Description of Device Parameters
Dosimass
Modbus RS485

Coriolis flowmeter

Menu/Variable
⊞ 📂 Proline Device
┆ P▭ Access status tooling:
⊞ 📁 Operation
⊞ 📁 Setup
⊞ 📁 Diagnostics
⊟ 📂 Expert
┆ P▭ Locking status:
┆ P▭ Access status tooling:
┆ P▭ Enter access code:
⊞ 📁 System
⊞ 📁 Sensor
⊞ 📁 Input
⊞ 📁 Output
⊞ 📁 Communication
⊞ 📁 Application
⊞ 📁 Diagnostics
< ┆┆┆ >

Endress+Hauser

People for Process Automation
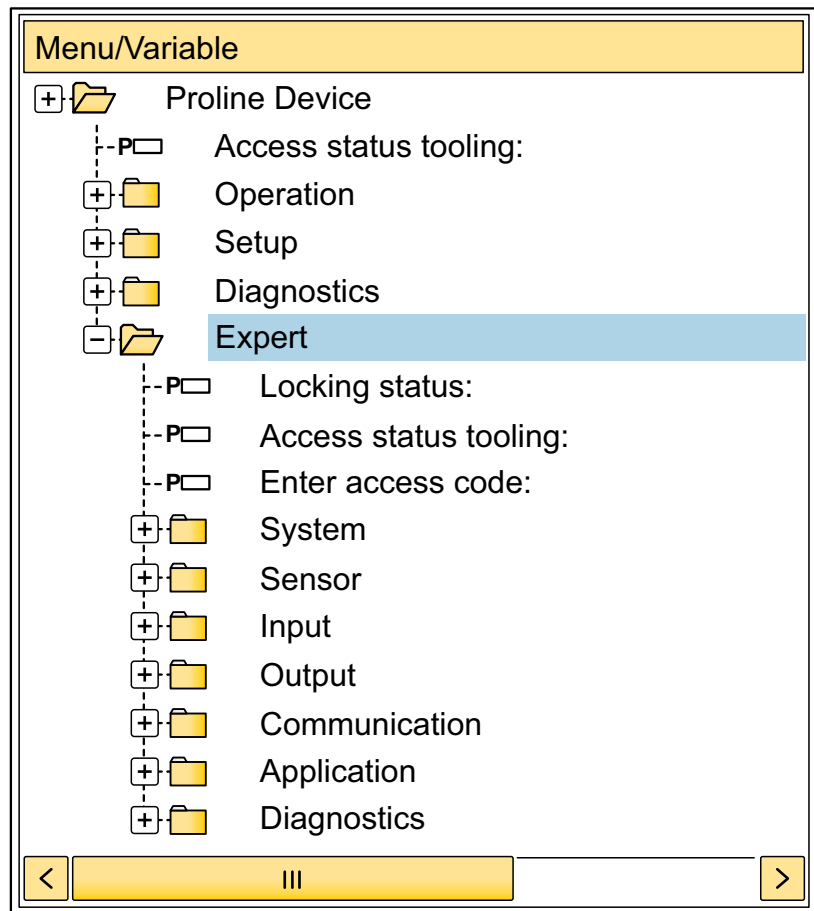
Table of contents

