■ Zero adjustment ■ Reset weighted averages * ■ Reset weighted averages + totalizer 3 *
Factory setting	Off
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ 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 (→ 105) is activated. <p>i Note on the Flow override (→ 105):</p> <ul style="list-style-type: none"> ■ The Flow override (→ 105) is enabled as long as the level is at the status input (continuous signal). ■ All other assignments react to a change in level (pulse) at the status input.

Value status input

Navigation	  Expert → Input → Status input 1 to n → Val.stat.inp. (1353–1 to n)
Description	Displays the current input signal level.
User interface	<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

* Visibility depends on order options or device settings

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

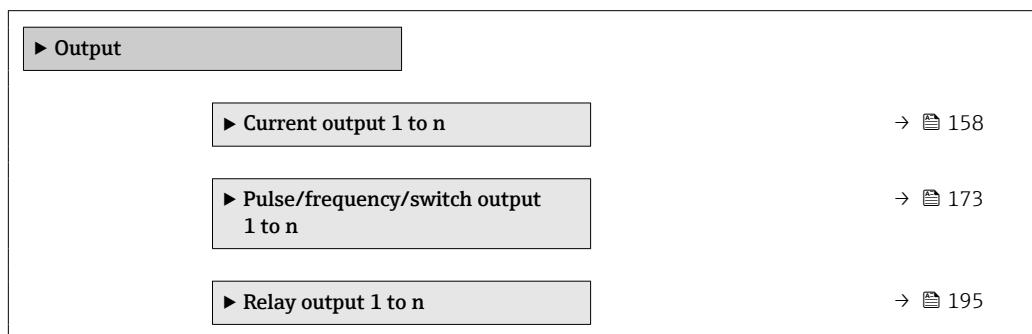
Factory setting

50 ms

3.5 "Output" submenu

Navigation

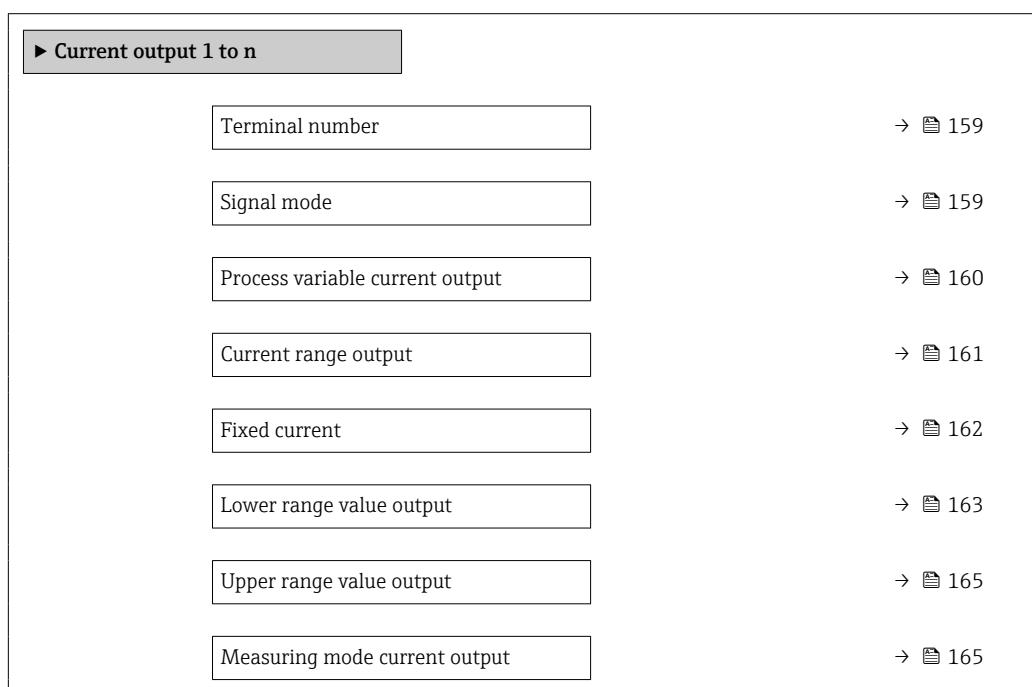
Expert → Output



3.5.1 "Current output 1 to n" submenu

Navigation

Expert → Output → Curr.output 1 to n



Damping current output	→ 170
Failure behavior current output	→ 171
Failure current	→ 172
Output current	→ 172
Measured current	→ 173

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
 - 26-27 (I/O 1)
 - 24-25 (I/O 2)
 - 22-23 (I/O 3)
 - 20-21 (I/O 4) *

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

* Visibility depends on order options or device settings

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 (→ 23)

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 *

* Visibility depends on order options or device settings

- 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.

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)

* Visibility depends on order options or device settings

Additional information**Description**

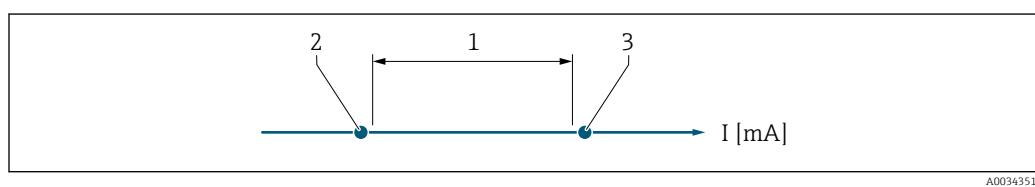
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 171).
- If the measured value is outside the measuring range, the **△S441 Current output 1 to n** diagnostic message is displayed.
- The measuring range is specified via the **Lower range value output** parameter (→ 163) and **Upper range value output** parameter (→ 165).

"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 162).

Example

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



- 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

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 (→ 161).

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 (→ 161):

- 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 (→ 160). 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 (→ 165).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 160).

Current output behavior

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

- Current span (→ 161)
- Failure mode (→ 171)

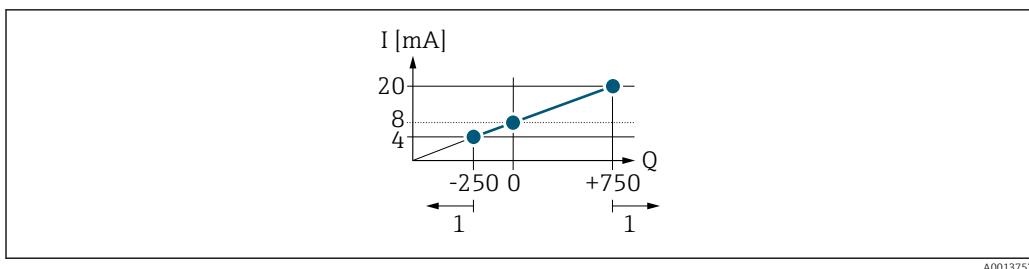
Configuration examples

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 (→ 163) = not equal to zero flow (e.g. -250 m³/h)
- **Upper range value output** parameter (→ 165) = not equal to zero flow (e.g. +750 m³/h)
- Calculated current value = 8 mA at zero flow



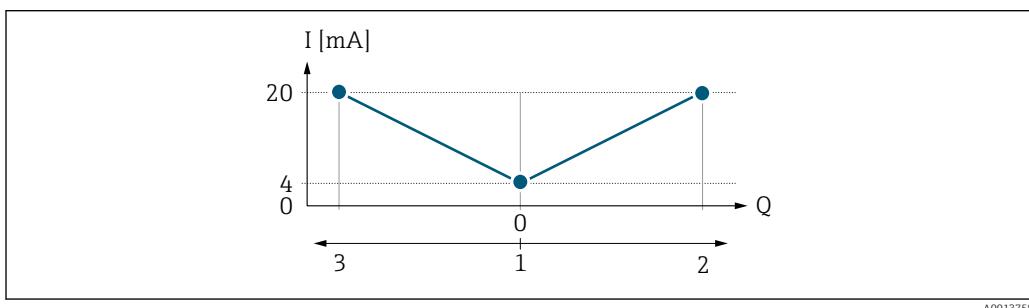
A0013757

- Q Flow
- I Current
- 1 Measuring range is exceeded or undershot

The operational range of the measuring device is defined by the values entered for the **Lower range value output** parameter (→ 163) and **Upper range value output** parameter (→ 165). 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



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 (→ 163) and **Upper range value output** parameter (→ 165) must have the same algebraic sign. The value for the **Upper range value output** parameter (→ 165) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (→ 165) (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 → 165.

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 (→ 161):

- 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 → 360

Additional information *Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 160). 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 (→ 163).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 160).

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 (→ 165), different algebraic signs cannot be entered for the values for the **Lower range value output** parameter (→ 163) and **Upper range value output** parameter (→ 165). 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 (→ 163).

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 (→ 160):

- 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 *

i Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry**: Value 1 display parameter (→ 23)

One of the following options is selected in the **Current span** parameter (→ 161):

- 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

i The process variable that is assigned to the current output via the **Assign current output** parameter (→ 160) is displayed below the parameter.

"Forward flow" option

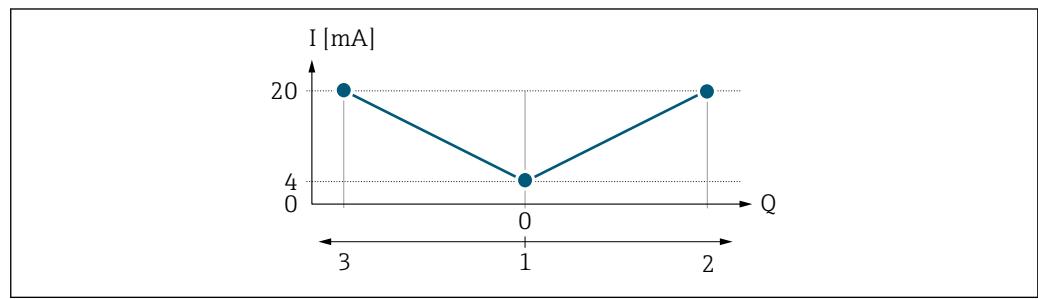
The current output signal is proportional to the process variable assigned. The measuring range is defined by the values that are assigned to the **Lower range value output** parameter (→ 163) and the **Upper range value output** parameter (→ 165).

* 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 **$\Delta S441$ Current output 1 to n** diagnostic message is output.

"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 (\rightarrow 163) and **Upper range value output** parameter (\rightarrow 165) must have the same algebraic sign.
- The value for the **Upper range value output** parameter (\rightarrow 165) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (\rightarrow 165) (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 **$\Delta S441$ Current output 1 to n** diagnostic message is displayed.

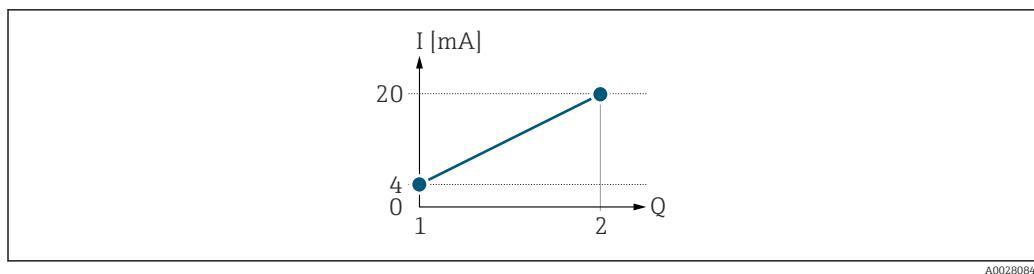
In the event of prolonged and undesired reverse flow, flow values can accumulate in the buffer memory. Due to the configuration of the current output, these values are not factored in, however, i.e. there is no compensation for the reverse flow.

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

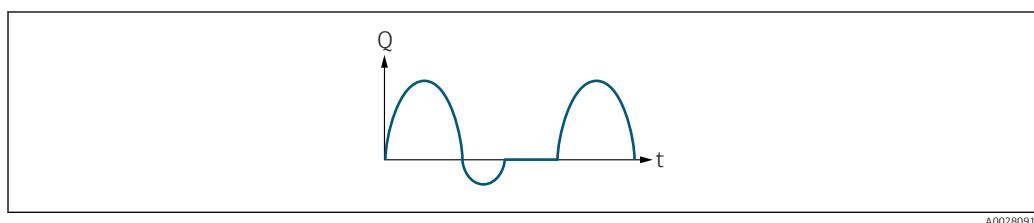
Examples of how the current output behaves

Example 1

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

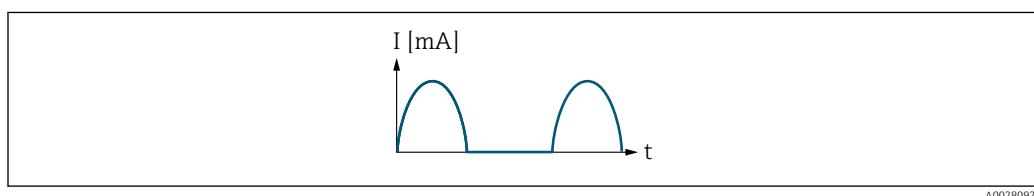
**Fig 4 Measuring range***I Current**Q Flow**1 Lower range value (Start of measuring range output)**2 Upper range value (end of measuring range output)*

With the following flow response:

**Fig 5 Flow response***Q Flow**t Time*

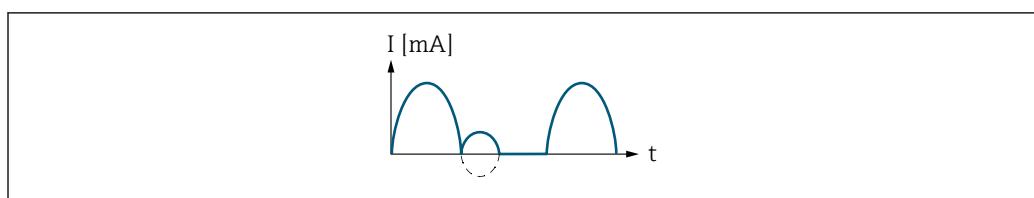
With **Forward flow** option

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

*I Current**t Time*

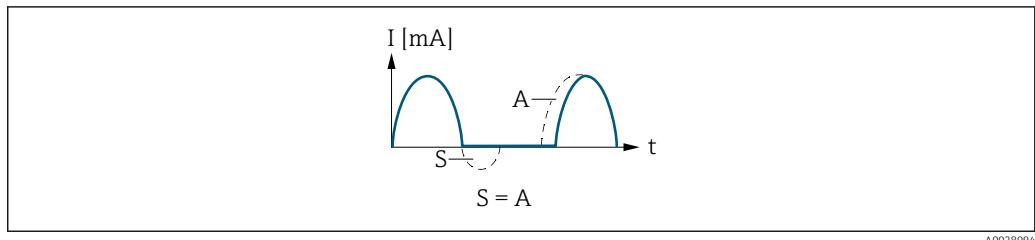
With **Forward/Reverse flow** option

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

*I Current**t Time*

With **Reverse flow compensation** option

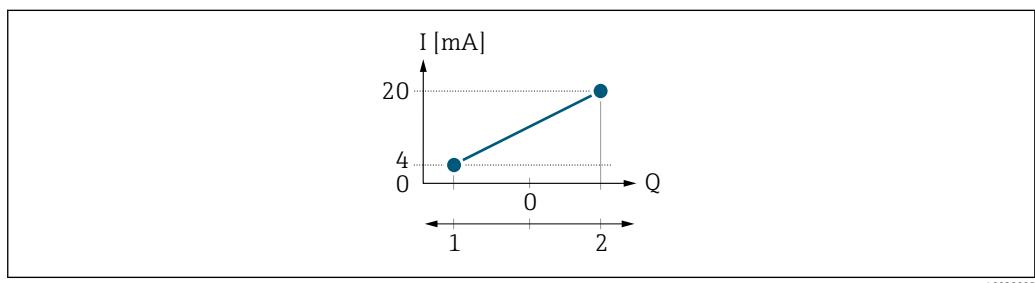
Flow components outside the measuring span are buffered, balanced and output after a maximum delay of 60 s.



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

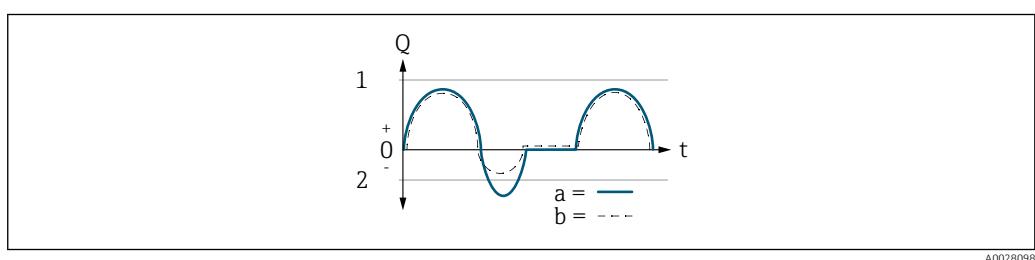
Example 2

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)

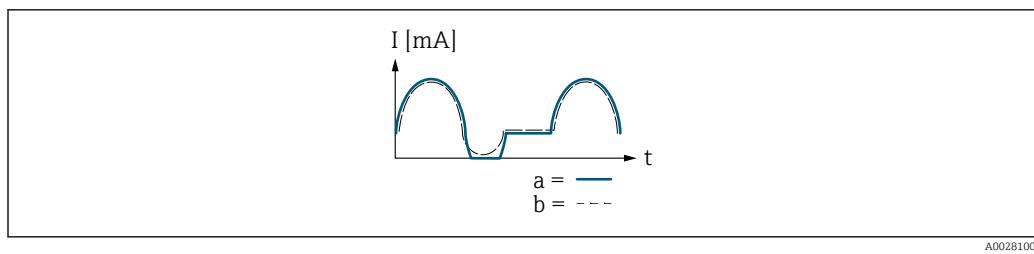
With flow a (-) outside, b (- -) inside the measuring range



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 (-): 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

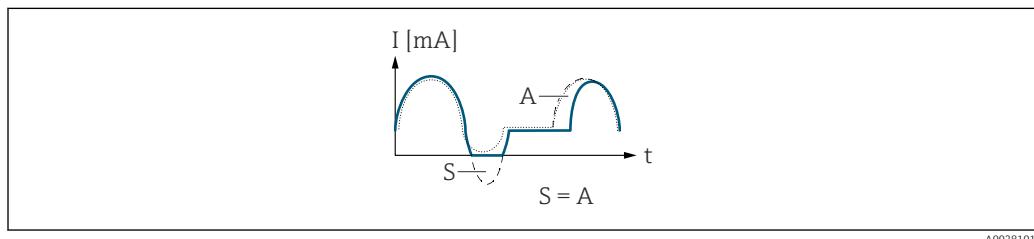
A0028100

With Forward/Reverse flow option

This option cannot be selected here since the values for the **Lower range value output** parameter (\rightarrow 163) and **Upper range value output** parameter (\rightarrow 165) 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

A0028101

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 (\rightarrow 160) and one of the following options is selected in the **Current span** parameter (\rightarrow 161):

- 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**

Diagram: 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 (→ 160) and one of the following options is selected in the **Current span** parameter (→ 161):

- 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 (→ 161).

"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 (→ 161).

"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 (→ 172).

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 (→ 171).

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)

→  174

Signal mode (0490–1 to n)

→  175

Operating mode (0469–1 to n)

→  175

Assign pulse output (0460–1 to n)

→  177

Pulse scaling (0455–1 to n)

→  177

Pulse width (0452–1 to n)

→  178

Measuring mode (0457–1 to n)

→  179

Failure mode (0480–1 to n)

→  179

Pulse output 1 to n (0456–1 to n)

→  180

Assign frequency output (0478–1 to n)

→  181

Minimum frequency value
(0453–1 to n)

→  182

Maximum frequency value
(0454–1 to n)

→  182

Measuring value at minimum
frequency (0476–1 to n)

→  183

Measuring value at maximum
frequency (0475–1 to n)

→  183

Measuring mode (0479-1 to n)	→ 183
Damping output (0477-1 to n)	→ 185
Response time (0491-1 to n)	→ 186
Failure mode (0451-1 to n)	→ 187
Failure frequency (0474-1 to n)	→ 187
Output frequency (0471-1 to n)	→ 188
Switch output function (0481-1 to n)	→ 188
Assign diagnostic behavior (0482-1 to n)	→ 189
Assign limit (0483-1 to n)	→ 189
Switch-on value (0466-1 to n)	→ 192
Switch-off value (0464-1 to n)	→ 192
Assign flow direction check (0484-1 to n)	→ 193
Assign status (0485-1 to n)	→ 193
Switch-on delay (0467-1 to n)	→ 193
Switch-off delay (0465-1 to n)	→ 194
Failure mode (0486-1 to n)	→ 194
Switch state (0461-1 to n)	→ 194
Invert output signal (0470-1 to n)	→ 195

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	<ul style="list-style-type: none"> ■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4) *
-----------------------	---

Additional information	<p>"Not used" option</p> <p>The pulse/frequency/switch output module does not use any terminal numbers.</p>
-------------------------------	---

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	<ul style="list-style-type: none"> ■ Passive * ■ Active * ■ Passive NE
------------------	---

Factory setting	Passive
------------------------	---------

Operating mode	
-----------------------	---

Navigation	 Expert → Output → PFS output 1 to n → Operating mode (0469-1 to n)
-------------------	--

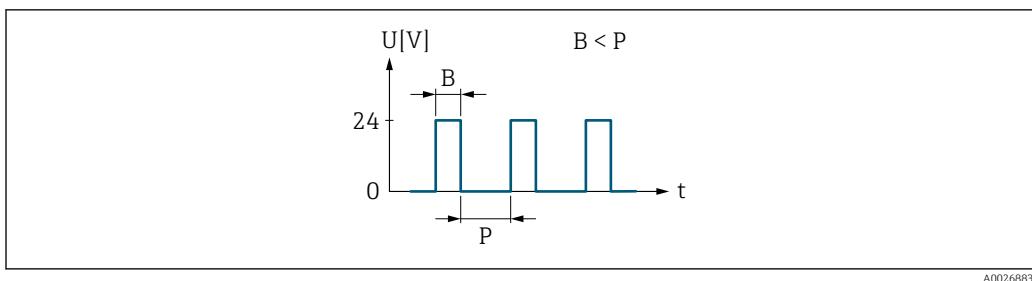
Description	Use this function to select the operating mode of the output as a pulse, frequency or switch output.
--------------------	--

Selection	<ul style="list-style-type: none"> ■ Pulse ■ Frequency ■ Switch
------------------	--

Factory setting	Pulse
------------------------	-------

Additional information	<p>"Pulse" option</p> <p>Quantity-dependent pulse with configurable pulse width</p> <ul style="list-style-type: none"> ■ 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. <p>Example</p> <ul style="list-style-type: none"> ■ 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

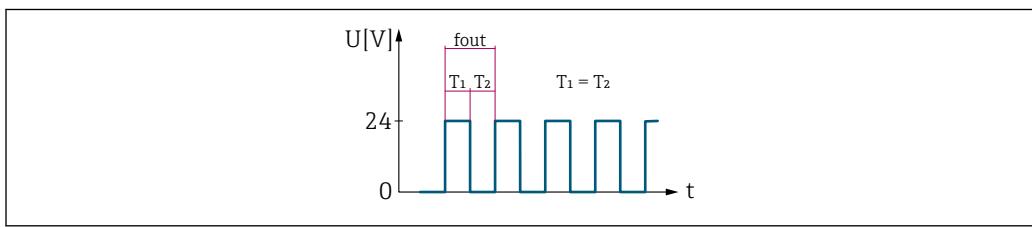
"Frequency" option

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 1000 g/s
- Output frequency approx. 1000 Hz



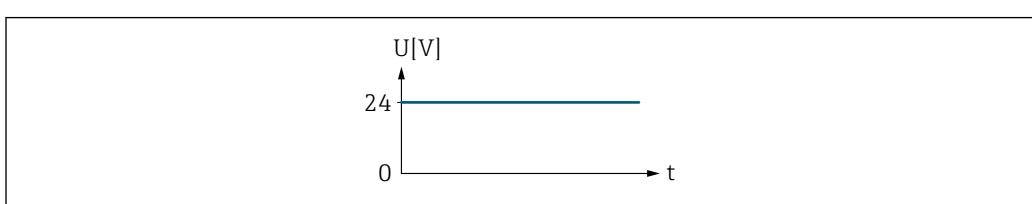
■ 8 Flow-proportional frequency output

"Switch" option

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

Example

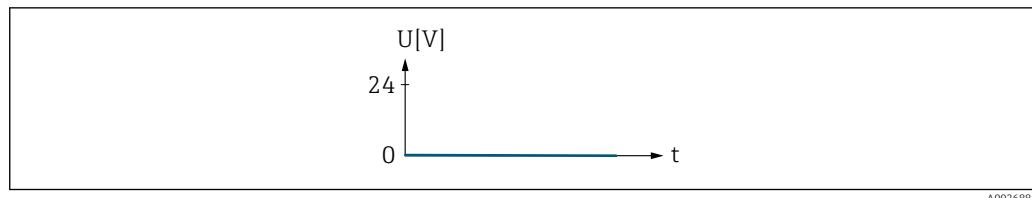
Alarm response without alarm



■ 9 No alarm, high level

Example

Alarm response in case of alarm



A0026885

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 (→ 175).

