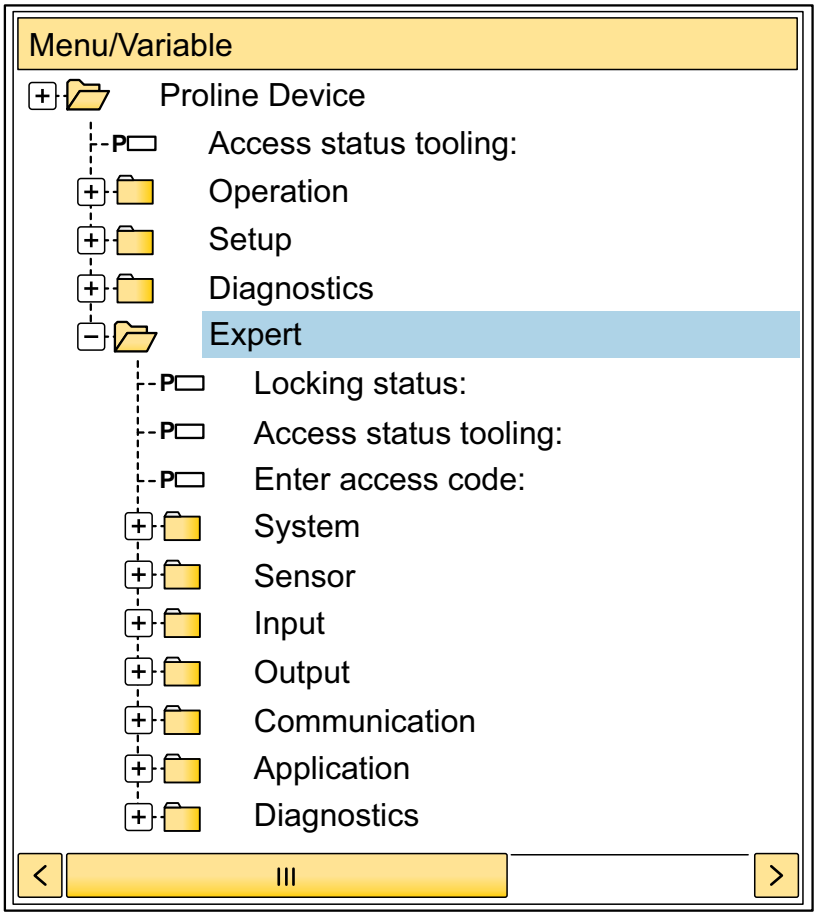
GP01035D/06/EN/02.17
71377885

Valid as of version
01.03.zz (Device firmware)

Description of Device Parameters
Proline Promass 100
Modbus RS485

Coriolis flowmeter



Endress+Hauser
People for Process Automation

Table of contents

1 About this document

1.1 Document function

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

It is used to perform tasks that require detailed knowledge of the function of the device:
- Commissioning measurements under difficult conditions
- Optimal adaptation of the measurement to difficult conditions
- Detailed configuration of the communication interface
- Error diagnostics in difficult cases

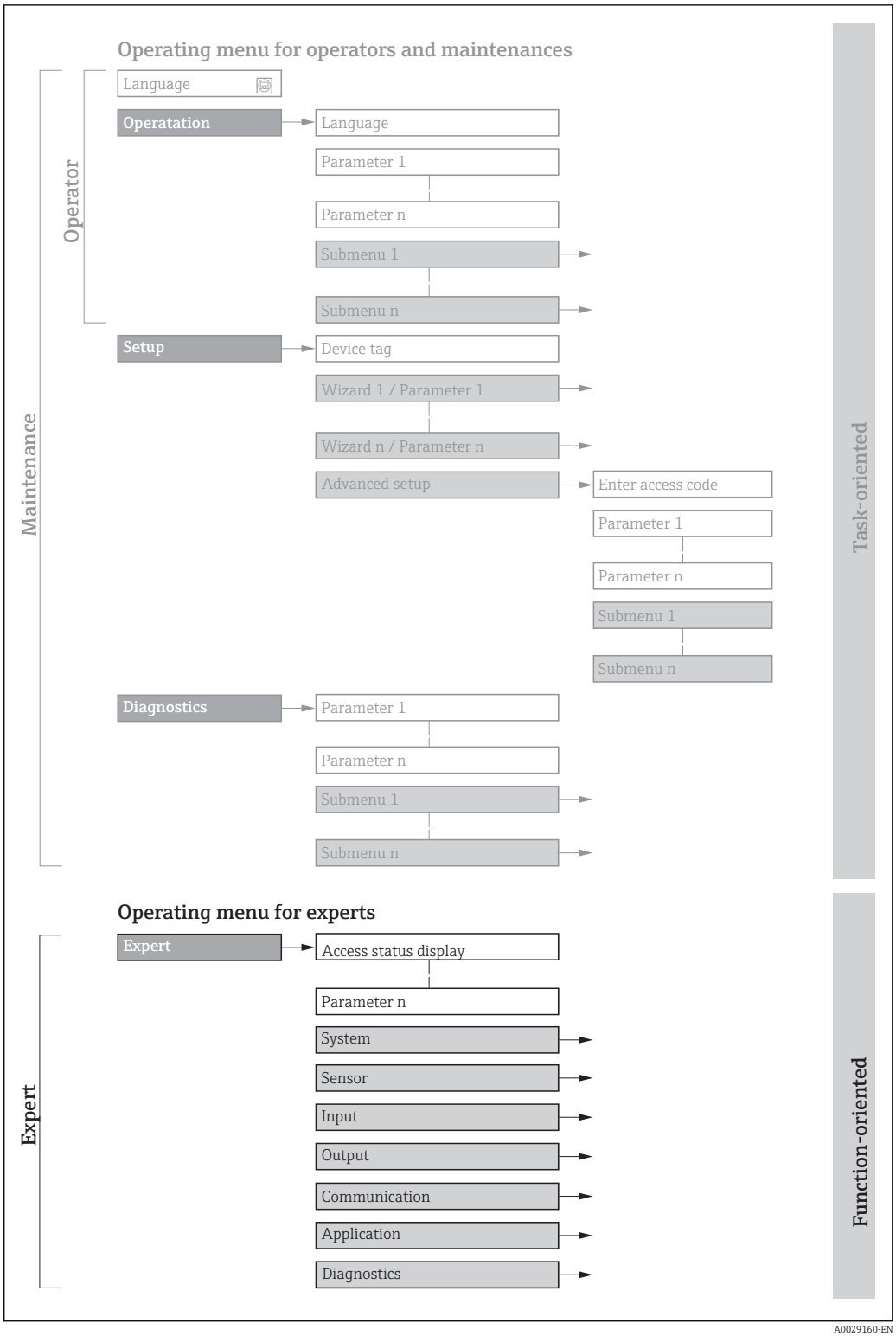
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

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



1 *Sample graphic for the schematic layout of the operating menu*

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

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 operating tool The names of the menus, submenus and parameters are displayed in abbreviated format.
Prerequisite	The parameter is only available under these specific conditions
Description	Description of the parameter function
Selection	List of the individual options for the parameter ▪ Option 1 ▪ Option 2
User entry	Input range for the parameter
User interface	Display value/data for the parameter
Factory setting	Default setting ex works
Additional information	Additional explanations (e.g. in examples): ▪ On individual options ▪ On display values/data ▪ On the input range ▪ On the factory setting ▪ On the parameter function

1.4 Symbols used

1.4.1 Symbols for certain types of information

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

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

Measuring device	Documentation code
Promass A 100	BA01179D
Promass E 100 (8E1B**-...)	BA01056D
Promass E 100 (8E1C**-...)	BA01711D
Promass F 100	BA01057D
Promass G 100	BA01345D
Promass H 100	BA01177D
Promass I 100	BA01058D
Promass O 100	BA01180D
Promass P 100	BA01059D
Promass S 100	BA01060D
Promass X 100	BA01181D

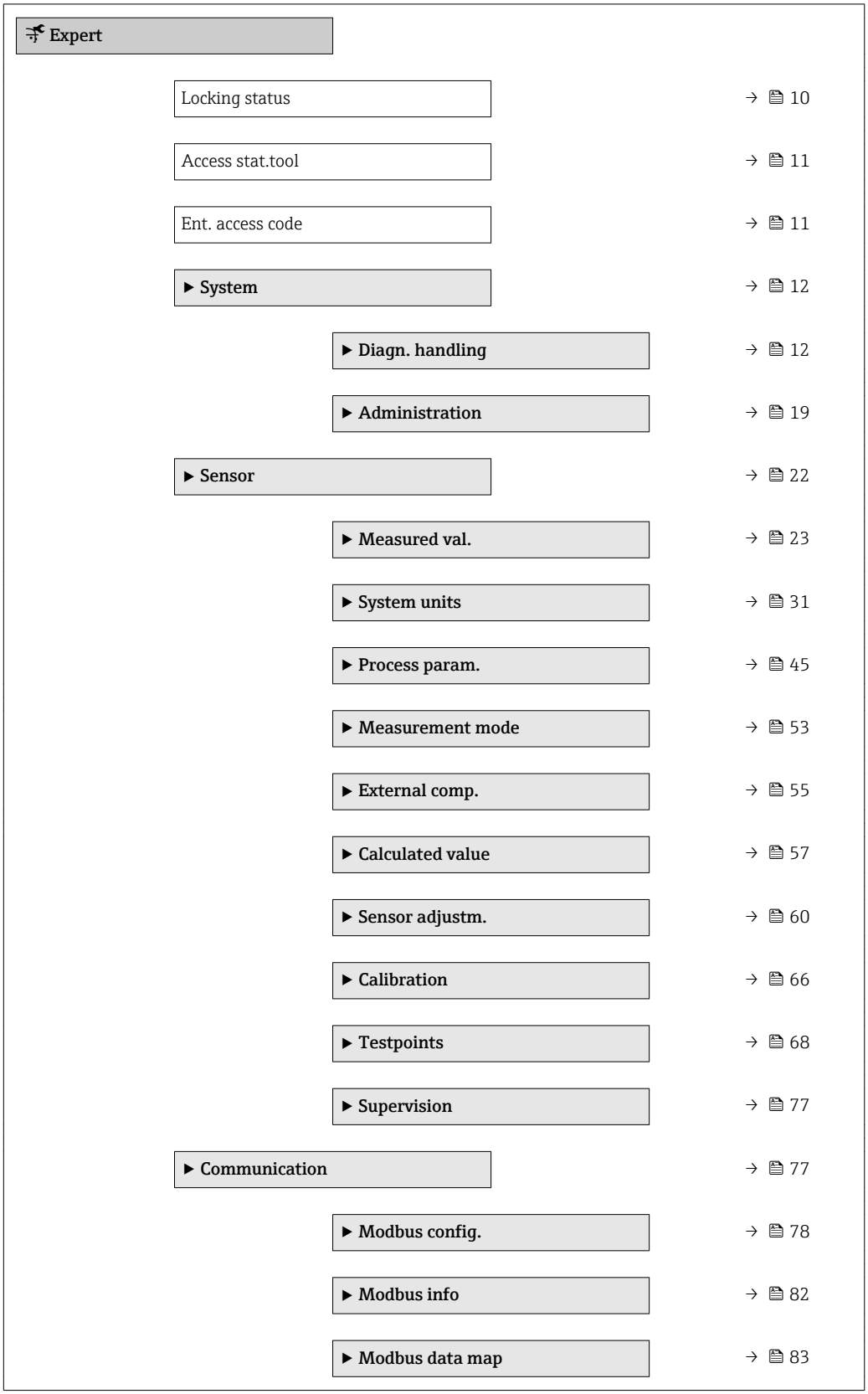
1.5.2 Supplementary device-dependent documentation

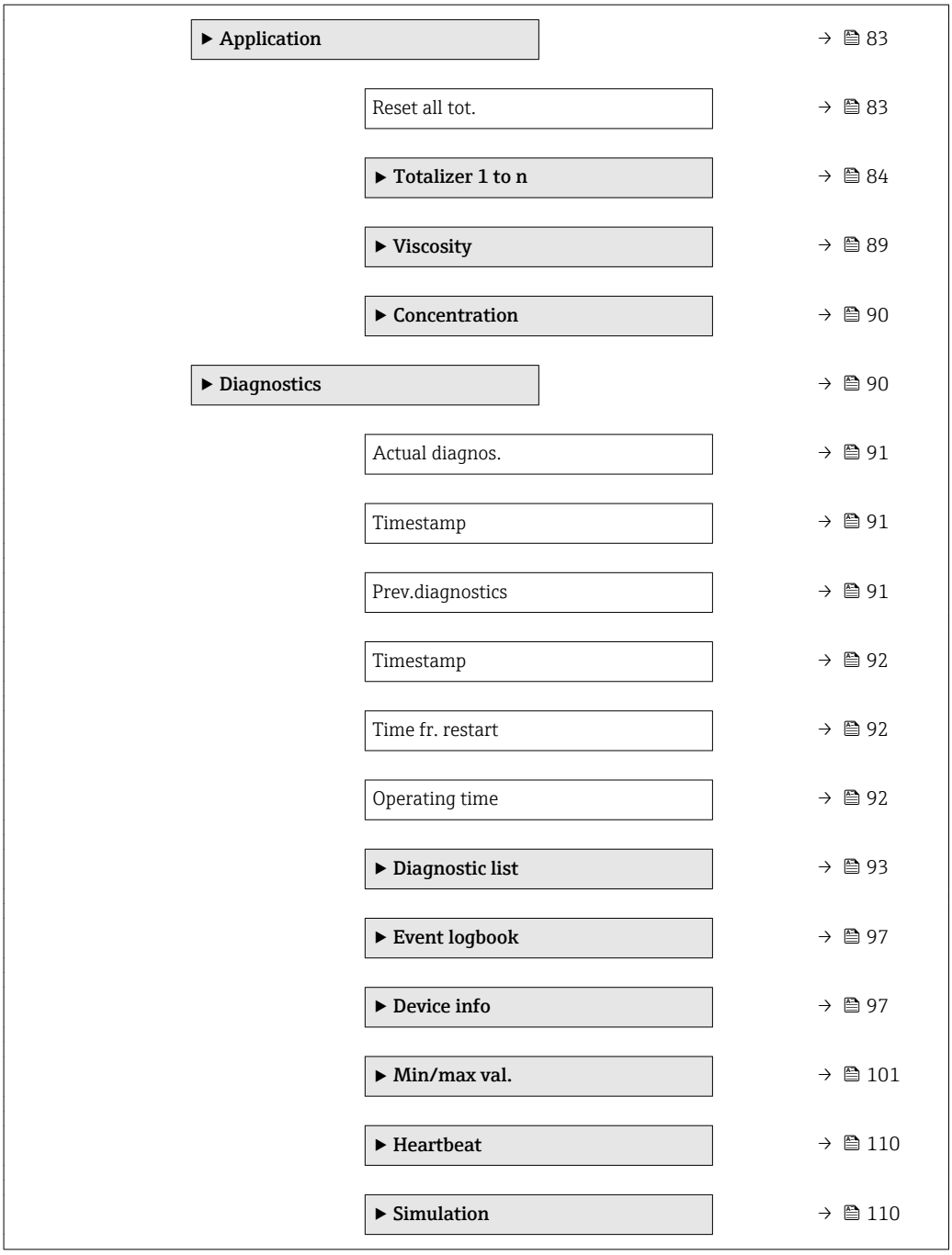
Special Documentation

Content	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Modbus RS485 Register Information	SD00154D
Concentration Measurement	SD01152D
Heartbeat Technology	SD01153D

2 Overview of the Expert operating menu

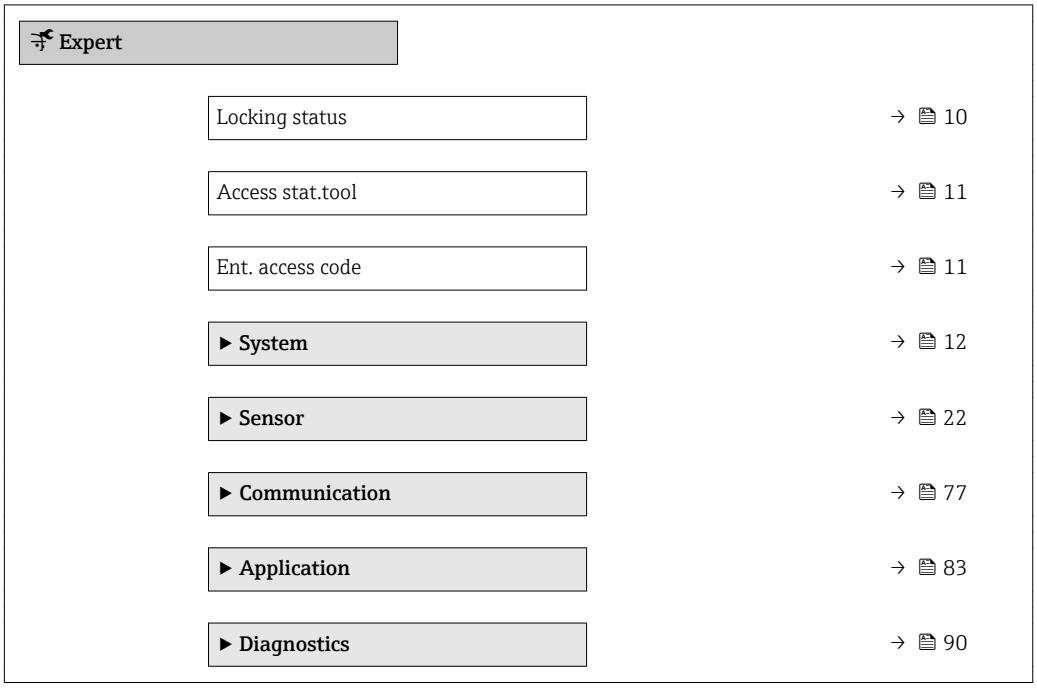
The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.




▶ Application → 83
Reset all tot. → 83
▶ Totalizer 1 to n → 84
▶ Viscosity → 89
▶ Concentration → 90
▶ Diagnostics → 90
Actual diagnos. → 91
Timestamp → 91
Prev.diagnostics → 91
Timestamp → 92
Time fr. restart → 92
Operating time → 92
▶ Diagnostic list → 93
▶ Event logbook → 97
▶ Device info → 97
▶ Min/max val. → 101
▶ Heartbeat → 110
▶ Simulation → 110

3 Description of device parameters

In the following section, the parameters are listed according to the menu structure of the operating tool.



Locking status

Navigation Expert → Locking status

Description Displays the active write protection.

User interface
- Hardware locked
- Temp. locked

Additional information

Display

If two or more types of write protection are active, all the active types of write protection are displayed in the operating tool.

If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 10).

"Hardware locked" option (priority 1)

The DIP switch for hardware locking is activated on the main electronics module. This locks write access to the parameters (e.g. via local display or operating tool).

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.

"Temp. locked" option (priority 2)

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

Access stat.tool

Navigation Expert → Access stat.tool

Description Displays the access authorization to the parameters via the operating tool.

User interface

- Operator
- Maintenance

Factory setting Maintenance

Additional information

Description

Access authorization can be modified via the **Ent. access code** parameter (→ 11).

If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 10).

Display

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.

Ent. access code

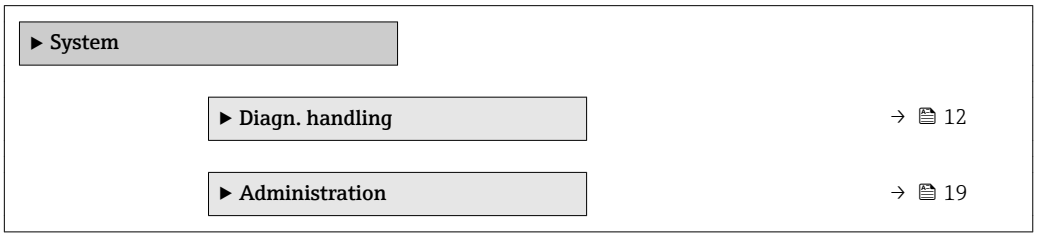
Navigation Expert → Ent. access code

Description Use this function to enter the user-specific release code to remove parameter write protection.

User entry 0 to 9 999

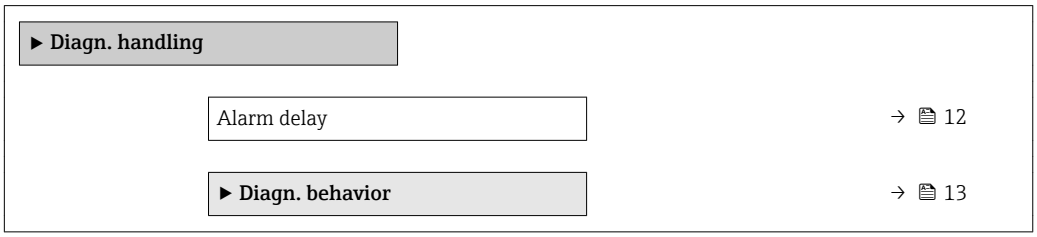
3.1 "System" submenu

Navigation Expert → System



3.1.1 "Diagn. handling" submenu

Navigation Expert → System → Diagn. handling



Alarm delay

Navigation Expert → System → Diagn. handling → Alarm delay

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
- 140 Sensor signal
- 144 MeasErrorTooHigh
- 190 Special event 1
- 191 Special event 5
- 192 Special event 9
- 830 Sensor temp.
- 831 Sensor temp.

- 832 Electronic temp.
- 833 Electronic temp.
- 834 Process temp.
- 835 Process temp.
- 843 Process limit
- 910 Tube not oscill.
- 912 Medium inhomog.
- 913 Medium unsuitab.
- 944 MonitoringFailed
- 990 Special event 4
- 991 Special event 8
- 992 Special event 12

"Diagn. behavior" submenu

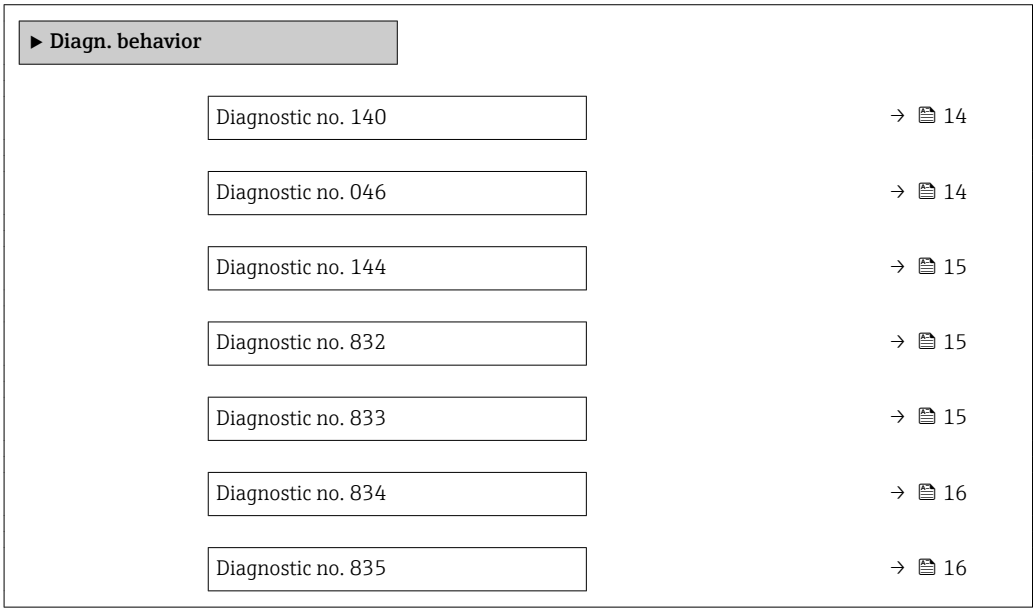
Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the **Diagn. behavior** submenu (→ 13).