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.
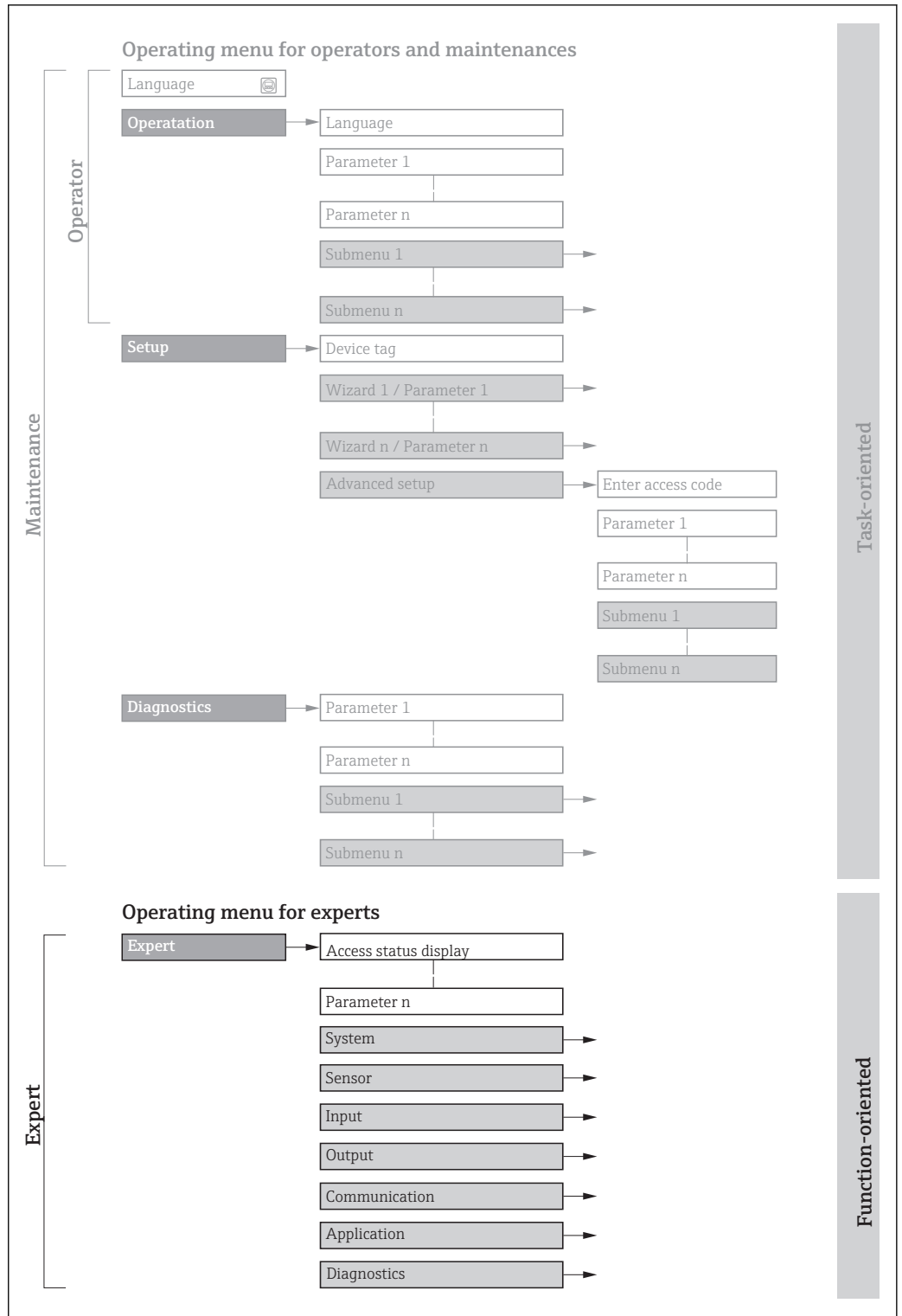
🖾 1   Sample graphic for the schematic layout of the operating menu

📖 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
Dosimass	BA01320D

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.

3   Description of device parameters

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

⌖ Expert		
Locking status	→ 🕮	10
Access stat.tool	→ 🕮	11
Ent. access code	→ 🕮	11
▶ System	→ 🕮	11
▶ Sensor	→ 🕮	19
▶ Input	→ 🕮	52
▶ Communication	→ 🕮	54
▶ Application	→ 🕮	61
▶ Diagnostics	→ 🕮	83

Locking status

Navigation	▫ Expert → Locking status
Description	Displays the active write protection.
User interface	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.

📖   Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device

Selection

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

Access 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*

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.