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 (→ 175) and a process variable is selected in the **Assign pulse output** parameter (→ 177).

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 → [361](#)

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.

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 (→ [175](#)) and a process variable is selected in the **Assign pulse output** parameter (→ [177](#)).

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

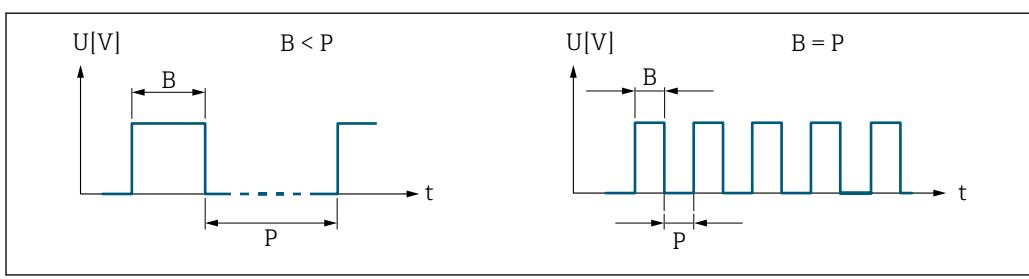
User entry 0.05 to 2 000 ms

Factory setting 100 ms

Additional information

Description

- Define how long a pulse is (duration).
- The maximum pulse rate is defined by $f_{\max} = 1 / (2 \times \text{pulse width})$.
- The interval between two pulses lasts at least as long as the set pulse width.
- The maximum flow is defined by $Q_{\max} = f_{\max} \times \text{pulse value}$.
- If the flow exceeds these limit values, the measuring device displays the **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 (→ 175), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse output** parameter (→ 177):

- 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 (→ 165)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 165)

Failure mode

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

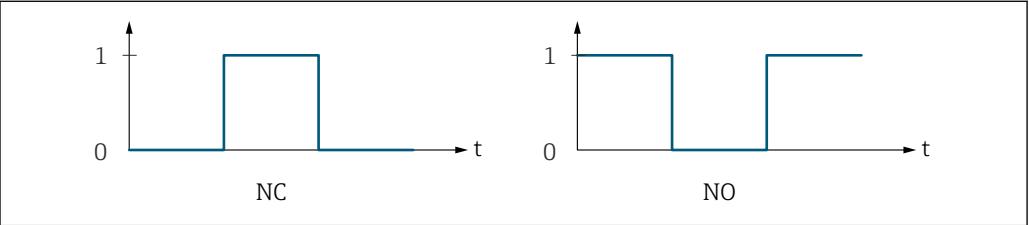
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 175) and a process variable is selected in the **Assign pulse output** parameter (→ 177).

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 (→ 175) 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. <div style="border: 1px solid black; padding: 10px; margin-top: 10px;">  <p>A0028726</p> <table border="0"> <tr> <td>0</td> <td>Non-conductive</td> </tr> <tr> <td>1</td> <td>Conductive</td> </tr> <tr> <td>NC</td> <td>NC contact (normally closed)</td> </tr> <tr> <td>NO</td> <td>NO contact (normally open)</td> </tr> </table> </div>	0	Non-conductive	1	Conductive	NC	NC contact (normally closed)	NO	NO contact (normally open)
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 (→ [195](#)) 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 (→ [179](#))) 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 (→ 175), 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 (→ 23)

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 (→ 175) and a process variable is selected in the **Assign frequency output** parameter (→ 181).

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 (→ 175) and a process variable is selected in the **Assign frequency output** parameter (→ 181).

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 (→ 175) and a process variable is selected in the **Assign frequency output** parameter (→ 181).**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 (→ 181).

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 (→ 175) and a process variable is selected in the **Assign frequency output** parameter (→ 181).**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 (→ 181).

Measuring mode

**Navigation** Expert → Output → PFS output 1 to n → Measuring mode (0479–1 to n)**Prerequisite** In the **Operating mode** parameter (→ 175), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→ 181):

- 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 *

i Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry**: Value 1 display parameter (→ 23)

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

i For a detailed description of the options available, see the **Measuring mode** parameter (→ 165)

Examples

i For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 165)

* 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 (→ 175), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→ 181):

- 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 (→ 23)

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.

Response time

Navigation

Expert → Output → PFS output 1 to n → Response time (0491-1 to n)

Prerequisite

In the **Operating mode** parameter (→ 175), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→ 181):

- 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 *

i Detailed description of the options **Oscillation frequency**, **Oscillation amplitude**, **Oscillation damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 23)

Description

Displays the response time. This specifies how quickly the pulse/frequency/switch output reaches the measured value change of 63 % of 100 % of the measured value change.

User interface

Positive floating-point number

* Visibility depends on order options or device settings

Additional information*Description*

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

- Damping of pulse/frequency/switch output → [170](#)
and
- Depending on the measured variable assigned to the output.
 - Flow damping
or
 - Density damping
or
 - Temperature damping

Failure mode**Navigation**

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

Prerequisite

The **Frequency** option is selected in the **Operating mode** parameter (→ [175](#)) and a process variable is selected in the **Assign frequency output** parameter (→ [181](#)).

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 (→ [187](#)) 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 (→ [175](#)), the **Frequency** option is selected, in the **Assign frequency output** parameter (→ [181](#)) a process variable is selected, and in the **Failure mode** parameter (→ [187](#)), 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 (→  175), 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 (→  175).
Description	Use this function to select a function for the switch output.
Selection	<ul style="list-style-type: none">▪ Off▪ On▪ Diagnostic behavior▪ Limit▪ Flow direction check▪ Status
Factory setting	Off
Additional information	<p>Selection</p> <ul style="list-style-type: none">▪ 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 (→ 175), the **Switch** option is selected.
- In the **Switch output function** parameter (→ 188), 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 (→ 175), the **Switch** option is selected.
- In the **Switch output function** parameter (→ 188), the **Limit** option is selected.

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

Selection

- Mass flow
- Volume flow
- Corrected volume flow *
- Target mass flow *
- Carrier mass flow *
- Target volume flow *
- Carrier volume flow *
- Target corrected volume flow *
- Carrier corrected volume flow *
- Density
- Reference density *
- Reference density alternative *
- GSV flow
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water volume flow *
- Oil corrected volume flow *
- Water corrected volume flow *
- 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

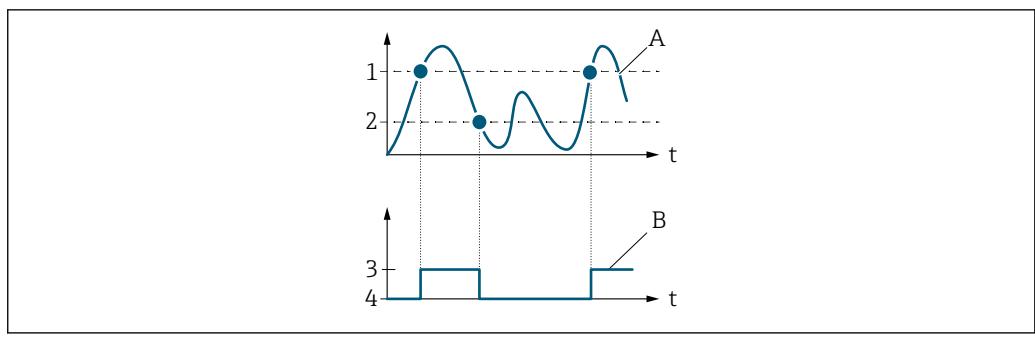
Volume flow

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

* Visibility depends on order options or device settings

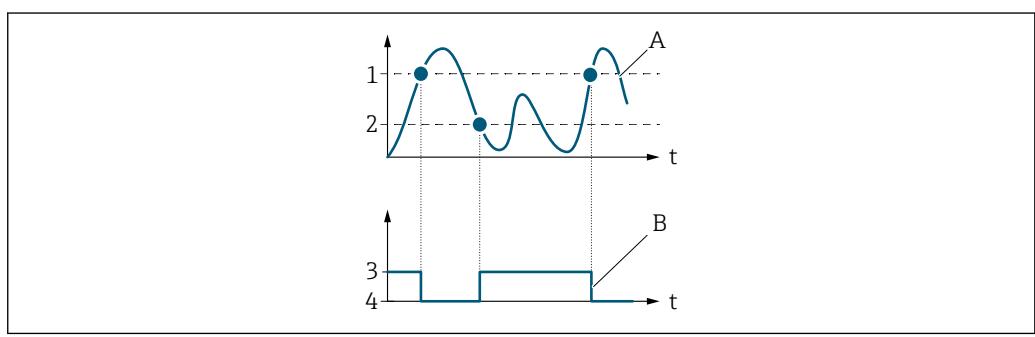


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- 1 Switch-on value
- 2 Switch-off value
- 3 Conductive
- 4 Non-conductive
- A Process variable
- B Status output

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

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

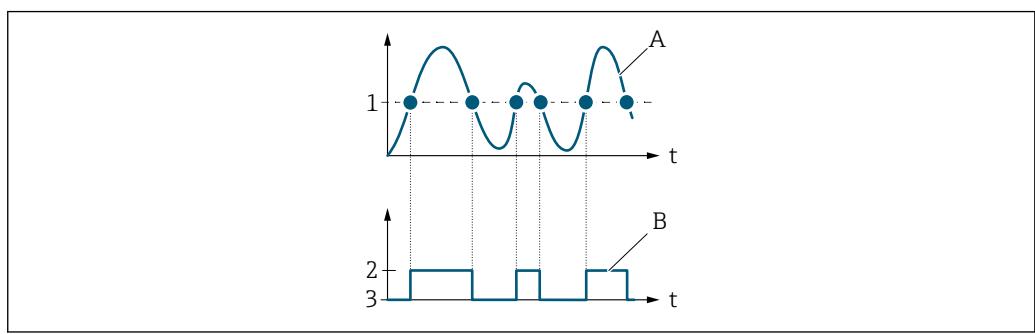


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- 1 Switch-off value
- 2 Switch-on value
- 3 Conductive
- 4 Non-conductive
- A Process variable
- B Status output

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

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



A0026893

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

Switch-on value**Navigation**

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

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ 175).
- The **Limit** option is selected in the **Switch output function** parameter (→ 188).

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 depends on the process variable selected in the **Assign limit** parameter (→ 189).

Switch-off value**Navigation**

Expert → Output → PFS output 1 to n → Switch-off value (0464-1 to n)

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ 175).
- The **Limit** option is selected in the **Switch output function** parameter (→ 188).

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 depends on the process variable selected in the **Assign limit** parameter (→ 189).

Assign flow direction check

Navigation Expert → Output → PFS output 1 to n → Assign dir.check (0484-1 to n)

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ [175](#)).
- The **Flow direction check** option is selected in the **Switch output function** parameter (→ [188](#)).

Description Use this function to select a process variable for monitoring the flow direction.

Selection

- Off
- Volume flow
- Mass flow
- Corrected volume flow *

Factory setting Mass flow

Assign status

Navigation Expert → Output → PFS output 1 to n → Assign status (0485-1 to n)

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ [175](#)).
- The **Status** option is selected in the **Switch output function** parameter (→ [188](#)).

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

Selection

- Partially filled pipe detection
- Low flow cut off
- Binary output *
- Binary output *
- Binary output *

Factory setting Partially filled pipe detection

Additional information *Selection*

If empty pipe detection or low flow cut off are active, the output is conductive. Otherwise, the switch output is non-conductive.

Switch-on delay

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

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ [175](#)).
- The **Limit** option is selected in the **Switch output function** parameter (→ [188](#)).

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

* Visibility depends on order options or device settings

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-off delay



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

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ [175](#)).
- The **Limit** option is selected in the **Switch output function** parameter (→ [188](#)).

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 (→ [175](#)).

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.

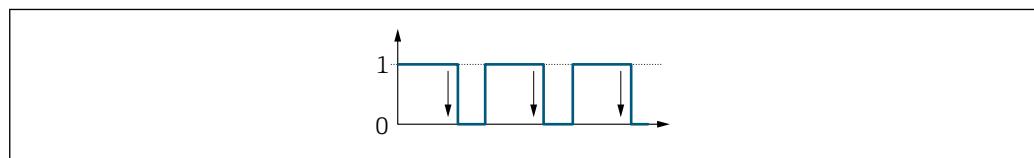
Selection

- No
- Yes

Factory setting No

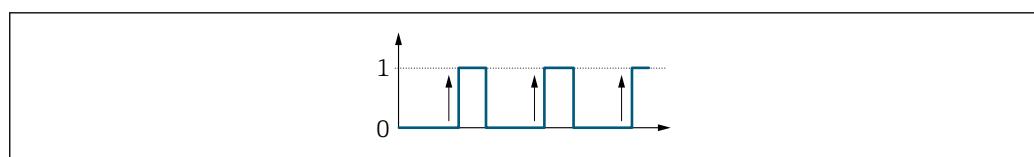
Additional information

Selection
No option (passive - negative)



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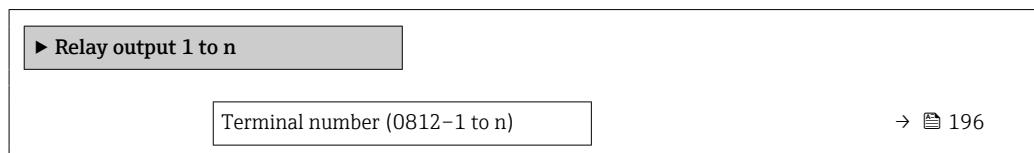
Yes option (passive - positive)



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3.5.3 "Relay output 1 to n" submenu

Navigation Expert → Output → Relay output 1 to n



Relay output function (0804-1 to n)	→ 196
Assign flow direction check (0808-1 to n)	→ 197
Assign limit (0807-1 to n)	→ 197
Assign diagnostic behavior (0806-1 to n)	→ 198
Assign status (0805-1 to n)	→ 199
Switch-off value (0809-1 to n)	→ 199
Switch-off delay (0813-1 to n)	→ 200
Switch-on value (0810-1 to n)	→ 200
Switch-on delay (0814-1 to n)	→ 201
Failure mode (0811-1 to n)	→ 201
Switch state (0801-1 to n)	→ 202
Powerless relay status (0816-1 to n)	→ 202

Terminal number

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

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

User interface

- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4)

Additional information

"Not used" option

The relay output module does not use any terminal numbers.

Relay output function



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

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

Selection	<ul style="list-style-type: none"> ■ Closed ■ Open ■ Diagnostic behavior ■ Limit ■ Flow direction check ■ Status
Factory setting	Closed
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ 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 (→ 196).
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 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 (→ 196).

* Visibility depends on order options or device settings

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 *
- 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 (→ 196), the **Diagnostic behavior** option is selected.

* Visibility depends on order options or device settings

Description	Use this function to select the category of the diagnostic events that are displayed for the relay output.
Selection	<ul style="list-style-type: none"> ▪ Alarm ▪ Alarm or warning ▪ Warning
Factory setting	Alarm
Additional information	<p><i>Description</i></p> <p> If no diagnostic event is pending, the relay output is closed and conductive.</p> <p><i>Selection</i></p> <ul style="list-style-type: none"> ▪ 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 (→ 196), the Digital Output option is selected.
Description	Use this function to select the device status for the relay output.
Selection	<ul style="list-style-type: none"> ▪ Partially filled pipe detection ▪ Low flow cut off ▪ Binary output * ▪ Binary output * ▪ Binary output *
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 (→ 196), 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

* Visibility depends on order options or device settings

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 is dependent on the process variable selected in the Assign limit parameter (→ 197).</p>

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 (→ 196), 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 (→ 196).
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 (→ 197).

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 (→ 196), 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.

3.6 "Communication" submenu

Navigation  Expert → Communication

► Communication	
► Physical block	→  203
► Application relation	→  209
► WLAN settings	→  211
► Web server	→  220

3.6.1 "Physical block" submenu

Navigation

Expert → Communication → Physical block

► Physical block	
PROFINET device name (2071)	→ 204
Device tag (4301)	→ 204
Descriptor (4311)	→ 204
Device location (4308)	→ 205
IPv4 address (4316)	→ 205
IPv4 default gateway (4318)	→ 205
IPv4 subnet mask (4317)	→ 205
Installation date (4312)	→ 206
Serial number (4307)	→ 206
Firmware version (4304)	→ 206
Hardware version (4303)	→ 206
Last change (4315)	→ 207
Manufacturer (4305)	→ 207
Device type (4306)	→ 207
Profile (4310)	→ 207
Profile revision (4319)	→ 208
Startup settings (4313)	→ 208
Alarm delay (4314)	→ 208
Configuration counter (4309)	→ 208
Target mode (4302)	→ 209

PROFINET device name

Navigation   Expert → Communication → Physical block → PROFINET DevName (2071)

Description Displays a unique name for the measuring point so it can be identified quickly within the plant.

User entry Max. 240 characters such as lower-case letters or numbers

Factory setting eh-promass500-xxxxx

Additional information *Description*

The device tag corresponds to the device name ("Name Of Station" of PROFINET specification). The device name can be adjusted via DIP switch or the automation system.

Factory setting

Structure of the device tag:

eh-promass500-xxxxx

- eh: Endress+Hauser
- promass: Instrument family
- 500: Transmitter
- xxxx: Serial number of the device

Device tag

Navigation   Expert → Communication → Physical block → Device tag (4301)

Description Enter a name for the measuring point to identify the measuring device in the plant.

User entry Character string comprising numbers, letters and special characters (32)

Factory setting

Descriptor

Navigation   Expert → Communication → Physical block → Descriptor (4311)

Description Enter a description for the measuring point.

User entry Character string comprising numbers, letters and special characters (54)

Factory setting

Device location

Navigation	 Expert → Communication → Physical block → Device location (4308)
Description	Enter the location of the measuring point.
User entry	Character string comprising numbers, letters and special characters (22)
Factory setting	

IPv4 address

Navigation	 Expert → Communication → Physical block → IPv4 address (4316)
Description	Shows the APL port IP address of the measuring device.
User interface	Character string comprising numbers, letters and special characters
Factory setting	000.000.000.000

IPv4 default gateway

Navigation	 Expert → Communication → Physical block → IPv4 gateway (4318)
Description	Shows the IP address of the default gateway for the APL port of the measuring device.
User interface	Character string comprising numbers, letters and special characters
Factory setting	000.000.000.000

IPv4 subnet mask

Navigation	 Expert → Communication → Physical block → IPv4 subnet mask (4317)
Description	Shows the subnet mask for the APL port of the measuring device.
User interface	Character string comprising numbers, letters and special characters
Factory setting	000.000.000.000

Installation date

Navigation	 Expert → Communication → Physical block → InstallationDate (4312)
Description	Enter date, e. g. date when the device was installed or commissioned.
User entry	Character string comprising numbers, letters and special characters (16)
Factory setting	

Serial number

Navigation	 Expert → Communication → Physical block → Serial number (4307)
Description	Shows the serial number of the measuring device.
User interface	Character string comprising numbers, letters and special characters
Factory setting	

Firmware version

Navigation	 Expert → Communication → Physical block → Firmware version (4304)
Description	Shows the device firmware version installed.
User interface	Character string comprising numbers, letters and special characters
Factory setting	00.00.00

Hardware version

Navigation	 Expert → Communication → Physical block → Hardware version (4303)
Description	Shows the hardware version of the measuring device.
User interface	Character string comprising numbers, letters and special characters
Factory setting	00.00.00

Last change

Navigation	  Expert → Communication → Physical block → Last change (4315)
Description	Enter the date when static parameters (e.g. configuration parameters) were last changed.
User entry	Character string comprising numbers, letters and special characters (16)
Factory setting	

Manufacturer

Navigation	  Expert → Communication → Physical block → Manufacturer (4305)
Description	Shows the manufacturer of the measuring device.
User interface	0 to 65 535
Factory setting	17

Device type

Navigation	  Expert → Communication → Physical block → Device type (4306)
Description	Shows the device type assigned by the manufacturer to the measuring device.
User interface	Character string comprising numbers, letters and special characters
Factory setting	Promass 300 500

Profile

Navigation	  Expert → Communication → Physical block → Profile (4310)
Description	Shows the profile ID of the PA profile.
User interface	0 to 65 535
Factory setting	38656

Profile revision

Navigation   Expert → Communication → Physical block → Profile revision (4319)

User interface 0 to 65 535

Factory setting 1 026

Startup settings

Navigation   Expert → Communication → Physical block → Startup settings (4313)

Description Indicates which configuration settings (factory settings unless otherwise specified by the controller) are applied on startup.

Selection

- None applied
- Only units applied
- All applied

Factory setting None applied

Alarm delay

Navigation   Expert → Communication → Physical block → Alarm delay (4314)

Description Enter a delay to suppress momentarily pending diagnostic messages.