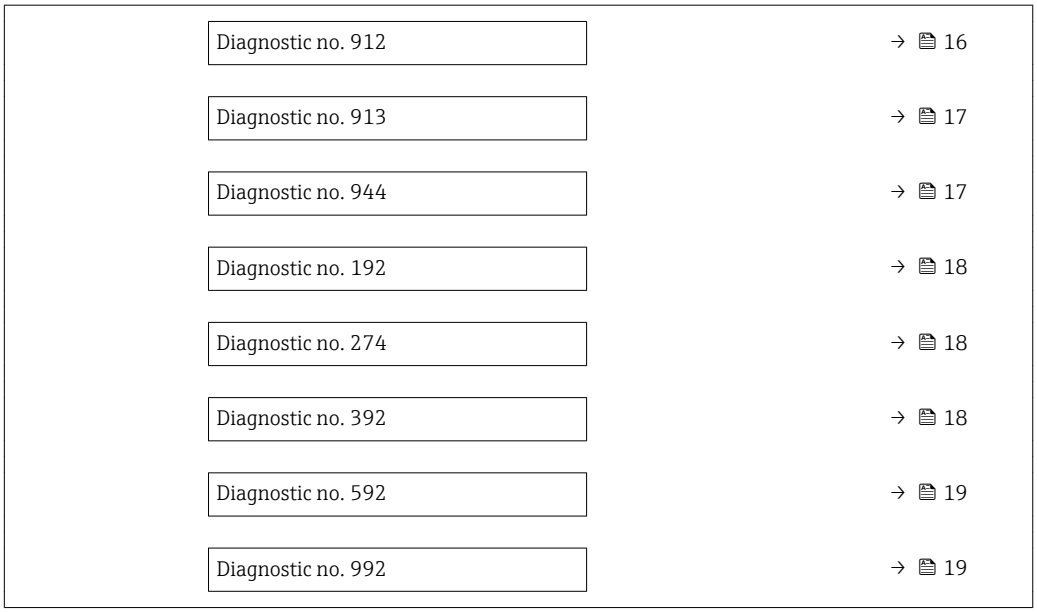
The following options are available in the **Assign behavior of diagnostic no. xxx** parameters:

Options	Description
Alarm	The device stops measurement. The measured value output via Modbus RS485 and the totalizers assume the defined alarm condition. A diagnostic message is generated.
Warning	The device continues to measure. The measured value output via Modbus RS485 and the totalizers are not affected. A diagnostic message is generated.
Logbook only	The device continues to measure. The diagnostic message is entered only in the **Event logbook** submenu (→ 97).
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

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





Diagnostic no. 140 (Sensor signal)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 140

Description Option for changing the diagnostic behavior of the diagnostic message **140 Sensor signal**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 046 (Sensor limit)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 046

Description Option for changing the diagnostic behavior of the diagnostic message **046 Sensor limit**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 144 (MeasErrorTooHigh)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 144

Description Option for changing the diagnostic behavior of the diagnostic message **144 MeasErrorTooHigh**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Alarm

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 832 (Electronic temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832

Description Use this function to change the diagnostic behavior of the diagnostic message **832 Electronic temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 833 (Electronic temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833

Description Use this function to change the diagnostic behavior of the diagnostic message **833 Electronic temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 834 (Process temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834

Description Use this function to change the diagnostic behavior of the diagnostic message **834 Process temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 835 (Process temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835

Description Use this function to change the diagnostic behavior of the diagnostic message **835 Process temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 912 (Medium inhomog.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 912

Description Option for changing the diagnostic behavior of the diagnostic message **912 Medium inhomog.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 913 (Medium unsuitab.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 913

Description Option for changing the diagnostic behavior of the diagnostic message **913 Medium unsuitab.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 944 (MonitoringFailed)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 944

Description Option for changing the diagnostic behavior of the diagnostic message **944 MonitoringFailed**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 948 (Tube damp. high)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 948

Description Option for changing the diagnostic behavior of the diagnostic message **948 Tube damp. high**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 192 (Special event 9)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 192

Description Option for changing the diagnostic behavior of the diagnostic message **192 Special event 9**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 274 (Main electronic)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 274

Description Option for changing the diagnostic behavior of the diagnostic message **274 Main electronic**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 392 (Special event 10)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 392

Description Option for changing the diagnostic behavior of the diagnostic message **392 Special event 10**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 592 (Special event 11)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 592

Description Option for changing the diagnostic behavior of the diagnostic message **592 Special event 11**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

Diagnostic no. 992 (Special event 12)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 992

Description Option for changing the diagnostic behavior of the diagnostic message **992 Special event 12**.

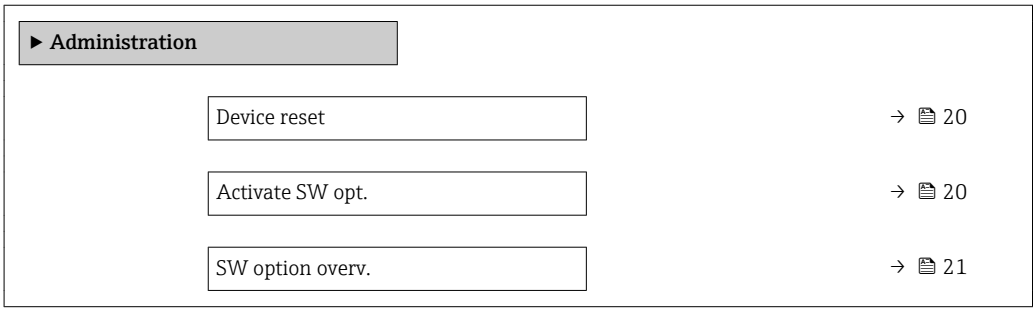
Selection
- Off
- Alarm
- Warning
- Logbook only

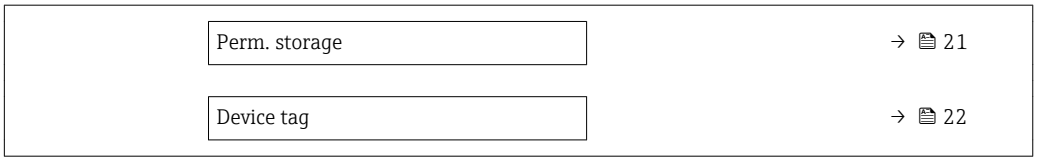
Factory setting Warning

Additional information For a detailed description of the options available, see → 13→ 13

3.1.2 "Administration" submenu

Navigation Expert → System → Administration





Device reset

Navigation Expert → System → Administration → Device reset

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

Selection
- Cancel
- To bus defaults *
- To delivery set.
- Restart device

Factory setting Cancel

Additional information

"Cancel" option

No action is executed and the user exits the parameter.

"To bus defaults" option

Every parameter is reset to fieldbus default values.

"To delivery set." option

Every parameter for which a customer-specific default setting was ordered is reset to this customer-specific value. All other parameters are reset to the factory setting.

This option is not visible if no customer-specific settings have been ordered.

"Restart device" option

The restart resets every parameter whose data are in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.

Activate SW opt.

Navigation Expert → System → Administration → Activate SW opt.

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 0

* Visibility depends on communication

Additional information

User entry

Endress+Hauser provides the corresponding activation code for the software option with the order.

NOTICE! This activation code varies depending on the measuring device and the software option. If an incorrect or invalid code is entered, this can result in the loss of software options that are already been activated. After commissioning the measuring device: in this parameter only enter activation codes which Endress+Hauser has provided (e.g. when a new software option was ordered). If an incorrect or invalid activation code is entered, enter the activation code from the parameter protocol again and contact your Endress+Hauser sales organization, quoting the serial number of your device.

Example for a software option

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

SW option overv.

Navigation Expert → System → Administration → SW option overv.

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

User interface

- HBT Verification
- HBT Monitoring
- Concentration
- Viscosity

Additional information

Description

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

"HBT Verification" optionand"HBT Monitoring" option

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

"Concentration" option

Order code for "Application package", option ED "Concentration" and option EF "Special density + concentration"

"Viscosity" option

Only available for Promass I.

Order code for "Application package", option EG "Viscosity " and option EH "Special density + viscosity"

Perm. storage

Navigation Expert → System → Administration → Perm. storage

Description Use this function to switch permanent storage on and off.

Selection
- Off
- On

Factory setting On

Additional information *Description*

NOTE!

If non-volatile device parameters are modified via the MODBUS RS485 function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device.

The number of writes to the EEPROM is technically restricted to a maximum of 1 million.

▸ Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.

▸ Avoid constantly writing non-volatile device parameters via the MODBUS RS485.

Device tag

Navigation Expert → System → Administration → Device tag

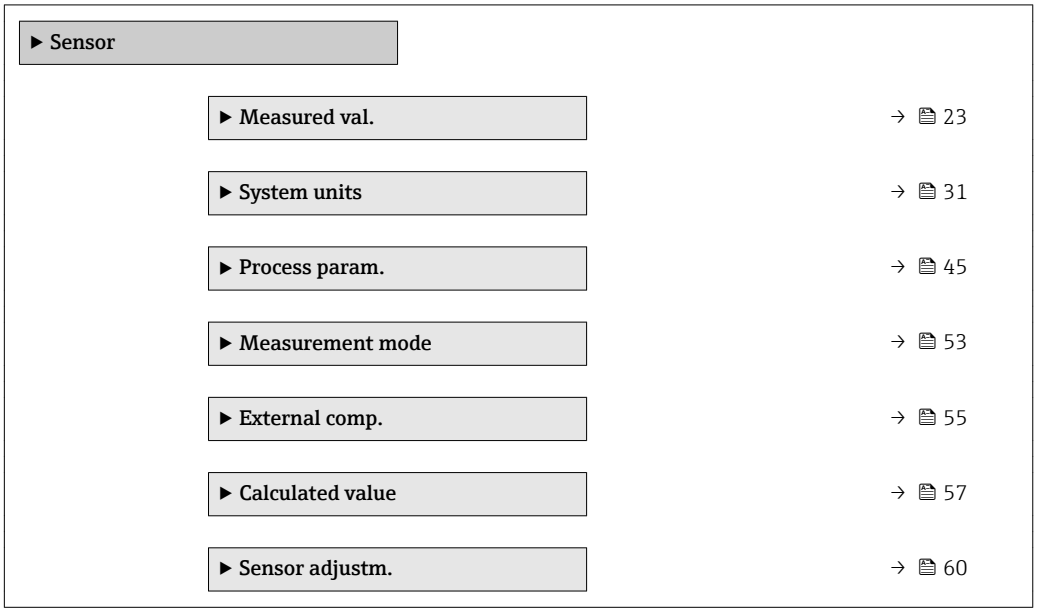
Description Use this function to enter the name for the measuring point.

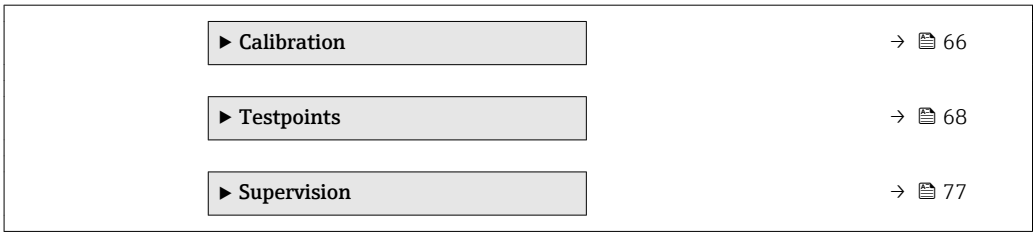
User entry Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /).

Factory setting Promass

3.2 "Sensor" submenu

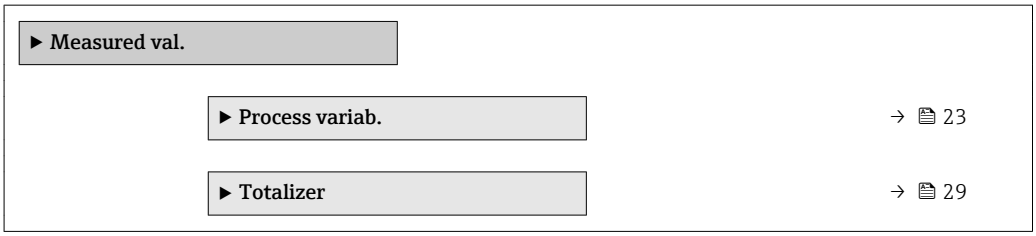
Navigation Expert → Sensor





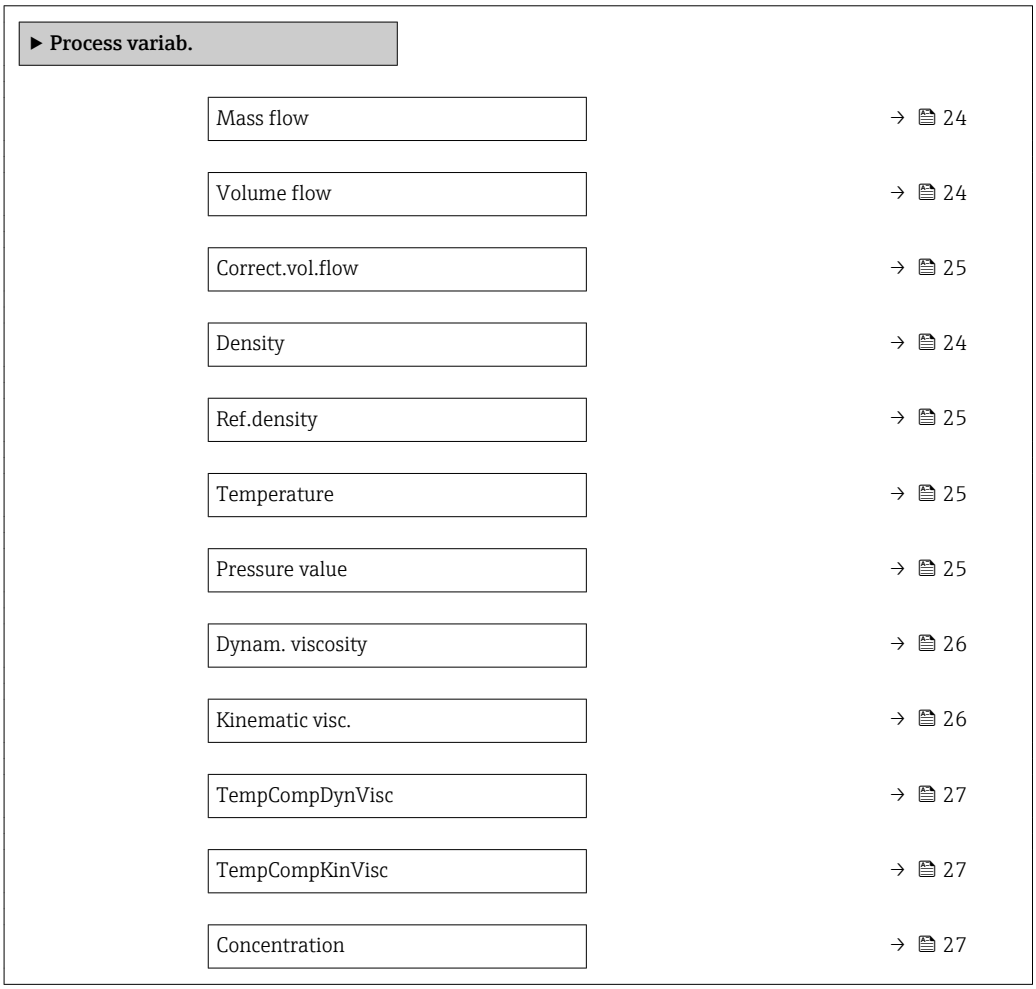
3.2.1 "Measured val." submenu

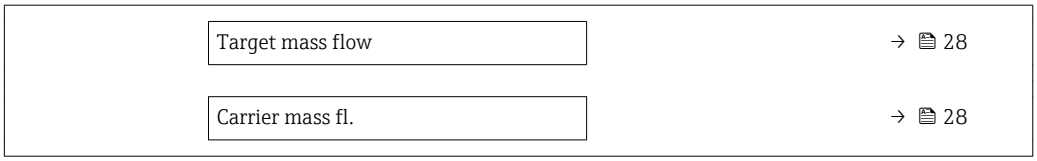
Navigation Expert → Sensor → Measured val.



"Process variab." submenu

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





Mass flow

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

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 (→ 32)

Volume flow

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

Description Displays the volume flow currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Volume flow unit** parameter (→ 33)

Density

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

Description Displays the density currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Density unit** parameter (→ 37)

Correct.vol.flow

Navigation Expert → Sensor → Measured val. → Process variab. → Correct.vol.flow

Description Displays the corrected volume flow currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Cor.volflow unit** parameter (→ 35)

Ref.density

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

Description Displays the reference density currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Ref. dens. unit** parameter (→ 38)

Temperature

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

Description Displays the medium temperature currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 38)

Pressure value

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

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 (→ 39)

Dynam. viscosity

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

Prerequisite For the following order code:
"Application package", option EG "Viscosity"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 21).

Description Displays the dynamic viscosity currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Dyn. visc. unit** parameter

Kinematic visc.

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

Prerequisite For the following order code:
"Application package", option EG "Viscosity"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 21).

Description Displays the kinematic viscosity currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Kin. visc. unit** parameter

TempCompDynVisc

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

Prerequisite
For the following order code:
"Application package", option EG "Viscosity"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 21).

Description Displays the temperature compensation currently calculated for the viscosity.

User interface Signed floating-point number

Additional information
Dependency

The unit is taken from the **Dyn. visc. unit** parameter

TempCompKinVisc

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

Prerequisite
For the following order code:
"Application package", option EG "Viscosity"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 21).

Description Displays the temperature compensation currently calculated for the kinetic viscosity.

User interface Signed floating-point number

Additional information
Dependency

The unit is taken from the **Kin. visc. unit** parameter

Concentration

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

Prerequisite
For the following order code:
"Application package", option ED "Concentration"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 21).

Description Displays the concentration currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Concentr. unit** parameter.

Target mass flow

Navigation Expert → Sensor → Measured val. → Process variab. → Target mass flow

Prerequisite With the following conditions:
- Order code for "Application package", option ED "Concentration"
- The **WT-%** option or the **User conc.** option is selected in the **Concentr. unit** parameter.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 21).

Description Displays the mass flow currently measured for the target medium.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 32)

Carrier mass fl.

Navigation Expert → Sensor → Measured val. → Process variab. → Carrier mass fl.

Prerequisite With the following conditions:
- Order code for "Application package", option ED "Concentration"
- The **WT-%** option or the **User conc.** option is selected in the **Concentr. unit** parameter.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 21).

Description Displays the mass flow currently measured for the carrier medium.

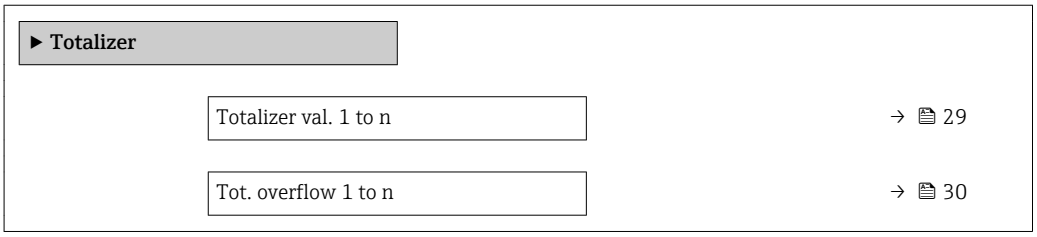
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 32)

"Totalizer" submenu

Navigation Expert → Sensor → Measured val. → Totalizer



Totalizer val. 1 to n

Navigation Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to n

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 84)**Totalizer 1 to n** submenu:
- Volume flow
- Mass flow
- Correct.vol.flow
- Target mass flow **
- Carrier mass fl. **

Description Displays the current totalizer reading.

User interface Signed floating-point number

** Visibility depends on order options or device settings

Additional information

Description

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

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 89).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Operation mode** parameter (→ 87).

The unit of the selected process variable is specified for the totalizer depending on the selection made in the **Assign variable** parameter (→ 84):
- **Volume flow** option: **Volume flow unit** parameter (→ 33)
- **Mass flow** option, **Target mass flow** option, **Carrier mass fl.** option: **Mass flow unit** parameter (→ 32)
- **Correct.vol.flow** option: **Corr. vol. unit** parameter (→ 86)

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
- Value in the **Totalizer val. 1** parameter: 1 968 457 m^3
- Value in the **Tot. overflow 1** parameter: $1 \cdot 10^7$ (1 overflow) = 10 000 000 [m^3]
- Current totalizer reading: 11 968 457 m^3

Tot. overflow 1 to n

Navigation Expert → Sensor → Measured val. → Totalizer → Tot. overflow 1 to n

Prerequisite

One of the following options is selected in the **Assign variable** parameter (→ 84)**Totalizer 1 to n** submenu:
- Volume flow
- Mass flow
- Correct.vol.flow
- Target mass flow **
- Carrier mass fl. **

Description

Displays the current totalizer overflow.

User interface

Integer with sign

Additional information

Description

If the current totalizer reading exceeds 7 digits, which is the maximum value range that can be displayed by the operating tool, the value above this range is output as an overflow.

** Visibility depends on order options or device settings

The current totalizer value is therefore the sum of the overflow value and the totalizer value from the **Totalizer val. 1 to n** parameter.

User interface

The unit of the selected process variable is specified for the totalizer depending on the selection made in the **Assign variable** parameter (→ 84):
- **Volume flow** option: **Volume flow unit** parameter (→ 33)
- **Mass flow** option, **Target mass flow** option, **Carrier mass fl.** option: **Mass flow unit** parameter (→ 32)
- **Correct.vol.flow** option: **Corr. vol. unit** parameter (→ 86)

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
- Value in the **Totalizer val. 1** parameter: 1 968 457 m^3
- Value in the **Tot. overflow 1** parameter: $2 \cdot 10^7$ (2 overflows) = 20 000 000 [m^3]
- Current totalizer reading: 21 968 457 m^3

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units

▶ **System units**	
Mass flow unit	→ 32
Mass unit	→ 32
Volume flow unit	→ 33
Volume unit	→ 35
Cor.volflow unit	→ 35
Corr. vol. unit	→ 36
Density unit	→ 37
Ref. dens. unit	→ 38
Temperature unit	→ 38
Pressure unit	→ 39
Date/time format	→ 39
▶ **User-spec. units**	→ 40

Mass flow unit

Navigation Expert → Sensor → System units → Mass flow unit

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

Custom-specific units
- User mass/s
- User mass/min
- User mass/h
- User mass/d

Factory setting Country-specific:
- kg/h (DN > 150 (6"): t/h)
- lb/min

Additional information

Result

The selected unit applies for:
- **Target mass flow** parameter (→ 28)
- **Carrier mass fl.** parameter (→ 28)
- **Mass flow** parameter (→ 24)

Selection

For an explanation of the abbreviated units: → 117

Customer-specific units

The unit for the customer-specific mass is specified in the **Mass text** parameter (→ 40).

Mass unit

Navigation Expert → Sensor → System units → Mass unit

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

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

Custom-specific units
User mass

Factory setting

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

Additional information

Selection

For an explanation of the abbreviated units: → 117

Customer-specific units

The unit for the customer-specific mass is specified in the **Mass text** parameter (→ 40).

Volume flow unit

Navigation

Expert → Sensor → System units → Volume flow unit

Description

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

Selection

SI units
- cm^3/s
- cm^3/min
- cm^3/h
- cm^3/d
- dm^3/s
- dm^3/min
- dm^3/h
- dm^3/d
- m^3/s
- m^3/min
- m^3/h
- m^3/d
- ml/s
- ml/min
- ml/h
- ml/d
- l/s
- l/min
- l/h
- l/d
- hl/s
- hl/min
- hl/h
- hl/d
- Ml/s
- Ml/min
- Ml/h
- Ml/d

US units
- af/s
- af/min
- af/h
- af/d
- ft^3/s
- ft^3/min
- ft^3/h
- ft^3/d
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)
- gal/s (us)
- gal/min (us)
- gal/h (us)
- gal/d (us)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)
- Mgal/s (us)
- Mgal/min (us)
- Mgal/h (us)
- Mgal/d (us)
- bbl/s (us;liq.)
- bbl/min (us;liq.)
- bbl/h (us;liq.)
- bbl/d (us;liq.)
- bbl/s (us;beer)
- bbl/min (us;beer)
- bbl/h (us;beer)
- bbl/d (us;beer)
- bbl/s (us;oil)
- bbl/min (us;oil)
- bbl/h (us;oil)
- bbl/d (us;oil)
- bbl/s (us;tank)
- bbl/min (us;tank)
- bbl/h (us;tank)
- bbl/d (us;tank)

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

Custom-specific units
- User vol./s
- User vol./min
- User vol./h
- User vol./d

Factory setting

Country-specific:
- l/h (DN > 150 (6"): m^3/h)
- gal/min (us)

Additional information

Result

The selected unit applies for:
Volume flow parameter (→ 24)

Selection

For an explanation of the abbreviated units: → 117

Customer-specific units

The unit for the customer-specific volume is specified in the **Volume text** parameter (→ 41).

Volume unit

Navigation Expert → Sensor → System units → Volume unit

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

Selection

SI units
- cm^3
- dm^3
- m^3
- ml
- l
- hl
- Ml Mega

US units
- af
- ft^3
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us;oil)
- bbl (us;liq.)
- bbl (us;beer)
- bbl (us;tank)

Imperial units
- gal (imp)
- Mgal (imp)
- bbl (imp;beer)
- bbl (imp;oil)

Custom-specific units
User vol.

Factory setting

Country-specific:
- l (DN > 150 (6"): m^3)
- gal (us)

Additional information

Selection

For an explanation of the abbreviated units: → 117

Customer-specific units

The unit for the customer-specific volume is specified in the **Volume text** parameter (→ 41).