Display

📖   Detailed information on access authorization is provided in the "User roles and
associated access authorization" and "Operating concept" sections of the Operations
Instructions for the device

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

3.1   "System" submenu

Navigation   ▣   Expert → System

▶ System	
▶ Diagn. handling	→ 🖹 12
▶ Administration	→ 🖹 18

3.1.1   "Diagn. handling" submenu

Navigation   ▣   Expert → System → Diagn. handling

```
▸ Diagn. handling

                    Alarm delay                                    → 🖺 12

                    ▸ Diagn. behavior                              → 🖺 13
```
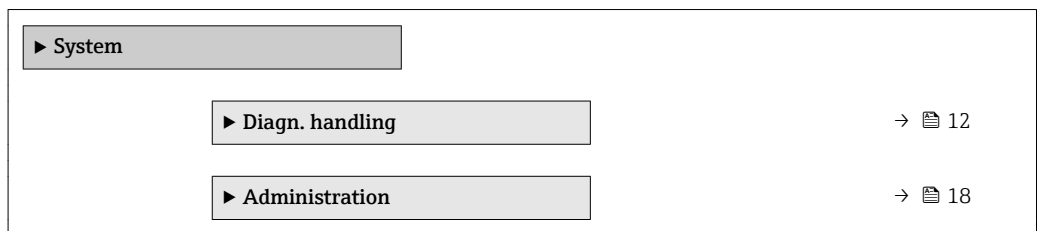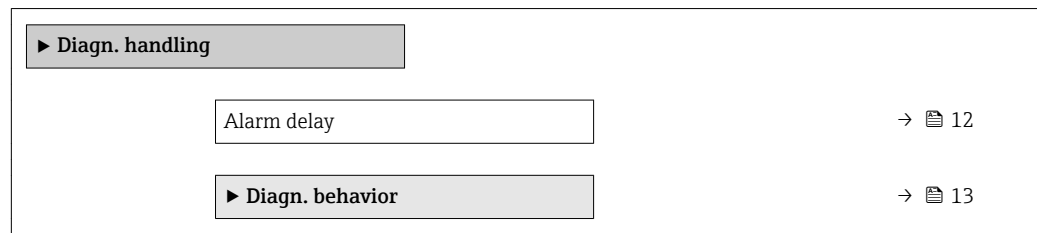
Alarm delay   🔒

Navigation   ▣   Expert → System → Diagn. handling → Alarm delay

Description   Use this function to enter the time interval until the device generates a diagnostic
                           message.

                           ℹ   The diagnostic message is reset without a time delay.

User entry   0 to 60 s

Factory setting   0 s

Additional information *Description*

                           This setting affects the following diagnostic messages:
                           • 022 Sensor temp.
                           • 046 Sensor limit
                           • 062 Sensor connect.
                           • 082 Data storage
                           • 083 Memory content
                           • 140 Sensor signal
                           • 190 Special event 1
                           • 191 Special event 5
                           • 192 Special event 9
                           • 270 Main electronic
                           • 271 Main electronic
                           • 273 Main electronic
                           • 274 Main electronic
                           • 311 Electr. failure
                           • 453 Flow override
                           • 834 Process temp.
                           • 835 Process temp.
                           • 862 Partly filled
                           • 912 Medium inhomog.
                           • 913 Medium unsuitab.
                           • 948 Tube damp. high
                           • 990 Special event 4
                           • 991 Batch time
                           • 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 (→ 🗎 92).
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

▸ Diagn. behavior	
Diagnostic no. 140	→ 🗎 14
Diagnostic no. 046	→ 🗎 14
Diagnostic no. 834	→ 🗎 14
Diagnostic no. 835	→ 🗎 15
Diagnostic no. 912	→ 🗎 15
Diagnostic no. 913	→ 🗎 15
Diagnostic no. 192	→ 🗎 16
Diagnostic no. 274	→ 🗎 16
Diagnostic no. 392	→ 🗎 16
Diagnostic no. 592	→ 🗎 17
Diagnostic no. 992	→ 🗎 17
Diagnostic no. 991	→ 🗎 17

Diagnostic no. 140 (Sensor sig.asym.)   ⬚

Navigation	⬚ Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 140
Description	Option for changing the diagnostic behavior of the diagnostic message **140 Sensor sig.asym.**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning
Additional information	ℹ Detailed description of the options available for selection: → 🖺 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	ℹ Detailed description of the options available for selection: → 🖺 13→ 🖺 13