User entry 0 to 60

Factory setting 0

Configuration counter

Navigation   Expert → Communication → Physical block → Config. counter (4309)

Description Shows the number of changes made to static parameters (e.g. configuration parameters).

User interface 0 to 65 535

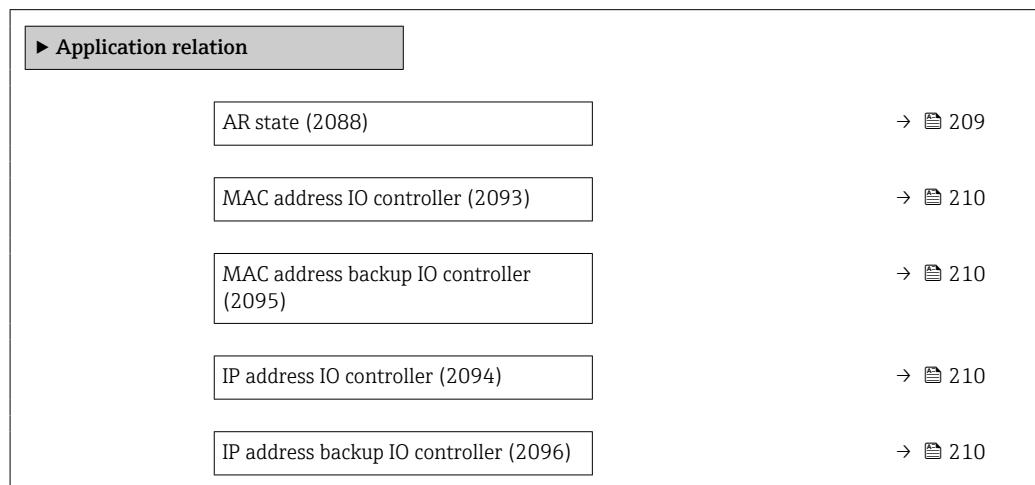
Factory setting 0

Target mode

Navigation	 Expert → Communication → Physical block → Target mode (4302)
Description	Select the target mode. The selected mode applies to all output function blocks.
Selection	<ul style="list-style-type: none"> ▪ Automatic ▪ Out of service
Factory setting	Automatic

3.6.2 "Application relation" submenu

Navigation  Expert → Communication → Application relat.



AR state

Navigation	 Expert → Communication → Application relat. → AR state (2088)
Description	Displays whether an active AR (Application Relation) connection has been established.
User interface	<ul style="list-style-type: none"> ▪ Active ▪ Not active ▪ Redundancy 1AR active ▪ Redundancy 2AR active
Factory setting	Not active

MAC address IO controller

Navigation  Expert → Communication → Applicat. relat. → MAC IO contr. (2093)

Description Shows the MAC address of the only or of the primary IO controller.

User interface Character string comprising numbers, letters and special characters

Factory setting 0x00

MAC address backup IO controller

Navigation  Expert → Communication → Applicat. relat. → MAC backup IO c. (2095)

Description Shows the MAC address of the backup IO controller.

User interface Character string comprising numbers, letters and special characters

Factory setting 0x00

IP address IO controller

Navigation  Expert → Communication → Applicat. relat. → IP IO controller (2094)

Description Shows the IP address of the only or of the primary IO controller.

User interface Character string comprising numbers, letters and special characters

Factory setting 0x00

IP address backup IO controller

Navigation  Expert → Communication → Applicat. relat. → IP backup IO c. (2096)

Description Shows the IP address of the backup IO controller.

User interface Character string comprising numbers, letters and special characters

Factory setting 0x00

3.6.3 "WLAN settings" wizard

Navigation

Expert → Communication → WLAN settings

► WLAN settings	
WLAN (2702)	→ 212
WLAN mode (2717)	→ 212
SSID name (2714)	→ 212
Network security (2705)	→ 212
Security identification (2718)	→ 213
User name (2715)	→ 213
WLAN password (2716)	→ 214
WLAN IP address (2711)	→ 214
WLAN MAC address (2703)	→ 214
WLAN subnet mask (2709)	→ 214
WLAN MAC address (2703)	→ 214
WLAN passphrase (2706)	→ 215
WLAN MAC address (2703)	→ 214
Assign SSID name (2708)	→ 215
SSID name (2707)	→ 215
2.4 GHz WLAN channel (2704)	→ 216
Select antenna (2713)	→ 216
Connection state (2722)	→ 216
Received signal strength (2721)	→ 217
WLAN IP address (2711)	→ 214
Gateway IP address (2719)	→ 217
IP address domain name server (2720)	→ 217

WLAN**Navigation**

Expert → Communication → WLAN settings → WLAN (2702)

Description

Use this function to enable and disable the WLAN connection.

Selection

- Disable
- Enable

Factory setting

Enable

WLAN mode**Navigation**

Expert → Communication → WLAN settings → WLAN mode (2717)

Description

Use this function to select the WLAN mode.

Selection

- WLAN access point
- WLAN Client

Factory setting

WLAN access point

SSID name**Navigation**

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

Prerequisite

The client is activated.

Description

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

User entry

–

Factory setting

–

Network security**Navigation**

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

Description

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

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

* Visibility depends on order options or device settings

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 MAC⁸⁾ 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)

8) Media Access Control

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 (→ 212).
Description	Use this function to enter the network key.
User entry	8 to 32-digit character string comprising numbers, letters and special characters (without spaces)
Factory setting	Serial number of the measuring device (e.g. L100A802000)

**Assign SSID name**

Navigation	Expert → Communication → WLAN settings → Assign SSID name (2708)
Description	Use this function to select which name is used for the SSID ⁹⁾ .
Selection	<ul style="list-style-type: none"> ■ Device tag ■ User-defined
Factory setting	User-defined
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ The User-defined option is selected in the Assign SSID name parameter (→ 215). ■ The WLAN access point option is selected in the WLAN mode parameter (→ 212).
Description	Use this function to enter a user-defined SSID name.
User entry	Max. 32-digit character string comprising numbers, letters and special characters

9) Service Set Identifier

Factory setting	EH_device designation_last 7 digits of the serial number (e.g. EH_Promass_500_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

Factory setting 6

Additional information *Description*



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

Select antenna



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

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

Selection

- External antenna
- Internal antenna

Factory setting Internal antenna

Connection state

Navigation Expert → Communication → WLAN settings → Connection state (2722)

Description The connection status is displayed.

User interface

- Connected
- Not connected

Factory setting Not connected

Received signal strength

Navigation	  Expert → Communication → WLAN settings → Rec.sig.strength (2721)
Description	Displays the signal strength received.
User interface	<ul style="list-style-type: none"> ■ Low ■ Medium ■ High
Factory setting	High

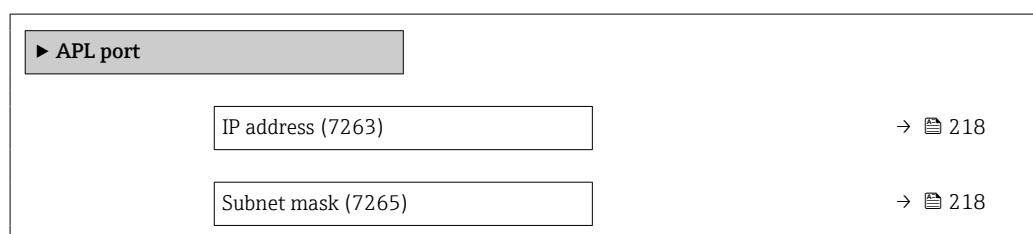
Gateway IP address

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

3.6.4 "APL port" submenu

Navigation  Setup → Communication → APL port

Default gateway (7264)	→ 218
MAC address (7262)	→ 218

IP address

Navigation Setup → Communication → APL port → IP address (7263)

Description Enter the IP address of the measuring device.

User entry Character string comprising numbers, letters and special characters (15)

Factory setting 0.0.0.0

Default gateway

Navigation Setup → Communication → APL port → Default gateway (7264)

Description Enter IP address for the default gateway of the measuring device.

User entry Character string comprising numbers, letters and special characters (15)

Factory setting 0.0.0.0

Subnet mask

Navigation Setup → Communication → APL port → Subnet mask (7265)

Description Enter subnet mask of the measuring device.

User entry Character string comprising numbers, letters and special characters (15)

Factory setting 255.255.255.0

MAC address

Navigation Setup → Communication → APL port → MAC Address (7262)

Description Shows the MAC address of the measuring device.

User interface Character string comprising numbers, letters and special characters

Factory setting**3.6.5 "Service interface" submenu***Navigation*  Setup → Communication → ServiceInterface

► Service interface	
IP address (7209)	→  219
Subnet mask (7211)	→  219
Default gateway (7210)	→  220
MAC address (7214)	→  220

IP address**Navigation**  Setup → Communication → ServiceInterface → 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**  Setup → Communication → ServiceInterface → 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   Setup → Communication → ServiceInterface → Default gateway (7210)

Description Display or enter the Default gateway (→ [220](#)).

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

Factory setting 0.0.0.0

MAC address

Navigation   Setup → Communication → ServiceInterface → MAC Address (7214)

Description Displays the MAC¹⁰⁾ address of the measuring device.

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

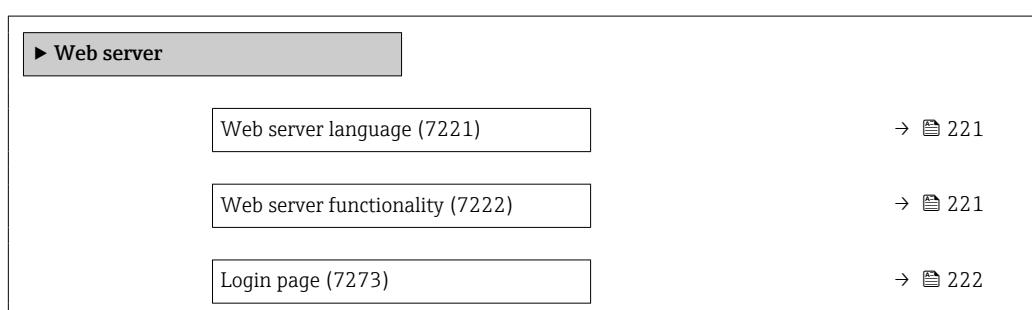
Factory setting Each measuring device is given an individual address.

Additional information *Example*

For the display format
00:07:05:10:01:5F

3.6.6 "Web server" submenu

Navigation   Expert → Communication → Web server



10) Media Access Control

Web server language

Navigation	 Expert → Communication → Web server → Webserv.language (7221)
Description	Set web server language.
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) ■ العربية (Arabic) * ■ Bahasa Indonesia * ■ ภาษาไทย (Thai) * ■ tiếng Việt (Vietnamese) ■ čeština (Czech)
Factory setting	English

Web server functionality



Navigation	 Expert → Communication → Web server → Webserver funct. (7222)
Description	Use this function to switch the Web server on and off.
Selection	<ul style="list-style-type: none"> ■ Off ■ HTML Off ■ On
Factory setting	On

* Visibility depends on order options or device settings

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**

Diagram: 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

3.7 "Analog inputs" submenu

Navigation

Diagram: Expert → Analog inputs

3.7.1 "Analog inputs" submenu

Navigation

Diagram: Expert → Analog inputs → Mass flow

▶ Analog input 1 to n

Assign process variable (11074-1 to n)

→ [Diagram 223](#)

Process value (11071-1 to n)

→ [Diagram 224](#)

Process variable unit (11072-1 to n)

→ [Diagram 224](#)

Damping (11073-1 to n)

→ [Diagram 225](#)

Process value status (11076-1 to n)	→ 225
Process value status (Hex) (11075-1 to n)	→ 225
Simulation (11080-1 to n)	→ 225
Simulation value (11078-1 to n)	→ 226
Simulated status (11079-1 to n)	→ 226

Assign process variable

Navigation

Expert → Analog inputs → Mass flow → Assign variable (11074)

Description

Select a process variable.

User interface

- Mass flow
- Volume flow
- Density
- 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
- Torsion signal asymmetry *
- Exciter current 0
- Exciter current 1
- HBSI
- Current input 1
- Current input 2
- Current input 3
- Application specific output 0
- Application specific output 1
- Inhomogeneous medium index
- Suspended bubbles index
- Test point 0
- Test point 1
- Sensor index coil asymmetry
- Raw value mass flow
- Corrected volume flow

* Visibility depends on order options or device settings

- Target mass flow
- Carrier mass flow
- Target volume flow
- Carrier volume flow
- Target corrected volume flow
- Carrier corrected volume flow
- Reference density
- Reference density alternative
- GSV flow
- GSV flow alternative
- NSV flow
- NSV flow alternative *
- S&W volume flow
- Water cut *
- Oil density
- Water density
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Concentration
- Dynamic viscosity
- Kinematic viscosity
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity

Factory setting

Mass flow

Process value**Navigation** Expert → Analog inputs → Mass flow → Process value (11071)**Description**

Shows the process value reported to the controller for further processing.

User interface

Signed floating-point number

Factory setting

0 kg/h

Process variable unit**Navigation** Expert → Analog inputs → Mass flow → ProcVariableUnit (11072)**Description**

Shows the unit of the process variable.

User interface

0 to 65 535

* Visibility depends on order options or device settings

Factory setting	1.997
------------------------	-------

Damping

Navigation	 Expert → Analog inputs → Mass flow → Damping (11073)
Description	Enter time constant for input damping (PT1 element). Damping reduces the effect of fluctuations in the measured value on the output signal.
User entry	Positive floating-point number
Factory setting	1.0 s

Process value status

Navigation	 Expert → Analog inputs → Mass flow → Proc.ValueStatus (11076)
Description	Shows the status of the process value reported to the controller for further processing ('Good', 'Uncertain', 'Bad').
User interface	<ul style="list-style-type: none">■ Good■ Uncertain■ Bad
Factory setting	Good

Process value status (Hex)

Navigation	 Expert → Analog inputs → Mass flow → ProcValStatusHex (11075)
Description	Shows the status of the process value reported to the controller for further processing (Hex).
User interface	0 to 255
Factory setting	128

Simulation

Navigation	 Expert → Analog inputs → Mass flow → Simulation (11080)
Description	Switch simulation of the analog input on or off (Off = 0, On > 0).

User entry 0 to 255

Factory setting 0

Simulation value

Navigation ☐ Expert → Analog inputs → Mass flow → Simulation value (11078)

Description Enter the simulation value for the selected process variable.

User entry Signed floating-point number

Factory setting 0 kg/h

Simulated status

Navigation ☐ Expert → Analog inputs → Mass flow → Simulated status (11079)

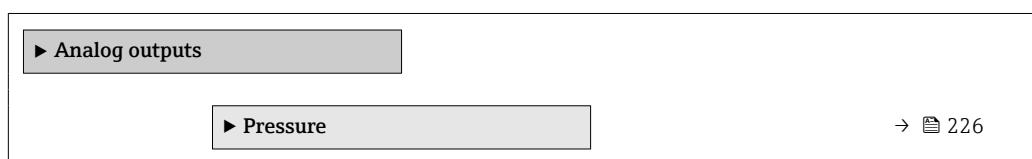
Description Specify the status of the simulated process value (Hex).

User entry 0 to 255

Factory setting 60

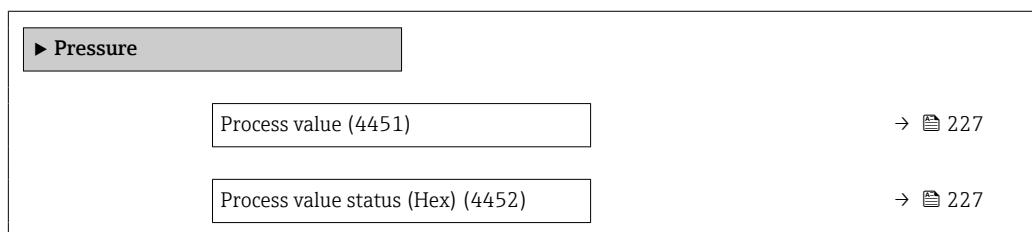
3.8 "Analog outputs" submenu

Navigation ☐ ☐ Expert → Analog outputs



3.8.1 "Pressure" submenu

Navigation ☐ ☐ Expert → Analog outputs → Pressure



Process value status (4458)	→ 227
Process variable unit (4456)	→ 228
Failure behavior delay (4453)	→ 229
Failure behavior (4454)	→ 229
Fixed value (4455)	→ 229
AO block output value (4457)	→ 230
AO block output value status (Hex) (4460)	→ 230
AO block output value status (4461)	→ 230

Process value

Navigation

Expert → Analog outputs → Pressure → Process value (4451)

Description

Shows the process value reported by the controller for further processing.

User entry

Signed floating-point number

Factory setting

0 bar

Process value status (Hex)

Navigation

Expert → Analog outputs → Pressure → ProcValStatusHex (4452)

Description

Shows the status of the process value reported by the controller (Hex).

User entry

0 to 255

Factory setting

128

Process value status

Navigation

Expert → Analog outputs → Pressure → Proc.ValueStatus (4458)

Description

Shows the status of the process value reported by the controller ('Good', 'Uncertain', 'Bad').

User interface	<ul style="list-style-type: none"> ■ Good ■ Uncertain ■ Bad
-----------------------	--

Factory setting	Good
------------------------	------

Process variable unit

Navigation  Expert → Analog outputs → Pressure → ProcVariableUnit (4456)

Description Shows the unit of the process variable.

Selection
Other units
 * None

* Visibility depends on order options or device settings

or

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

* Visibility depends on order options or device settings

or

<i>SI units</i>	<i>US units</i>
% *	

* Visibility depends on order options or device settings

or

<i>SI units</i>	<i>US units</i>
■ kg/Nm ³ *	■ lb/Sft ³ *
■ kg/Nl *	■ RD60°F *
■ g/Scm ³ *	
■ kg/Sm ³ *	
■ RD15°C *	
■ RD20°C *	

* Visibility depends on order options or device settings

or

<i>Other units</i>	
°APIbase *	

* Visibility depends on order options or device settings

or

SI units

- MPa a *
- MPa g *
- kPa a *
- kPa g *
- Pa a *
- Pa g *
- bar *
- bar g *

US units

- psi a *
- psi g *

* Visibility depends on order options or device settings

Factory setting	bar
------------------------	-----

Failure behavior delay

Navigation	Expert → Analog outputs → Pressure → FailBehavDelay (4453)
Description	Enter a delay until in the event of a failure (value with status ‘Bad’) the failure behavior specified applies.
User entry	Positive floating-point number
Factory setting	0 s

Failure behavior

Navigation	Expert → Analog outputs → Pressure → Failure behavior (4454)
Description	Select failure behavior in the event of a failure (value with status ‘Bad’).
Selection	<ul style="list-style-type: none"> ■ Fixed value ■ Last valid value ■ Actual value
Factory setting	Actual value

Fixed value

Navigation	Expert → Analog outputs → Pressure → Fixed value (4455)
Description	Enter value to report in the event of a failure (value with status ‘Bad’).
User entry	Signed floating-point number

Factory setting	0 bar
------------------------	-------

AO block output value

Navigation	 Expert → Analog outputs → Pressure → AOBLOCKOUTVALUE (4457)
Description	Shows the external process value reported to the measuring device for further processing.
User entry	Signed floating-point number
Factory setting	0 bar

AO block output value status (Hex)

Navigation	 Expert → Analog outputs → Pressure → OUTVALSTATUSHEX (4460)
Description	Shows the status of the external process value reported to the measuring device for further processing (Hex).
User entry	0 to 255
Factory setting	128

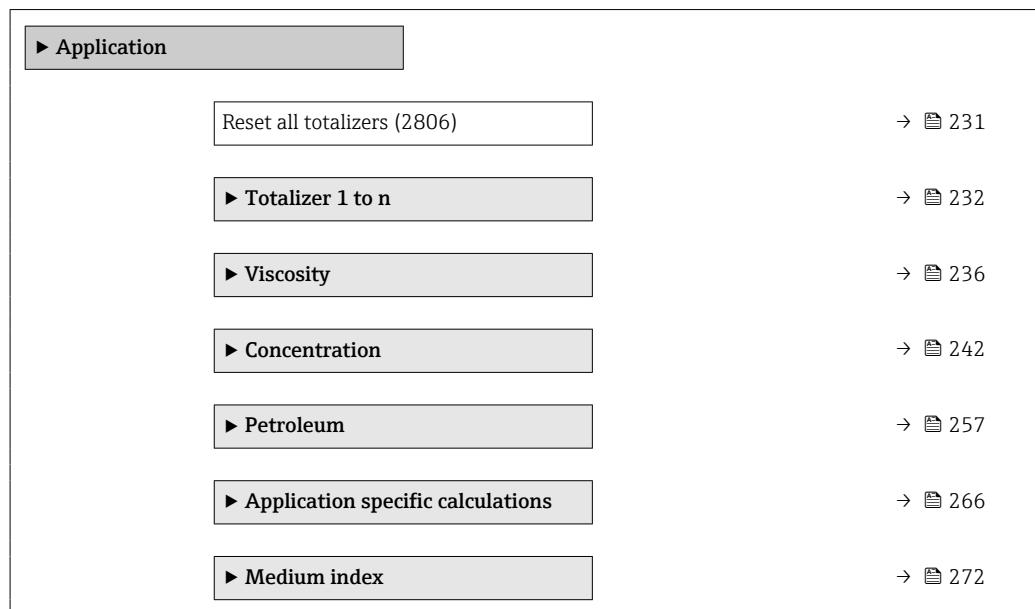
AO block output value status

Navigation	 Expert → Analog outputs → Pressure → OUTVALUESSTATUS (4461)
Description	Shows the status of the external process value reported to the measuring device for further processing ('Good', 'Uncertain', 'Bad').
User interface	<ul style="list-style-type: none">▪ Good▪ Uncertain▪ Bad
Factory setting	Good

3.9 "Application" submenu

Navigation

Expert → Application



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

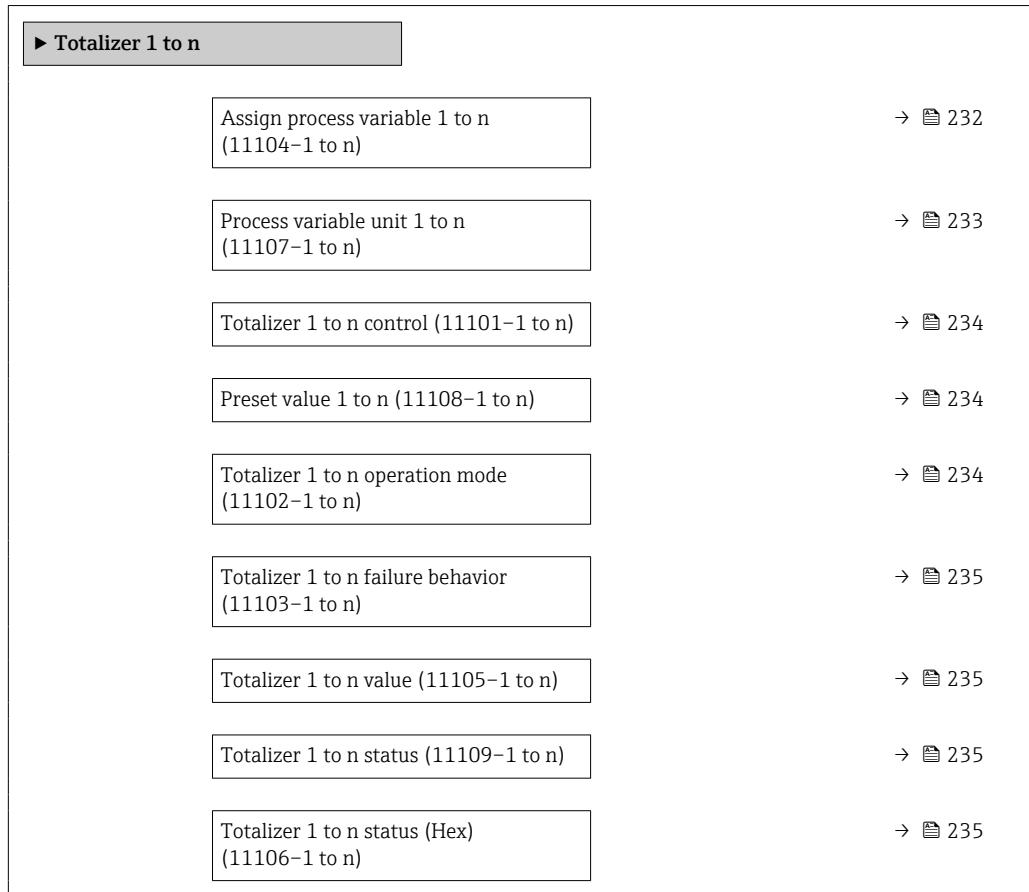
Additional information

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.