Cor.volflow unit

Navigation Expert → Sensor → System units → Cor.volflow unit

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

Selection

SI units
- Nl/s
- Nl/min
- Nl/h
- Nl/d
- Nm^3/s
- Nm^3/min
- Nm^3/h
- Nm^3/d
- Sm^3/s
- Sm^3/min
- Sm^3/h
- Sm^3/d

US units
- Sft^3/s
- Sft^3/min
- Sft^3/h
- Sft^3/d
- Sgal/s (us)
- Sgal/min (us)
- Sgal/h (us)
- Sgal/d (us)
- Sbbl/s (us;liq.)
- Sbbl/min (us;liq.)
- Sbbl/h (us;liq.)
- Sbbl/d (us;liq.)
- Sgal/s (imp)
- Sgal/min (imp)
- Sgal/h (imp)
- Sgal/d (imp)

Custom-specific units
- UserCrVol./s
- UserCrVol./min
- UserCrVol./h
- UserCrVol./d

Factory setting

Country-specific:
- Nl/h (DN > 150 (6"): Nm^3/h)
- Sft^3/min

Additional information

Result

The selected unit applies for:
Correct.vol.flow parameter (→ 25)

Selection

For an explanation of the abbreviated units: → 117

Corr. vol. unit

Navigation

Expert → Sensor → System units → Corr. vol. unit

Description

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

Selection

SI units
- Nl
- Nm^3
- Sl
- Sm^3

US units
- Sft^3
- Sgal (us)
- Sbbl (us;liq.)

Imperial units
Sgal (imp)

Custom-specific units
UserCrVol.

Factory setting

Country-specific:
- Nl (DN > 150 (6"): Nm^3)
- Sft^3

Additional information *Selection*

For an explanation of the abbreviated units: → 117

Density unit

Navigation Expert → Sensor → System units → Density unit

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

Selection

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

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

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

Custom-specific units
User dens.

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

Additional information *Result*

The selected unit applies for:
Density parameter (→ 24)

Selection

- SD = specific density
  The specific density is the ratio of the fluid 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 fluid 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: → 117

Customer-specific units

The unit for the customer-specific density is specified in the **Density text** parameter (→ 43).

Ref. dens. unit

Navigation Expert → Sensor → System units → Ref. dens. unit

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

Selection

SI units
- kg/Nm³
- kg/Nl
- g/Scm³
- kg/Sm³

US units
- lb/Sft³

Factory setting Country-dependent
- kg/Nl
- lb/Sft³

Additional information *Result*

The selected unit applies for:
- **Ext. ref.density** parameter (→ 58)
- **Fix ref.density** parameter (→ 58)
- **Ref.density** parameter (→ 25)

Selection

For an explanation of the abbreviated units: → 117

Temperature unit

Navigation Expert → Sensor → System units → Temperature unit

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

Selection

SI units
- °C
- K

US units
- °F
- °R

Factory setting Country-specific:
- °C
- °F

Additional information *Result*

The selected unit applies for:
- **Maximum value** parameter (→ 102)
- **Minimum value** parameter (→ 102)
- **Maximum value** parameter (→ 103)
- **Minimum value** parameter (→ 103)
- **Maximum value** parameter (→ 104)
- **Minimum value** parameter (→ 104)
- **External temp.** parameter (→ 57)

- **Ref. temperature** parameter
- **Temperature** parameter (→ 25)
- **Ref. temperature** parameter (→ 59)

Selection

For an explanation of the abbreviated units: → 117

Pressure unit

Navigation Expert → Sensor → System units → Pressure unit

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

Selection

SI units
- Pa a
- kPa a
- MPa a
- bar
- Pa g
- kPa g
- MPa g
- bar g

US units
- psi a
- psi g

Custom-specific units
User pres.

Factory setting
Country-specific:
- bar a
- psi a

Additional information

Result

The unit is taken from:
- **Pressure value** parameter (→ 56)
- **External press.** parameter (→ 56)
- **Pressure value** parameter (→ 25)

Selection

For an explanation of the abbreviated units: → 117

Date/time format

Navigation Expert → Sensor → System units → Date/time format

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

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

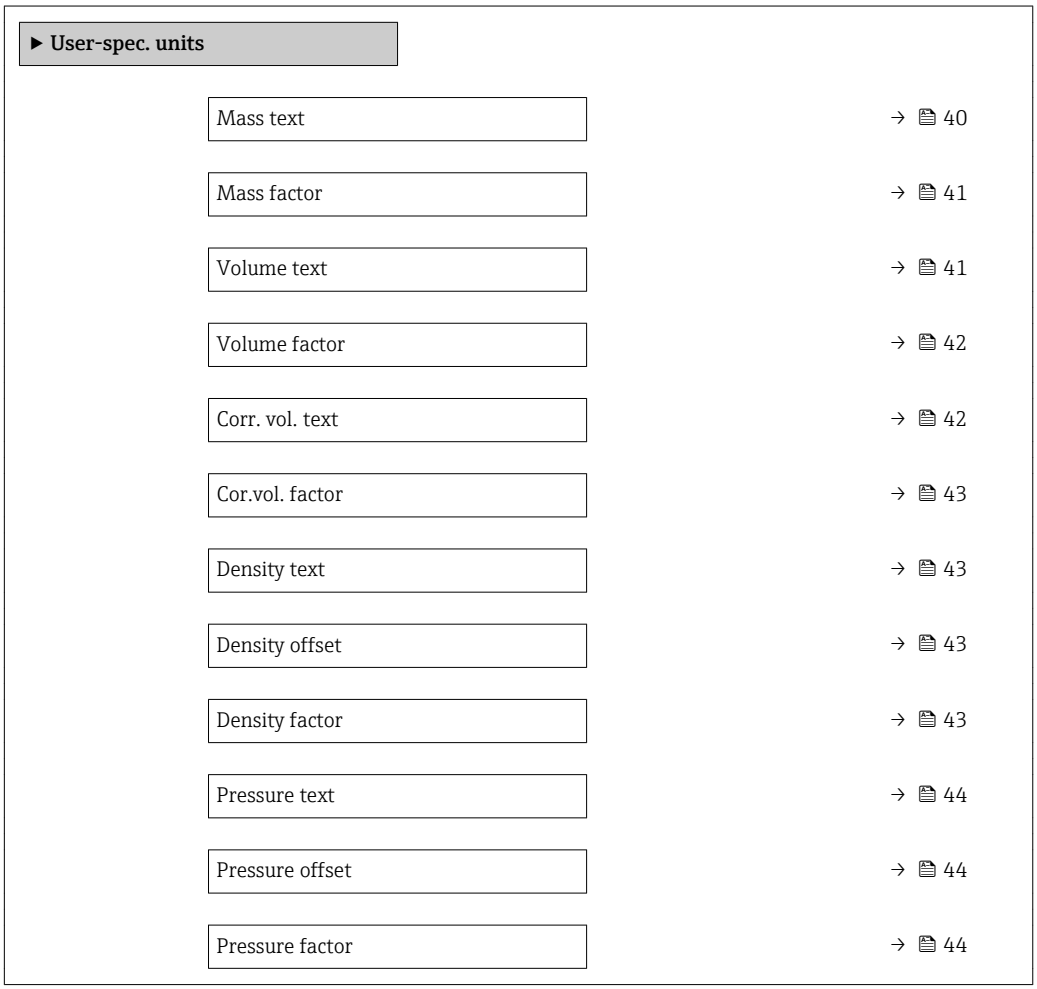
Factory setting dd.mm.yy hh:mm

Additional information *Selection*

For an explanation of the abbreviated units: → 117

"User-spec. units" submenu

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



Mass text

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

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

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

Factory setting User mass

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Mass flow unit** parameter (→ 32)
- **Mass unit** parameter (→ 32)

Example

If the text CENT for "centner" is entered, the following options are displayed in the picklist for the **Mass flow unit** parameter (→ 32):
- CENT/s
- CENT/min
- CENT/h
- CENT/d

Mass factor

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

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

User entry Signed floating-point number

Factory setting 1.0

Additional information *Example*

Mass of 1 Zentner = 50 kg → 0.02 Zentner = 1 kg → entry: 0.02

Volume text

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

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

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

Factory setting User vol.

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Volume flow unit** parameter (→ 33)
- **Volume unit** parameter (→ 35)

Example

If the text GLAS is entered, the choose list of the **Volume flow unit** parameter (→ 33) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

Volume factor

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

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

User entry Signed floating-point number

Factory setting 1.0

Corr. vol. text

Navigation Expert → Sensor → System units → User-spec. units → Corr. vol. text

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

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

Factory setting UserCrVol.

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Cor.volflow unit** parameter (→ 35)
- **Corr. vol. unit** parameter (→ 36)

Example

If the text GLAS is entered, the choose list of the **Cor.volflow unit** parameter (→ 35) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

Cor.vol. factor

Navigation Expert → Sensor → System units → User-spec. units → Cor.vol. factor

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

User entry Signed floating-point number

Factory setting 1.0

Density text

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

Description Use this function to enter a text or the user-specific unit of density.

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

Factory setting User dens.

Additional information *Result*

The defined unit is shown as an option in the choose list of the **Density unit** parameter (→ 37).

Example

Enter text “CE_L” for centners per liter

Density offset

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

Description Use this function to enter the zero point shift for the user-specific density unit.

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

User entry Signed floating-point number

Factory setting 0

Density factor

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

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

User entry Signed floating-point number

Factory setting 1.0

Pressure text

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

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

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

Factory setting User pres.

Additional information *Result*

The defined unit is shown as an option in the choose list of the **Pressure unit** parameter (→ 39).

Pressure offset

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

Description Use this function to enter the offset for adapting the user-specific pressure unit.

User entry Signed floating-point number

Factory setting 0

Pressure factor

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

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

User entry Signed floating-point number

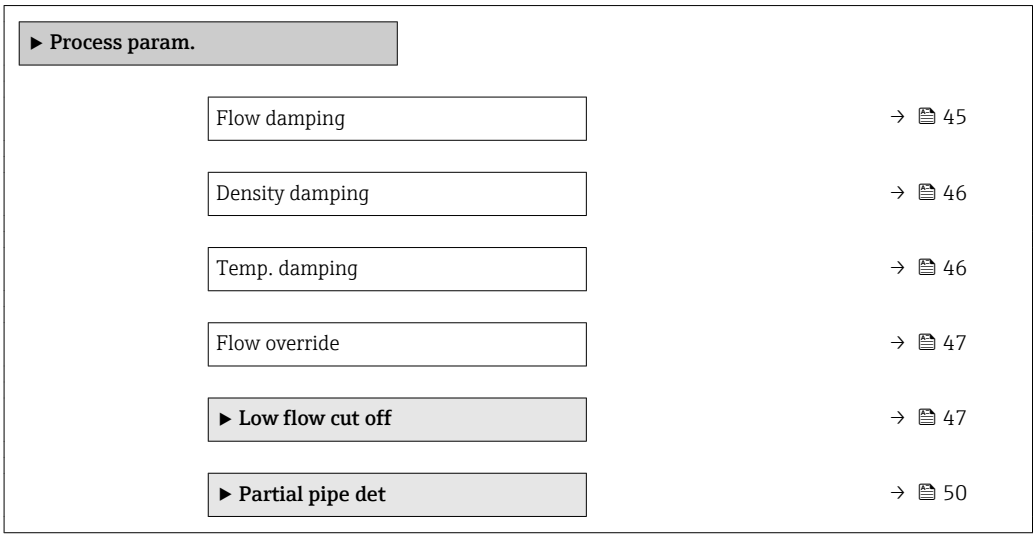
Factory setting 1.0

Additional information *Example*

1 Dyn/cm² = 0.1 Pa → 10 Dyn/cm² = 1 Pa → user entry: 10

3.2.3 "Process param." submenu

Navigation Expert → Sensor → Process param.



Flow damping

Navigation Expert → Sensor → Process param. → Flow damping

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

User entry 0 to 100.0 s

Factory setting 0 s

Additional information

Description

The damping is performed by a PT1 element [1].

User entry

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

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

Result

The damping affects the following variables of the device:
- Outputs
- Low flow cut off → 47
- Totalizers

1) Proportional behavior with first-order lag

Density damping

Navigation Expert → Sensor → Process param. → Density damping

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

User entry 0 to 999.9 s

Factory setting 0 s

Additional information *Description*

The damping is performed by a PT1 element [2].

User entry

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

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

Temp. damping

Navigation Expert → Sensor → Process param. → Temp. damping

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

User entry 0 to 999.9 s

Factory setting 0 s

Additional information *Description*

The damping is performed by a PT1 element [3].

User entry

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

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

2) Proportional behavior with first-order lag
3) Proportional behavior with first-order lag

Flow override

Navigation Expert → Sensor → Process param. → Flow override

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

Selection
- Off
- On

Factory setting Off

Additional information *Result*

This setting affects all the functions and outputs of the measuring device.

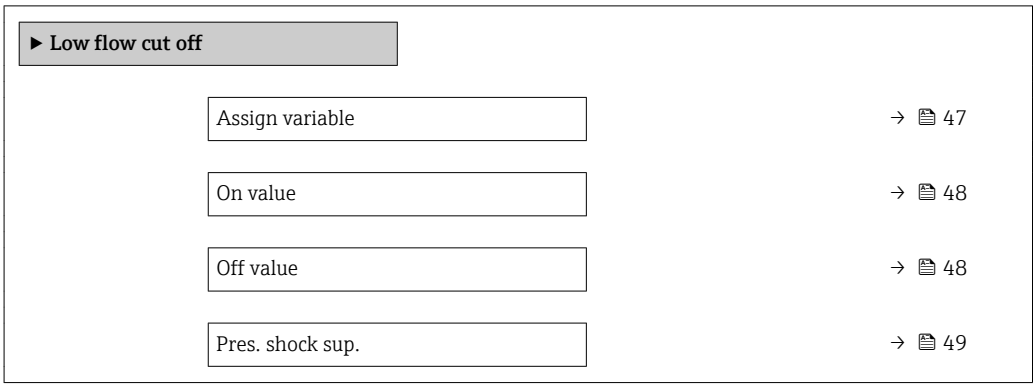
Description

Flow override is active
- The diagnostic message diagnostic message ⚠**C453 Flow override** is displayed.
- Output values
  - Output: Value at zero flow
  - Temperature: proceeding output
  - Totalizers 1-3: Stop being totalized

Positive zero return can also be enabled via the Status input: **Assign stat.inp.** parameter.

"Low flow cut off" submenu

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



Assign variable

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

Description Use this function to select the process variable for low flow cutoff detection.

Selection
- Off
- Mass flow
- Volume flow
- Correct.vol.flow

Factory setting Mass flow

On value

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 47):
- Mass flow
- Volume flow
- Correct.vol.flow

Description Use this function to enter a switch-on value for low flow cut off. Low flow cut off is activated if the value entered is not equal to 0 → 48.

User entry Positive floating-point number

Factory setting Depends on country and nominal diameter → 114

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign variable** parameter (→ 47).

Off value

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

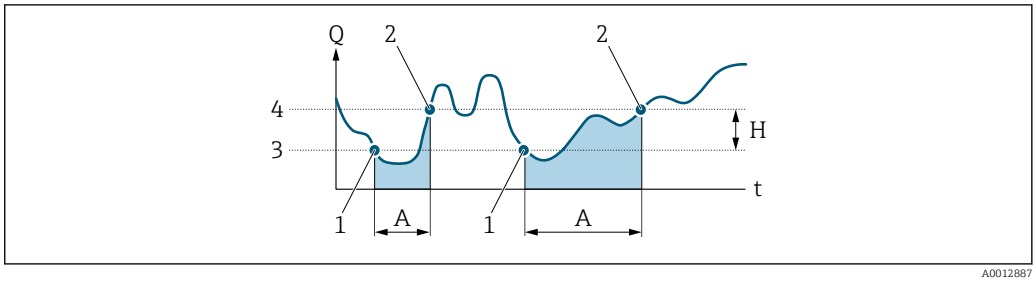
Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 47):
- Mass flow
- Volume flow
- Correct.vol.flow

Description Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value→ 48.

User entry 0 to 100.0 %

Factory setting 50 %

Additional information *Example*



A0012887

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

Pres. shock sup.

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 47):
- Mass flow
- Volume flow
- Correct.vol.flow

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

User entry 0 to 100 s

Factory setting 0 s

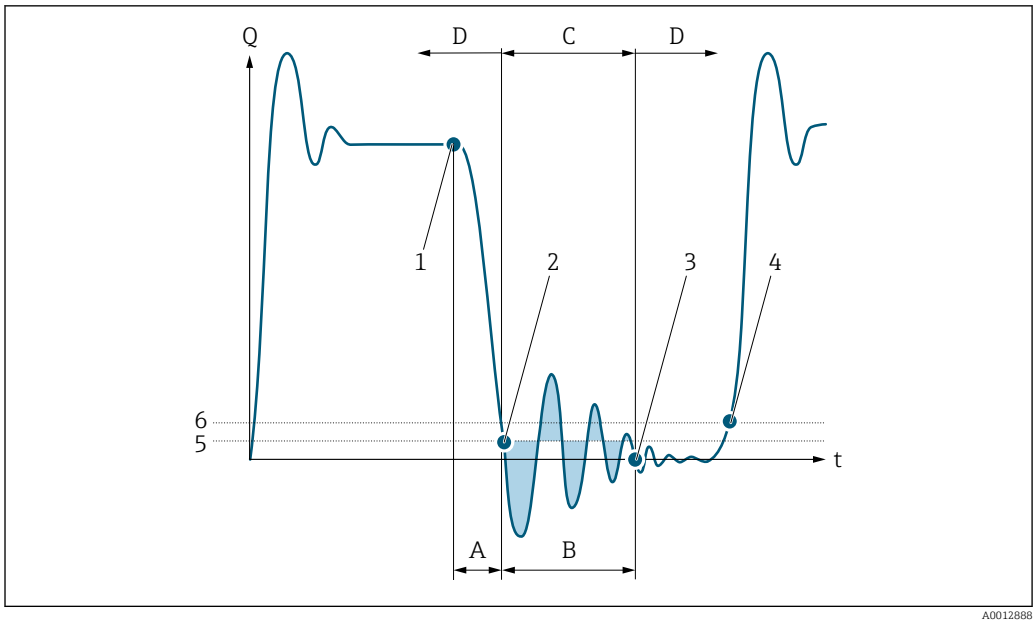
Additional information *Description*

Pressure shock suppression is enabled
- Prerequisite:
  - Flow rate < on-value of low flow cut off
    or
  - Changing the flow direction
- Output values
  - Flow displayed: 0
  - Totalizer: the totalizers are pegged at the last correct value

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

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

"Partial pipe det" submenu

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

▶ Partial pipe det	
Assign variable	→ 51
Low value	→ 51
High value	→ 51
Response time	→ 52
Max. damping	→ 52

Assign variable

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

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

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

Selection
- Off
- Density
- Ref.density

Factory setting Off

Low value

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 51):
- Density
- Ref.density

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

User entry Signed floating-point number

Factory setting 200

Additional information *User entry*

The lower limit value must be less than the upper limit value defined in the **High value** parameter (→ 51).

The unit depends on the process variable selected in the **Assign variable** parameter (→ 51).

Limit value

If the displayed value is outside the limit value, the measuring device displays the diagnostic message ⚠**S862 Partly filled**.

High value

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 51):
- Density
- Ref.density

Description Use this function to enter an upper limit value to enable detection of empty or partially filled measuring tubes. If the measured density exceeds this value, detection is enabled.

User entry Signed floating-point number

Factory setting 6 000

Additional information

User entry

The upper limit value must be greater than the lower limit value defined in the **Low value** parameter (→ 51).

The unit depends on the process variable selected in the **Assign variable** parameter (→ 51).

Limit value

If the displayed value is outside the limit value, the measuring device displays the diagnostic message ⚠**S862 Partly filled**.

Response time

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 51):
- Density
- Ref.density

Description Use this function to enter the minimum length of time (debouncing time) the signal must be present for the diagnostic message ⚠**S862 Partly filled** to be triggered if the measuring pipe is empty or partially full.

User entry 0 to 100 s

Factory setting 1 s

Max. damping

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 51):
- Density
- Ref.density

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

Description

If oscillation damping (**Testpoints** submenu (→ 68)) exceeds the specified value, the measuring device presumes that the pipe is partially filled and the flow signal is set to **0**. The measuring device displays the diagnostic message ⚠**S862 Partly filled**. In the case of non-homogeneous media or air pockets, the damping of the measuring tubes increases.

User entry

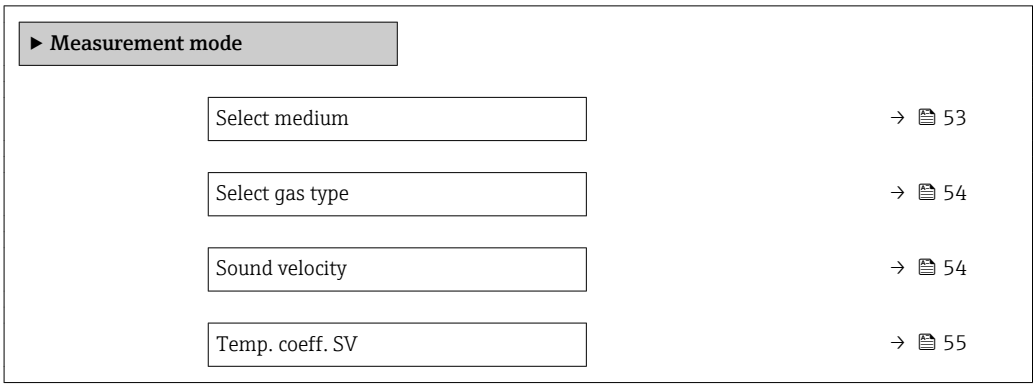
- Damping is disabled if **0** is entered (factory setting).
- Damping is enabled if the value entered is greater than **0**.
- The value entered depends on application-specific influence variables, such as the medium, nominal diameter, sensor etc.

Example

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

3.2.4 "Measurement mode" submenu

Navigation Expert → Sensor → Measurement mode



Select medium

Navigation Expert → Sensor → Measurement mode → Select medium

Description Use this function to select the type of medium.

Selection
- Liquid
- Gas

Factory setting Liquid

Select gas type

Navigation Expert → Sensor → Measurement mode → Select gas type

Prerequisite The **Gas** option is selected in the **Select medium** parameter (→ 53).

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

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

Factory setting Methane CH4

Sound velocity

Navigation Expert → Sensor → Measurement mode → Sound velocity

Prerequisite The **Others** option is selected in the **Select gas type** parameter (→ 54).

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

User entry 1 to 99 999.9999 m/s

Factory setting 0 m/s

Temp. coeff. SV

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

Prerequisite The **Others** option is selected in the **Select gas type** parameter (→ 54).

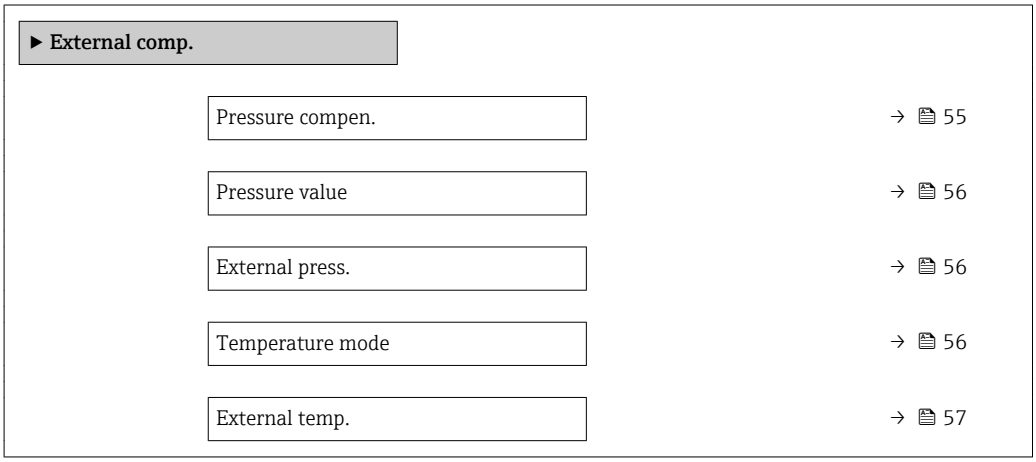
Description Use this function to enter a temperature coefficient for the sound velocity of the gas.

User entry Positive floating-point number

Factory setting 0 (m/s)/K

3.2.5 "External comp." submenu

Navigation Expert → Sensor → External comp.



Pressure compen.

Navigation Expert → Sensor → External comp. → Pressure compen.

Prerequisite The **Gas** option is selected in the **Select medium** parameter (→ 53).

Description Use this function select the type of pressure compensation.