3.9.1 "Totalizer 1 to n" submenu

Navigation

 Expert → Application → Totalizer 1 to n


Assign process variable 1 to n



Navigation

 Expert → Application → Totalizer 1 to n → AssignVariab. 1 to n (11104–1 to n)

Description

Select process variable for totalizer.

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 *
- GSV flow *
- GSV flow alternative *
- NSV flow *
- NSV flow alternative *
- S&W volume flow *

* Visibility depends on order options or device settings

- 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

Process variable unit 1 to n

Navigation  Expert → Application → Totalizer 1 to n → VariableUnit 1 to n (11107-1 to n)

Description Select the unit for the process variable of the totalizer.

Selection

SI units

- g *
- kg *
- t

US units

- oz *
- lb *
- STon *

* Visibility depends on order options or device settings

or

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) *

* Visibility depends on order options or device settings

or

US units

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

Imperial units

- bbl (imp;beer) *

* Visibility depends on order options or device settings

or

* Visibility depends on order options or device settings

SI units

- Nl *
- Nhl *
- Nm³ *
- Sl *
- Sm³ *

US units

- Sft³ *
- MSft³ *
- MMSft³ *
- Sgal (us) *
- Sbbl (us;liq.) *
- Sbbl (us;oil) *

Imperial units

- Sgal (imp) *

* Visibility depends on order options or device settings

Factory setting

kg

Totalizer 1 to n control

Navigation

Expert → Application → Totalizer 1 to n → Tot. 1 to n control (11101-1 to n)

Description

Operate the totalizer.

Selection

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

Factory setting

Totalize

Preset value 1 to n

Navigation

Expert → Application → Totalizer 1 to n → Preset value 1 to n (11108-1 to n)

Description

Specify start value for totalizer.

User entry

Signed floating-point number

Factory setting

0 kg

Totalizer 1 to n operation mode



Navigation

Expert → Application → Totalizer 1 to n → Operat. mode 1 to n (11102-1 to n)

Description

Select totalizer operation mode, e.g. only totalize forward flow or only totalize reverse flow.

Selection

- Net
- Forward
- Reverse

Factory setting

Forward

Totalizer 1 to n failure behavior

Navigation	Expert → Application → Totalizer 1 to n → FailureBehav. 1 to n (11103–1 to n)
Description	Select totalizer behavior in the event of a device alarm.
Selection	<ul style="list-style-type: none"> ■ Hold ■ Continue ■ Last valid value + continue
Factory setting	Continue

Totalizer 1 to n value

Navigation	Expert → Application → Totalizer 1 to n → Tot. 1 to n value (11105–1 to n)
Description	Shows the totalizer value reported to the controller for further processing.
User interface	Signed floating-point number
Factory setting	0 kg

Totalizer 1 to n status

Navigation	Expert → Application → Totalizer 1 to n → Tot. 1 to n status (11109–1 to n)
Description	Shows the status of the totalizer value reported to the controller for further processing ('Good', 'Uncertain', 'Bad').
User interface	<ul style="list-style-type: none"> ■ Good ■ Uncertain ■ Bad
Factory setting	Good

Totalizer 1 to n status (Hex)

Navigation	Expert → Application → Totalizer 1 to n → Status 1 to n (Hex) (11106–1 to n)
Description	Shows the status of the totalizer value reported to the controller for further processing (Hex).
User interface	0 to 255

Factory setting 128

3.9.2 "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	
Viscosity damping (1883)	→ 237
► Temperature compensation	
Calculation model (6221)	→ 237
Reference temperature (6222)	→ 238
Compensation coefficient X 1 (6223)	→ 238
Compensation coefficient X 2 (6224)	→ 238
► Dynamic viscosity	
Dynamic viscosity unit (0577)	→ 239
User dynamic viscosity text (0595)	→ 239
User dynamic viscosity factor (0593)	→ 240
User dynamic viscosity offset (0594)	→ 240
► Kinematic viscosity	
Kinematic viscosity unit (0578)	→ 240
User kinematic viscosity text (0598)	→ 241
User kinematic viscosity factor (0596)	→ 241
User kinematic viscosity offset (0597)	→ 241
► Hydrocarbon viscosity	

Viscosity reliability	→ 242
Medium type	→ 242

Viscosity damping



Navigation Expert → Application → Viscosity → Viscos. damping (1883)

Description Enter value for damping the viscosity.

User entry 0 to 999.9 s

Factory setting 0 s

"Temperature compensation" submenu

Navigation Expert → Application → Viscosity → Temp. compensat.

► Temperature compensation	
Calculation model (6221)	→ 237
Reference temperature (6222)	→ 238
Compensation coefficient X 1 (6223)	→ 238
Compensation coefficient X 2 (6224)	→ 238

Calculation model



Navigation Expert → Application → Viscosity → Temp. compensat. → Calc. model (6221)

Description Select a formula for the temperature compensation of viscosity.

Selection

- Power law
- Exponential
- Polynomial

Factory setting Polynomial

Reference temperature

Navigation Expert → Application → Viscosity → Temp. compensat. → Ref. temperature (6222)

Description Enter reference temperature used to calculate the temperature compensated viscosity.

User entry -273.15 to 99 999 °C

Factory setting 0 °C

Compensation coefficient X 1

Navigation Expert → Application → Viscosity → Temp. compensat. → Comp. coeff. X 1 (6223)

Description Enter compensation coefficient used to calculate the temperature compensated viscosity.

User entry Signed floating-point number

Factory setting 0

Compensation coefficient X 2

Navigation Expert → Application → Viscosity → Temp. compensat. → Comp. coeff. X 2 (6224)

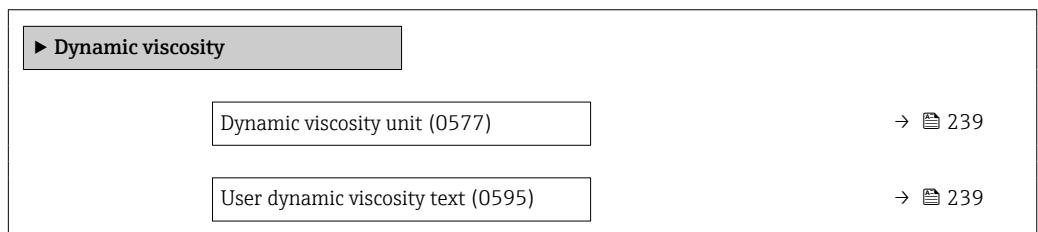
Description Enter compensation coefficient used to calculate the temperature compensated viscosity.

User entry Signed floating-point number

Factory setting 0

"Dynamic viscosity" submenu

Navigation Expert → Application → Viscosity → Dynam. viscosity



User dynamic viscosity factor (0593)	→ 240
User dynamic viscosity offset (0594)	→ 240

Dynamic viscosity unit



Navigation	Expert → Application → Viscosity → Dynam. viscosity → Dyn. visc. unit (0577)
Description	Use this function to select the unit for dynamic viscosity.
Selection	<p><i>SI units</i></p> <ul style="list-style-type: none"> ■ cP ■ mPa s ■ Pa s ■ P <p><i>Custom-specific units</i></p> UserDynVis
Factory setting	Pa s
Additional information	<p><i>Result</i></p> The selected unit applies for: <ul style="list-style-type: none"> ■ Dynamic viscosity parameter (gases) ■ Dynamic viscosity parameter (liquids)
Additional information	<p><i>Selection</i></p> For an explanation of the abbreviated units: → 366

User dynamic viscosity text



Navigation	Expert → Application → Viscosity → Dynam. viscosity → Dyn. visc. text (0595)
Description	Enter text for the user specific unit of the dynamic viscosity.
User entry	Character string comprising numbers, letters and special characters (10)
Factory setting	UserDynVis

User dynamic viscosity factor**Navigation**

Expert → Application → Viscosity → Dynam. viscosity → Dyn.visc. factor (0593)

Description

With user-specific unit: Enter a factor which is multiplicated with the measured dynamic viscosity value.

User entry

Signed floating-point number

Factory setting

1.0

User dynamic viscosity offset**Navigation**

Expert → Application → Viscosity → Dynam. viscosity → Dyn.visc. offset (0594)

Description

With user-specific unit: Enter zero point shift which is added or subtracted to/from the measured value of the dynamic viscosity.

User entry

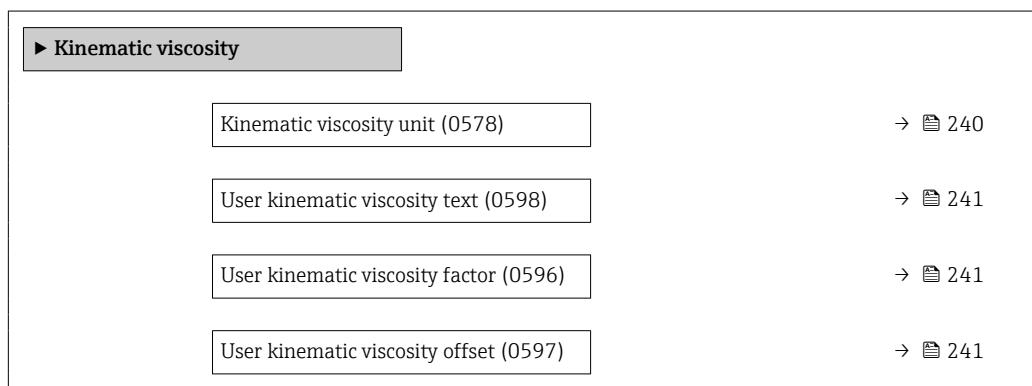
Signed floating-point number

Factory setting

0

"Kinematic viscosity" submenu**Navigation**

Expert → Application → Viscosity → Kinematic visc.

**Kinematic viscosity unit****Navigation**

Expert → Application → Viscosity → Kinematic visc. → Kin. visc. unit (0578)

Description

Use this function to select the unit for the kinematic viscosity.

Selection	<p><i>SI units</i></p> <ul style="list-style-type: none"> ■ cSt ■ m²/s ■ mm²/s ■ St <p><i>Custom-specific units</i></p> <p>UserKinVis</p>
Factory setting	cSt

User kinematic viscosity text

Navigation	Expert → Application → Viscosity → Kinematic visc. → Kin. visc. text (0598)
Description	Enter text for the user specific unit of the kinematic viscosity.
User entry	Character string comprising numbers, letters and special characters (10)
Factory setting	UserKinVis

User kinematic viscosity factor

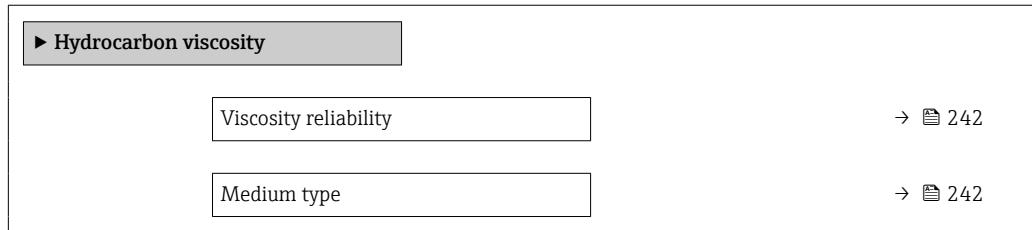
Navigation	Expert → Application → Viscosity → Kinematic visc. → Kin.visc. factor (0596)
Description	With user-specific unit: Enter a factor which is multiplicated with the measured kinematic viscosity value.
User entry	Signed floating-point number
Factory setting	1.0

User kinematic viscosity offset

Navigation	Expert → Application → Viscosity → Kinematic visc. → Kin.visc. offset (0597)
Description	With user-specific unit: Enter zero point shift which is added or subtracted to/from the measured value of the kinematic viscosity.
User entry	Signed floating-point number
Factory setting	0

"Hydrocarbon viscosity" submenu**Navigation**

Expert → Application → Viscosity → Hydrocarbon visc



Viscosity reliability**Navigation**

Expert → Application → Viscosity → Hydrocarbon visc → ViscosityReliab.

Description

Indicates the reliability of the viscosity value reported.

User interface

- Good
- Uncertain
- Bad

Factory setting

Bad

Medium type**Navigation**

Expert → Application → Viscosity → Hydrocarbon visc → Medium type

Description

Select the medium type.

Selection

- Hydrocarbon-based medium
- Water-based medium

Factory setting

Water-based medium

3.9.3 "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 settings	→ 244
Liquid type (4032)	→ 245
Carrier type (4039)	→ 246
Water mineral content (4040)	→ 246
Carrier reference density (4033)	→ 247
Carrier linear expansion coefficient (4035)	→ 247
Carrier square expansion coefficient (4037)	→ 248
Target reference density (4034)	→ 248
Target linear expansion coefficient (4036)	→ 248
Target square expansion coefficient (4038)	→ 249
Reference temperature expansion (4045)	→ 249
Create coefficients for liquid type (4001)	→ 249
► Concentration unit	→ 250
Concentration unit (0613)	→ 250
User concentration text (0589)	→ 250
User concentration factor (0587)	→ 251
User concentration offset (0588)	→ 251
Reference temperature (4046)	→ 251
► Concentration profile 1 to n	→ 251
Coefficients set name (4113-1 to n)	→ 252
A 0 (4101)	→ 252
A 1 (4102)	→ 253
A 2 (4103)	→ 253

A 3 (4105)	→ 253
A 4 (4107)	→ 253
B 1 (4104)	→ 254
B 2 (4106)	→ 254
B 3 (4108)	→ 254
D 1 (4109)	→ 254
D 2 (4110)	→ 255
D 3 (4111)	→ 255
D 4 (4112)	→ 255
► Mineral content determination	→ 255
Control mineral content determination (4041)	→ 256
State mineral content determination (4042)	→ 256
Carrier density during determination (4043)	→ 256
Process temperature during determination (4044)	→ 257

"Concentration settings" submenu

Navigation

Expert → Application → Concentration → Concentr. sett.

► Concentration settings	
Liquid type (4032)	→ 245
Carrier type (4039)	→ 246
Water mineral content (4040)	→ 246
Carrier reference density (4033)	→ 247
Carrier linear expansion coefficient (4035)	→ 247

Carrier square expansion coefficient (4037)	→ 248
Target reference density (4034)	→ 248
Target linear expansion coefficient (4036)	→ 248
Target square expansion coefficient (4038)	→ 249
Reference temperature expansion (4045)	→ 249
Create coefficients for liquid type (4001)	→ 249

Liquid type

Navigation

Expert → Application → Concentration → Concentr. sett. → Liquid type (4032)

Description

Select liquid type.

The measuring device already contains the density/concentration correlation for a range of binary mixtures. Please refer to table for information on the validity ranges with regard to temperature and concentration and for standard deviations of the approximation model for converting density to concentration.

3 sets of coefficients are available for user-defined media. The coefficients are determined from table values via FieldCare

Selection

- Off
- Sucrose in water
- Glucose in water
- Fructose in water
- Invert sugar in water
- HFCS42
- HFCS55
- HFCS90
- Wort
- Whey (Total Solids)
- Ethanol in water (OIML)
- Methanol in water
- Hydrogen peroxide in water
- Hydrochloric acid
- Sulfuric acid
- Nitric acid
- Phosphoric acid
- Sodium hydroxide
- Potassium hydroxide
- Ammonia in water
- Ammonium hydroxide in water
- Ammonium nitrate in water
- Iron(III)chloride in water

- Sodium chloride in water
- %mass / %volume
- Coef Set
- Coef Set
- Coef Set

Factory setting Off

Carrier type



Navigation Expert → Application → Concentration → Concentr. sett. → Carrier type (4039)

Prerequisite The **%mass / %volume** option is selected in the **Liquid type** parameter (→ 245).

Description Select carrier medium type.

For the **%mass / %volume** option, it is possible to choose whether the carrier medium is water. If "water-based" is selected, the "**Carrier reference density**" parameter (→ 247), **Carrier linear expansion coefficient** (→ 247) and **Carrier square expansion coefficient** (→ 248) are not available. Instead, the density characteristic of water is determined using Kell's formula (ITS-90).

Selection

- Water based
- Not water based

Factory setting Water based

Water mineral content



Navigation Expert → Application → Concentration → Concentr. sett. → Water mineral.c. (4040)

Prerequisite The following options are selected in the **Liquid type** parameter (→ 245):

One of the following options is selected in the **Liquid type** parameter (→ 245):

- Sucrose in water
- Glucose in water
- Fructose in water
- Invert sugar in water
- HFCS42
- HFCS55
- HFCS90
- Wort
- Methanol in water
- Hydrogen peroxide in water
- Hydrochloric acid
- Sulfuric acid
- Nitric acid
- Phosphoric acid
- Sodium hydroxide
- Ammonium nitrate in water
- Iron(III)chloride in water
- %mass / %volume

Description

Enter mineral content for water based carriers.

It is generally presumed that water is present as a carrier medium in pure form, i.e. fully demineralized. If the water contains minerals, these affect the density of the carrier medium and therefore the density of the mixture. This effect can be taken into consideration by entering the mineral content in the device.

If the mineral content is to be calculated, this is performed in a separate menu

User entry

Positive floating-point number

Factory setting

0 mg/l

**Carrier reference density****Navigation**

Expert → Application → Concentration → Concentr. sett. → Carr. ref. dens. (4033)

Prerequisite

The **%mass / %volume** option is selected in the **Liquid type** parameter (→ 245) and the **Not water based** option is selected in the **Carrier type** parameter (→ 246).

Description

Enter reference density for carrier.

Density of the carrier medium at reference temperature if the **%mass / %volume** option is selected.

User entry

Positive floating-point number

Factory setting

1 kg/Nl

**Carrier linear expansion coefficient****Navigation**

Expert → Application → Concentration → Concentr. sett. → Carr.lin.exp.co. (4035)

Prerequisite

The **%mass / %volume** option is selected in the **Liquid type** parameter (→ 245) and the **Not water based** option is selected in the **Carrier type** parameter (→ 246).

Description

Enter linear expansion coefficient for the carrier.

Coefficient of the linear term for approximating the thermal expansion of the carrier medium.

User entry

Signed floating-point number

Factory setting

0.0 1/K

Carrier square expansion coefficient

Navigation	Expert → Application → Concentration → Concentr. sett. → Carr.sq.exp.coe. (4037)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245) and the Not water based option is selected in the Carrier type parameter (→ 246).
Description	Enter square expansion coefficient for the carrier. Coefficient of the quadratic term for approximating the thermal expansion of the carrier medium.
User entry	Signed floating-point number
Factory setting	0.0 1/K ²

Target reference density

Navigation	Expert → Application → Concentration → Concentr. sett. → Targ.ref.density (4034)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245).
Description	Enter reference density for target. Density of the target medium at reference temperature if the %mass / %volume option is selected.
User entry	Positive floating-point number
Factory setting	1 kg/Nl

Target linear expansion coefficient

Navigation	Expert → Application → Concentration → Concentr. sett. → Targ.lin.exp.co. (4036)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245).
Description	Enter linear expansion coefficient for the target. Coefficient of the linear term for approximating the thermal expansion of the target medium.
User entry	Signed floating-point number
Factory setting	0.0 1/K

Target square expansion coefficient



Navigation	Expert → Application → Concentration → Concentr. sett. → Targ.sq.exp.coe. (4038)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245).
Description	Enter square expansion coefficient for the target. Coefficient of the quadratic term for approximating the thermal expansion of the target medium.
User entry	Signed floating-point number
Factory setting	0.0 1/K ²

Reference temperature expansion



Navigation	Expert → Application → Concentration → Concentr. sett. → Ref.temp.expan. (4045)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245).
Description	Enter the temperature at which the specified reference densities of the carrier and target media are valid.
User entry	-273.15 to 99 999 °C
Factory setting	20 °C

Create coefficients for liquid type



Navigation	Expert → Application → Concentration → Concentr. sett. → Create coeff. (4001)
Description	Create coefficient set for selected liquid type. Adjust concentration values via user concentration factor and user concentration offset.
Selection	<ul style="list-style-type: none">■ Cancel■ Coefficient set 1■ Coefficient set 2■ Coefficient set 3
Factory setting	Cancel

"Concentration unit" submenu**Navigation**

Expert → Application → Concentration → Concentr. unit

► Concentration unit	
Concentration unit (0613)	→ 250
User concentration text (0589)	→ 250
User concentration factor (0587)	→ 251
User concentration offset (0588)	→ 251
Reference temperature (4046)	→ 251

Concentration unit**Navigation**

Expert → Application → Concentration → Concentr. unit → Concentr. unit (0613)

Description

Select concentration unit.

Selection**Factory setting**

°Brix

User concentration text**Navigation**

Expert → Application → Concentration → Concentr. unit → Concentr. text (0589)

PrerequisiteThe **Coeff Set 1...3** option is selected in the **Liquid type** parameter (→ 245) and the **User conc.** option is selected in the **Concentration unit** parameter (→ 250).**Description**

Enter text for the user specific unit of the concentration.

User entry

Character string comprising numbers, letters and special characters (10)

Factory setting

User conc.