Selection
- Off
- Fixed value
- External value

Factory setting Off

Pressure value

Navigation Expert → Sensor → External comp. → Pressure value

Prerequisite The **Fixed value** option is selected in the **Pressure compen.** parameter (→ 55).

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

User entry Positive floating-point number

Factory setting 0 bar

Additional information *User entry*

The unit is taken from the **Pressure unit** parameter (→ 39)

External press.

Navigation Expert → Sensor → External comp. → External press.

Prerequisite The **External value** option is selected in the **Pressure compen.** parameter (→ 55).

Description Use this function to enter an external pressure value.

User entry Positive floating-point number

Factory setting 0 bar

Additional information *User entry*

The unit is taken from the **Pressure unit** parameter (→ 39)

Temperature mode

Navigation Expert → Sensor → External comp. → Temperature mode

Description Use this function to select the temperature mode.

Selection
- Internal value
- External value

Factory setting Internal value

External temp.

Navigation Expert → Sensor → External comp. → External temp.

Prerequisite The **External value** option is selected in the **Temperature mode** parameter (→ 56) parameter.

Description Use this function to enter the external temperature.

User entry −273.15 to 99 999 °C

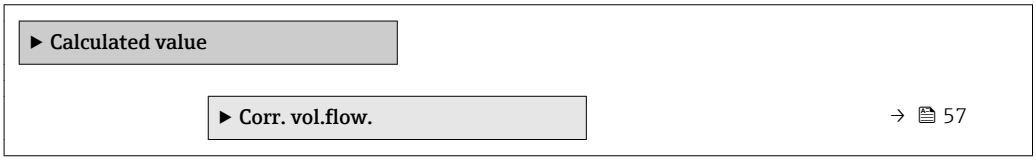
Factory setting
- 0 °C
- +32 °F

Additional information *Description*

The unit is taken from the **Temperature unit** parameter (→ 38)

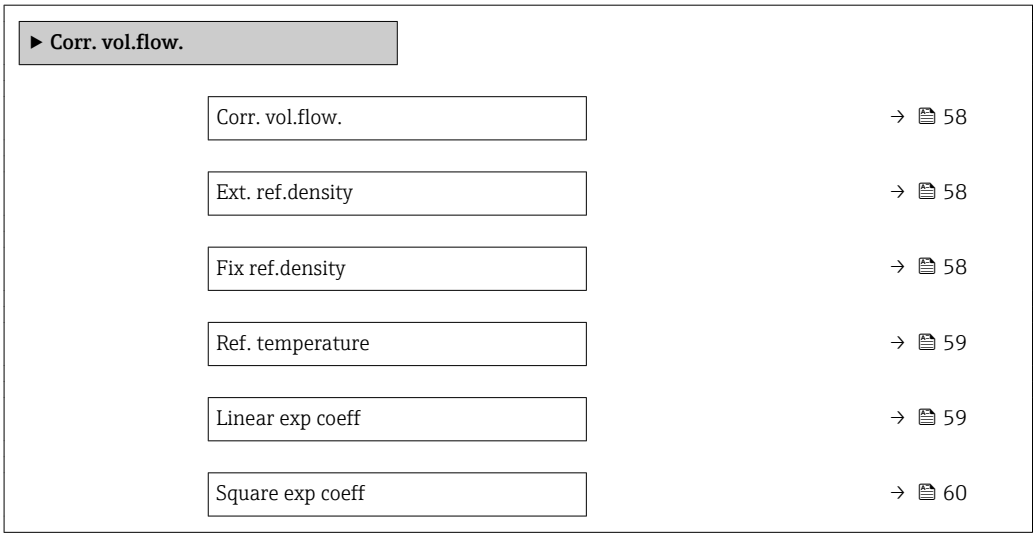
3.2.6 "Calculated value" submenu

Navigation Expert → Sensor → Calculated value



"Corr. vol.flow." submenu

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



Corr. vol.flow.

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

Description Use this function to select the reference density for calculating the corrected volume flow.

Selection
- Fix ref.density
- Calc ref density
- Ref. dens API 53
- Ext. ref.density

Factory setting Calc ref density

Ext. ref.density

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Ext. ref.density

Prerequisite In the **Corr. vol.flow.** parameter (→ 58), the **Ext. ref.density** option is selected.

Description Displays the reference density which is read in externally, e.g. via the current input.

User interface Floating point number with sign

Additional information *Dependency*

The unit is taken from the **Ref. dens. unit** parameter (→ 38)

Fix ref.density

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Fix ref.density

Prerequisite The **Fix ref.density** option is selected in the **Corr. vol.flow.** parameter (→ 58) parameter.

Description Use this function to enter a fixed value for the reference density.

User entry Positive floating-point number

Factory setting 1 kg/Nl

Additional information *Dependency*

The unit is taken from the **Ref. dens. unit** parameter (→ 38)

Ref. temperature

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

Prerequisite In the **Corr. vol.flow.** parameter (→ 58), the **Calc ref density** option is selected.

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 (→ 38)

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/K^2]

Linear exp coeff

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Linear exp coeff

Prerequisite In the **Corr. vol.flow.** parameter (→ 58), the **Calc ref density** option is selected.

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

Square exp coeff

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Square exp coeff

Prerequisite In the **Corr. vol.flow.** parameter (→ 58), the **Calc ref density** option is selected.

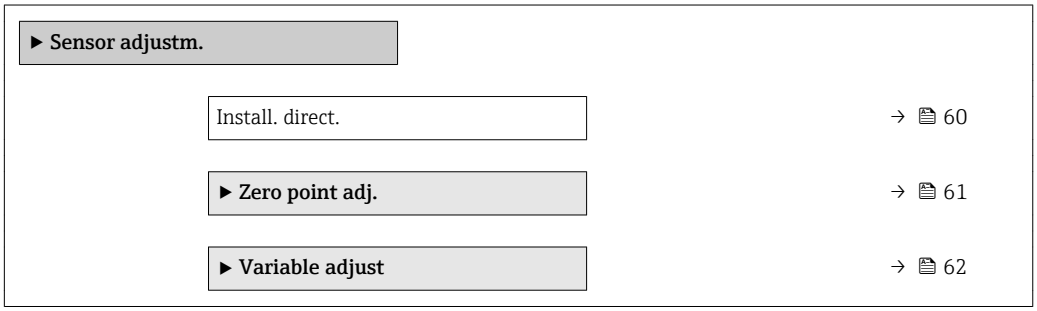
Description For fluid with a non-linear expansion pattern: use this function to enter a quadratic, fluid-specific expansion coefficient for calculating the reference density.

User entry Signed floating-point number

Factory setting 0.0

3.2.7 "Sensor adjustm." submenu

Navigation Expert → Sensor → Sensor adjustm.



Install. direct.

Navigation Expert → Sensor → Sensor adjustm. → Install. direct.

Description Use this function to change the sign of the medium flow direction.

Selection
- In arrow direct.
- Against arrow

Factory setting In arrow direct.

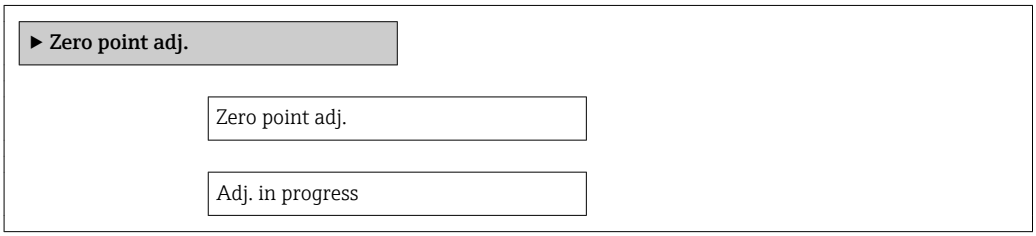
Additional information *Description*

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

"Zero point adj." submenu

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

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



Zero point adj.

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

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

Observe conditions → 61.

Selection
- Cancel
- Busy
- Zero adjust fail
- Start

Factory setting Cancel

Additional information *Description*

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

Progress

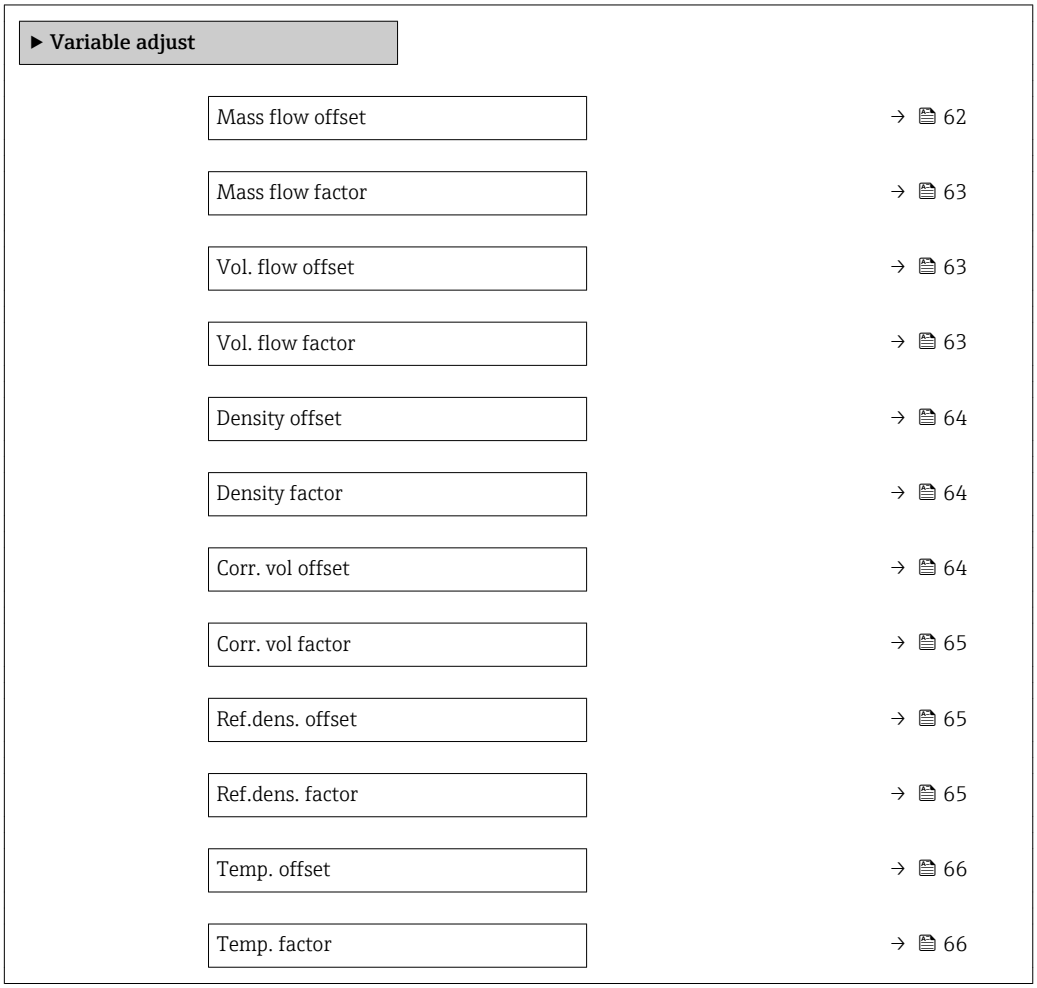
Navigation Expert → Sensor → Sensor adjustm. → Zero point adj. → Progress

Description The progress of the process is indicated.

User interface 0 to 100 %

"Variable adjust" submenu

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust



Mass flow offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Mass flow offset

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

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

Vol. flow offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Vol. flow offset

Description Use this function to enter the zero point shift for the volume flow trim. The volume flow unit on which the shift is based is m^3/s.

User entry Signed floating-point number

Factory setting 0 m^3/s

Additional information *Description*

Corrected value = (factor × value) + offset

Vol. flow factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Vol. flow factor

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Density offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Density offset

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 *Description*

Corrected value = (factor × value) + offset

Density factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Density factor

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Corr. vol offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol offset

Description Use this function to enter the zero point shift for the corrected volume flow trim. The corrected volume flow unit on which the shift is based is 1 Nm^3/s.

User entry Signed floating-point number

Factory setting 0 Nm^3/s

Additional information *Description*

Corrected value = (factor × value) + offset

Corr. vol factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol factor

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

Ref.dens. offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Ref.dens. offset

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

Ref.dens. factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Ref.dens. factor

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Temp. offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. offset

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

User entry Signed floating-point number

Factory setting 0 K

Additional information *Description*

Corrected value = (factor × value) + offset

Temp. factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. factor

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

User entry Positive floating-point number

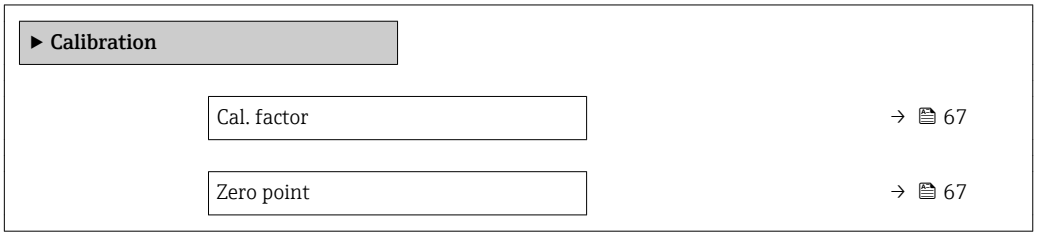
Factory setting 1

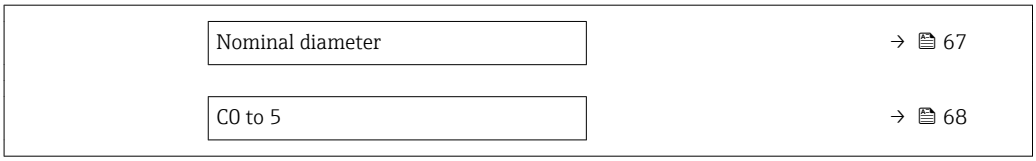
Additional information *Description*

Corrected value = (factor × value) + offset

3.2.8 "Calibration" submenu

Navigation Expert → Sensor → Calibration





Cal. factor

Navigation Expert → Sensor → Calibration → Cal. factor

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

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

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

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

User interface Signed floating-point number

Factory setting 0

3.2.9 "Testpoints" submenu

- The **Testpoints** submenu (→ 68) is used to test the measuring device or the application.
- The parameters can only be accessed via CDI interface or Modbus.

Navigation Expert → Sensor → Testpoints

Osc. freq. 0 to 1

Navigation Expert → Sensor → Testpoints → Osc. freq. 0 to 1

Description Displays the current oscillation frequency.

User interface Positive floating point number

Additional information *Typical values*

Sensor	Material	DN		f_{Air}		f_{Water}	
		[mm]	[in]	Min. nom. [Hz]	max. nom. [Hz]	Min. nom. [Hz]	max. nom. [Hz]
Promass A	Stainless steel, 1.4539 (904L)	1	1/24	275	317	254	292
		2	1/12	265	305	246	282
		4	1/8	284	326	246	282
	Alloy C22, 2.4602 (N 06022)	1	1/24	276	318	255	293
		2	1/12	266	306	249	287
		4	1/8	280	322	244	280
	Stainless steel, 1.4539 (904L), high-pressure version	2	1/12	265	305	258	296
		4	1/8	276	318	259	297
Promass E	Stainless steel, 1.4539 (904L)	8	3/8	531	611	479	551
		15	1/2	654	752	564	648
		25	1	770	886	649	747
		40	1 1/2	706	812	597	687
		50	2	495	569	408	470
Promass F	Stainless steel, 1.4539 (904L)	8	3/8	404	464	365	419
		15	1/2	558	642	484	556
		25	1	744	856	628	722
		40	1 1/2	679	781	577	663
		50	2	521	599	432	498
		80	3	446	514	372	428
		100	4	372	428	305	351
	Stainless steel, 1.4404 (316L)	150	6	265	305	219	251
		250	10	237	273	195	225
	Alloy C22, 2.4602 (N 06022)	8	3/8	409	471	381	439
		15	1/2	549	631	484	556
		25	1	744	856	628	722
		40	1 1/2	674	776	577	663
		50	2	512	589	432	498
		80	3	446	514	377	433
		100	4	363	417	305	351
		150	6	282	324	219	251
Promass F HT	Alloy C22, 2.4602 (N 06022)	25	1	670	770	586	674
		50	2	502	578	423	487
		80	3	432	498	372	428

Sensor	Material	DN		f_{Air}		f_{Water}	
		[mm]	[in]	Min. nom. [Hz]	max. nom. [Hz]	Min. nom. [Hz]	max. nom. [Hz]
Promass G	Stainless steel, 1.4435 (316L)	8	3/8	530	600	510	580
		15	1/2	640	690	610	660
		25	1	780	835	745	800
Promass H	Zirconium 702/R 60702	8	3/8	451	519	405	465
		15	1/2	502	578	451	519
		25	1	516	594	456	524
		40	1 1/2	367	423	328	378
		50	2	288	332	260	300
	Tantalum 2.5W	8	3/8	409	471	391	449
		15	1/2	465	535	437	503
		25	1	442	508	409	471
		40	1 1/2	321	369	302	348
		50	2	274	316	260	300
Promass I	Grade 9 titanium Titanium Grade 2 (flange)	8	3/8	539	621	512	589
		15	1/2	646	744	609	701
		25, 15 FB	1, 1/2 FB	646	744	605	696
		40, 25 FB	1 1/2, 1/2 FB	674	776	609	701
		50, 40 FB	2, 1 1/2 FB	634	730	569	655
		80	3	491	565	438	504
Promass O	Stainless steel, 25Cr Duplex (Super Duplex), 1.4410 (UNS S 32750)	80	3	462	532	405	467
		100	4	367	423	323	371
		150	6	280	322	245	281
Promass P	Stainless steel, 1.4435 (316L)	8	3/8	665	765	577	663
		15	1/2	814	936	707	813
		25	1	781	899	670	770
		40	1 1/2	570	640	500	570
		50	2	400	460	330	390
Promass S 8x1B	Stainless steel, EN 1.4539 (ASTM 904L)	8	3/8	646	744	558	642
		15	1/2	804	926	693	797
		25	1	767	883	660	760
		40	1 1/2	479	551	423	487
		50	2	428	492	372	428
Promass S 8x1C	Stainless steel, 1.4435 (316L)	8	3/8	646	744	558	642
		15	1/2	804	926	693	797
		25	1	767	883	660	760
		40	1 1/2	570	640	500	570

Sensor	Material	DN		f_{Air}		f_{Water}	
		[mm]	[in]	Min. nom. [Hz]	max. nom. [Hz]	Min. nom. [Hz]	max. nom. [Hz]
		50	2	400	460	330	390
Promass X	Stainless steel, 1.4404/316 (316L)	350	14	242	278	195	225

Freq. fluct. 0 to 1

Navigation Expert → Sensor → Testpoints → Freq. fluct. 0 to 1

Description Displays the current frequency fluctuation.

User interface Signed floating-point number

Osc. ampl. 0 to 1

Navigation Expert → Sensor → Testpoints → Osc. ampl. 0 to 1

Description Displays the relative oscillation amplitude of the sensor in relation to the optimum value.

User interface Signed floating-point number

Additional information

Description

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).

Limit values

5 %

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

- Diagnostic message ⚠**S913 Medium unsuitab.**, associated service ID **205 Osc Amp Limit**
  Explanation: The measured oscillation amplitude has dropped below the xMin limit value.
- Diagnostic message ⚠**S912 Medium inhomog.**, 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)

For detailed information about troubleshooting, refer to the section entitled "Overview of the service-specific diagnostics information"

Osc. damping 0 to 1

Navigation Expert → Sensor → Testpoints → Osc. damping 0 to 1

Description Displays the current oscillation damping.

User interface Positive floating-point number

Additional information *Description*

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

Typical values

Sensor	Material	DN		Nominal value, air	Nominal value, water
		[mm]	[in]	[A/m]	[A/m]
Promass A	Stainless steel, 1.4539 (904L)	1	1/24	250	300
		2	1/12	4	6
		4	1/8	8	12
	Alloy C22, 2.4602 (N 06022)	1	1/24	213	255
		2	1/12	4	6
		4	1/8	8	11
	Stainless steel, 1.4539 (904L), high-pressure version	2	1/12	6	7
		4	1/8	12	15
Promass E	Stainless steel, 1.4539 (904L)	8	3/8	230	270
		15	½	600	750
		25	1	320	380
		40	1½	500	650
		50	2	270	310
		80	3	500	360
Promass F	Stainless steel, 1.4539 (904L)	8	3/8	60	70
		15	½	160	190
		25	1	270	310
		40	1½	510	560
		50	2	320	330
		80	3	180	190
		100	4	200	200
	Stainless steel, 1.4404 (316L)	150	6	200	210
		250	10	310	330
	Alloy C22, 2.4602 (N 06022)	8	3/8	50	55
		15	1/2	120	140
		25	1	200	220
		40	1 1/2	340	380
		50	2	210	230
		80	3	160	180
		100	4	180	180

Sensor	Material	DN		Nominal value, air	Nominal value, water
		[mm]	[in]	[A/m]	[A/m]
		150	6	200	200
Promass F HT	Alloy C22, 2.4602 (N 06022)	25	1	700	750
		50	2	800	900
		80	3	700	700
Promass G	Stainless steel, 1.4435 (316L)	8	3/8	235	245
		15	1/2	620	660
		25	1	630	660
Promass H	Zirconium 702/R 60702	8	3/8	180	180
		15	1/2	120	110
		25	1	400	230
		40	1 1/2	180	160
		50	2	100	70
	Tantalum 2.5W	8	3/8	200	210
		15	1/2	120	120
		25	1	500	220
		40	1 1/2	125	120
		50	2	80	70
Promass I	Grade 9 titanium Titanium Grade 2 (flange)	8	3/8	70	90
		15	1/2	110	130
		25, 15 FB	1, 1/2 FB	110	120
		40, 25 FB	1 1/2, 1/2 FB	270	270
		50, 40 FB	2, 1 1/2 FB	210	180
		80	3	200	190
Promass O	Stainless steel, 25Cr Duplex (Super Duplex), 1.4410 (UNS S 32750)	80	3	160	170
		100	4	170	220
		150	6	230	250
Promass P	Stainless steel, 1.4435 (316L)	8	3/8	250	300
		15	1/2	250	300
		25	1	500	620
		40	1 1/2	280	340
		50	2	370	450
Promass S 8x1B	Stainless steel, EN 1.4539 (ASTM 904L)	8	3/8	210	260
		15	1/2	270	300
		25	1	460	530
		40	1 1/2	255	290
		50	2	230	290
Promass S 8x1C	Stainless steel, 1.4435 (316L)	8	3/8	210	260
		15	1/2	270	300
		25	1	460	530
		40	1 1/2	280	340

Sensor	Material	DN		Nominal value, air	Nominal value, water
		[mm]	[in]	[A/m]	[A/m]
		50	2	370	450
Promass X	Stainless steel, 1.4404/316 (316L)	350	14	380	420

Limit values

The damping depends on the transmitter type and model and changes with the type of medium (differences between models: approx. ±30 %). The minimum value is reached when the sensor is empty. The value can be several 1 000 for viscous media and even several 10 000 in the case of multiphase 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:
Diagnostic message ⚠**S862 Partly filled**, associated service ID **146 Density Monitoring**

For detailed information about troubleshooting, refer to the section entitled "Overview of the service-specific diagnostics information"

Damping fluct 0 to 1

Navigation Expert → Sensor → Testpoints → Damping fluct 0 to 1

Description Displays the current fluctuation of tube damping.

User interface Signed floating-point number

Signal asymmetry

Navigation Expert → Sensor → Testpoints → Signal asymmetry

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.

Limit values

If the value is > 10 %, this is an indicator of a damaged sensor or sensor cable.

If the displayed value is outside the limit value, the measuring device displays the following diagnostic message:
Diagnostic message ⚠**S140 Sensor signal**, associated service ID **204 El Dyn Sensor**
– Explanation: The amplitude asymmetry between the inlet and outlet sensor has exceeded the limit value.
– Possible cause: Virtually only occurs if one of the two signal sensors is defective.

For detailed information about troubleshooting, refer to the section entitled "Overview of the service-specific diagnostics information"

Electronic temp.

Navigation Expert → Sensor → Testpoints → Electronic temp.

Description Displays the current temperature inside the main electronics.

User interface Signed floating-point number

Additional information

Description

As there is minimum internal heating in the electronics, the electronics temperature corresponds to the housing or ambient temperature.

NOTE!

Stay within the specified ambient temperature range.

Dependency

The unit is taken from the **Temperature unit** parameter

Carr. pipe temp.

Navigation Expert → Sensor → Testpoints → Carr. pipe temp.

Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- If the carrier tube temperature is provided:
  - Promass A
  - Promass F
  - Promass G
  - Promass H
  - Promass I
  - Promass O
  - Promass P
  - 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

Exc. current 0 to 1

Navigation Expert → Sensor → Testpoints → Exc. current 0 to 1

Description Displays the effective excitation current.

User interface Signed floating-point number

Additional information

NOTE!

The maximum available excitation current is reached when the indicated oscillation amplitude is smaller than 100 %.

RawMassFlow

Navigation Expert → Sensor → Testpoints → RawMassFlow

Description Displays the unprocessed mass flow (contains all sensor corrections etc.).

User interface Signed floating-point number

Additional information *Description*

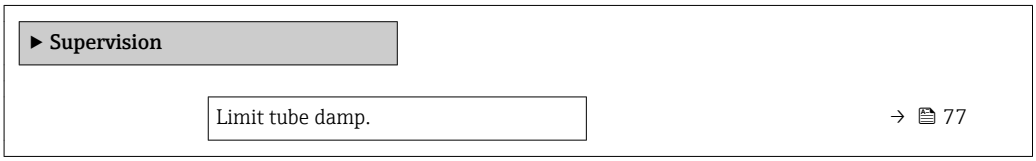
Displays the mass flow value before offset and factor correction, damping, low flow cut off and monitoring of a partially filled pipe. This value can be used to check the current zero point, similar to the zero point adjustment function.

Dependency

The unit is taken from the **Mass flow unit** parameter (→ 32)

3.2.10 "Supervision" submenu

Navigation Expert → Sensor → Supervision



Limit tube damp.

Navigation Expert → Sensor → Supervision → Limit tube damp.

Description Use this function to enter a limit value for measuring tube damping.

User entry Positive floating-point number

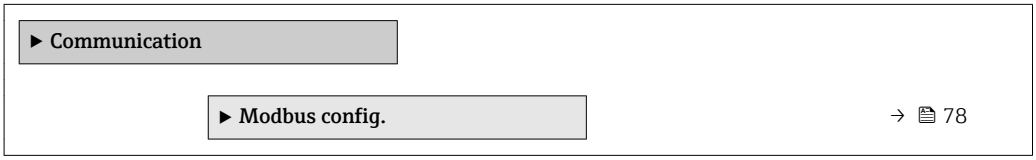
Factory setting Positive floating-point number

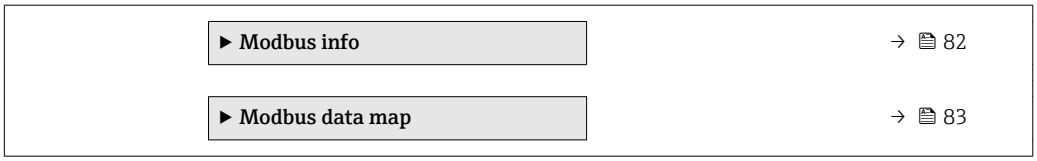
Additional information *Limit value*

- If the displayed value is outside the limit value, the measuring device displays the diagnostic message ⚠**S948 Tube damp. high**.
- For detecting inhomogeneous media, for example

3.3 "Communication" submenu

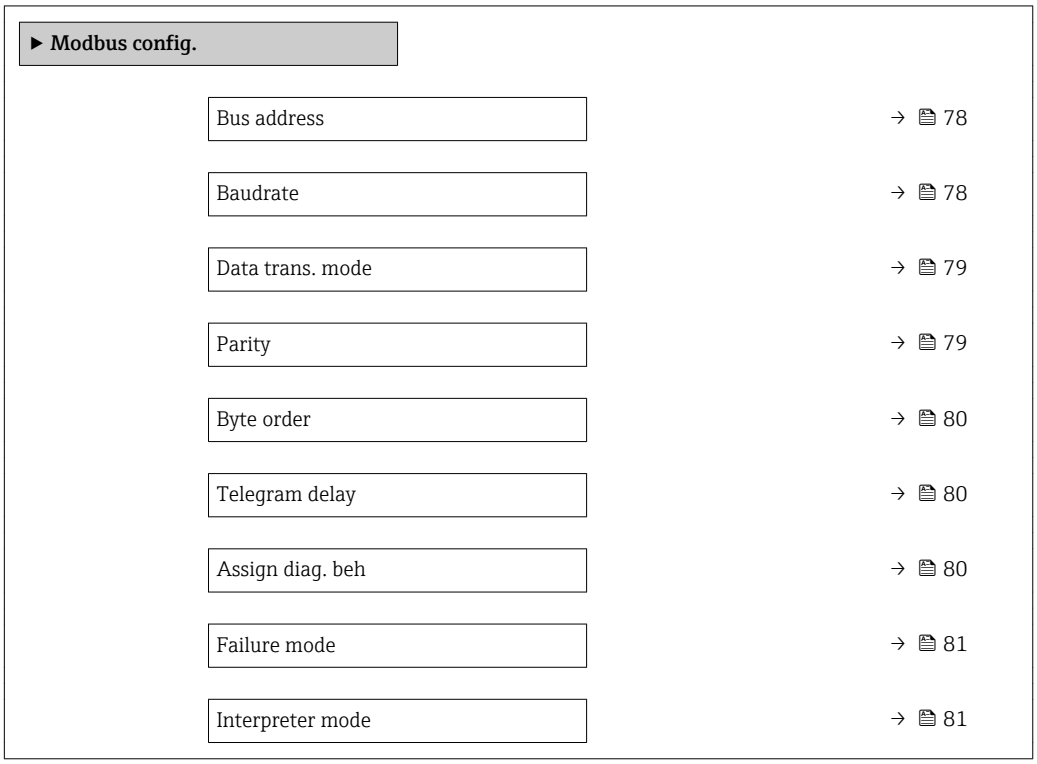
Navigation Expert → Communication





3.3.1 "Modbus config." submenu

Navigation Expert → Communication → Modbus config.



Bus address

Navigation Expert → Communication → Modbus config. → Bus address

Description For entering the device address.

User entry 1 to 247

Factory setting 247

Baudrate

Navigation Expert → Communication → Modbus config. → Baudrate

Description Use this function to select a transmission rate.

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

Factory setting 19200 BAUD

Data trans. mode

Navigation Expert → Communication → Modbus config. → Data trans. mode

Description Use this function to select the data transmission mode.

Selection
- ASCII
- RTU

Factory setting RTU

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

Parity

Navigation Expert → Communication → Modbus config. → Parity

Description Use this function to select the parity bit.

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

Factory setting Even

Additional information *Options*

Picklist **ASCII** option:
- 0 = **Even** option
- 1 = **Odd** option

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

Byte order

Navigation Expert → Communication → Modbus config. → Byte order

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

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

Factory setting 1-0-3-2

Telegram delay

Navigation Expert → Communication → Modbus config. → Telegram delay

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

User entry 0 to 100 ms

Factory setting 6 ms

Assign diag. beh

Navigation Expert → Communication → Modbus config. → Assign diag. beh

Description Use this function to select the diagnostic behavior for Modbus communication.

Selection
- Off
- Alarm or warning
- Warning
- Alarm

Factory setting Alarm

Additional information *Description*

Defines the category of messages to which data transmission responds:
- Off
  The device continues to measure. The diagnostic event is ignored, and no diagnostic message is generated.
- Alarm or warning
  The device continues to measure. A diagnostic message is generated. The signal outputs assume the alarm condition specified in **Failure mode** parameter (→ 81).
- Warning
  The device continues to measure. A diagnostic message is generated. The signal outputs assume the alarm condition specified in **Failure mode** parameter (→ 81).
- Alarm
  The device continues to measure. A diagnostic message is generated. The signal outputs assume the alarm condition specified in **Failure mode** parameter (→ 81).

Failure mode

Navigation Expert → Communication → Modbus config. → Failure mode

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

Selection
- NaN value
- Last valid value

Factory setting NaN value

Additional information *Options*
- NaN value
  The device outputs the NaN value [4].
- Last valid value
  The device outputs the last valid measured value before the fault occurred.

This effect of this parameter depends on the option selected in the **Assign diag. beh** parameter (→ 80).

Interpreter mode

Navigation Expert → Communication → Modbus config. → Interpreter mode

Description Use this function to select the interpreter mode. This mode defines the behavior of the telegram reception interpreter.

Selection
- Standard
- Ignore end bytes

Factory setting Standard

4) Not a Number

Additional information

"Standard" option

Behaves according to the Modbus standard, i.e. the last two bytes received are the checksum CRC16.

NOTE!

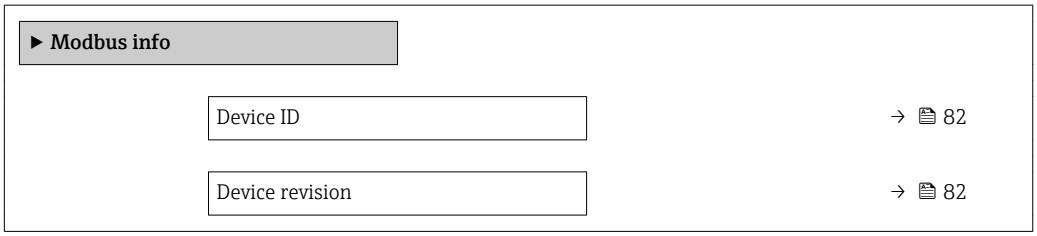
The selection is only relevant in the RTU mode. In the ASCII mode, the device always behaves according to the Modbus standard.

"Ignore end bytes" option

If supported by the function code, the two bytes for the checksum CRC16 are determined from the anticipated telegram length. Surplus bytes at the end of the actual telegram are ignored. This is not the standard Modbus behavior.

3.3.2 "Modbus info" submenu

Navigation Expert → Communication → Modbus info



Device ID

Navigation Expert → Communication → Modbus info → Device ID

Description Displays the device ID for identifying the measuring device.

User interface 4-digit hexadecimal number

Device revision

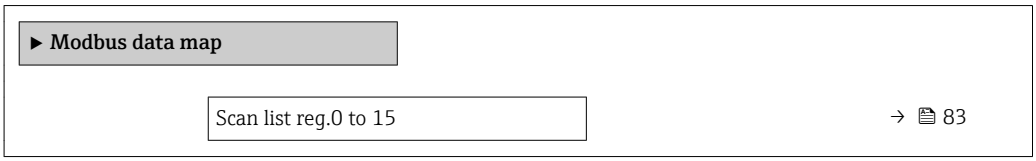
Navigation Expert → Communication → Modbus info → Device revision

Description Displays the device revision.

User interface 4-digit hexadecimal number

3.3.3 "Modbus data map" submenu

Navigation Expert → Communication → Modbus data map



Scan list reg.0 to 15

Navigation Expert → Communication → Modbus data map → Scan list reg.0 to 15

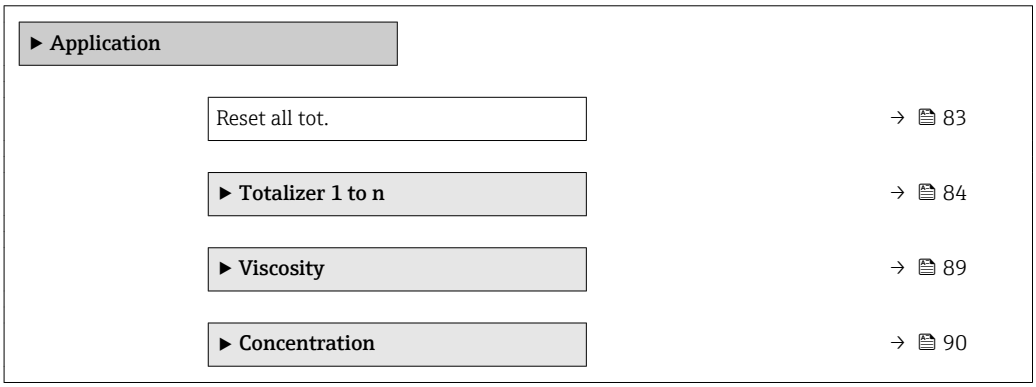
Description Use this function to enter the scan list register. By entering the register address (1-based), up to 16 device parameters can be grouped by assigning them to the scan list registers 0 to 15. The data of the device parameters assigned here are read out via the register addresses 5051 to 5081.

User entry 1 to 65 535

Factory setting 1

3.4 "Application" submenu

Navigation Expert → Application



Reset all tot.

Navigation Expert → Application → Reset all tot.

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.

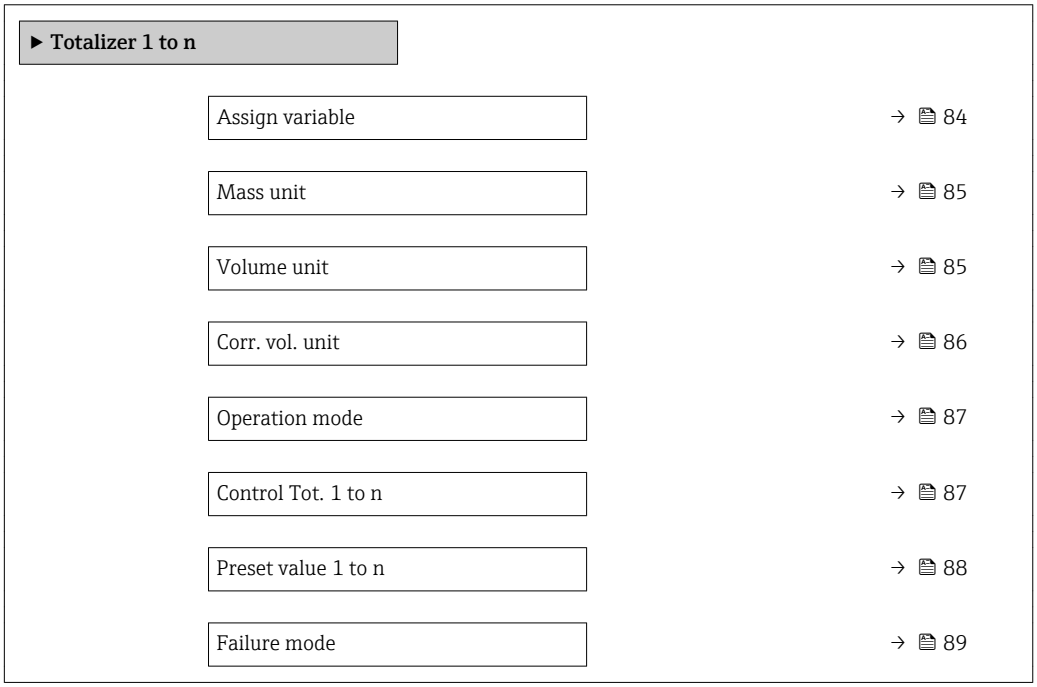
Selection
- Cancel
- Reset + totalize

Factory setting Cancel

Additional information *Selection*
- Cancel
  No action is executed and the user exits the parameter.
- Reset + totalize
  All totalizers are reset to 0 and the totaling process is restarted.

3.4.1 "Totalizer 1 to n" submenu

Navigation Expert → Application → Totalizer 1 to n



Assign variable

Navigation Expert → Application → Totalizer 1 to n → Assign variable

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

Selection
- Off
- Mass flow
- Volume flow

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

Factory setting Mass flow

Additional information *Description*

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

Selection

If the **Off** option is selected, only **Assign variable** parameter (→ 84) is still displayed in the **Totalizer 1 to n** submenu. All other parameters in the submenu are hidden.

Mass unit

Navigation Expert → Application → Totalizer 1 to n → Mass unit

Prerequisite The **Mass flow** option is selected in the **Assign variable** parameter (→ 84) of the **Totalizer 1 to n** submenu.

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

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

Custom-specific units
User mass

Factory setting Country-specific:
- kg (DN > 150 (6"): t)
- lb

Additional information *Selection*

For an explanation of the abbreviated units: → 117

Volume unit

Navigation Expert → Application → Totalizer 1 to n → Volume unit

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 84) of the **Totalizer 1 to n** submenu:
- Volume flow
- Target mass flow **
- Carrier mass fl. **

** Visibility depends on order options or device settings

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

Selection

SI units
- cm^3
- dm^3
- m^3
- ml
- l
- hl
- Ml Mega

US units
- af
- ft^3
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us;oil)
- bbl (us;liq.)
- bbl (us;beer)
- bbl (us;tank)

Imperial units
- gal (imp)
- Mgal (imp)
- bbl (imp;beer)
- bbl (imp;oil)

Custom-specific units
User vol.

Factory setting Country-specific:
- l (DN > 150 (6"): m^3)
- gal (us)

Additional information *Selection*

For an explanation of the abbreviated units: → 117

Corr. vol. unit

Navigation Expert → Application → Totalizer 1 to n → Corr. vol. unit

Prerequisite The **Correct.vol.flow** option is selected in the **Assign variable** parameter (→ 84) of the **Totalizer 1 to n** submenu.

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

Selection

SI units
- Nl
- Nm^3
- Sl
- Sm^3

US units
- Sft^3
- Sgal (us)
- Sbbl (us;liq.)

Imperial units
Sgal (imp)

Custom-specific units
UserCrVol.

Factory setting Country-specific:
- Nl ((DN > 150 (6"): Nm^3)
- Sft^3

Additional information *Selection*

For an explanation of the abbreviated units: → 117

Operation mode

Navigation Expert → Application → Totalizer 1 to n → Operation mode

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 84)**Totalizer 1 to n** submenu:
- Volume flow
- Mass flow
- Correct.vol.flow
- Target mass flow **
- Carrier mass fl. **

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

Selection
- Net flow total
- Forward total
- Reverse total

Factory setting Net flow total

Additional information *Selection*
- Net flow total
  Positive and negative flow values are totalized and balanced against one another. Net flow is registered in the flow direction.
- Forward total
  Only the flow in the forward flow direction is totalized.
- Reverse total
  Only the flow against the forward flow direction is totalized (= reverse flow total).

Control Tot. 1 to n

Navigation Expert → Application → Totalizer 1 to n → Control Tot. 1 to n

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 84) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow
- Correct.vol.flow
- Target mass flow **
- Carrier mass fl. **

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

Selection
- Totalize
- Reset + hold
- Preset + hold
- Reset + totalize
- Preset+totalize

Factory setting Totalize

** Visibility depends on order options or device settings

Additional information *Selection*

- Totalize
  The totalizer is started or continues totalizing with the current counter reading.
- Reset + hold
  The totaling process is stopped and the totalizer is reset to 0.
- Preset + hold
  The totaling process is stopped and the totalizer is set to its defined start value from the **Preset value** parameter (→ 88).
- Reset + totalize
  The totalizer is reset to 0 and the totaling process is restarted.
- Preset+totalize
  The totalizer is set to the defined start value from the **Preset value** parameter (→ 88) and the totaling process is restarted.

Preset value 1 to n

Navigation Expert → Application → Totalizer 1 to n → Preset value 1 to n

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 84) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow
- Correct.vol.flow
- Target mass flow **
- Carrier mass fl. **

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

User entry Signed floating-point number

Factory setting Country-specific:
- 0 kg
- 0 lb

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer depending on the selection made in the **Assign variable** parameter (→ 84):
- **Volume flow** option: **Volume flow unit** parameter (→ 33)
- **Mass flow** option, **Target mass flow** option, **Carrier mass fl.** option: **Mass flow unit** parameter (→ 32)
- **Correct.vol.flow** option: **Corr. vol. unit** parameter (→ 86)

Example

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

** Visibility depends on order options or device settings

Failure mode

Navigation Expert → Application → Totalizer 1 to n → Failure mode

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 84) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow
- Correct.vol.flow
- Target mass flow **
- Carrier mass fl. **

Description Use this function to select how a totalizer behaves in the event of a device alarm.

Selection
- Stop
- Actual value
- Last valid value

Factory setting Stop

Additional information

Description

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

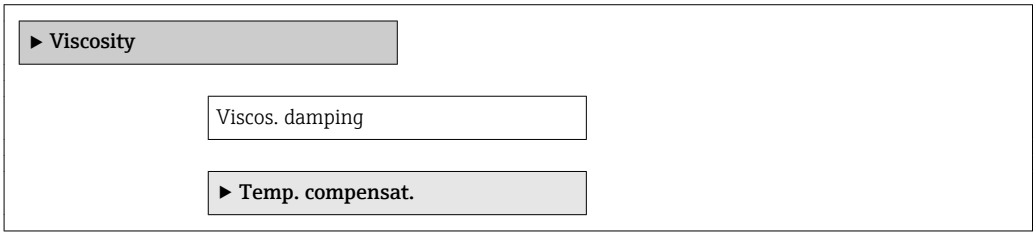
Selection
- Stop
  Totalizing is stopped when a device alarm occurs.
- Actual value
  The totalizer continues to count based on the actual measured value; the device alarm is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the device alarm occurred.

3.4.2 "Viscosity" submenu

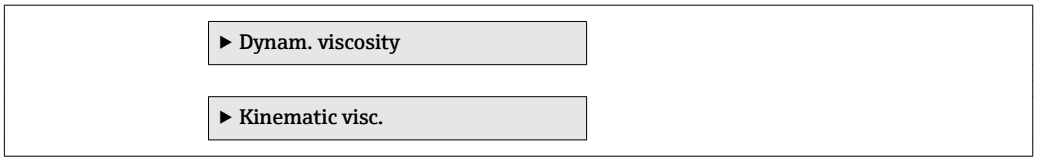
Only available for Promass I.

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

Navigation Expert → Application → Viscosity



** Visibility depends on order options or device settings



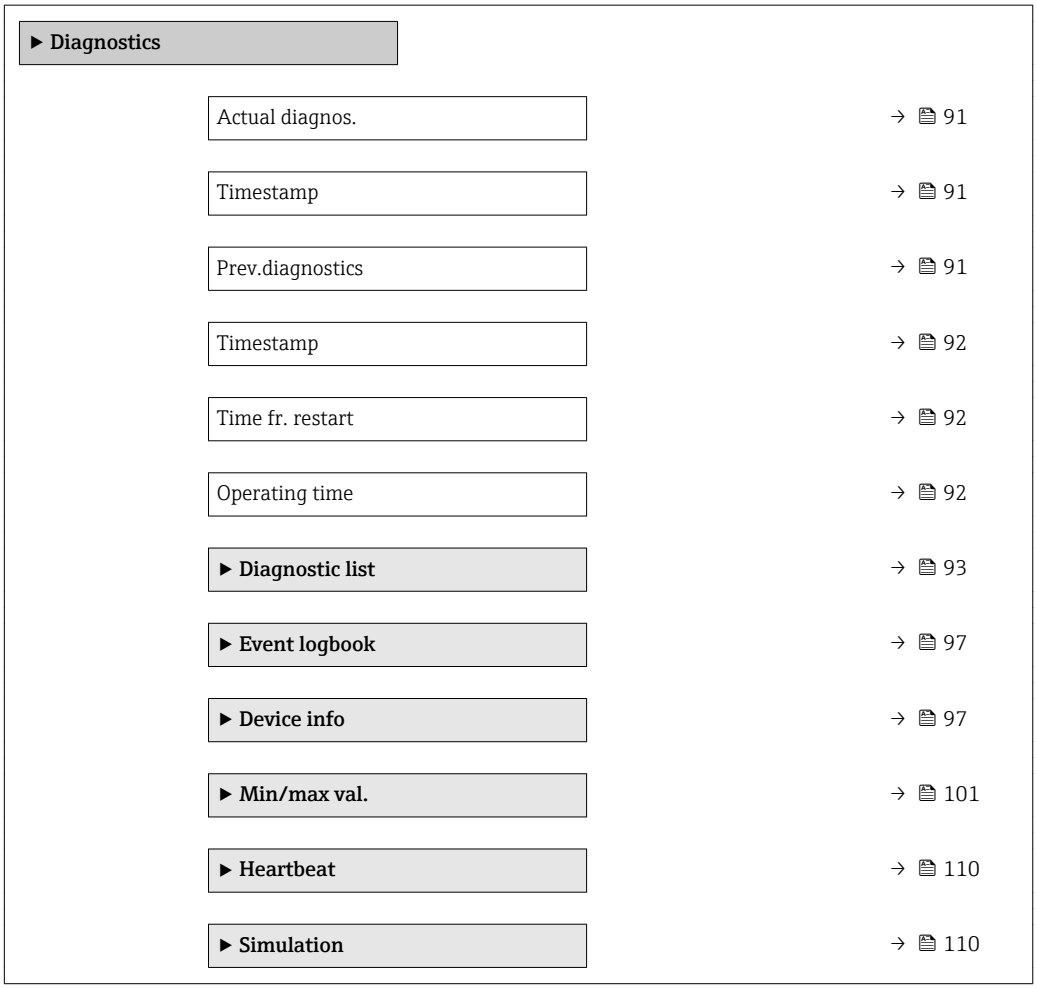
3.4.3 "Concentration" submenu

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

Navigation Expert → Application → Concentration

3.5 "Diagnostics" submenu

Navigation Expert → Diagnostics



Actual diagnos.