User concentration factor

Navigation	④⑤ Expert → Application → Concentration → Concentr. unit → Concentr. factor (0587)
Prerequisite	The Coef Set 1...3 option is selected in the Liquid type parameter (→ 245) and the User conc. option is selected in the Concentration unit parameter (→ 250).
Description	With user-specific unit: Enter a factor which is multiplicated with the measured concentration value.
User entry	Signed floating-point number
Factory setting	1.0

User concentration offset

Navigation	④⑤ Expert → Application → Concentration → Concentr. unit → Concentr. offset (0588)
Prerequisite	The Coef Set 1...3 option is selected in the Liquid type parameter (→ 245) and the User conc. option is selected in the Concentration unit parameter (→ 250).
Description	With user-specific unit: Enter zero point shift which is added or subtracted to/from the measured concentration value.
User entry	Signed floating-point number
Factory setting	0

Reference temperature

Navigation	④⑤ Expert → Application → Concentration → Concentr. unit → Ref. temperature (4046)
Description	Enter reference temperature for calculating the reference density.
User entry	-273.15 to 99 999 °C
Factory setting	20 °C

"Concentration profile 1 to n" submenu*Navigation*

④⑤ Expert → Application → Concentration → Conc. profile 1 to n

▶ Concentration profile 1 to n

Coefficients set name (4113-1 to n)	→ 252
A 0 (4101)	→ 252
A 1 (4102)	→ 253
A 2 (4103)	→ 253
A 3 (4105)	→ 253
A 4 (4107)	→ 253
B 1 (4104)	→ 254
B 2 (4106)	→ 254
B 3 (4108)	→ 254
D 1 (4109)	→ 254
D 2 (4110)	→ 255
D 3 (4111)	→ 255
D 4 (4112)	→ 255

Coefficients set name**Navigation**

Expert → Application → Concentration → Conc. profile 1 to n → Coeff. set name (4113-1 to n)

Description

Enter name for coefficients set.

User entry

Character string comprising numbers, letters and special characters (16)

Factory setting

Coef Set No.

A 0**Navigation**

Expert → Application → Concentration → Conc. profile 1 to n → A 0 (4101)

Description

Enter the coefficient.

User entry

Signed floating-point number

Factory setting -7.2952

A 1

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 1 (4102)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting 15.1555

A 2

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 2 (4103)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting -11.6756

A 3

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 3 (4105)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting 4.4759

A 4

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 4 (4107)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting -0.6615

B 1

Navigation Expert → Application → Concentration → Conc. profile 1 to n → B 1 (4104)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $0.7220 \cdot 10^{-3}$ E-3

B 2

Navigation Expert → Application → Concentration → Conc. profile 1 to n → B 2 (4106)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $38.9126 \cdot 10^{-6}$ E-6

B 3

Navigation Expert → Application → Concentration → Conc. profile 1 to n → B 3 (4108)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $-1.6739 \cdot 10^{-9}$ E-9

D 1

Navigation Expert → Application → Concentration → Conc. profile 1 to n → D 1 (4109)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $-0.0975 \cdot 10^{-2}$ E-2

D 2

Navigation	Expert → Application → Concentration → Conc. profile 1 to n → D 2 (4110)
Description	Enter the coefficient.
User entry	Signed floating-point number
Factory setting	$-0.3731 \cdot 10^{-4}$ E-4

D 3

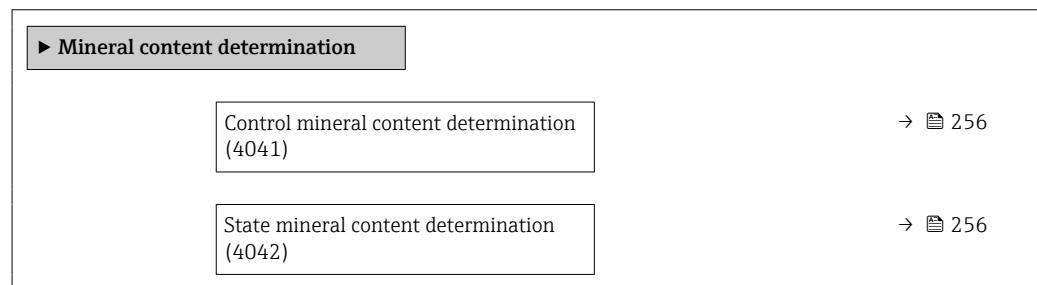
Navigation	Expert → Application → Concentration → Conc. profile 1 to n → D 3 (4111)
Description	Enter the coefficient.
User entry	Signed floating-point number
Factory setting	$0.2957 \cdot 10^{-3}$ E-3

D 4

Navigation	Expert → Application → Concentration → Conc. profile 1 to n → D 4 (4112)
Description	Enter the coefficient.
User entry	Signed floating-point number
Factory setting	$-0.1721 \cdot 10^{-5}$ E-5

"Mineral content determination" submenu*Navigation*

Expert → Application → Concentration → Mineral content



Carrier density during determination (4043)	→ 256
Process temperature during determination (4044)	→ 257

Control mineral content determination



Navigation	Expert → Application → Concentration → Mineral content → Contr.min.determ (4041)
Description	Use this function to start or cancel mineral content determination. Select the Use result option to take the mineral content into consideration.
Selection	<ul style="list-style-type: none"> ■ Cancel ■ Start ■ Use result *
Factory setting	Cancel

State mineral content determination

Navigation	Expert → Application → Concentration → Mineral content → State determ. (4042)
Description	Displays the current status of mineral content determination.
User interface	<ul style="list-style-type: none"> ■ In progress ■ Failed ■ Not done ■ Done
Factory setting	Not done

Carrier density during determination

Navigation	Expert → Application → Concentration → Mineral content → Carrier density (4043)
Description	Displays the current measured density of the water with minerals under process conditions. <i>Dependency</i> The unit is taken from the Density unit parameter (→ 99).

* Visibility depends on order options or device settings

User interface Signed floating-point number

Factory setting 0 kg/l

Process temperature during determination

Navigation  Expert → Application → Concentration → Mineral content → Process temp. (4044)

Description Displays the measured process temperature.

Dependency

The unit is taken from the **Temperature unit** parameter (→  102).

User interface -273.15 to 99 726.8499 °C

Factory setting -273.15 °C

3.9.4 "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	
Petroleum mode (4187)	→  258
Water cut mode (4190)	→  258
API commodity group (4151)	→  259
API table selection (4152)	→  259
Bitumen ASTM table (4186)	→  260
Thermal expansion coefficient (4153)	→  260
Alternative pressure value (4155)	→  260
Alternative temperature value (4154)	→  261
Shrinkage factor (4167)	→  261
S&W input mode (4189)	→  261

S&W (4156)	→ 262
S&W correction value (4194)	→ 262
Oil density unit (0615)	→ 262
Oil sample density (4162)	→ 263
Oil sample temperature (4163)	→ 263
Oil sample pressure (4166)	→ 263
Water density unit (0616)	→ 264
Water reference density unit (0617)	→ 264
Water sample density (4164)	→ 265
Water sample temperature (4165)	→ 265
Meter factor (4198)	→ 265
Density limit (4199)	→ 266

Petroleum mode**Navigation**

Expert → Application → Petroleum → Petroleum mode (4187)

Description

Select petroleum mode.

Selection

- Off
- API referenced correction
- Net oil & water cut
- ASTM D4311

Factory setting

Off

Water cut mode**Navigation**

Expert → Application → Petroleum → Water cut mode (4190)

Prerequisite

The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ 258) parameter.

Description

Select water cut mode.

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

Factory setting	Calculated value
------------------------	------------------

API commodity group

Navigation	Expert → Application → Petroleum → API comm. group (4151)
-------------------	---

Prerequisite	The following options are available if the Net oil & water cut option is selected in the Petroleum mode parameter (→ 258):
	<ul style="list-style-type: none"> ■ A - crude oil ■ C - special applications

Description	Select API commodity group of the measured medium.
--------------------	--

Selection	<ul style="list-style-type: none"> ■ A - crude oil ■ B - refined products * ■ C - special applications ■ D - lubricating oils * ■ E - NGL / LPG *
------------------	--

Factory setting	A - crude oil
------------------------	---------------

API table selection

Navigation	Expert → Application → Petroleum → API tab. select. (4152)
-------------------	--

Description	Select reference density by API table.
--------------------	--

Selection	<ul style="list-style-type: none"> ■ API table 5/6 * ■ API table 23/24 ■ API table 53/54 ■ API table 59/60
------------------	--

Factory setting	API table 53/54
------------------------	-----------------

* Visibility depends on order options or device settings

Bitumen ASTM table

Navigation Expert → Application → Petroleum → ASTM table (4186)

Description Select calculation table for density and specific gravity.

- Selection**
- >= 966kg/m³ (15°C)
 - 850-965kg/m³ (15°C)
 - >= 0.967 (60°F)
 - 0.850-0.966 (60°F)

Factory setting >= 966kg/m³ (15°C)

Thermal expansion coefficient

Navigation Expert → Application → Petroleum → Therm.exp.coeff. (4153)

Prerequisite The **C - special applications** option is selected in the **API commodity group** parameter (→ 259) parameter

Description Enter the thermal expansion coefficient of the measured medium.

User entry $414 \cdot 10^{-6}$ to $1674 \cdot 10^{-6}$ 1/K

Factory setting $414 \cdot 10^{-6}$ 1/K

Alternative pressure value

Navigation Expert → Application → Petroleum → Alternat. press. (4155)

Prerequisite The **API referenced correction** option is selected in the **Petroleum mode** parameter (→ 258) parameter.

Description Enter an alternative user-defined pressure value.

User entry 1.01325 to 104.43460935 bar

Factory setting 1.01325 bar

Additional information The unit is taken from the **Pressure unit** parameter (→ 102)

Alternative temperature value

**Navigation**

Expert → Application → Petroleum → Alternativ.temp. (4154)

Prerequisite

The **API referenced correction** option is selected in the **Petroleum mode** parameter
(→ 258) parameter.

Description

Enter an alternative user-defined temperature value.

User entry

-46 to 93 °C

Factory setting

29.5 °C

Shrinkage factor

**Navigation**

Expert → Application → Petroleum → Shrinkage factor (4167)

Description

Enter shrinkage factor.

User entry

Positive floating-point number

Factory setting

1.0

S&W input mode

**Navigation**

Expert → Application → Petroleum → S&W input mode (4189)

Prerequisite

The **API referenced correction** option is selected in the **Petroleum mode** parameter
(→ 258) parameter.

Description

Select input mode for sediment and water.

Selection

- Off
- Fixed value
- External value
- Current input 1 ^{*}
- Current input 2 ^{*}
- Current input 3 ^{*}

Factory setting

Off

* Visibility depends on order options or device settings

S&W**Navigation**

Expert → Application → Petroleum → S&W (4156)

Prerequisite

The **Fixed value** option is selected in the **S&W input mode** parameter (→ [261](#)) parameter

Description

Enter a value for sediment and water in percent.

Use this function to enter a percentage to factor in a reduction in the volume flow due to the presence of sediment and water in the fluid.

User entry

0 to 100 %

Factory setting

0 %

S&W correction value**Navigation**

Expert → Application → Petroleum → S&W correction (4194)

Prerequisite

For the following order code:

- "Application package", option **EJ** "Petroleum"
- In the **S&W input mode** parameter (→ [261](#)), 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 (→ [60](#)).

Description

Shows the correction value for sediment and water.

User interface

Positive floating-point number

Factory setting

–

Oil density unit**Navigation**

Expert → Application → Petroleum → Oil density unit (0615)

Prerequisite

The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description

Select unit for the density of oil.

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	▪ kg/m ³	▪ SG60°F	▪ lb/gal (imp)
	▪ kg/l	▪ lb/ft ³	▪ lb/bbl (imp;oil)
	▪ g/cm ³	▪ lb/gal (us)	
	▪ g/l	▪ lb/bbl (us;oil)	
	▪ SG15°C	▪ lb/in ³	
	▪ SG20°C	▪ STon/yd ³	
	<i>Other units</i>		
	°API		
Factory setting	kg/m ³		

Oil sample density

Navigation	Expert → Application → Petroleum → Oil sample dens. (4162)
Prerequisite	The Net oil & water cut option is selected in the Petroleum mode parameter (→ 258) parameter.
Description	Enter the value for the density of the oil sample.
User entry	470 to 1 210 kg/m ³
Factory setting	850 kg/m ³

Oil sample temperature

Navigation	Expert → Application → Petroleum → Oil sample temp. (4163)
Prerequisite	The Net oil & water cut option is selected in the Petroleum mode parameter (→ 258) parameter.
Description	Enter the value for the temperature of the oil sample.
User entry	-273.15 to 99 726.8499 °C
Factory setting	15 °C

Oil sample pressure

Navigation	Expert → Application → Petroleum → Oil samp. press. (4166)
Prerequisite	The Net oil & water cut option is selected in the Petroleum mode parameter (→ 258) parameter.
Description	Enter the value for the pressure of the oil sample.

User entry Positive floating-point number

Factory setting 1.01325 bar

Water density unit



Navigation Expert → Application → Petroleum → Water dens. unit (0616)

Prerequisite The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ 258) parameter.

Description Select unit for the density of the water.

Selection

SI units

- kg/m³
- kg/l
- g/cm³
- g/l
- SG15°C
- SG20°C

US units

- SG60°F
- lb/ft³
- lb/gal (us)
- lb/in³
- STon/yd³

Imperial units

lb/gal (imp)

Other units

°API

Factory setting

kg/m³

Water reference density unit



Navigation Expert → Application → Petroleum → Water ref. dens. (0617)

Prerequisite The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ 258) parameter.

Description Select unit for reference density of the water.

Selection

SI units

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

US units

- lb/Sft³
- RD60°F

Factory setting

kg/Nm³

Water sample density

Navigation Expert → Application → Petroleum → Water samp. dens (4164)

Prerequisite The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description Enter the value for the density of the water sample.

User entry 900 to 1 200 kg/m³

Factory setting 999.2 kg/m³

Water sample temperature

Navigation Expert → Application → Petroleum → Water samp. temp (4165)

Prerequisite The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description Enter the value for the temperature of the water sample.

User entry -273.15 to 99 726.8499 °C

Factory setting 15 °C

Meter factor

Navigation Expert → Application → Petroleum → Meter factor (4198)

Prerequisite The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description Displays the current calibration factor for correcting the volume flow. The correction is required due to inaccuracies in the measuring device.

User entry Signed floating-point number

Factory setting 1.0

Density limit**Navigation**

Expert → Application → Petroleum → 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

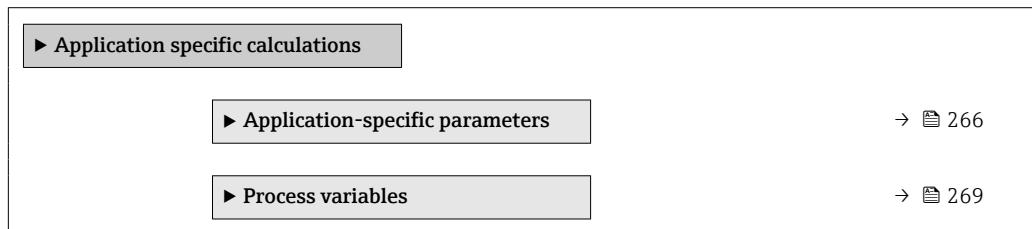
0 kg/l

3.9.5 "Application specific calculations" submenu

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

Navigation

Expert → Application → Appl.spec. calc.

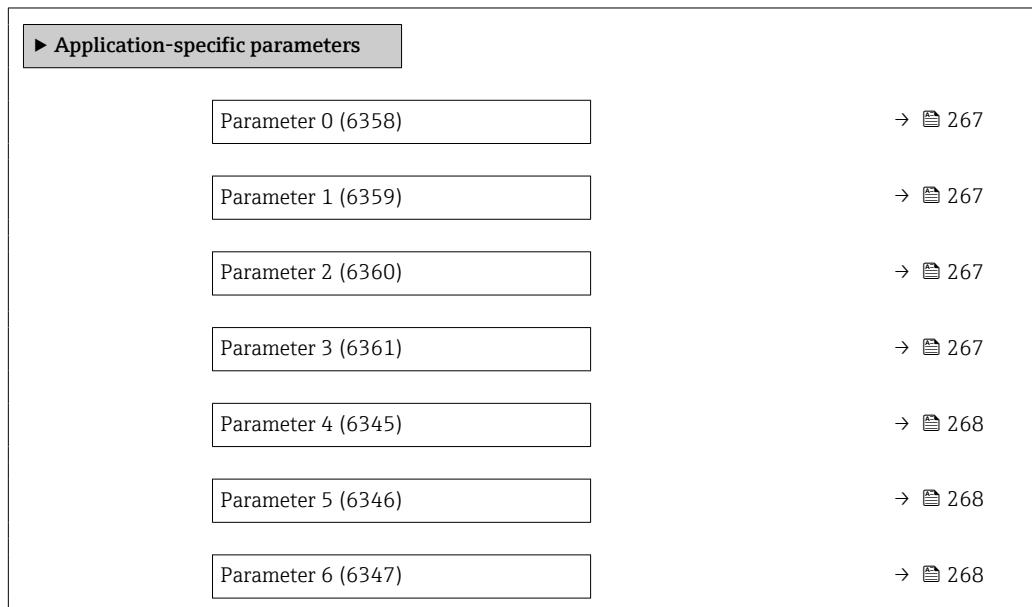


"Application-specific parameters" submenu

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

Navigation

Expert → Application → Appl.spec. calc. → Appl.spec.param.



Parameter 7 (6348)	→ 268
Parameter 8 (6349)	→ 269
Parameter 9 (6350)	→ 269

Parameter 0

Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 0 (6358)
Description	Enter application specific value 0 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 1

Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 1 (6359)
Description	Enter application specific value 1 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 2

Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 2 (6360)
Description	Enter application specific value 2 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 3

Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 3 (6361)
Description	Enter application specific value 3 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 4



Navigation  Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 4 (6345)

Description Enter application specific value 4 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 5



Navigation  Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 5 (6346)

Description Enter application specific value 5 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 6



Navigation  Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 6 (6347)

Description Enter application specific value 6 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 7



Navigation  Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 7 (6348)

Description Enter application specific value 7 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 8

Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 8 (6349)
Description	Enter application specific value 8 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

Parameter 9

Navigation	Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 9 (6350)
Description	Enter application specific value 9 for application specific calculation.
User entry	Signed floating-point number
Factory setting	0

"Process variables" submenu

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

Navigation

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

► Process variables	
Application specific input 0 (6366)	→ 269
Application specific input 1 (6367)	→ 270
Application specific output 0 (6364)	→ 271
Application specific output 1 (6365)	→ 271

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

3.9.6 "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

► Medium index	
Inhomogeneous medium index (6368)	→ 272
Cut off inhomogeneous wet gas (6375)	→ 273
Cut off inhomogeneous liquid (6374)	→ 273
Suspended bubbles index (6376)	→ 273
Cut off suspended bubbles (6370)	→ 274

Inhomogeneous medium index

Navigation

Expert → Application → Medium index → InhomogMedIndex (6368)

Description

Shows the degree of inhomogeneity of the medium.

User interface

Signed floating-point number

Additional information

- The 'Index inhomogeneous medium' diagnostic indicates the overall scale of two-phase flow associated with free bubbles.
- If the liquid does not contain entrained gas, the value is 0. For very high levels of gas content (e.g. associated with slug flow), the value is over 10.
- The diagnostic index generally increases with an increasing gas volume content. The index will not saturate with an excessive second phase.
- Although the index shows a qualitative correlation to the severity of gas entrainment, it should not be understood on a one-to-one basis as the gas volume content.
- The 'Index inhomogeneous medium' is reproducible under the same entrained gas conditions and can help to better understand the process conditions and the level of gas entrainment in relative terms.
- Similarly, the diagnostic index can also be used to describe the relative share of solids in a liquid application or the relative share of a liquid phase in a wet gas application.

Cut off inhomogeneous wet gas

**Navigation**

Expert → Application → Medium index → Cut off inh. gas (6375)

Description

Enter cut off value for wet gas applications. Below this value the 'Inhomogeneous medium index' is set to 0.

User entry

Positive floating-point number

Factory setting

0.25

Additional information

This parameter is used for wet gas applications. If the 'Index inhomogeneous medium' drops below this value and the measured density is < 400 kg/m³, the 'Index inhomogeneous medium' is reported as zero.

Cut off inhomogeneous liquid

**Navigation**

Expert → Application → Medium index → Cut off liquid (6374)

Description

Enter cut off value for liquid applications. Below this value the 'Inhomogeneous medium index' is set to 0.

User entry

Positive floating-point number

Factory setting

0.05

Additional information

This parameter is used for entrained gas in liquid applications or for solids in liquid applications. If the 'Index inhomogeneous medium' drops below this value and the measured density is < 400 kg/m³, 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.

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.

3.10 "Diagnostics" submenu

Navigation

Expert → Diagnostics

► **Diagnostics**

Actual diagnostics (0691)	→ 275
Previous diagnostics (0690)	→ 276
Operating time from restart (0653)	→ 276
Operating time (0652)	→ 276
► Diagnostic list	→ 277
► Event logbook	→ 279

▶ Device information	→ 281
▶ Main electronic module + I/O module 1	→ 285
▶ Sensor electronic module (ISEM)	→ 286
▶ I/O module 2	→ 287
▶ I/O module 3	→ 288
▶ I/O module 4	→ 289
▶ Display module	→ 292
▶ Data logging	→ 293
▶ Min/max values	→ 302
▶ Heartbeat Technology	→ 314
▶ Simulation	→ 327

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 (→ 277).