Navigation Expert → Diagnostics → Actual diagnos.

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 (→ 93).

Example

For the display format:
⊗F271 Main electronic

Timestamp

Navigation Expert → Diagnostics → Timestamp

Description Displays the operating time when the current diagnostic message occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Actual diagnos.** parameter (→ 91).

Example

For the display format:
24d12h13m00s

Prev.diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics

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 *Example*

For the display format:
⊗F271 Main electronic

Timestamp

Navigation Expert → Diagnostics → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Prev.diagnostics** parameter (→ 91).

Example

For the display format:
24d12h13m00s

Time fr. restart

Navigation Expert → Diagnostics → Time fr. restart

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

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

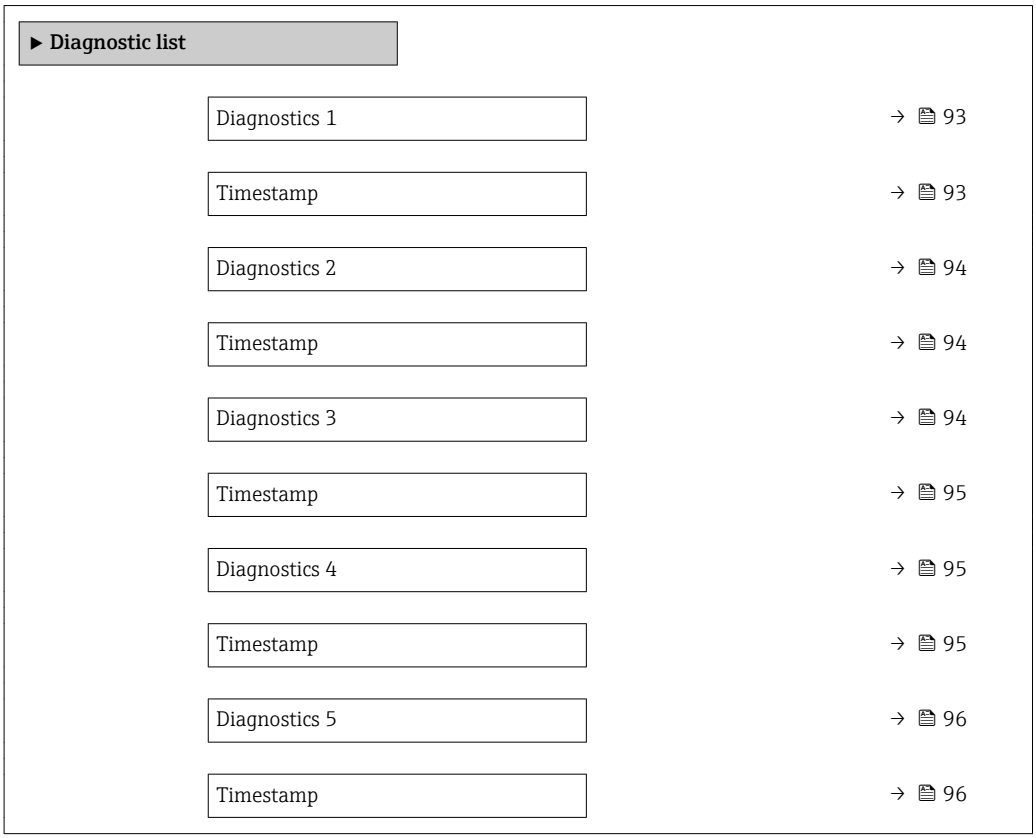
User interface Days (d), hours (h), minutes (m) and seconds (s)

Additional information *User interface*

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

3.5.1 "Diagnostic list" submenu

Navigation Expert → Diagnostics → Diagnostic list



Diagnostics 1

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 1

Description Displays the current diagnostics message with the highest priority.

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information *Examples*

For the display format:
- ⊗F271 Main electronic
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 93).

Example

For the display format:
24d12h13m00s

Diagnostics 2

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 2

Description Displays the current diagnostics message with the second-highest priority.

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information *Examples*

For the display format:
- ⊗F271 Main electronic
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 94).

Example

For the display format:
24d12h13m00s

Diagnostics 3

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 3

Description Displays the current diagnostics message with the third-highest priority.

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information *Examples*

For the display format:
- ⊗F271 Main electronic
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 94).

Example

For the display format:
24d12h13m00s

Diagnostics 4

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 4

Description Displays the current diagnostics message with the fourth-highest priority.

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information *Examples*

For the display format:
- ⊗F271 Main electronic
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ 95).

Example

For the display format:
24d12h13m00s

Diagnostics 5

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 5

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

User interface Symbol for diagnostic behavior, diagnostic code and short message.

Additional information *Examples*

For the display format:
- ⊗F271 Main electronic
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

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

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

Additional information *Display*

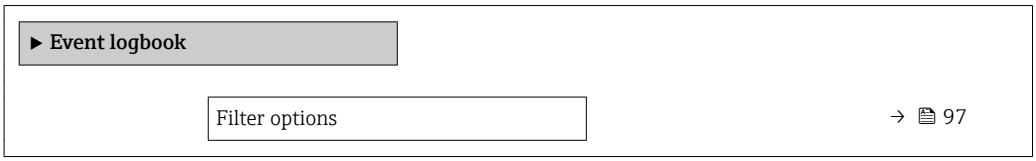
The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 96).

Example

For the display format:
24d12h13m00s

3.5.2 "Event logbook" submenu

Navigation Expert → Diagnostics → Event logbook



Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options

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

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

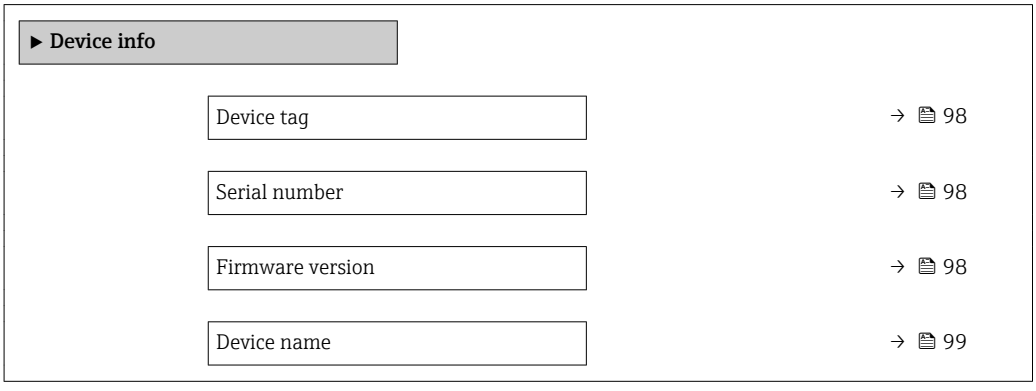
Factory setting All

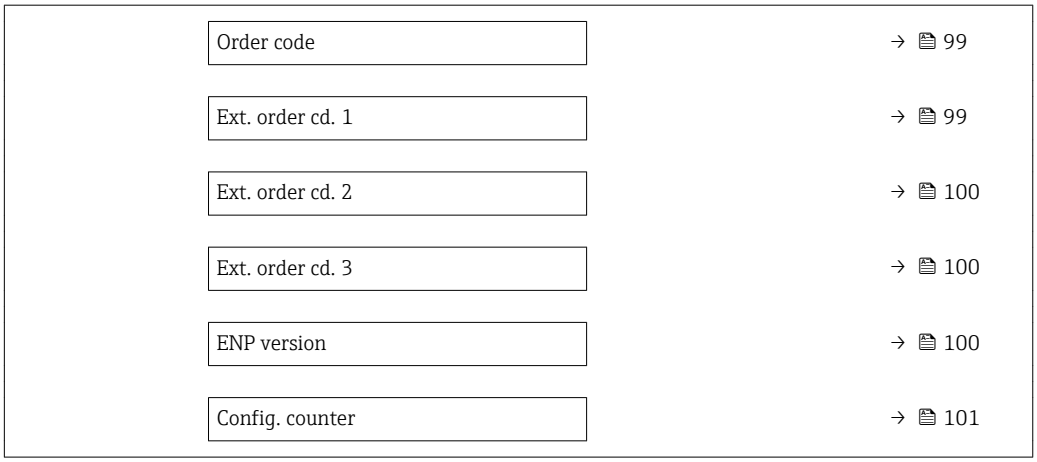
Additional information *Description*

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

3.5.3 "Device info" submenu

Navigation Expert → Diagnostics → Device info





Device tag

Navigation Expert → Diagnostics → Device info → Device tag

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

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

Factory setting Promass 100

Serial number

Navigation Expert → Diagnostics → Device info → Serial number

Description Displays the serial number of the measuring device.

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

User interface A maximum of 11-digit character string comprising letters and numbers.

Additional information *Description*

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

Firmware version

Navigation Expert → Diagnostics → Device info → Firmware version

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

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

User interface Max. 32 characters such as letters or numbers.

Factory setting Promass 100

Order code

Navigation Expert → Diagnostics → Device info → Order code

Description Displays the device order code.

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

Additional information *Description*

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

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

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

Ext. order cd. 1

Navigation Expert → Diagnostics → Device info → Ext. order cd. 1

Description Displays the first part of the extended order code.

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

User interface Character string

Additional information *Description*

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

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

Ext. order cd. 2

Navigation Expert → Diagnostics → Device info → Ext. order cd. 2

Description Displays the second part of the extended order code.

User interface Character string

Additional information For additional information, see **Ext. order cd. 1** parameter (→ 99)

Ext. order cd. 3

Navigation Expert → Diagnostics → Device info → Ext. order cd. 3

Description Displays the third part of the extended order code.

User interface Character string

Additional information For additional information, see **Ext. order cd. 1** parameter (→ 99)

ENP version

Navigation Expert → Diagnostics → Device info → ENP version

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.

Config. counter

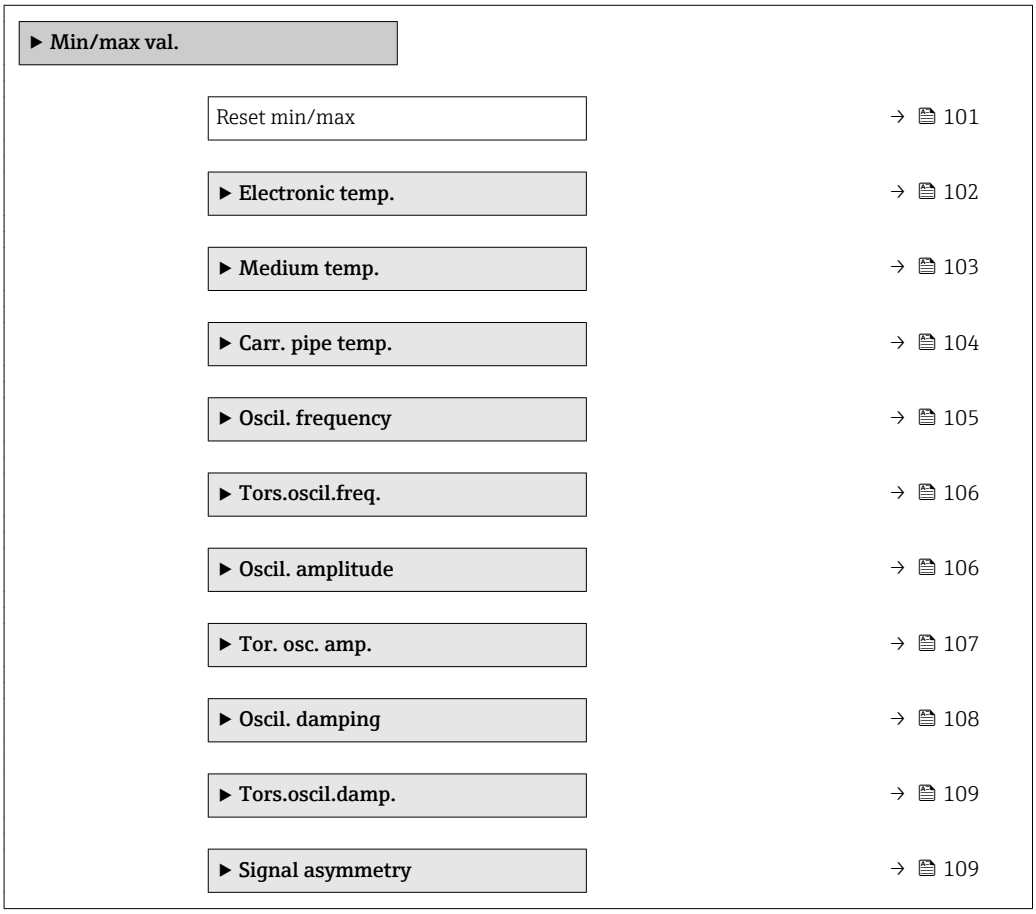
Navigation Expert → Diagnostics → Device info → Config. counter

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

3.5.4 "Min/max val." submenu

Navigation Expert → Diagnostics → Min/max val.



Reset min/max

Navigation Expert → Diagnostics → Min/max val. → Reset min/max

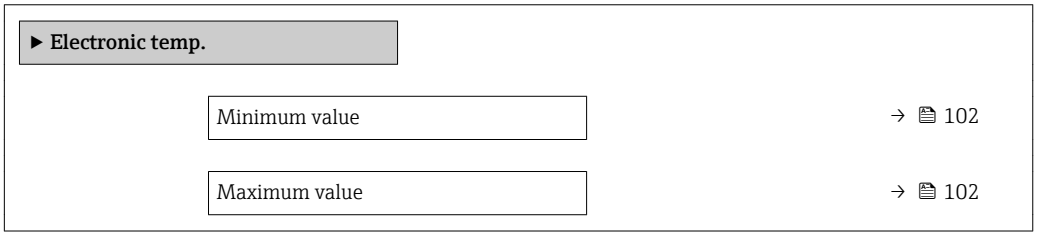
Description Use this function to select measured variables whose minimum, maximum and average measured values are to be reset.

Selection
- Cancel
- Oscil. amplitude
- Osc. ampl. 1 **
- Oscil. damping
- Tors.oscil.damp. **
- Oscil. frequency
- Tors.oscil.freq. **
- Signal asymmetry

Factory setting Cancel

"Electronic temp." submenu

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



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Electronic temp. → Minimum value

Description Displays the lowest previously measured temperature value of the main electronics module.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 38)

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Electronic temp. → Maximum value

Description Displays the highest previously measured temperature value of the main electronics module.

User interface Signed floating-point number

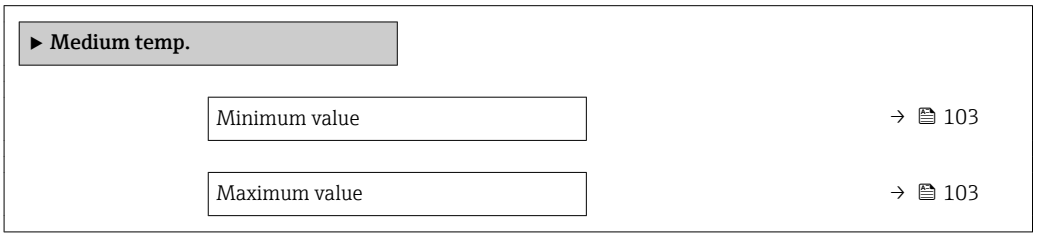
** Visibility depends on order options or device settings

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 38)

"Medium temp." submenu

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



Minimum value

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

Description Displays the lowest previously measured medium temperature value.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 38)

Maximum value

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

Description Displays the highest previously measured medium temperature value.

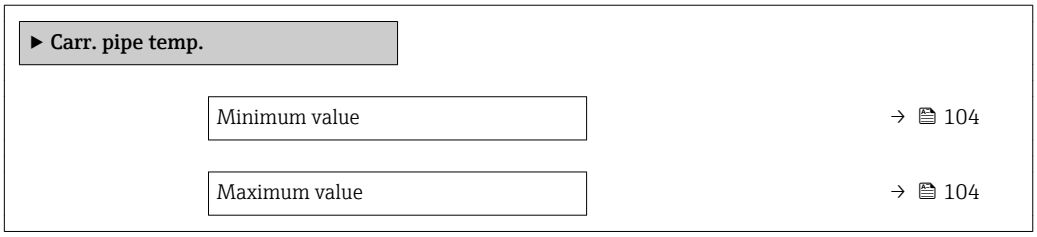
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 38)

"Carr. pipe temp." submenu

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



Minimum value

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

Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- If the carrier tube temperature is provided:
  - Promass F
  - Promass G
  - Promass H
  - Promass I
  - Promass O
  - Promass P
  - Promass S
  - Promass X

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 (→ 38)

Maximum value

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

Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- If the carrier tube temperature is provided:
  - Promass F
  - Promass G
  - Promass H
  - Promass I
  - Promass O
  - Promass P
  - Promass S
  - Promass X

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

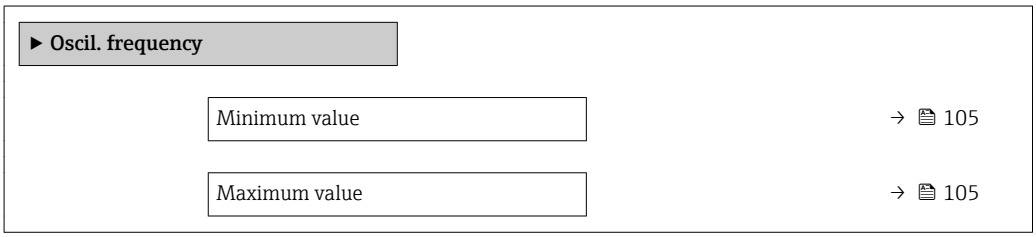
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 38)

"Oscil. frequency" submenu

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



Minimum value

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

Description Displays the lowest previously measured oscillation frequency.

User interface Signed floating-point number

Maximum value

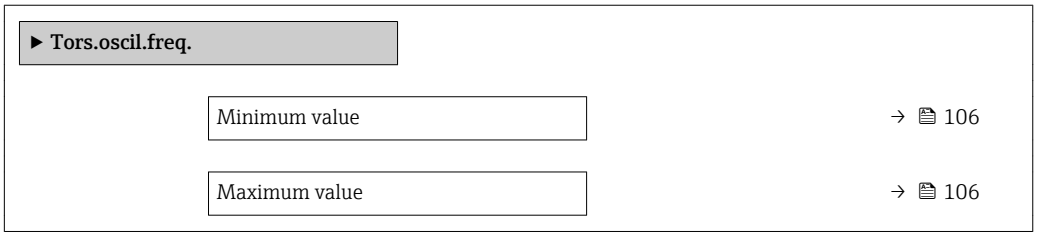
Navigation Expert → Diagnostics → Min/max val. → Oscil. frequency → Maximum value

Description Displays the highest previously measured oscillation frequency.

User interface Signed floating-point number

"Tors.oscil.freq." submenu

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



Minimum value

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

Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- Available only for Promass I.

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

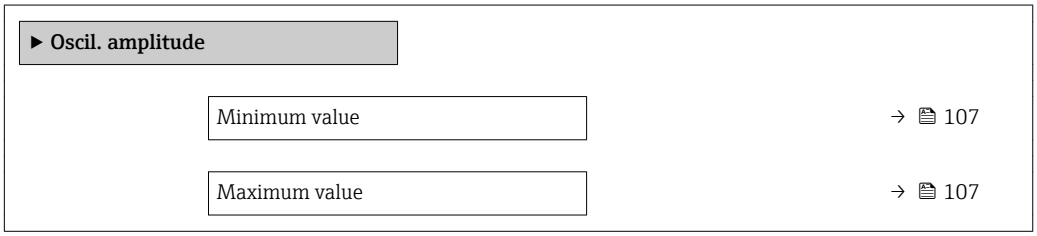
Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- Available only for Promass I.

Description Displays the highest previously measured torsion oscillation frequency.

User interface Signed floating-point number

"Oscil. amplitude" submenu

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



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Oscil. amplitude → Minimum value

Description Displays the lowest previously measured oscillation amplitude.

User interface Signed floating-point number

Maximum value

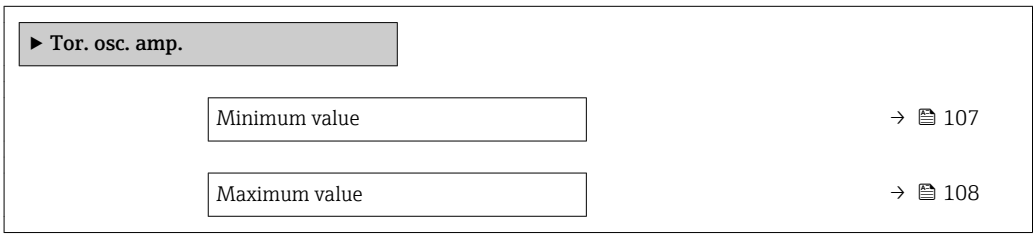
Navigation Expert → Diagnostics → Min/max val. → Oscil. amplitude → Maximum value

Description Displays the highest previously measured oscillation amplitude.

User interface Signed floating-point number

"Tor. osc. amp." submenu

Navigation Expert → Diagnostics → Min/max val. → Tor. osc. amp.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Tor. osc. amp. → Minimum value

Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- Available only for Promass I.

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

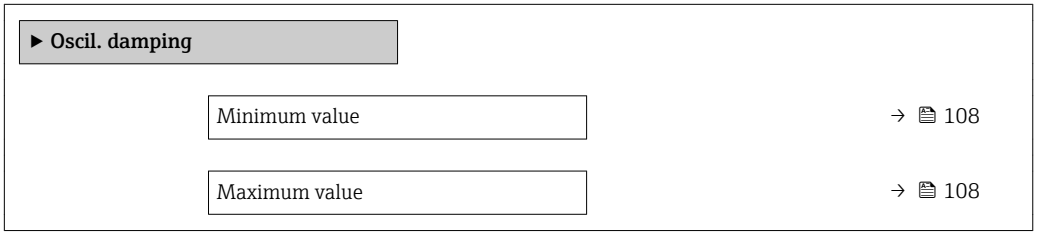
Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- Available only for Promass I.

Description Displays the highest previously measured torsion oscillation amplitude.

User interface Signed floating-point number

"Oscil. damping" submenu

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



Minimum value

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

Description Displays the lowest previously measured oscillation damping.

User interface Signed floating-point number

Maximum value

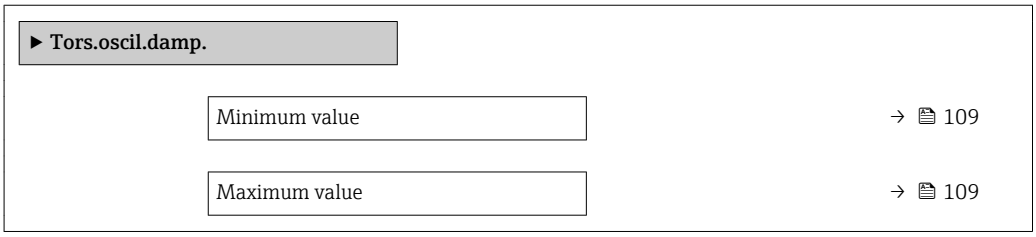
Navigation Expert → Diagnostics → Min/max val. → Oscil. damping → Maximum value

Description Displays the highest previously measured oscillation damping.

User interface Signed floating-point number

"Tors.oscil.damp." submenu

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



Minimum value

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

Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- Available only for Promass I.

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

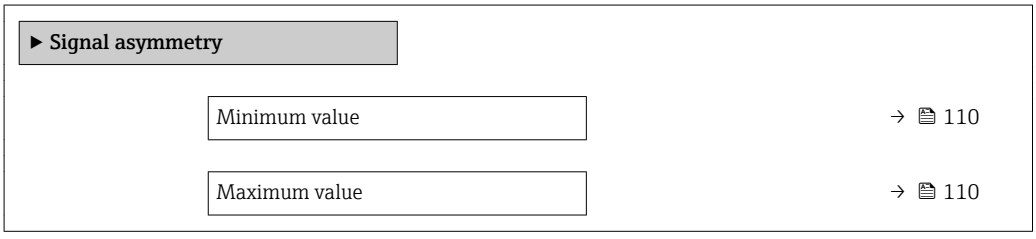
Prerequisite
- Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
- Available only for Promass I.

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

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

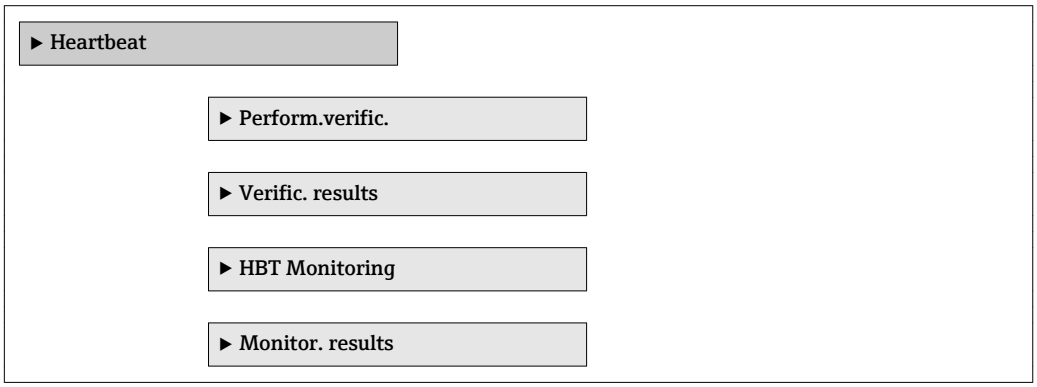
Description Displays the highest previously measured signal asymmetry.

User interface Signed floating-point number

3.5.5 "Heartbeat" submenu

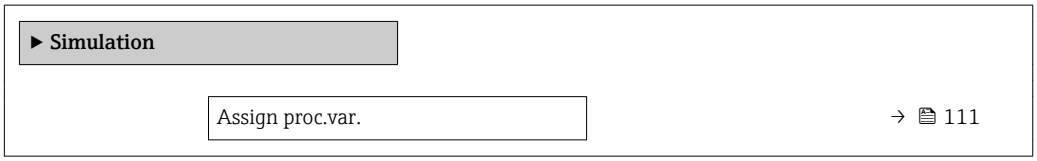
For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring**application package, refer to the Special Documentation for the device

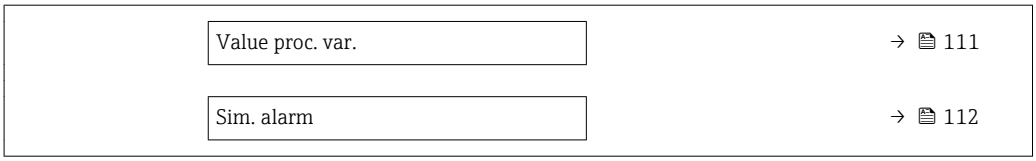
Navigation Expert → Diagnostics → Heartbeat



3.5.6 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation





Assign proc.var.

Navigation Expert → Diagnostics → Simulation → Assign proc.var.

Description Use this function to select a process variable for the simulation process that is activated.

Selection
- Off
- Mass flow
- Volume flow
- Correct.vol.flow
- Density
- Ref.density
- Temperature
- Dynam. viscosity **
- Kinematic visc. **
- TempCompDynVisc **
- TempCompKinVisc **
- Concentration **
- Target mass flow **
- Carrier mass fl. **

Factory setting Off

Additional information *Description*

The simulation value of the process variable selected is defined in the **Value proc. var.** parameter (→ 111).

Value proc. var.

Navigation Expert → Diagnostics → Simulation → Value proc. var.

Prerequisite One of the following options is selected in the **Assign proc.var.** parameter (→ 111):
- Mass flow
- Volume flow
- Correct.vol.flow
- Density
- Ref.density
- Temperature
- Dynam. viscosity **
- Kinematic visc. **
- TempCompDynVisc **
- TempCompKinVisc **

** Visibility depends on order options or device settings

- Concentration **
- Target mass flow **
- Carrier mass fl. **

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 (→ 31).

Sim. alarm

Navigation Expert → Diagnostics → Simulation → Sim. alarm

Description Use this function to switch the device alarm on and off.

Selection
- Off
- On

Factory setting Off

** Visibility depends on order options or device settings

4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

Mass	kg
Mass flow	kg/h
Volume	l
Volume flow	l/h
Corrected volume	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 applie to the following parameters:
100% bar graph value 1

Nominal diameter [mm]	[kg/h]
1	4
2	20
4	90
8	400
15	1 300
15 FB	3 600
25	3 600
25 FB	9 000
40	9 000
40 FB	14 000
50	14 000
50 FB	36 000
80	36 000
100	60 000
150	130 t/h
250	360 t/h
350	650 t/h

4.1.3 On value low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

Nominal diameter [mm]	On-value for liquid [kg/h]
1	0.08
2	0.4
4	1.8
8	8
15	26
15 FB	72
25	72
25 FB	180
40	180
40 FB	300
50	300
50 FB	720
80	720
100	1200
150	2.6 t/h
250	7.2 t/h
350	13 t/h

Nominal diameter [mm]	Switch-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
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

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

4.2.2 Full scale values

The factory settings applie to the following parameters:
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
½	50
½ FB	130
1	130
1 FB	330
1½	330
1½ FB	550
2	550
2 FB	1 300
3	1 300
4	2 200
6	4 800
10	13 000
14	23 500

4.2.3 On value low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

Nominal diameter [in]	On-value for liquid [lb/min]
1/24	0.003
1/12	0.015
1/8	0.066
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
10	260
14	470

Nominal diameter [in]	Switch-on value for gas [lb/min]
1/24	0.001
1/12	0.004
1/8	0.016
3/8	0.075
½	0.25
½ 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
10	65
14	117.5

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Density	g/cm³, g/m³	Gram/volume unit
	kg/dm³, kg/l, kg/m³	Kilogram/volume unit
	SD4°C, SD15°C, SD20°C	Specific density: The specific density is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
	SG4°C, SG15°C, SG20°C	Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
Pressure	Pa a, kPa a, MPa a	Pascal, kilopascal, megapascal (absolute)
	bar	Bar
	Pa g, kPa g, MPa g	Pascal, kilopascal, megapascal (relative/gauge)
	bar g	Bar (relative/gauge)
Mass	g, kg, t	Gram, kilogram, metric ton
Mass flow	g/s, g/min, g/h, g/d	Gram/time unit
	kg/s, kg/min, kg/h, kg/d	Kilogram/time unit
	t/s, t/min, t/h, t/d	Metric ton/time unit
Ref.density	kg/Nm³, kg/Nl, g/Scm³, kg/Sm³	Kilogram, gram/standard volume unit
Corrected volume	Nl, Nm³, Sm³	Normal liter, normal cubic meter, standard cubic meter
Correct.vol.flow	Nl/s, Nl/min, Nl/h, Nl/d	Normal liter/time unit
	Nm³/s, Nm³/min, Nm³/h, Nm³/d	Normal cubic meter/time unit
	Sm³/s, Sm³/min, Sm³/h, Sm³/d	Standard cubic meter/time unit
Temperature	°C , K	Celsius, Kelvin
Volume	cm³, dm³, m³	Cubic centimeter, cubic decimeter, cubic meter
	ml, l, hl, Ml Mega	Milliliter, liter, hectoliter, megaliter
Volume flow	cm³/s, cm³/min, cm³/h, cm³/d	Cubic centimeter/time unit
	dm³/s, dm³/min, dm³/h, dm³/d	Cubic decimeter/time unit
	m³/s, m³/min, m³/h, m³/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/ft³, lb/gal (us)	Pound/cubic foot, pound/gallon
	lb/bbl (us;liq.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)	Pound/volume unit

Process variable	Units	Explanation
Pressure	psi a	Pounds per square inch (absolute)
	psi g	Pounds per square inch (gauge)
Mass	oz, lb, STon	Ounce, pound, standard ton
Mass flow	oz/s, oz/min, oz/h, oz/d	Ounce/time unit
	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	STon/s, STon/min, STon/h, STon/d	Standard ton/time unit
Ref.density	lb/Sft³	Weight unit/standard volume unit
Corrected volume	Sft³, Sgal (us), Sbbl (us;liq.)	Standard cubic foot, standard gallon, standard barrel
Correct.vol.flow	Sft³/s, Sft³/min, Sft³/h, Sft³/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
	ft³	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
	ft³/s, ft³/min, ft³/h, ft³/d	Cubic foot/time unit
	fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us)	Fluid ounce/time unit
	gal/s (us), gal/min (us), gal/h (us), gal/d (us)	Gallon/time unit
	kgal/s (us), kgal/min (us), kgal/h (us), kgal/d (us)	Kilogallon/time unit
	Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us)	Million gallon/time unit
	bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.)	Barrel/time unit (normal liquids) Normal liquids: 31.5 gal/bbl
	bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer)	Barrel /time unit (beer) Beer: 31.0 gal/bbl
	bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 42.0 gal/bbl
	bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank)	Barrel/time unit (filling tank) Filling tanks: 55.0 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

5.3 Imperial units

Process variable	Units	Explanation
Density	lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)	Pound/volume unit
Corrected volume	Sgal (imp)	Standard gallon
Correct.vol.flow	Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp)	Standard gallon/time unit
Volume	gal (imp), Mgal (imp)	Gallon, mega gallon
	bbl (imp;beer), bbl (imp;oil)	Barrel (beer), barrel (petrochemicals)
Volume flow	gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)	Gallon/time unit
	Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)	Mega gallon/time unit
	bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)	Barrel /time unit (beer) Beer: 36.0 gal/bbl
	bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 34.97 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

6 Modbus RS485 Register Information

6.1 Notes

6.1.1 Structure of the register information

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

Navigation: navigation path to the parameter					
Parameter	**Register**	**Data type**	**Access type**	**Selection/input**	**→**
Name of parameter	Indicated in decimal numerical format	▪ Float length = 4 byte ▪ Integer length = 2 byte ▪ String length, depending on parameter	Possible type of access to parameter: ▪ Read access via function codes 03, 04 or 23 ▪ Write access via function codes 06, 16 or 23	**Options** List of the individual options for the parameter ▪ Option 1 ▪ **Option 2** ▪ **Option 3** (+) ▪ Factory setting highlighted in bold ▪ (+) = Factory setting depends on country, order options or device settings **User entry** Input range for the parameter	Page number information and cross-reference to the standard parameter description

NOTICE

If non-volatile device parameters are modified via the MODBUS RS485 function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device.

The number of writes to the EEPROM is technically restricted to a maximum of 1 million.

- ▶ Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.
- ▶ Avoid constantly writing non-volatile device parameters via the MODBUS RS485.

6.1.2 Address model

The Modbus RS485 register addresses of the measuring device are implemented in accordance with the "Modbus Applications Protocol Specification V1.1".

In addition, systems are used that work with the register address model "Modicon Modbus Protocol Reference Guide (PI-MBUS-300 Rev. J)".

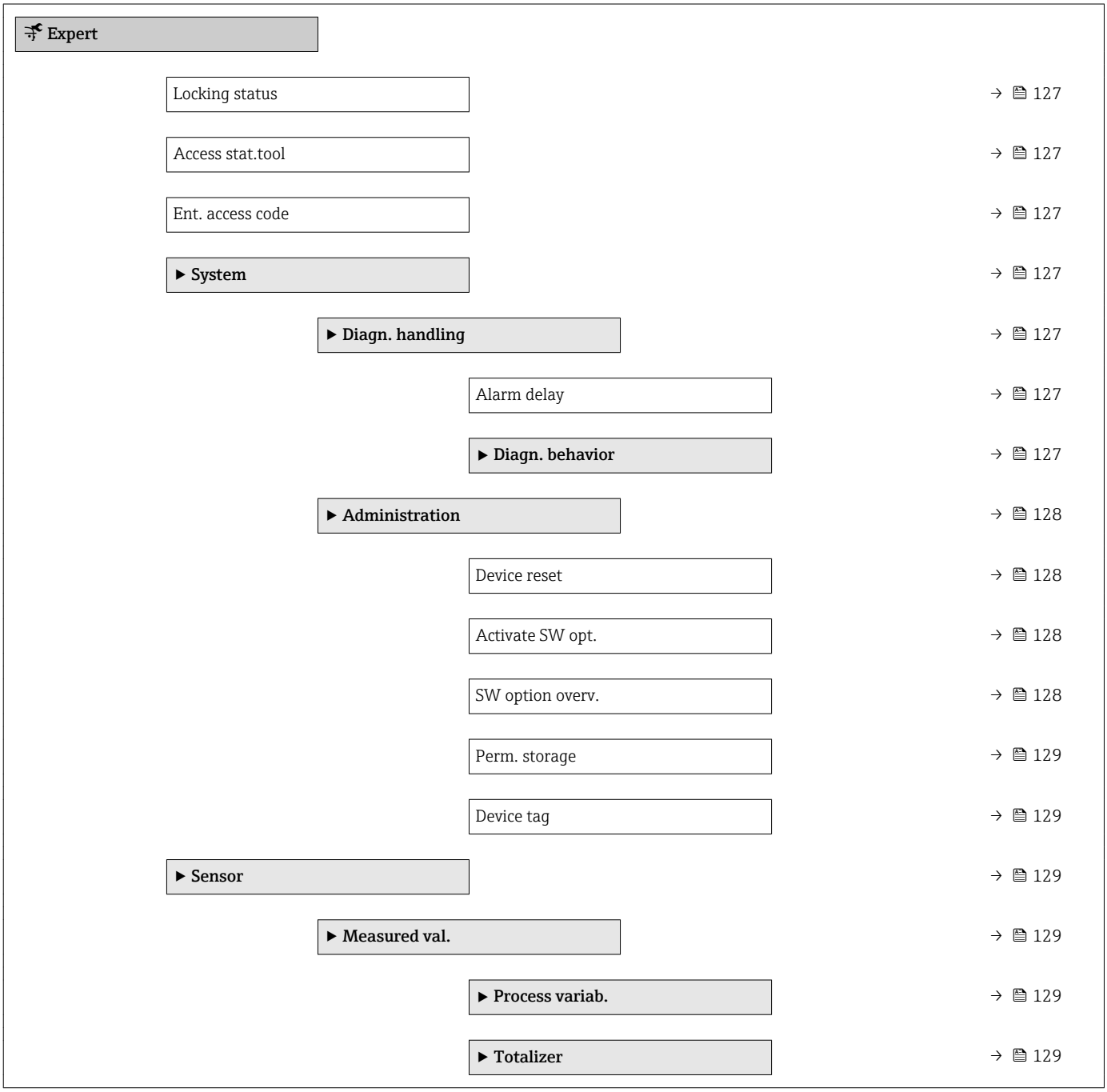
Depending on the function code used, a number is added at the start of the register address with this specification:

- "3" → "Read" access
- "4" → "Write" access

Function code	Access type	Register in accordance with "Modbus Applications Protocol Specification"	Register in accordance with "Modicon Modbus Protocol Reference Guide"
03 04 23	Read	XXXX Example: mass flow = 2007	3XXXX Example: mass flow = 32007
06 16 23	Write	XXXX Example: reset totalizer = 6401	4XXXX Example: reset totalizer = 46401

6.2 Overview of the Expert operating menu

The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.



- ▶ **External comp.** → 136
  - Pressure compen. → 136
  - Pressure value → 136
  - External press. → 136
  - Temperature mode → 136
  - External temp. → 136
- ▶ **Calculated value** → 136
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- ▶ **Sensor adjustm.** → 137
  - Install. direct. → 137
  - ▶ **Zero point adj.** → 137
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- ▶ **Calibration** → 137
  - Cal. factor → 137
  - Zero point → 137
  - Nominal diameter → 138
  - C0 to 5 → 138
- ▶ **Testpoints** → 138
  - Osc. freq. 0 to 1 → 138
  - Freq. fluct. 0 to 1 → 138
  - Osc. ampl. 0 to 1 → 138
  - Osc. damping 0 to 1 → 138
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  - Signal asymmetry → 138
  - Electronic temp. → 138

- Carr. pipe temp. → 138
- Exc. current 0 to 1 → 138
- RawMassFlow → 138
- ▶ **Communication** → 138
  - ▶ **Modbus config.** → 138
    - Bus address → 138
    - Baudrate → 138
    - Data trans. mode → 138
    - Parity → 138
    - Byte order → 139
    - Telegram delay → 139
    - Assign diag. beh → 139
    - Failure mode → 139
    - Interpreter mode → 139
  - ▶ **Modbus info** → 139
    - Device ID → 139
    - Device revision → 139
  - ▶ **Modbus data map** → 139
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- ▶ **Application** → 139
  - Reset all tot. → 139
  - ▶ **Totalizer 1 to n** → 140
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- Corr. vol. unit → 140
- Operation mode → 140
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- Preset value 1 to n → 140
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- Timestamp → 141
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- Timestamp → 141
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▶ **Diagnostic list** → 141

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- Timestamp → 141
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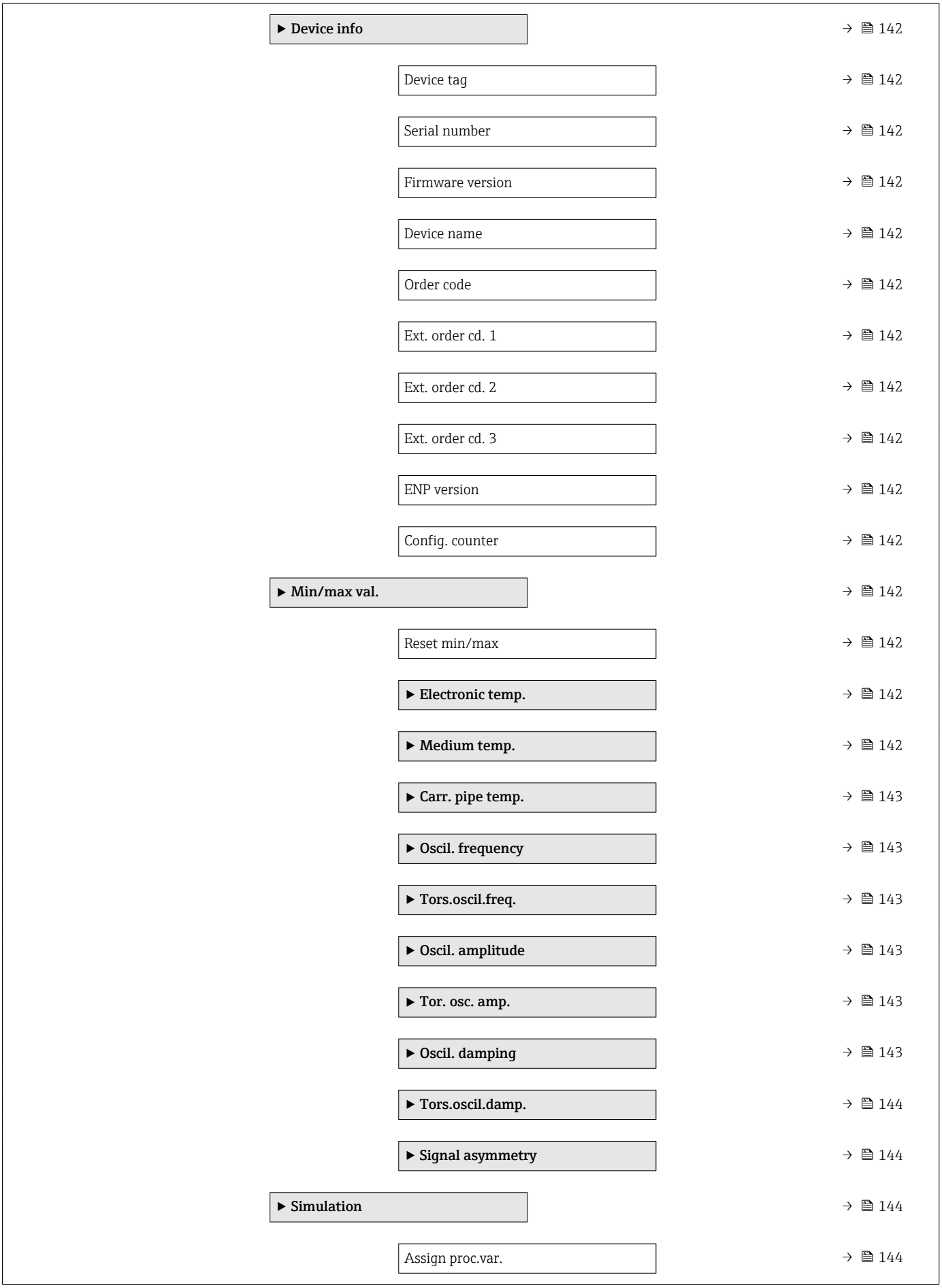
- Timestamp → 141
- Diagnostics 3 → 141
- Timestamp → 141
- Diagnostics 4 → 141
- Timestamp → 141
- Diagnostics 5 → 141
- Timestamp → 141

▶ **Event logbook** → 141

- Filter options → 141


▶ Device info → 142
Device tag → 142
Serial number → 142
Firmware version → 142
Device name → 142
Order code → 142
Ext. order cd. 1 → 142
Ext. order cd. 2 → 142
Ext. order cd. 3 → 142
ENP version → 142
Config. counter → 142
▶ Min/max val. → 142
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▶ Tor. osc. amp. → 143
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▶ Simulation → 144
Assign proc.var. → 144

	Value proc. var.	→ 144
	Sim. alarm	→ 144

6.3 Register information

Navigation: Expert					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Locking status	4918	Integer	Read	256 = Hardware locked 512 = Temp. locked	10
Access stat.tool	2178	Integer	Read	0 = Operator **1 = Maintenance**	11
Ent. access code	2177	Integer	Read / Write	0 to 9 999	11

6.3.1 "System" submenu

"Diagn. handling" submenu

Navigation: Expert → System → Diagn. handling					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Alarm delay	6808 to 6809	Float	Read / Write	0 to 60 s	12

"Diagn. behavior" submenu

Navigation: Expert → System → Diagn. handling → Diagn. behavior					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Diagnostic no. 140	2757	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	14
Diagnostic no. 046	2756	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	14
Diagnostic no. 144	2081	Integer	Read / Write	0 = Off 1 = Logbook only 2 = Warning **3 = Alarm**	15
Diagnostic no. 832	2759	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	15
Diagnostic no. 833	2762	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	15
Diagnostic no. 834	2761	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	16

Navigation: Expert → System → Diagn. handling → Diagn. behavior					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Diagnostic no. 835	2760	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	16
Diagnostic no. 912	2758	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	16
Diagnostic no. 913	2754	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	17
Diagnostic no. 944	2082	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	17
Diagnostic no. 192	2022	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	18
Diagnostic no. 274	2755	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	18
Diagnostic no. 392	2023	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	18
Diagnostic no. 592	2024	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	19
Diagnostic no. 992	2021	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	19

"Administration" submenu

Navigation: Expert → System → Administration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Device reset	6817	Integer	Read / Write	**0 = Cancel** 1 = Restart device 2 = To delivery set. 14 = To bus defaults *	20
Activate SW opt.	2795	Integer	Read / Write	Max. 10-digit string consisting of numbers.	20
SW option overv.	2902	Integer	Read	4 = Concentration 64 = Viscosity 16384 = HBT Monitoring 32768 = HBT Verification	21

Navigation: Expert → System → Administration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Perm. storage	6907	Integer	Read / Write	0 = Off **1 = On**	21
Device tag	4901 to 4908	String	Read / Write	Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /).	22

* Visibility depends on communication

6.3.2 "Sensor" submenu

"Measured val." submenu

"Process variab." submenu

Navigation: Expert → Sensor → Measured val. → Process variab.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Mass flow	2007 to 2008	Float	Read	Signed floating-point number	24
Volume flow	2009 to 2010	Float	Read	Signed floating-point number	24
Correct.vol.flow	2011 to 2012	Float	Read	Signed floating-point number	25
Density	2013 to 2014	Float	Read	Signed floating-point number	24
Ref.density	2015 to 2016	Float	Read	Signed floating-point number	25
Temperature	2017 to 2018	Float	Read	Signed floating-point number	25
Pressure value	2089 to 2090	Float	Read	Signed floating-point number	25
Dynam. viscosity	2019 to 2020	Float	Read	Signed floating-point number	26
Kinematic visc.	2083 to 2084	Float	Read	Signed floating-point number	26
TempCompDynVisc	2093 to 2094	Float	Read	Signed floating-point number	27
TempCompKinVisc	2095 to 2096	Float	Read	Signed floating-point number	27
Concentration	2598 to 2599	Float	Read	Signed floating-point number	27
Target mass flow	2797 to 2798	Float	Read	Signed floating-point number	28
Carrier mass fl.	2799 to 2800	Float	Read	Signed floating-point number	28

"Totalizer" submenu

Navigation: Expert → Sensor → Measured val. → Totalizer					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Totalizer val. 1 to n	1: 2610 to 2611 2: 2810 to 2811 3: 3010 to 3011	Float	Read	Signed floating-point number	29
Tot. overflow 1 to n	1: 2612 to 2613 2: 2812 to 2813 3: 3012 to 3013	Float	Read	Integer with sign	30

"System units" submenu

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Mass flow unit	2101	Integer	Read / Write	0 = g/s 1 = g/min 2 = g/h 3 = g/d 4 = kg/s 5 = kg/min **6 = kg/h** (+) 7 = kg/d 8 = t/s 9 = t/min 10 = t/h 11 = t/d 12 = oz/s 13 = oz/min 14 = oz/h 15 = oz/d 16 = lb/s 17 = lb/min 18 = lb/h 19 = lb/d 20 = STon/s 21 = STon/min 22 = STon/h 23 = STon/d 24 = User mass/s 25 = User mass/min 26 = User mass/h 27 = User mass/d	32
Mass unit	2102	Integer	Read / Write	0 = g **1 = kg** (+) 2 = t 3 = oz 4 = lb 5 = STon 6 = User mass	32