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

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	<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>Example</i> For the display format:  F271 Main electronic failure

Operating time from restart

Navigation	  Expert → Diagnostics → Time fr. restart (0653)
Description	Use this function to display the time the device has been in operation since the last device restart.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

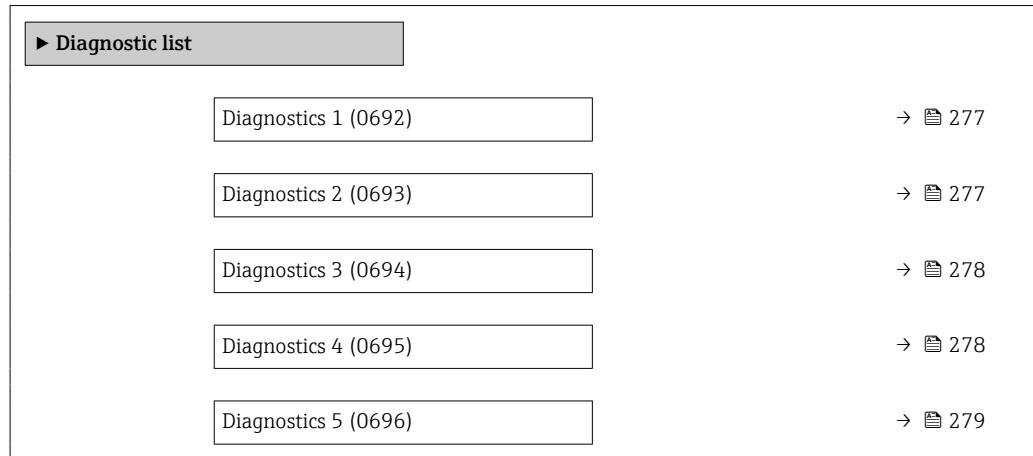
Operating time

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

3.10.1 "Diagnostic list" submenu

Navigation

Expert → Diagnostics → Diagnostic list



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

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

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*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

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

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	<p><i>Display</i></p> <p> Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.</p>
	<p><i>Examples</i></p> <p>For the display format:</p> <ul style="list-style-type: none"> ▪  F271 Main electronic failure ▪  F276 I/O module failure

3.10.2 "Event logbook" submenu

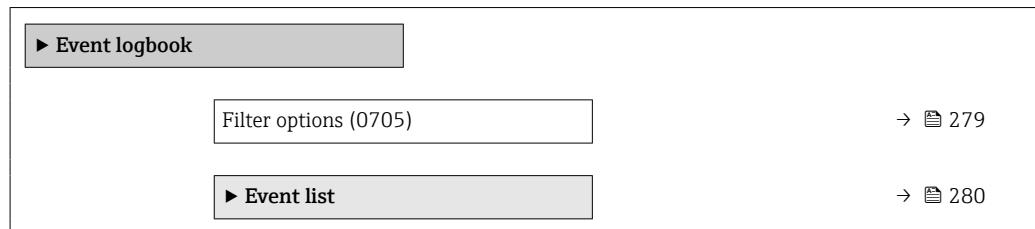
Viewing event messages

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



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	<ul style="list-style-type: none"> ▪ All ▪ Failure (F) ▪ Function check (C) ▪ Out of specification (S) ▪ Maintenance required (M) ▪ Information (I)

Factory setting All

Additional information *Description*

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

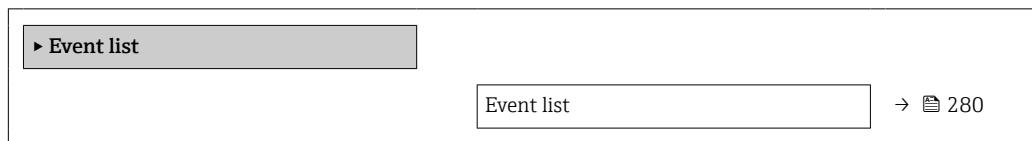
"Event list" submenu

i 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

Navigation

 Expert → Diagnostics → Event logbook → Event list

Description

Displays the history of event messages of the category selected in the **Filter options** parameter (→  279).

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.

3.10.3 "Device information" submenu

Navigation

Expert → Diagnostics → Device info

▶ Device information	
Device tag (0011)	→ 282
Serial number (0009)	→ 282
Firmware version (0010)	→ 282
Device name (0020)	→ 283
Order code (0008)	→ 283
Extended order code 1 (0023)	→ 283
Extended order code 2 (0021)	→ 284
Extended order code 3 (0022)	→ 284
Configuration counter (2751)	→ 284
ENP version (0012)	→ 284

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

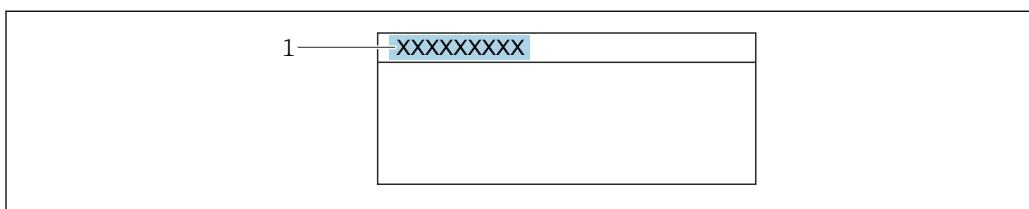
Character string comprising numbers, letters and special characters

Factory setting

Promass

Additional information

User interface



1 Position of the header text on the display

The number of characters displayed depends on the characters used.

Serial number

Navigation

Expert → Diagnostics → Device info → Serial number (0009)

Description

Displays the serial number of the measuring device.



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

User interface

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 (→ 283)

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 (→ 283)

Configuration counter**Navigation**

Expert → Diagnostics → Device info → Config. counter (2751)

Description

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

User interface

0 to 65 535

ENP version**Navigation**

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

Description

Displays the version of the electronic nameplate.

User interface

Character string

Factory setting 2.02.00

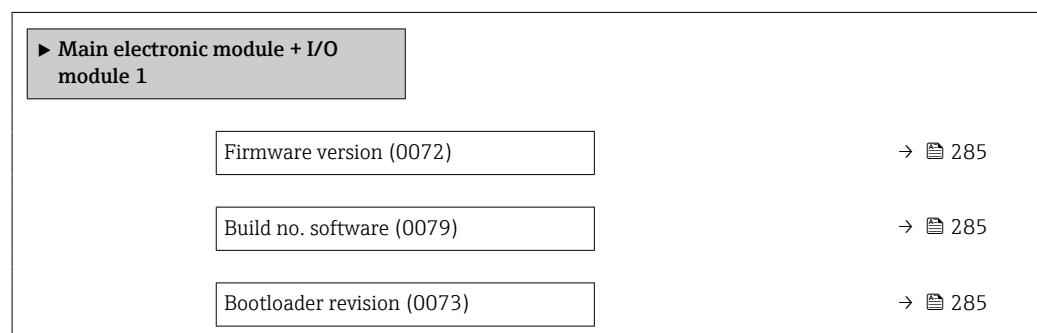
Additional information *Description*

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

3.10.4 "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)

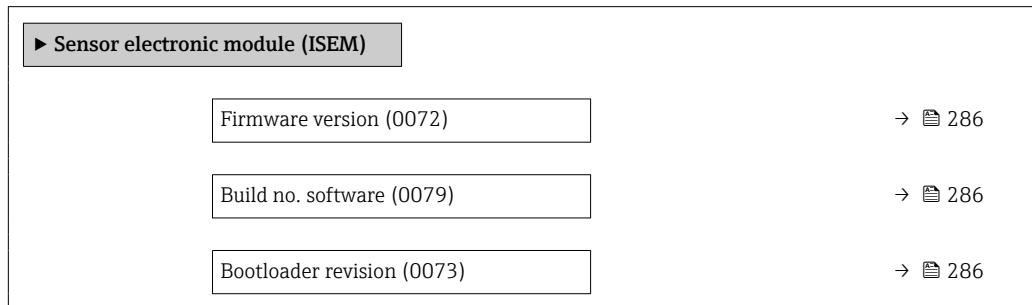
Description Use this function to display the bootloader revision of the software.

User interface	Positive integer
----------------	------------------

3.10.5 "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

3.10.6 "I/O module 2" submenu

Navigation

Expert → Diagnostics → I/O module 2

▶ I/O module 2	
I/O module 2 terminal numbers (3902-2)	→ 287
Firmware version (0072)	→ 287
Build no. software (0079)	→ 287
Bootloader revision (0073)	→ 288

I/O module 2 terminal numbers

Navigation

Expert → Diagnostics → I/O module 2 → I/O 2 terminals (3902-2)

Description

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

User interface

- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4)

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

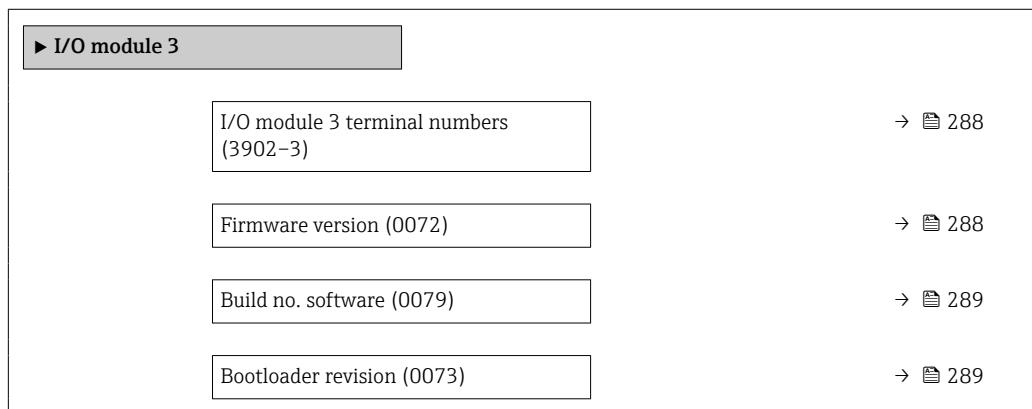
Navigation  Expert → Diagnostics → I/O module 2 → Bootloader rev. (0073)

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

User interface Positive integer

3.10.7 "I/O module 3" submenu

Navigation  Expert → Diagnostics → I/O module 3



I/O module 3 terminal numbers

Navigation  Expert → Diagnostics → I/O module 3 → I/O 3 terminals (3902-3)

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

User interface

- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4)

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

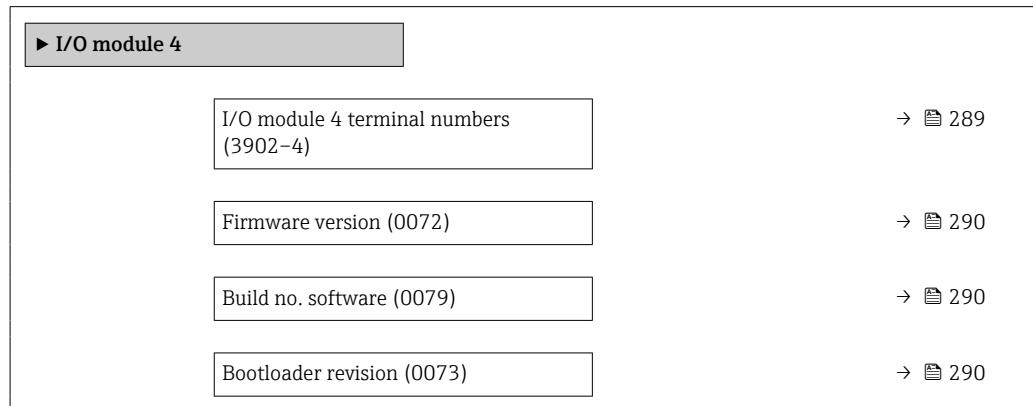
Navigation	Expert → Diagnostics → I/O module 3 → Build no. softw. (0079)
Description	Use this function to display the software build number of the module.
User interface	Positive integer

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

3.10.8 "I/O module 4" submenu

Navigation   Expert → Diagnostics → I/O module 4

**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	<ul style="list-style-type: none"> ■ Not used ■ 26-27 (I/O 1) ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)

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

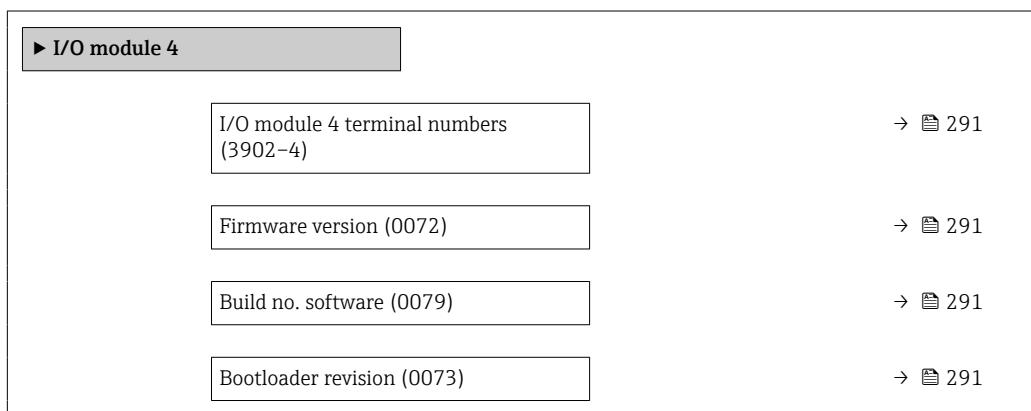
Navigation  Expert → Diagnostics → I/O module 4 → Bootloader rev. (0073)

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

User interface Positive integer

3.10.9 "I/O module 4" submenu

Navigation  Expert → Diagnostics → I/O module 4



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	<ul style="list-style-type: none">■ Not used■ 26-27 (I/O 1)■ 24-25 (I/O 2)■ 22-23 (I/O 3)■ 20-21 (I/O 4)

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

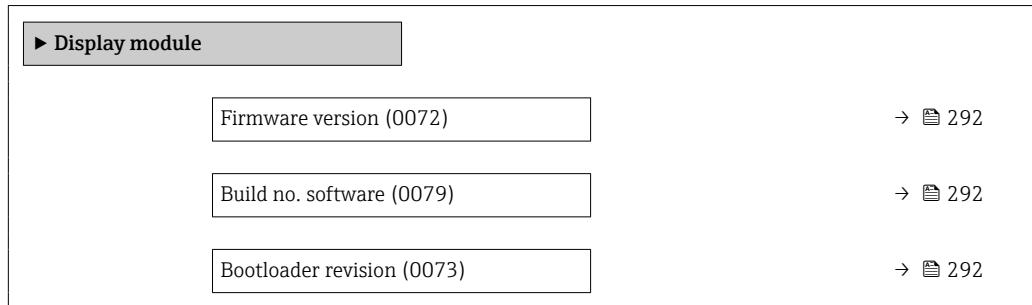
Bootloader revision

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

3.10.10 "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

3.10.11 "Data logging" submenu

Navigation

  Expert → Diagnostics → Data logging

▶ Data logging	
Assign channel 1 (0851)	→  293
Assign channel 2 (0852)	→  295
Assign channel 3 (0853)	→  296
Assign channel 4 (0854)	→  296
Logging interval (0856)	→  296
Clear logging data (0855)	→  297
Data logging (0860)	→  297
Logging delay (0859)	→  298
Data logging control (0857)	→  298
Data logging status (0858)	→  299
Entire logging duration (0861)	→  299
▶ Display channel 1	→  299
▶ Display channel 2	→  301
▶ Display channel 3	→  301
▶ Display channel 4	→  302

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 (→  60).

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 (→  60).

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

Selection For the picklist, see the **Assign channel 1** parameter (→  293)

* 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 (→ 60).

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

Selection For the picklist, see the **Assign channel 1** parameter (→ 293)

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 (→ 60).

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

Selection For the picklist, see the **Assign channel 1** parameter (→ 293)

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 (→ 60).

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 (→  60).

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 (→ 297), 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 (→ 298), 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 (→ 297), 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 (→ 297), 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 (→ 297), the Not overwriting option is selected.
Description	Displays the total logging duration.
User interface	Positive floating-point number
Factory setting	0 s

"Display channel 1" submenu

Navigation ◻ Expert → Diagnostics → Data logging → Displ.channel 1



Display channel 1

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 (→  60).

One of the following options is selected in the **Assign channel 1** parameter (→  293):

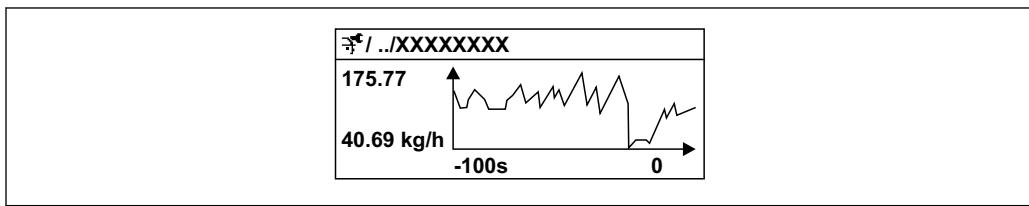
- Mass flow
- Volume flow
- Corrected volume flow
- Target mass flow ^{*}
- Carrier mass flow ^{*}
- Density
- Reference density ^{*}
- Concentration ^{*}
- Dynamic viscosity ^{*}
- Kinematic viscosity ^{*}
- Temp. compensated dynamic viscosity ^{*}
- Temp. compensated kinematic viscosity ^{*}
- Carrier 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 → 300

"Display channel 3" submenu

Navigation



Expert → Diagnostics → Data logging → Displ.channel 3



Display channel 3

Navigation



Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite

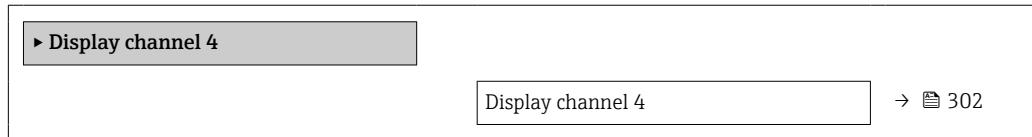
A process variable is specified in the **Assign channel 3** parameter.

Description

See the **Display channel 1** parameter → 300

"Display channel 4" submenu**Navigation**

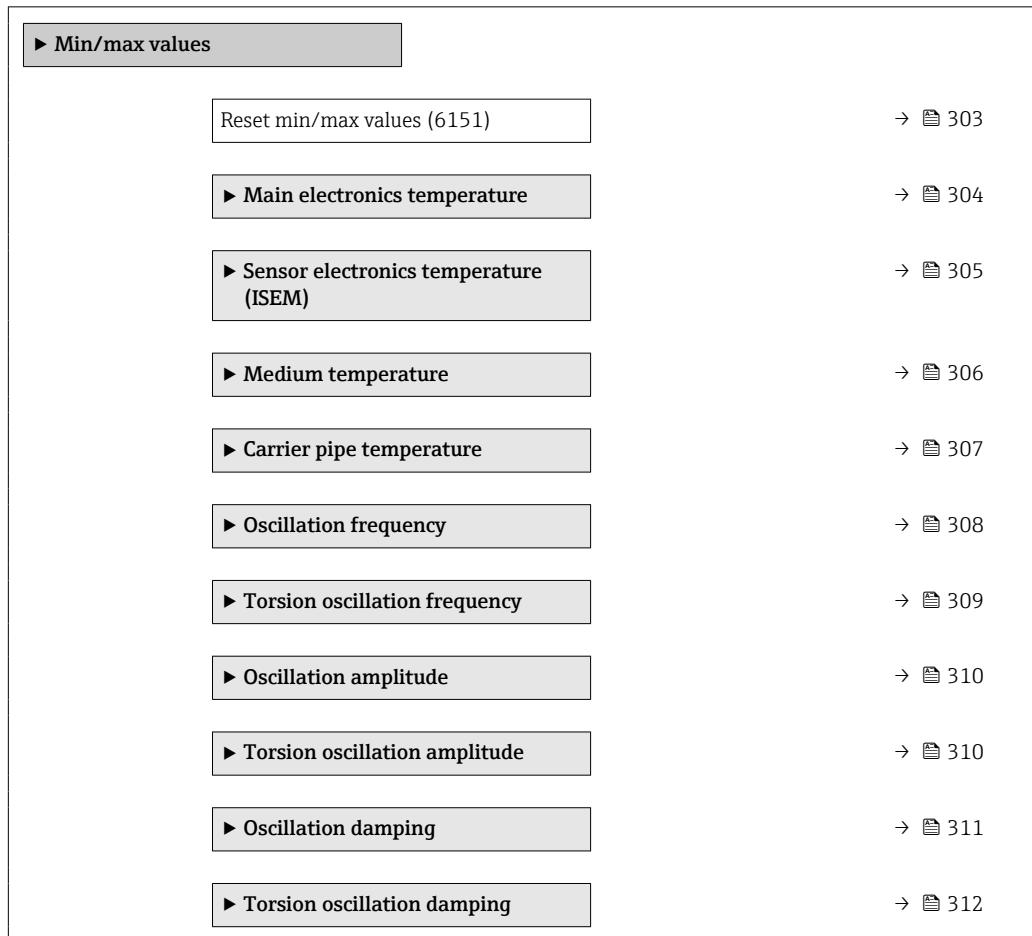
Expert → Diagnostics → Data logging → Displ.channel 4

**Display channel 4****Navigation**

Expert → Diagnostics → Data logging → Displ.channel 4

PrerequisiteA process variable is specified in the **Assign channel 4** parameter.**Description**See the **Display channel 1** parameter → [300](#)**3.10.12 "Min/max values" submenu****Navigation**

Expert → Diagnostics → Min/max val.



▶ Signal asymmetry	→ 313
▶ Torsion signal asymmetry	→ 313

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		→ 303
Maximum value		→ 304

Minimum value**Navigation**

Expert → Diagnostics → Min/max val. → Electronics temp → Minimum value (6052)

Description

Displays the lowest previously measured temperature value of the electronics module in the sensor connection housing.

User interface

Signed floating-point number

* Visibility depends on order options or device settings

Additional information*Dependency*

The unit is taken from the **Temperature unit** parameter (→ [102](#))

Maximum value

Navigation

Expert → Diagnostics → Min/max val. → Electronics temp → Maximum value (6051)

Description

Displays the highest previously measured temperature value of the electronics module in the sensor connection housing.

User interface

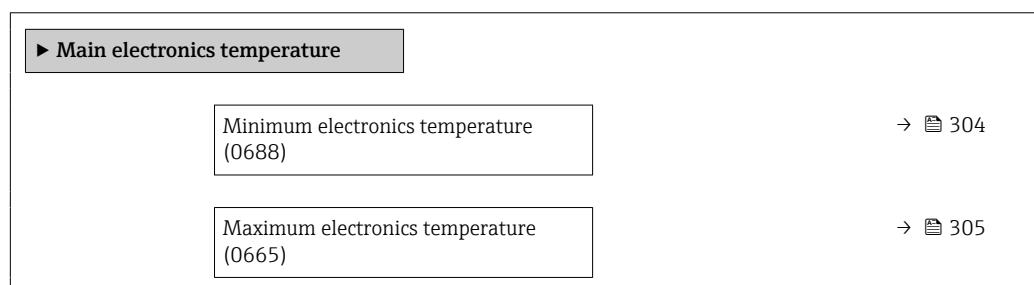
Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Temperature unit** parameter (→ [102](#))

"Main electronics temperature" submenu**Navigation**

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



Minimum electronics temperature

Navigation

Expert → Diagnostics → Min/max val. → Main elect.temp. → Min.electr.temp. (0688)

Description

Displays the lowest previously measured temperature value of the electronics module in the transmitter.