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	→
Volume flow unit	2103	Integer	Read / Write	0 = cm^3/s 1 = cm^3/min 2 = cm^3/h 3 = cm^3/d 4 = dm^3/s 5 = dm^3/min 6 = dm^3/h 7 = dm^3/d 8 = m^3/s 9 = m^3/min 10 = m^3/h 11 = m^3/d 12 = ml/s 13 = ml/min 14 = ml/h 15 = ml/d 16 = l/s 17 = l/min **18 = l/h** (+) 19 = l/d 20 = hl/s 21 = hl/min 22 = hl/h 23 = hl/d 24 = Ml/s 25 = Ml/min 26 = Ml/h 27 = Ml/d 32 = af/s 33 = af/min 34 = af/h 35 = af/d 36 = ft^3/s 37 = ft^3/min 38 = ft^3/h 39 = ft^3/d 40 = fl oz/s (us) 41 = fl oz/min (us) 42 = fl oz/h (us) 43 = fl oz/d (us) 44 = gal/s (us) 45 = gal/min (us) 46 = gal/h (us) 47 = gal/d (us) 48 = Mgal/s (us) 49 = Mgal/min (us) 50 = Mgal/h (us) 51 = Mgal/d (us) 52 = bbl/s (us;liq.) 53 = bbl/min (us;liq.) 54 = bbl/h (us;liq.) 55 = bbl/d (us;liq.) 56 = bbl/s (us;beer) 57 = bbl/min (us;beer) 58 = bbl/h (us;beer) 59 = bbl/d (us;beer) 60 = bbl/s (us;oil) 61 = bbl/min (us;oil) 62 = bbl/h (us;oil) 63 = bbl/d (us;oil) 64 = bbl/s (us;tank) 65 = bbl/min (us;tank) 66 = bbl/h (us;tank) 67 = bbl/d (us;tank) 68 = gal/s (imp) 69 = gal/min (imp) 70 = gal/h (imp)	33

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	→ 🖹
				71 = gal/d (imp) 72 = Mgal/s (imp) 73 = Mgal/min (imp) 74 = Mgal/h (imp) 75 = Mgal/d (imp) 76 = bbl/s (imp;beer) 77 = bbl/min (imp;beer) 78 = bbl/h (imp;beer) 79 = bbl/d (imp;beer) 80 = bbl/s (imp;oil) 81 = bbl/min (imp;oil) 82 = bbl/h (imp;oil) 83 = bbl/d (imp;oil) 84 = User vol./s 85 = User vol./min 86 = User vol./h 87 = User vol./d 88 = kgal/s (us) 89 = kgal/min (us) 90 = kgal/h (us) 91 = kgal/d (us)	
Volume unit	2104	Integer	Read / Write	0 = cm^3 1 = dm^3 2 = m^3 3 = ml **4 = l** (+) 5 = hl 6 = Ml Mega 8 = af 9 = ft^3 10 = fl oz (us) 11 = gal (us) 12 = Mgal (us) 13 = bbl (us;liq.) 14 = bbl (us;beer) 15 = bbl (us;oil) 16 = bbl (us;tank) 17 = gal (imp) 18 = Mgal (imp) 19 = bbl (imp;beer) 20 = bbl (imp;oil) 21 = User vol. 22 = kgal (us)	35

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Cor.volflow unit	2105	Integer	Read / Write	0 = Nl/s 1 = Nl/min **2 = Nl/h** (+) 3 = Nl/d 4 = Nm^3/s 5 = Nm^3/min 6 = Nm^3/h 7 = Nm^3/d 8 = Sm^3/s 9 = Sm^3/min 10 = Sm^3/h 11 = Sm^3/d 12 = Sft^3/s 13 = Sft^3/min 14 = Sft^3/h 15 = Sft^3/d 16 = Sgal/s (us) 17 = Sgal/min (us) 18 = Sgal/h (us) 19 = Sgal/d (us) 20 = Sbbl/s (us;liq.) 21 = Sbbl/min (us;liq.) 22 = Sbbl/h (us;liq.) 23 = Sbbl/d (us;liq.) 24 = Sgal/s (imp) 25 = Sgal/min (imp) 26 = Sgal/h (imp) 27 = Sgal/d (imp) 28 = UserCrVol./s 29 = UserCrVol./min 30 = UserCrVol./h 31 = UserCrVol./d	35
Corr. vol. unit	2106	Integer	Read / Write	**0 = Nl** (+) 1 = Nm^3 2 = Sm^3 3 = Sft^3 4 = Sl 5 = Sgal (us) 6 = Sbbl (us;liq.) 7 = Sgal (imp) 8 = UserCrVol.	36
Density unit	2107	Integer	Read / Write	0 = g/cm^3 2 = kg/dm^3 **3 = kg/l** (+) 4 = kg/m^3 5 = SD4°C 6 = SD15°C 7 = SD20°C 8 = SG4°C 9 = SG15°C 10 = SG20°C 11 = lb/ft^3 12 = lb/gal (us) 13 = lb/bbl (us;liq.) 14 = lb/bbl (us;beer) 15 = lb/bbl (us;oil) 16 = lb/bbl (us;tank) 17 = lb/gal (imp) 18 = lb/bbl (imp;beer) 19 = lb/bbl (imp;oil) 20 = User dens. 21 = g/m^3 22 = g/ml	37

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	→ 🖹
Ref. dens. unit	2108	Integer	Read / Write	0 = g/Scm³ **1 = kg/Nl** (+) 2 = kg/Nm³ 3 = kg/Sm³ 4 = lb/Sft³	38
Temperature unit	2109	Integer	Read / Write	**0 = °C** (+) 1 = K 2 = °F 3 = °R	38
Pressure unit	2130	Integer	Read / Write	0 = bar 1 = psi a 2 = bar g 3 = psi g 4 = Pa a 5 = kPa a 6 = MPa a 7 = Pa g 8 = kPa g 9 = MPa g 10 = User pres.	39
Date/time format	2150	Integer	Read / Write	**0 = dd.mm.yy hh:mm** 1 = mm/dd/yy am/pm 2 = dd.mm.yy am/pm 3 = mm/dd/yy hh:mm	39

"User-spec. units" submenu

Navigation: Expert → Sensor → System units → User-spec. units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	→ 🖹
Mass text	2531 to 2535	String	Read / Write	Max. 10 characters such as letters, numbers or special characters (@, %, /)	40
Mass factor	2115 to 2116	Float	Read / Write	Signed floating-point number	41
Volume text	2542 to 2546	String	Read / Write	Max. 10 characters such as letters, numbers or special characters (@, %, /)	41
Volume factor	2119 to 2120	Float	Read / Write	Signed floating-point number	42
Corr. vol. text	2568 to 2572	String	Read / Write	Max. 10 characters such as letters, numbers or special characters (@, %, /)	42
Cor.vol. factor	2573 to 2574	Float	Read / Write	Signed floating-point number	43
Density text	2549 to 2553	String	Read / Write	Max. 10 characters such as letters, numbers or special characters (@, %, /)	43
Density offset	2556 to 2557	Float	Read / Write	Signed floating-point number	43
Density factor	2123 to 2124	Float	Read / Write	Signed floating-point number	43
Pressure text	2559 to 2563	String	Read / Write	Max. 10 characters such as letters, numbers or special characters (@, %, /)	44
Pressure offset	2566 to 2567	Float	Read / Write	Signed floating-point number	44
Pressure factor	2564 to 2565	Float	Read / Write	Signed floating-point number	44

"Process param." submenu

Navigation: Expert → Sensor → Process param.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Flow damping	5510 to 5511	Float	Read / Write	0 to 100.0 s	45
Density damping	5508 to 5509	Float	Read / Write	0 to 999.9 s	46
Temp. damping	5127 to 5128	Float	Read / Write	0 to 999.9 s	46
Flow override	5503	Integer	Read / Write	**0 = Off** 1 = On	47

"Low flow cut off" submenu

Navigation: Expert → Sensor → Process param. → Low flow cut off					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign variable	5101	Integer	Read / Write	0 = Off **1 = Mass flow** 2 = Volume flow 3 = Correct.vol.flow	47
On value	5138 to 5139	Float	Read / Write	Positive floating-point number	48
Off value	5104 to 5105	Float	Read / Write	0 to 100.0 %	48
Pres. shock sup.	5140 to 5141	Float	Read / Write	0 to 100 s	49

"Partial pipe det" submenu

Navigation: Expert → Sensor → Process param. → Partial pipe det					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign variable	5106	Integer	Read / Write	**0 = Off** 4 = Density 5 = Ref.density	51
Low value	5110 to 5111	Float	Read / Write	Signed floating-point number	51
High value	5112 to 5113	Float	Read / Write	Signed floating-point number	51
Response time	5108 to 5109	Float	Read / Write	0 to 100 s	52
Max. damping	2414 to 2415	Float	Read / Write	Positive floating-point number	52

"Measurement mode" submenu

Navigation: Expert → Sensor → Measurement mode					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Select medium	2442	Integer	Read / Write	**0 = Liquid** 1 = Gas	53
Select gas type	5229	Integer	Read / Write	0 = Air 1 = Nitrogen N2 2 = Argon Ar 3 = Helium He 4 = Carbon diox. CO2 5 = Oxygen O2 **6 = Methane CH4** 7 = Ammonia NH3 9 = Hydrogen H2 10 = Ethane C2H6 11 = Propane C3H8 12 = Butane C4H10 13 = Chlorine Cl2 14 = Hydrog.chlor.HCl 15 = Carbon monox. CO 16 = Nitrous ox. N2O 17 = Nitrog. ox. NOx 18 = Hydrog.sulf. H2S 19 = Sulf. hex.fl.SF6 20 = Propylene C3H6 21 = Ozone O3 22 = Others 23 = Ethylene C2H4	54
Sound velocity	7413 to 7414	Float	Read / Write	1 to 99 999.9999 m/s	54
Temp. coeff. SV	7411 to 7412	Float	Read / Write	Positive floating-point number	55

"External comp." submenu

Navigation: Expert → Sensor → External comp.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Pressure compen.	5184	Integer	Read / Write	**0 = Off** 1 = Fixed value 2 = External value	55
Pressure value	5185 to 5186	Float	Read / Write	Positive floating-point number	56
External press.	2440 to 2441	Float	Read / Write	Positive floating-point number	56
Temperature mode	5515	Integer	Read / Write	**0 = Internal value** 1 = External value	56
External temp.	2507 to 2508	Float	Read / Write	−273.15 to 99 999 °C	57

"Calculated value" submenu

"Corr. vol.flow." submenu

Navigation: Expert → Sensor → Calculated value → Corr. vol.flow.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Corr. vol.flow.	5129	Integer	Read / Write	**0 = Calc ref density** 1 = Fix ref.density 2 = Ext. ref.density 3 = Ref. dens API 53	58
Ext. ref.density	2509 to 2510	Float	Read / Write	Floating point number with sign	58
Fix ref.density	5130 to 5131	Float	Read / Write	Positive floating-point number	58

Navigation: Expert → Sensor → Calculated value → Corr. vol.flow.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Ref. temperature	5136 to 5137	Float	Read / Write	−273.15 to 99 999 °C	59
Linear exp coeff	5132 to 5133	Float	Read / Write	Signed floating-point number	59
Square exp coeff	5134 to 5135	Float	Read / Write	Signed floating-point number	60

"Sensor adjustm." submenu

Navigation: Expert → Sensor → Sensor adjustm.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Install. direct.	5501	Integer	Read / Write	**0 = In arrow direct.** 1 = Against arrow	60

"Zero point adj." submenu

Navigation: Expert → Sensor → Sensor adjustm. → Zero point adj.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Zero point adj.	5121	Integer	Read / Write	**0 = Cancel** 1 = Start 2 = Zero adjust fail 8 = Busy	61
Progress	6797	Integer	Read	0 to 100 %	62

"Variable adjust" submenu

Navigation: Expert → Sensor → Sensor adjustm. → Variable adjust					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Mass flow offset	5521 to 5522	Float	Read / Write	Signed floating-point number	62
Mass flow factor	5519 to 5520	Float	Read / Write	Positive floating-point number	63
Vol. flow offset	5525 to 5526	Float	Read / Write	Signed floating-point number	63
Vol. flow factor	5523 to 5524	Float	Read / Write	Positive floating-point number	63
Density offset	5529 to 5530	Float	Read / Write	Signed floating-point number	64
Density factor	5527 to 5528	Float	Read / Write	Positive floating-point number	64
Corr. vol offset	2044 to 2045	Float	Read / Write	Signed floating-point number	64
Corr. vol factor	2076 to 2077	Float	Read / Write	Positive floating-point number	65
Ref.dens. offset	2046 to 2047	Float	Read / Write	Signed floating-point number	65
Ref.dens. factor	2042 to 2043	Float	Read / Write	Positive floating-point number	65
Temp. offset	5533 to 5534	Float	Read / Write	Signed floating-point number	66
Temp. factor	5531 to 5532	Float	Read / Write	Positive floating-point number	66

"Calibration" submenu

Navigation: Expert → Sensor → Calibration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Cal. factor	7513 to 7514	Float	Read	Signed floating-point number	67
Zero point	7527 to 7528	Float	Read / Write	Signed floating-point number	67

Navigation: Expert → Sensor → Calibration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Nominal diameter	2048 to 2057	String	Read	DNxx / x"	67
C0 to 5	0: 7501 to 7502 1: 7503 to 7504 2: 7505 to 7506 3: 7507 to 7508 4: 7509 to 7510 5: 7511 to 7512	Float	Read	Signed floating-point number	68

"Testpoints" submenu

Navigation: Expert → Sensor → Testpoints					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Osc. freq. 0 to 1	0: 9501 to 9502 1: 9503 to 9504	Float	Read	Positive floating point number	68
Freq. fluct. 0 to 1	0: 2498 to 2499 1: 2500 to 2501	Float	Read	Signed floating-point number	71
Osc. ampl. 0 to 1	0: 2449 to 2450 1: 2451 to 2452	Float	Read	Signed floating-point number	71
Osc. damping 0 to 1	0: 9505 to 9506 1: 9507 to 9508	Float	Read	Positive floating-point number	72
Damping fluct 0 to 1	0: 2502 to 2503 1: 2504 to 2505	Float	Read	Signed floating-point number	74
Signal asymmetry	2443 to 2444	Float	Read	Signed floating-point number	74
Electronic temp.	2457 to 2458	Float	Read	Signed floating-point number	75
Carr. pipe temp.	9513 to 9514	Float	Read	Signed floating-point number	76
Exc. current 0 to 1	0: 9509 to 9510 1: 9511 to 9512	Float	Read	Signed floating-point number	76
RawMassFlow	10232 to 10233	Float	Read	Signed floating-point number	76

6.3.3 "Communication" submenu

"Modbus config." submenu

Navigation: Expert → Communication → Modbus config.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Bus address	4910	Integer	Read / Write	1 to 247	78
Baudrate	4912	Integer	Read / Write	0 = 1200 BAUD 1 = 2400 BAUD 2 = 4800 BAUD 3 = 9600 BAUD **4 = 19200 BAUD** 5 = 38400 BAUD 6 = 57600 BAUD 7 = 115200 BAUD	78
Data trans. mode	4913	Integer	Read / Write	**0 = RTU** 1 = ASCII	79
Parity	4914	Integer	Read / Write	**0 = Even** 1 = Odd 2 = None/2 stop bits 3 = None/1 stop bit	79

Navigation: Expert → Communication → Modbus config.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Byte order	4915	Integer	Read / Write	0 = 0-1-2-3 1 = 3-2-1-0 2 = 2-3-0-1 **3 = 1-0-3-2**	80
Telegram delay	4916 to 4917	Float	Read / Write	0 to 100 ms	80
Assign diag. beh	4921	Integer	Read / Write	0 = Off 1 = Warning **2 = Alarm** 3 = Alarm or warning	80
Failure mode	4920	Integer	Read / Write	**0 = NaN value** 1 = Last valid value	81
Interpreter mode	4925	Integer	Read / Write	**0 = Standard** 1 = Ignore end bytes	81

"Modbus info" submenu

Navigation: Expert → Communication → Modbus info					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Device ID	2547	Integer	Read	4-digit hexadecimal number	82
Device revision	4481	Integer	Read	4-digit hexadecimal number	82

"Modbus data map" submenu

Navigation: Expert → Communication → Modbus data map					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Scan list reg.0 to 15	0: 5001 1: 5002 2: 5003 3: 5004 4: 5005 5: 5006 6: 5007 7: 5008 8: 5009 9: 5010 10: 5011 11: 5012 12: 5013 13: 5014 14: 5015 15: 5016	Integer	Read / Write	1 to 65 535	83

6.3.4 "Application" submenu

Navigation: Expert → Application					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Reset all tot.	2609	Integer	Read / Write	**0 = Cancel** 1 = Reset + totalize	83

"Totalizer 1 to n" submenu

Navigation: Expert → Application → Totalizer 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign variable	1: 2601 2: 2801 3: 3001	Integer	Read / Write	0 = Off **1 = Mass flow** 2 = Volume flow 3 = Correct.vol.flow 13 = Target mass flow * 14 = Carrier mass fl. *	84
Mass unit	1: 2602 2: 2802 3: 3002	Integer	Read / Write	0 = g **1 = kg** (+) 2 = t 3 = oz 4 = lb 5 = STon 6 = User mass	85
Volume unit	1: 2603 2: 2803 3: 3003	Integer	Read / Write	0 = cm^3 1 = dm^3 2 = m^3 3 = ml **4 = l** (+) 5 = hl 6 = Ml Mega 8 = af 9 = ft^3 10 = fl oz (us) 11 = gal (us) 12 = Mgal (us) 13 = bbl (us;liq.) 14 = bbl (us;beer) 15 = bbl (us;oil) 16 = bbl (us;tank) 17 = gal (imp) 18 = Mgal (imp) 19 = bbl (imp;beer) 20 = bbl (imp;oil) 21 = User vol. 22 = kgal (us)	85
Corr. vol. unit	1: 2604 2: 2804 3: 3004	Integer	Read / Write	**0 = Nl** (+) 1 = Nm^3 2 = Sm^3 3 = Sft^3 4 = Sl 5 = Sgal (us) 6 = Sbbl (us;liq.) 7 = Sgal (imp) 8 = UserCrVol.	86
Operation mode	1: 2605 2: 2805 3: 3005	Integer	Read / Write	**0 = Net flow total** 1 = Forward total 2 = Reverse total	87
Control Tot. 1 to n	1: 2608 2: 2808 3: 3008	Integer	Read / Write	**0 = Totalize** 1 = Reset + totalize 2 = Preset + hold 3 = Reset + hold 4 = Preset+totalize	87
Preset value 1 to n	1: 2590 to 2591 2: 2592 to 2593 3: 2594 to 2595	Float	Read / Write	Signed floating-point number	88
Failure mode	1: 2606 2: 2806 3: 3006	Integer	Read / Write	**0 = Stop** 1 = Actual value 2 = Last valid value	89

* Visibility depends on order options or device settings

6.3.5 "Diagnostics" submenu

Navigation: Expert → Diagnostics					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Actual diagnos.	2732	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	91
Timestamp	2719	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	91
Prev.diagnostics	2734	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	91
Timestamp	2068	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	92
Time fr. restart	2624	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	92
Operating time	2631	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	92

"Diagnostic list" submenu

Navigation: Expert → Diagnostics → Diagnostic list					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Diagnostics 1	2736	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	93
Timestamp	2710	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	93
Diagnostics 2	2738	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	94
Timestamp	2701	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	94
Diagnostics 3	2740	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	94
Timestamp	2692	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	95
Diagnostics 4	2742	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	95
Timestamp	2683	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	95
Diagnostics 5	2744	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	96
Timestamp	2675	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	96

"Event logbook" submenu

Navigation: Expert → Diagnostics → Event logbook					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Filter options	2639	Integer	Read / Write	0 = Failure (F) 4 = Mainten. req.(M) 8 = Funct. check (C) 12 = Out of spec. (S) 16 = Information (I) **255 = All**	97

"Device info" submenu

Navigation: Expert → Diagnostics → Device info					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Device tag	2026 to 2041	String	Read	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).	98
Serial number	7003 to 7007.5	String	Read	A maximum of 11-digit character string comprising letters and numbers.	98
Firmware version	7277 to 7280	String	Read	Character string in the format xx.yy.zz	98
Device name	7263 to 7270	String	Read	Max. 32 characters such as letters or numbers.	99
Order code	2058 to 2067	String	Read	Character string composed of letters, numbers and certain punctuation marks (e.g. /).	99
Ext. order cd. 1	2212 to 2221	String	Read	Character string	99
Ext. order cd. 2	2222 to 2231	String	Read	Character string	100
Ext. order cd. 3	2232 to 2241	String	Read	Character string	100
ENP version	4003 to 4010	String	Read	Character string	100
Config. counter	3100	Integer	Read	0 to 65 535	101

"Min/max val." submenu

Navigation: Expert → Diagnostics → Min/max val.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Reset min/max	2525	Integer	Read / Write	**0 = Cancel** 6 = Osc. ampl. 1 * 8 = Oscil. amplitude 9 = Tors.oscil.freq. * 10 = Oscil. damping 11 = Tors.oscil.damp. * 12 = Oscil. frequency 13 = Signal asymmetry	101

* Visibility depends on order options or device settings

"Electronic temp." submenu

Navigation: Expert → Diagnostics → Min/max val. → Electronic temp.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	2421 to 2422	Float	Read	Signed floating-point number	102
Maximum value	2419 to 2420	Float	Read	Signed floating-point number	102

"Medium temp." submenu

Navigation: Expert → Diagnostics → Min/max val. → Medium temp.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	7529 to 7530	Float	Read	Signed floating-point number	103
Maximum value	7531 to 7532	Float	Read	Signed floating-point number	103

"Carr. pipe temp." submenu

Navigation: Expert → Diagnostics → Min/max val. → Carr. pipe temp.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	7533 to 7534	Float	Read	Signed floating-point number	104
Maximum value	7535 to 7536	Float	Read	Signed floating-point number	104

"Oscil. frequency" submenu

Navigation: Expert → Diagnostics → Min/max val. → Oscil. frequency					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	2459 to 2460	Float	Read	Signed floating-point number	105
Maximum value	2468 to 2469	Float	Read	Signed floating-point number	105

"Tors.oscil.freq." submenu

Navigation: Expert → Diagnostics → Min/max val. → Tors.oscil.freq.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	2519 to 2520	Float	Read	Signed floating-point number	106
Maximum value	2517 to 2518	Float	Read	Signed floating-point number	106

"Oscil. amplitude" submenu

Navigation: Expert → Diagnostics → Min/max val. → Oscil. amplitude					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	2472 to 2473	Float	Read	Signed floating-point number	107
Maximum value	2470 to 2471	Float	Read	Signed floating-point number	107

"Tor. osc. amp." submenu

Navigation: Expert → Diagnostics → Min/max val. → Tor. osc. amp.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	2515 to 2516	Float	Read	Signed floating-point number	107
Maximum value	2480 to 2481	Float	Read	Signed floating-point number	108

"Oscil. damping" submenu

Navigation: Expert → Diagnostics → Min/max val. → Oscil. damping					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	2478 to 2479	Float	Read	Signed floating-point number	108
Maximum value	2423 to 2424	Float	Read	Signed floating-point number	108

"Tors.oscil.damp." submenu

Navigation: Expert → Diagnostics → Min/max val. → Tors.oscil.damp.					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	2523 to 2524	Float	Read	Signed floating-point number	109
Maximum value	2521 to 2522	Float	Read	Signed floating-point number	109

"Signal asymmetry" submenu

Navigation: Expert → Diagnostics → Min/max val. → Signal asymmetry					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Minimum value	2474 to 2475	Float	Read	Signed floating-point number	110
Maximum value	2476 to 2477	Float	Read	Signed floating-point number	110

"Simulation" submenu

Navigation: Expert → Diagnostics → Simulation					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign proc.var.	6813	Integer	Read / Write	**0 = Off** 1 = Mass flow 2 = Volume flow 3 = Correct.vol.flow 4 = Density 5 = Ref.density 7 = Temperature 9 = Dynam. viscosity * 10 = Kinematic visc. * 11 = TempCompDynVisc * 12 = TempCompKinVisc * 13 = Target mass flow * 14 = Carrier mass fl. * 15 = Concentration *	111
Value proc. var.	6814 to 6815	Float	Read / Write	Depends on the process variable selected	111
Sim. alarm	6812	Integer	Read / Write	**0 = Off** 1 = On	112

* Visibility depends on order options or device settings

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