User interface

Signed floating-point number

Additional information*Dependency*

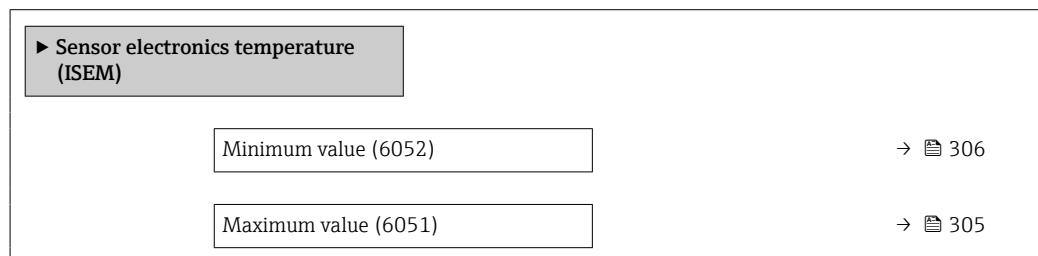
The unit is taken from the **Temperature unit** parameter (→ [102](#))

Maximum electronics temperature

Navigation	  Expert → Diagnostics → Min/max val. → Main elect.temp. → Max.electr.temp. (0665)
Description	Displays the highest previously measured temperature value of the electronics module in the transmitter.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  102)

"Sensor electronics temperature (ISEM)" submenu

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



Maximum value

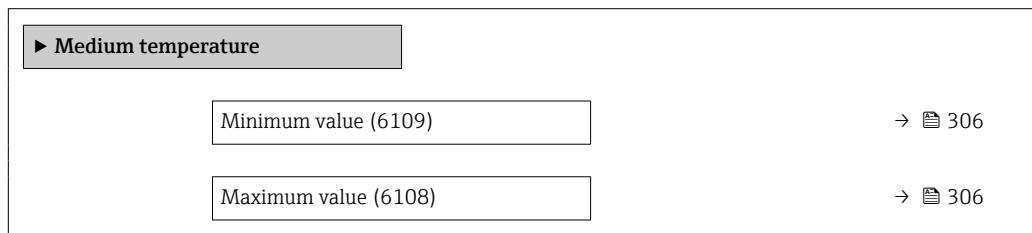
Navigation	  Expert → Diagnostics → Min/max val. → Sensor elec.temp → Maximum value (6051)
Description	Displays the highest previously measured temperature value of the electronics module in the sensor connection housing.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  102)

Minimum value

Navigation	  Expert → Diagnostics → Min/max val. → Sensor elec.temp → Minimum value (6052)
Description	Displays the lowest previously measured temperature value of the electronics module in the sensor connection housing.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→ 102)

"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	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→ 102)

Maximum value

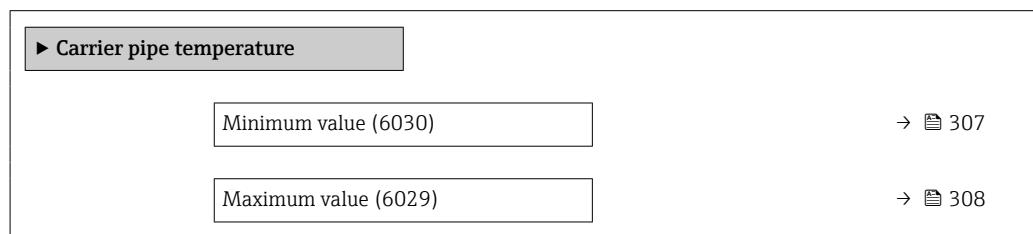
Navigation	  Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (6108)
Description	Displays the highest previously measured medium temperature value.
User interface	Signed floating-point number

Additional information*Dependency*

The unit is taken from the **Temperature unit** parameter (→ [102](#))

"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:

- 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*Dependency*

The unit is taken from the **Temperature unit** parameter (→ [102](#))

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

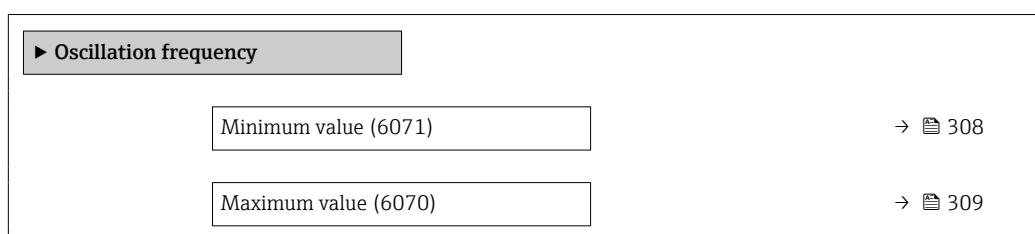
Dependency

 The unit is taken from the **Temperature unit** parameter (→ [102](#))

"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

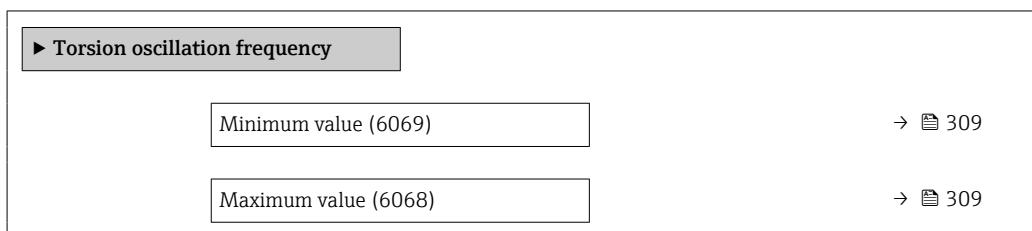
Signed floating-point number

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

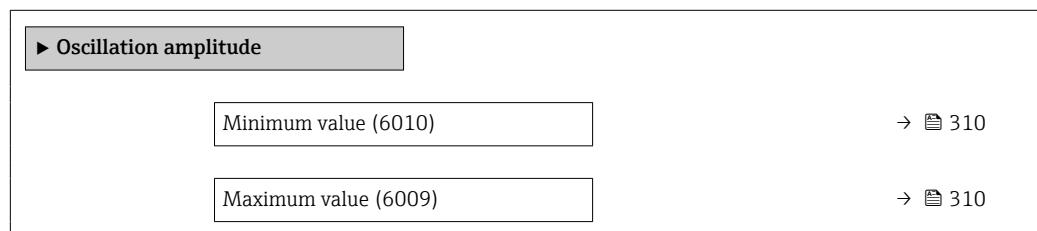
Navigation	Expert → Diagnostics → Min/max val. → Tors.oscil.freq. → Minimum value (6069)
Prerequisite	Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the lowest previously measured torsion oscillation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

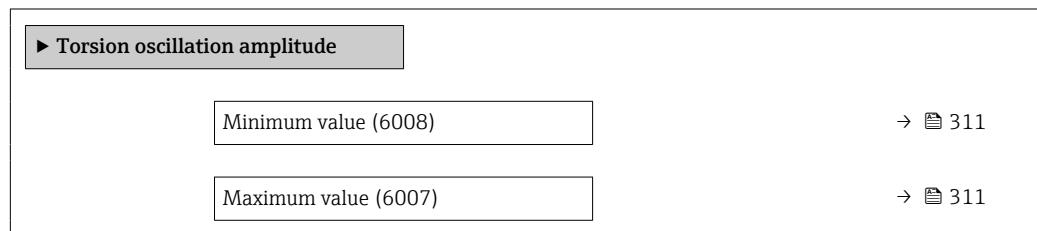
Signed floating-point number

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

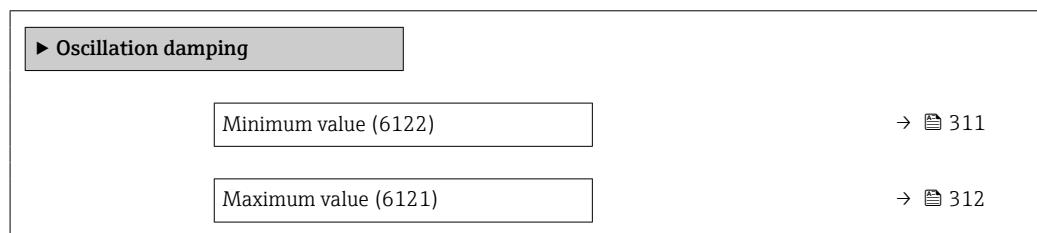
Navigation	Expert → Diagnostics → Min/max val. → Tor. osc. amp. → Minimum value (6008)
Prerequisite	 Only available for Promass I and Q. For the following order code: "Application package", option EB "Heartbeat Verification + Monitoring"
Description	Displays the lowest previously measured torsion oscillation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

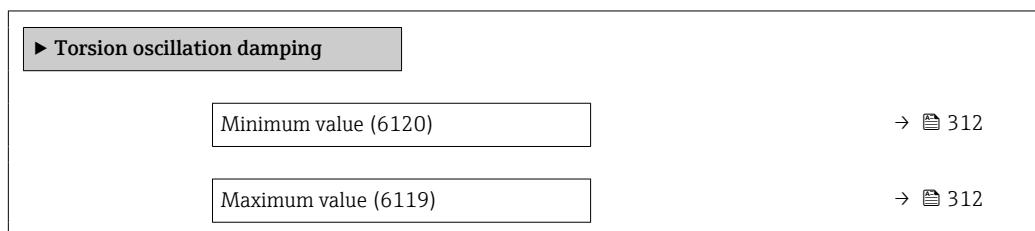
Navigation	Expert → Diagnostics → Min/max val. → Oscil. damping → Minimum value (6122)
Description	Displays the lowest previously measured oscillation damping.
User interface	Signed floating-point number

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

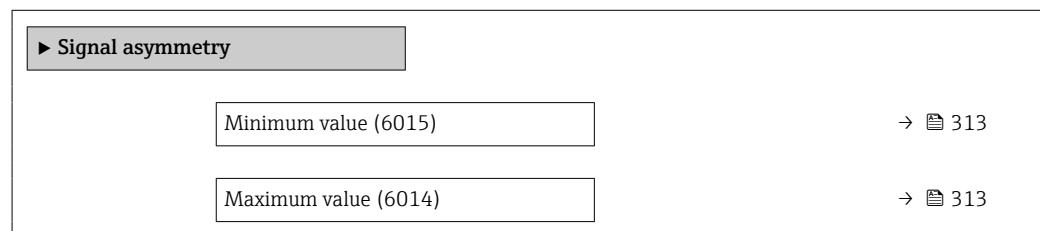
Maximum value

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

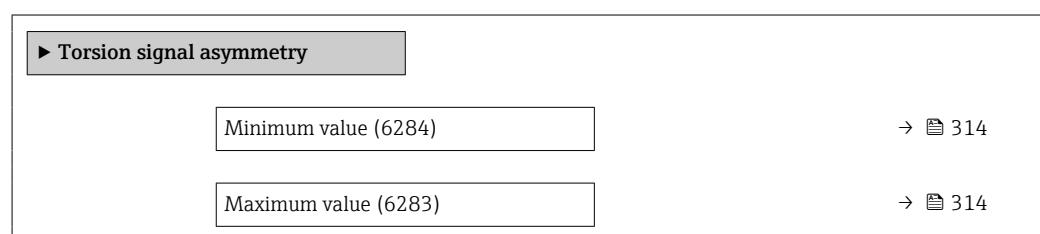
Navigation  Expert → Diagnostics → Min/max val. → Signal asymmetry → Maximum value (6014)

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

3.10.13 "Heartbeat Technology" submenu

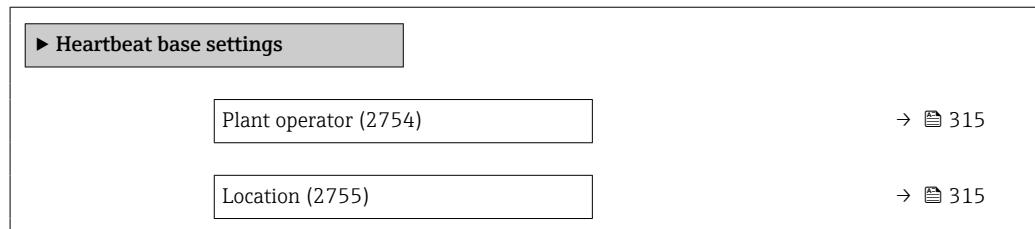
 For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring**: Special Documentation for the device →  8

Navigation  Expert → Diagnostics → Heartbeat Techn.

 Heartbeat Technology	
 Heartbeat base settings	→  315
 Performing verification	→  315
 Verification results	→  321
 Heartbeat Monitoring	→  325
 Monitoring results	→  326

"Heartbeat base settings" submenu**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Base settings

**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

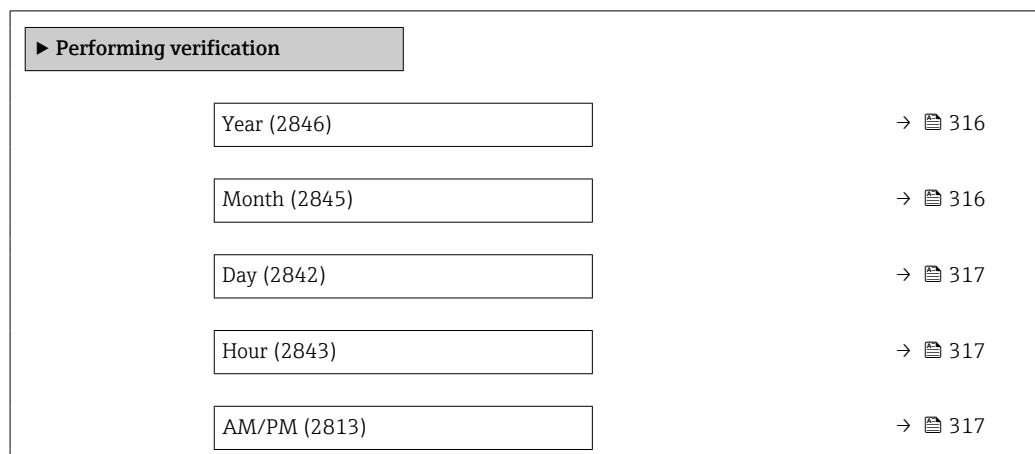
Use this function to enter the location.

User entry

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

"Performing verification" wizard**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific.



Minute (2844)	→ 318
Verification mode (12105)	→ 318
External device information (12101)	→ 318
Start verification (12127)	→ 319
Progress (2808)	→ 319
Measured values (12102)	→ 320
Output values (12103)	→ 320
Status (12153)	→ 320
Verification result (12149)	→ 321

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) (→ 103).
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 (→ 318).
- 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 * ■ Output 4 low value * ■ Output 4 high value * ■ Frequency output 1 * ■ Pulse output 1 * ■ Frequency output 2 * ■ Pulse output 2 * ■ Frequency output 3 * ■ 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.verific. → Measured val. (12102)

Prerequisite One of the following options is selected in the **Start verification** parameter (→ 319):

- Output 1 low value
- Output 1 high value
- Output 2 low value
- Output 2 high value
- Frequency output 1
- Pulse output 1

Description Use this function to enter the measured values (actual values) for the external measured variables::

- Current output: Output current in [mA]
- Pulse/frequency output: Output frequency in [Hz]
- Double pulse output: Output frequency in [Hz]

User entry Signed floating-point number

Factory setting 0

Output values

Navigation Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Output values (12103)

Description Displays the simulated output values (target values) for the external measured variables::

- Current output: Output current in [mA].
- Pulse/frequency output: Output frequency in [Hz].

User interface Signed floating-point number

Factory setting -

Status

Navigation Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Status (12153)

Description Displays the current status of the verification.

User interface

- Done
- Busy
- Failed
- Not done

Verification result

Navigation	  Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Verific. result (12149)
Description	Displays the overall result of the verification.  Detailed description of results classification:
User interface	<ul style="list-style-type: none"> ■ Not supported ■ Passed ■ Not done ■ Failed
Factory setting	Not done

"Verification results" submenu

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

► Verification results	→  322
Date/time (manually entered) (12142)	→  322
Verification ID (12141)	→  322
Operating time (12126)	→  322
Verification result (12149)	→  322
Sensor (12152)	→  323
HBSI (12167)	→  323
Sensor electronic module (ISEM) (12151)	→  323
I/O module (12145)	→  324
System status (12109)	→  324

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 is shown in the Overall result parameter (→  321).
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 (→  321), 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 is shown in the Overall result parameter (→  321).

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 The **Failed** option is shown in the **Overall result** parameter (→  321).

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 is shown in the **Overall result** parameter (→  321).

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

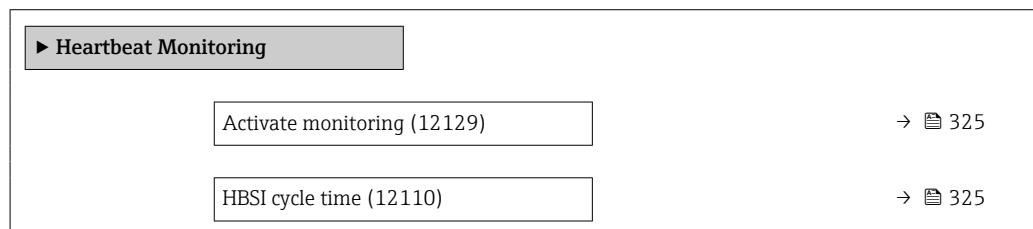
 Detailed description of results classification:

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 (→ 325), the **Time-controlled HBSI** option is selected.
Not available for Promass I.

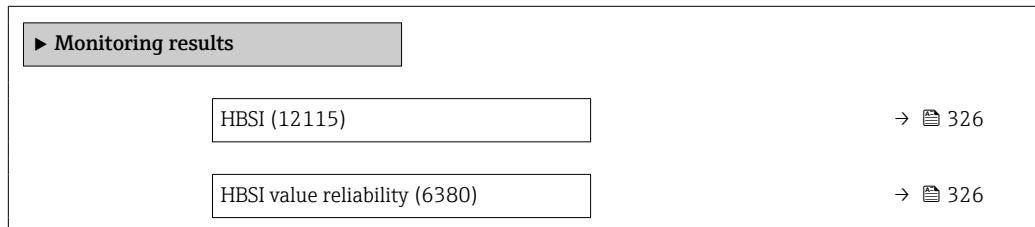
Description Use this function to enter the cycle time for determining the HBSI measured value. The HBSI measured value may only be determined in the configured cycle time in the firmware if the **Activate monitoring** parameter (→ 325) is set to **Scheduled HBSI** option.

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

3.10.14 "Simulation" submenu

Navigation

Expert → Diagnostics → Simulation

▶ Simulation	
Assign simulation process variable (1810)	→ 328
Process variable value (1811)	→ 329
Current input 1 to n simulation (1608-1 to n)	→ 329
Value current input 1 to n (1609-1 to n)	→ 330
Status input 1 to n simulation (1355-1 to n)	→ 330
Input signal level 1 to n (1356-1 to n)	→ 330
Current output 1 to n simulation (0354-1 to n)	→ 331
Current output value (0355)	→ 331
Frequency output 1 to n simulation (0472-1 to n)	→ 331
Frequency output 1 to n value (0473-1 to n)	→ 332
Pulse output simulation 1 to n (0458-1 to n)	→ 332
Pulse value 1 to n (0459-1 to n)	→ 333
Switch output simulation 1 to n (0462-1 to n)	→ 333
Switch state 1 to n (0463-1 to n)	→ 334
Relay output 1 to n simulation (0802-1 to n)	→ 334
Switch state 1 to n (0803-1 to n)	→ 335
Device alarm simulation (0654)	→ 335

Diagnostic event category (0738)	→  336
Diagnostic event simulation (0737)	→  336

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 (→ 329).

Process variable value**Navigation**

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

Prerequisite

A process variable is selected in the **Assign simulation process variable** parameter (→ 328).

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 (→ 94).

Current input 1 to n simulation**Navigation**

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

Description

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



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

Selection

- Off
- On

Factory setting

Off

Additional information*Selection*

- Off

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

- On

Current simulation is active.

Value current input 1 to n**Navigation**

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

Prerequisite

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

Description

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

User entry

0 to 22.5 mA

Status input 1 to n simulation**Navigation**

Expert → Diagnostics → Simulation → Status inp 1 to n sim (1355–1 to n)

Description

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

Selection

- Off
- On

Factory setting

Off

Additional information**Description**

The desired simulation value is defined in the **Input signal level** parameter (→ 330).

Selection

- Off
Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
Simulation for the status input is active.

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 (→ 330), the **On** option is selected.

Description

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

Selection

- High
- Low

Current output 1 to n simulation

Navigation	Expert → Diagnostics → Simulation → Curr.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	<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 Value current output 1 to n parameter.</p> <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.

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	<p><i>Dependency</i></p> <p>The input range is dependent on the option selected in the Current span parameter (→ 161).</p>

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 (→ 175), 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	<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 Frequency value 1 to n parameter.</p> <p><i>Selection</i></p> <ul style="list-style-type: none">▪ 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 (→ 175), 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	<ul style="list-style-type: none">▪ 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 (→ 178).

- Down-counting value

The pulses specified in the **Pulse value** parameter (→ 333) 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 (→ 175), 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.

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 (→ [336](#)).

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**

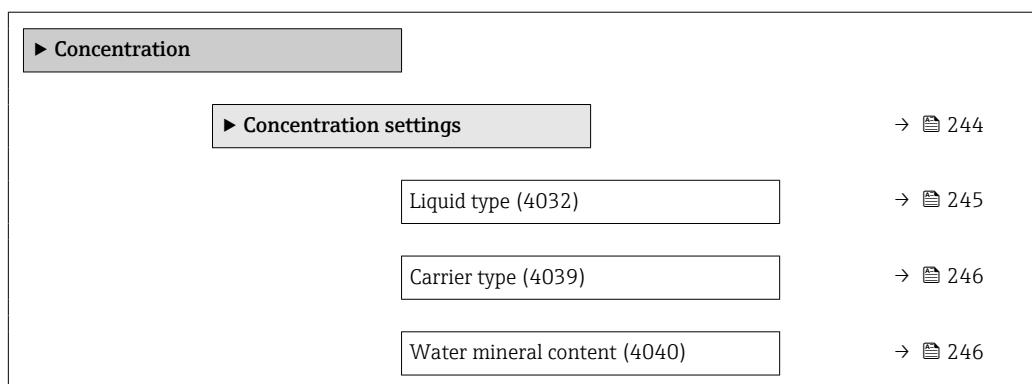
For the simulation, you can choose from the diagnostic events of the category selected in the **Diagnostic event category** parameter (→ [336](#)).

3.11 "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



Carrier reference density (4033)	→ 247
Carrier linear expansion coefficient (4035)	→ 247
Carrier square expansion coefficient (4037)	→ 248
Target reference density (4034)	→ 248
Target linear expansion coefficient (4036)	→ 248
Target square expansion coefficient (4038)	→ 249
Reference temperature expansion (4045)	→ 249
Create coefficients for liquid type (4001)	→ 249
► Concentration unit	→ 250
Concentration unit (0613)	→ 250
User concentration text (0589)	→ 250
User concentration factor (0587)	→ 251
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Reference temperature (4046)	→ 251
► Concentration profile 1 to n	→ 251
Coefficients set name (4113-1 to n)	→ 252
A 0 (4101)	→ 252
A 1 (4102)	→ 253
A 2 (4103)	→ 253
A 3 (4105)	→ 253
A 4 (4107)	→ 253
B 1 (4104)	→ 254
B 2 (4106)	→ 254

B 3 (4108)	→ 254
D 1 (4109)	→ 254
D 2 (4110)	→ 255
D 3 (4111)	→ 255
D 4 (4112)	→ 255
► Mineral content determination	→ 255
Control mineral content determination (4041)	→ 256
State mineral content determination (4042)	→ 256
Carrier density during determination (4043)	→ 256
Process temperature during determination (4044)	→ 257

3.11.1 "Concentration settings" submenu

Navigation

Expert → Application → Concentration → Concentr. sett.

► Concentration settings	
Liquid type (4032)	→ 245
Carrier type (4039)	→ 246
Water mineral content (4040)	→ 246
Carrier reference density (4033)	→ 247
Carrier linear expansion coefficient (4035)	→ 247
Carrier square expansion coefficient (4037)	→ 248
Target reference density (4034)	→ 248
Target linear expansion coefficient (4036)	→ 248

Target square expansion coefficient (4038)	→ 249
Reference temperature expansion (4045)	→ 249
Create coefficients for liquid type (4001)	→ 249

Liquid type

Navigation

Expert → Application → Concentration → Concentr. sett. → Liquid type (4032)

Description

Select liquid type.

The measuring device already contains the density/concentration correlation for a range of binary mixtures. Please refer to table for information on the validity ranges with regard to temperature and concentration and for standard deviations of the approximation model for converting density to concentration.

3 sets of coefficients are available for user-defined media. The coefficients are determined from table values via FieldCare

Selection

- Off
- Sucrose in water
- Glucose in water
- Fructose in water
- Invert sugar in water
- HFCS42
- HFCS55
- HFCS90
- Wort
- Whey (Total Solids)
- Ethanol in water (OIML)
- Methanol in water
- Hydrogen peroxide in water
- Hydrochloric acid
- Sulfuric acid
- Nitric acid
- Phosphoric acid
- Sodium hydroxide
- Potassium hydroxide
- Ammonia in water
- Ammonium hydroxide in water
- Ammonium nitrate in water
- Iron(III)chloride in water
- Sodium chloride in water
- %mass / %volume
- Coef Set
- Coef Set
- Coef Set

Factory setting

Off

Carrier type**Navigation**

Expert → Application → Concentration → Concentr. sett. → Carrier type (4039)

Prerequisite

The **%mass / %volume** option is selected in the **Liquid type** parameter (→ 245).

Description

Select carrier medium type.

For the **%mass / %volume** option, it is possible to choose whether the carrier medium is water. If "water-based" is selected, the "**Carrier reference density**" parameter (→ 247), **Carrier linear expansion coefficient** (→ 247) and **Carrier square expansion coefficient** (→ 248) are not available. Instead, the density characteristic of water is determined using Kell's formula (ITS-90).

Selection

- Water based
- Not water based

Factory setting

Water based

Water mineral content**Navigation**

Expert → Application → Concentration → Concentr. sett. → Water mineral.c. (4040)

Prerequisite

The following options are selected in the **Liquid type** parameter (→ 245):

One of the following options is selected in the **Liquid type** parameter (→ 245):

- Sucrose in water
- Glucose in water
- Fructose in water
- Invert sugar in water
- HFCS42
- HFCS55
- HFCS90
- Wort
- Methanol in water
- Hydrogen peroxide in water
- Hydrochloric acid
- Sulfuric acid
- Nitric acid
- Phosphoric acid
- Sodium hydroxide
- Ammonium nitrate in water
- Iron(III)chloride in water
- **%mass / %volume**

Description

Enter mineral content for water based carriers.

It is generally presumed that water is present as a carrier medium in pure form, i.e. fully demineralized. If the water contains minerals, these affect the density of the carrier medium and therefore the density of the mixture. This effect can be taken into consideration by entering the mineral content in the device.

If the mineral content is to be calculated, this is performed in a separate menu

User entry

Positive floating-point number

Factory setting	0 mg/l
-----------------	--------

Carrier reference density



Navigation	Expert → Application → Concentration → Concentr. sett. → Carr. ref. dens. (4033)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245) and the Not water based option is selected in the Carrier type parameter (→ 246).
Description	<p>Enter reference density for carrier.</p> <p>Density of the carrier medium at reference temperature if the %mass / %volume option is selected.</p>
User entry	Positive floating-point number
Factory setting	1 kg/Nl

Carrier linear expansion coefficient



Navigation	Expert → Application → Concentration → Concentr. sett. → Carr.lin.exp.co. (4035)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245) and the Not water based option is selected in the Carrier type parameter (→ 246).
Description	<p>Enter linear expansion coefficient for the carrier.</p> <p>Coefficient of the linear term for approximating the thermal expansion of the carrier medium.</p>
User entry	Signed floating-point number
Factory setting	0.0 1/K

Carrier square expansion coefficient



Navigation	Expert → Application → Concentration → Concentr. sett. → Carr.sq.exp.coe. (4037)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245) and the Not water based option is selected in the Carrier type parameter (→ 246).
Description	<p>Enter square expansion coefficient for the carrier.</p> <p>Coefficient of the quadratic term for approximating the thermal expansion of the carrier medium.</p>
User entry	Signed floating-point number

Factory setting 0.0 1/K²

Target reference density



Navigation Expert → Application → Concentration → Concentr. sett. → Targ.ref.density (4034)

Prerequisite The **%mass / %volume** option is selected in the **Liquid type** parameter (→ 245).

Description Enter reference density for target.

Density of the target medium at reference temperature if the **%mass / %volume** option is selected.

User entry Positive floating-point number

Factory setting 1 kg/Nl

Target linear expansion coefficient



Navigation Expert → Application → Concentration → Concentr. sett. → Targ.lin.exp.co. (4036)

Prerequisite The **%mass / %volume** option is selected in the **Liquid type** parameter (→ 245).

Description Enter linear expansion coefficient for the target.

Coefficient of the linear term for approximating the thermal expansion of the target medium.

User entry Signed floating-point number

Factory setting 0.0 1/K

Target square expansion coefficient



Navigation Expert → Application → Concentration → Concentr. sett. → Targ.sq.exp.coe. (4038)

Prerequisite The **%mass / %volume** option is selected in the **Liquid type** parameter (→ 245).

Description Enter square expansion coefficient for the target.

Coefficient of the quadratic term for approximating the thermal expansion of the target medium.

User entry Signed floating-point number

Factory setting 0.0 1/K²

Reference temperature expansion

Navigation	Expert → Application → Concentration → Concentr. sett. → Ref.temp.expan. (4045)
Prerequisite	The %mass / %volume option is selected in the Liquid type parameter (→ 245).
Description	Enter the temperature at which the specified reference densities of the carrier and target media are valid.
User entry	-273.15 to 99 999 °C
Factory setting	20 °C

Create coefficients for liquid type

Navigation	Expert → Application → Concentration → Concentr. sett. → Create coeff. (4001)
Description	Create coefficient set for selected liquid type. Adjust concentration values via user concentration factor and user concentration offset.
Selection	<ul style="list-style-type: none"> ■ Cancel ■ Coefficient set 1 ■ Coefficient set 2 ■ Coefficient set 3
Factory setting	Cancel

3.11.2 "Concentration unit" submenu

Navigation Expert → Application → Concentration → Concentr. unit

► Concentration unit	
Concentration unit (0613)	→ 250
User concentration text (0589)	→ 250
User concentration factor (0587)	→ 251
User concentration offset (0588)	→ 251
Reference temperature (4046)	→ 251

Concentration unit

Navigation	Expert → Application → Concentration → Concentr. unit → Concentr. unit (0613)
Description	Select concentration unit.
Selection	
Factory setting	°Brix

User concentration text

Navigation	Expert → Application → Concentration → Concentr. unit → Concentr. text (0589)
Prerequisite	The Coef Set 1...3 option is selected in the Liquid type parameter (→ 245) and the User conc. option is selected in the Concentration unit parameter (→ 250).
Description	Enter text for the user specific unit of the concentration.
User entry	Character string comprising numbers, letters and special characters (10)
Factory setting	User conc.

User concentration factor

Navigation	Expert → Application → Concentration → Concentr. unit → Concentr. factor (0587)
Prerequisite	The Coef Set 1...3 option is selected in the Liquid type parameter (→ 245) and the User conc. option is selected in the Concentration unit parameter (→ 250).
Description	With user-specific unit: Enter a factor which is multiplicated with the measured concentration value.
User entry	Signed floating-point number
Factory setting	1.0

User concentration offset

Navigation	Expert → Application → Concentration → Concentr. unit → Concentr. offset (0588)
Prerequisite	The Coef Set 1...3 option is selected in the Liquid type parameter (→ 245) and the User conc. option is selected in the Concentration unit parameter (→ 250).

Description	With user-specific unit: Enter zero point shift which is added or subtracted to/from the measured concentration value.
User entry	Signed floating-point number
Factory setting	0

Reference temperature

Navigation	Expert → Application → Concentration → Concentr. unit → Ref. temperature (4046)
Description	Enter reference temperature for calculating the reference density.
User entry	-273.15 to 99 999 °C
Factory setting	20 °C

3.11.3 "Concentration profile 1 to n" submenu

Navigation Expert → Application → Concentration → Conc. profile 1 to n

► Concentration profile 1 to n	
Coefficients set name (4113-1 to n)	→ 252
A 0 (4101)	→ 252
A 1 (4102)	→ 253
A 2 (4103)	→ 253
A 3 (4105)	→ 253
A 4 (4107)	→ 253
B 1 (4104)	→ 254
B 2 (4106)	→ 254
B 3 (4108)	→ 254
D 1 (4109)	→ 254
D 2 (4110)	→ 255

D 3 (4111)	→ 255
D 4 (4112)	→ 255

Coefficients set name

Navigation Expert → Application → Concentration → Conc. profile 1 to n → Coeff. set name (4113–1 to n)

Description Enter name for coefficients set.

User entry Character string comprising numbers, letters and special characters (16)

Factory setting Coef Set No.

A 0

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 0 (4101)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting -7.2952

A 1

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 1 (4102)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting 15.1555

A 2

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 2 (4103)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting -11.6756

A 3

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 3 (4105)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting 4.4759

A 4

Navigation Expert → Application → Concentration → Conc. profile 1 to n → A 4 (4107)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting -0.6615

B 1

Navigation Expert → Application → Concentration → Conc. profile 1 to n → B 1 (4104)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $0.7220 \cdot 10^{-3}$ E-3

B 2

Navigation Expert → Application → Concentration → Conc. profile 1 to n → B 2 (4106)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $38.9126 \cdot 10^{-6}$ E-6

B 3

Navigation Expert → Application → Concentration → Conc. profile 1 to n → B 3 (4108)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $-1.6739 \cdot 10^{-9}$ E-9

D 1

Navigation Expert → Application → Concentration → Conc. profile 1 to n → D 1 (4109)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $-0.0975 \cdot 10^{-2}$ E-2

D 2

Navigation Expert → Application → Concentration → Conc. profile 1 to n → D 2 (4110)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $-0.3731 \cdot 10^{-4}$ E-4

D 3

Navigation Expert → Application → Concentration → Conc. profile 1 to n → D 3 (4111)

Description Enter the coefficient.

User entry Signed floating-point number

Factory setting $0.2957 \cdot 10^{-3}$ E-3

D 4**Navigation**

Expert → Application → Concentration → Conc. profile 1 to n → D 4 (4112)

Description

Enter the coefficient.

User entry

Signed floating-point number

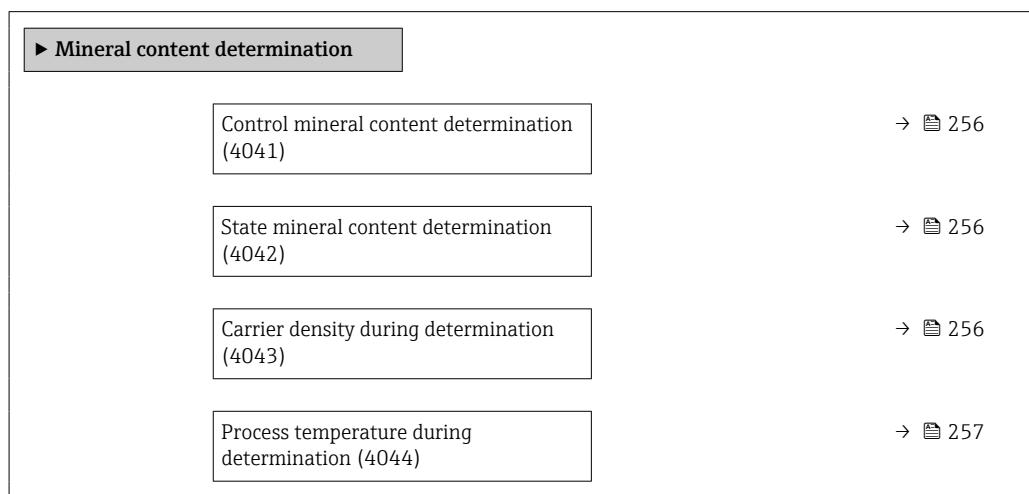
Factory setting

$-0.1721 \cdot 10^{-5}$ E-5

3.11.4 "Mineral content determination" submenu

Navigation

Expert → Application → Concentration → Mineral content



Control mineral content determination
**Navigation**

Expert → Application → Concentration → Mineral content → Contr.min.determ (4041)

Description

Use this function to start or cancel mineral content determination.

Select the **Use result** option to take the mineral content into consideration.

Selection

- Cancel
- Start
- Use result *

Factory setting

Cancel

* Visibility depends on order options or device settings

State mineral content determination

Navigation	  Expert → Application → Concentration → Mineral content → State determ. (4042)
Description	Displays the current status of mineral content determination.
User interface	<ul style="list-style-type: none">■ In progress■ Failed■ Not done■ Done
Factory setting	Not done

Carrier density during determination

Navigation	  Expert → Application → Concentration → Mineral content → Carrier density (4043)
Description	Displays the current measured density of the water with minerals under process conditions. <i>Dependency</i> The unit is taken from the Density unit parameter (→  99).
User interface	Signed floating-point number
Factory setting	0 kg/l

Process temperature during determination

Navigation	  Expert → Application → Concentration → Mineral content → Process temp. (4044)
Description	Displays the measured process temperature. <i>Dependency</i> The unit is taken from the Temperature unit parameter (→  102).
User interface	-273.15 to 99 726.8499 °C
Factory setting	-273.15 °C

3.12 "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	
Petroleum mode (4187)	→  258
Water cut mode (4190)	→  258
API commodity group (4151)	→  259
API table selection (4152)	→  259
Bitumen ASTM table (4186)	→  260
Thermal expansion coefficient (4153)	→  260
Alternative pressure value (4155)	→  260
Alternative temperature value (4154)	→  261
Shrinkage factor (4167)	→  261
S&W input mode (4189)	→  261
S&W (4156)	→  262
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Oil density unit (0615)	→  262
Oil sample density (4162)	→  263
Oil sample temperature (4163)	→  263
Oil sample pressure (4166)	→  263
Water density unit (0616)	→  264
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Water sample density (4164)	→  265
Water sample temperature (4165)	→  265
Meter factor (4198)	→  265
Density limit (4199)	→  266

Petroleum mode

Navigation Expert → Application → Petroleum → Petroleum mode (4187)

Description Select petroleum mode.

Selection

- Off
- API referenced correction
- Net oil & water cut
- ASTM D4311

Factory setting Off

Water cut mode

Navigation Expert → Application → Petroleum → Water cut mode (4190)

Prerequisite The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description Select water cut mode.

Selection

- Calculated value
- External value
- Current input 1 *
- Current input 2 *
- Current input 3 *

Factory setting Calculated value

API commodity group

Navigation Expert → Application → Petroleum → API comm. group (4151)

Prerequisite The following options are available if the **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)):

- A - crude oil
- C - special applications

Description Select API commodity group of the measured medium.

Selection

- A - crude oil
- B - refined products *
- C - special applications
- D - lubricating oils *
- E - NGL / LPG *

* Visibility depends on order options or device settings

Factory setting	A - crude oil
------------------------	---------------

API table selection

Navigation	Expert → Application → Petroleum → API tab. select. (4152)
Description	Select reference density by API table.
Selection	<ul style="list-style-type: none"> ■ API table 5/6 * ■ API table 23/24 ■ API table 53/54 ■ API table 59/60
Factory setting	API table 53/54

Bitumen ASTM table

Navigation	Expert → Application → Petroleum → ASTM table (4186)
Description	Select calculation table for density and specific gravity.
Selection	<ul style="list-style-type: none"> ■ >= 966kg/m³ (15°C) ■ 850-965kg/m³ (15°C) ■ >= 0.967 (60°F) ■ 0.850-0.966 (60°F)
Factory setting	>= 966kg/m ³ (15°C)

Thermal expansion coefficient

Navigation	Expert → Application → Petroleum → Therm.exp.coeff. (4153)
Prerequisite	The C - special applications option is selected in the API commodity group parameter (→ 259) parameter
Description	Enter the thermal expansion coefficient of the measured medium.
User entry	$414 \cdot 10^{-6}$ to $1674 \cdot 10^{-6}$ 1/K
Factory setting	$414 \cdot 10^{-6}$ 1/K

* Visibility depends on order options or device settings

Alternative pressure value



Navigation Expert → Application → Petroleum → Alternat. press. (4155)

Prerequisite The **API referenced correction** option is selected in the **Petroleum mode** parameter (→ 258) parameter.

Description Enter an alternative user-defined pressure value.

User entry 1.01325 to 104.43460935 bar

Factory setting 1.01325 bar

Additional information The unit is taken from the **Pressure unit** parameter (→ 102)

Alternative temperature value



Navigation Expert → Application → Petroleum → Alternativ.temp. (4154)

Prerequisite The **API referenced correction** option is selected in the **Petroleum mode** parameter (→ 258) parameter.

Description Enter an alternative user-defined temperature value.

User entry -46 to 93 °C

Factory setting 29.5 °C

Shrinkage factor



Navigation Expert → Application → Petroleum → Shrinkage factor (4167)

Description Enter shrinkage factor.

User entry Positive floating-point number

Factory setting 1.0

S&W input mode



Navigation Expert → Application → Petroleum → S&W input mode (4189)

Prerequisite The **API referenced correction** option is selected in the **Petroleum mode** parameter (→ 258) parameter.

Description Select input mode for sediment and water.

Selection

- Off
- Fixed value
- External value
- Current input 1^{*}
- Current input 2^{*}
- Current input 3^{*}

Factory setting Off

S&W

Navigation Expert → Application → Petroleum → S&W (4156)

Prerequisite The **Fixed value** option is selected in the **S&W input mode** parameter (→ 261) parameter

Description Enter a value for sediment and water in percent.

Use this function to enter a percentage to factor in a reduction in the volume flow due to the presence of sediment and water in the fluid.

User entry 0 to 100 %

Factory setting 0 %

S&W correction value

Navigation Expert → Application → Petroleum → S&W correction (4194)

Prerequisite For the following order code:

- "Application package", option EJ "Petroleum"
- In the **S&W input mode** parameter (→ 261), 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 (→ 60).

Description Shows the correction value for sediment and water.

User interface Positive floating-point number

Factory setting –

* Visibility depends on order options or device settings

Oil density unit**Navigation**

Expert → Application → Petroleum → Oil density unit (0615)

Prerequisite

The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description

Select unit for the density of oil.

Selection*SI units*

- kg/m³
- kg/l
- g/cm³
- g/l
- SG15°C
- SG20°C

US units

- SG60°F
- lb/ft³
- lb/gal (us)
- lb/bbl (us;oil)
- lb/in³
- STon/yd³

Imperial units

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

Other units

°API

Factory setting

kg/m³

Oil sample density**Navigation**

Expert → Application → Petroleum → Oil sample dens. (4162)

Prerequisite

The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description

Enter the value for the density of the oil sample.

User entry

470 to 1 210 kg/m³

Factory setting

850 kg/m³

Oil sample temperature**Navigation**

Expert → Application → Petroleum → Oil sample temp. (4163)

Prerequisite

The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description

Enter the value for the temperature of the oil sample.

User entry

-273.15 to 99 726.8499 °C

Factory setting

15 °C

Oil sample pressure**Navigation**

Expert → Application → Petroleum → Oil samp. press. (4166)

Prerequisite

The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description

Enter the value for the pressure of the oil sample.

User entry

Positive floating-point number

Factory setting

1.01325 bar

Water density unit**Navigation**

Expert → Application → Petroleum → Water dens. unit (0616)

Prerequisite

The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description

Select unit for the density of the water.

Selection*SI units*

- kg/m³
- kg/l
- g/cm³
- g/l
- SG15°C
- SG20°C

US units

- SG60°F
- lb/ft³
- lb/gal (us)
- lb/in³
- STon/yd³

Imperial units

lb/gal (imp)

Other units

°API

Factory setting

kg/m³

Water reference density unit**Navigation**

Expert → Application → Petroleum → Water ref. dens. (0617)

Prerequisite

The **Net oil & water cut** option is selected in the **Petroleum mode** parameter (→ [258](#)) parameter.

Description

Select unit for reference density of the water.

Selection	SI units	US units
	■ kg/Nm ³	■ lb/Sft ³
	■ kg/Nl	■ RD60°F
	■ kg/Sm ³	
	■ g/Scm ³	
	■ RD15°C	
	■ RD20°C	
Factory setting	kg/Nm ³	

Water sample density



Navigation	Expert → Application → Petroleum → Water samp. dens (4164)
Prerequisite	The Net oil & water cut option is selected in the Petroleum mode parameter (→ 258) parameter.
Description	Enter the value for the density of the water sample.
User entry	900 to 1 200 kg/m ³
Factory setting	999.2 kg/m ³

Water sample temperature



Navigation	Expert → Application → Petroleum → Water samp. temp (4165)
Prerequisite	The Net oil & water cut option is selected in the Petroleum mode parameter (→ 258) parameter.
Description	Enter the value for the temperature of the water sample.
User entry	-273.15 to 99 726.8499 °C
Factory setting	15 °C

Meter factor



Navigation	Expert → Application → Petroleum → Meter factor (4198)
Prerequisite	The Net oil & water cut option is selected in the Petroleum mode parameter (→ 258) parameter.
Description	Displays the current calibration factor for correcting the volume flow. The correction is required due to inaccuracies in the measuring device.

User entry Signed floating-point number

Factory setting 1.0

Density limit



Navigation Expert → Application → Petroleum → 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

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

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
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

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
15 FB	72
25	72
25 FB	180
40	180
40 FB	300
50	300
50 FB	720

Nominal diameter [mm]	On-value for liquid [kg/h]
80	720
100	1 200
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

Process variable	Unit
Reference density	lb/Sft ³
Temperature	°F
Pressure	psi a

4.2.2 Full scale values



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

Nominal diameter [in]	[lb/min]
1/24	0.15
1/12	0.75
1/8	3.3
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

Nominal diameter [in]	[lb/p]
1/24	0.002
1/12	0.02
1/8	0.02
3/8	0.2
1/2	0.2

Nominal diameter [in]	[lb/p]
½ FB	2
1	2
1 FB	2
1½	2
1½ 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]
1/24	0.003
1/12	0.015
1/8	0.066
3/8	0.3
½	1
½ FB	2.6
1	2.6
1 FB	6.6
1½	6.6
1½ FB	11
2	11
2 FB	26
3	26
4	44
6	95
8	165
10	260
14	470

Nominal diameter [in]	On-value for gas [lb/min]
1/24	0.001
1/12	0.004

Nominal diameter [in]	On-value for gas [lb/min]
1/8	0.016
3/8	0.075
1/2	0.25
1/2 FB	0.65
1	0.65
1 FB	1.65
1½	1.65
1½ 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)

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