Diagnostic no. 834 (Process temp.)   ⬚

Navigation	⬚ Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834
Description	Option for changing the diagnostic behavior of the diagnostic message **834 Process temp.**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning
Additional information	ℹ Detailed description of the options available for selection: → 🖺 13→ 🖺 13

Diagnostic no. 835 (Process temp.)   🔒

Navigation	▣ Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835
Description	Option for changing the diagnostic behavior of the diagnostic message **835 Process temp.**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning
Additional information	🛈 Detailed description of the options available for selection: → 🖺 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	🛈 Detailed description of the options available for selection: → 🖺 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	🛈 Detailed description of the options available for selection: → 🖺 13→ 🖺 13

Diagnostic no. 192 (Special event 9)

Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 192
Description	Use this function to change the diagnostic behavior of the diagnostic message **192 Special event 9**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning
Additional information	Detailed description of the options available for selection: → 🖹 13→ 🖹 13

Diagnostic no. 374 (Sensor electron.)

Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 274
Description	Option for changing the diagnostic behavior of the diagnostic message **374 Sensor electron.**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning
Additional information	Detailed description of the options available for selection: → 🖹 13→ 🖹 13

Diagnostic no. 392 (Special event 10)

Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 392
Description	Use this function to change the diagnostic behavior of the diagnostic message **392 Special event 10**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning
Additional information	Detailed description of the options available for selection: → 🖹 13→ 🖹 13

Diagnostic no. 592 (Special event 11) 🔒

Navigation	▤ Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 592
Description	Use this function to change the diagnostic behavior of the diagnostic message **592 Special event 11**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning
Additional information	🛈 Detailed description of the options available for selection: → 🖺 13→ 🖺 13

Diagnostic no. 992 (Special event 12) 🔒

Navigation	▤ Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 992
Description	Use this function to change the diagnostic behavior of the diagnostic message **992 Special event 12**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning
Additional information	🛈 Detailed description of the options available for selection: → 🖺 13→ 🖺 13

Diagnostic no. 991 (Batch time) 🔒

Navigation	▤ Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 991
Description	Use this function to change the diagnostic behavior of the diagnostic message **991 Batch time**.
Selection	• Off • Alarm • Warning • Logbook only
Factory setting	Warning

Additional information   ℹ️   Detailed description of the options available for selection: → 🖹 13→ 🖹 13

3.1.2 "Administration" submenu

Navigation   🖳   Expert → System → Administration

▸ Administration	
Device reset	→ 🖹 18
Perm. storage	→ 🖹 18
Device tag	→ 🖹 19

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 delivery set.
                      • Restart device

Factory setting   Cancel

Additional information   *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
To delivery set.	All the parameters are reset to their factory settings.
Restart device	The restart resets every parameter whose data are in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.

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

Factory setting	Dosimass

3.2   "Sensor" submenu

Navigation   🖥   Expert → Sensor

‣ Sensor	
‣ Measured val.	→ 🖺 20
‣ System units	→ 🖺 24
‣ Process param.	→ 🖺 32
‣ Sensor adjustm.	→ 🖺 41
‣ Calibration	→ 🖺 46
‣ Testpoints	→ 🖺 47
‣ Supervision	→ 🖺 51

3.2.1   "Measured val." submenu

Navigation   ⊟   Expert → Sensor → Measured val.

▶ Measured val.	
▶ Process variab.	→ 🗎 20
▶ Totalizer	→ 🗎 21
▶ Input values	→ 🗎 23

"Process variab." submenu

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

▶ Process variab.	
Mass flow	→ 🗎 20
Volume flow	→ 🗎 20
Density	→ 🗎 21
Temperature	→ 🗎 21

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 (→ 🗎 24)

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	*Description*
	The volume flow is calculated from the mass flow currently measured and the density currently measured.
	Dependency
	ℹ️ The unit is taken from the **Volume flow unit** parameter (→ 🕮 25)

Density

Navigation	🖵 Expert → Sensor → Measured val. → Process variab. → Density
Description	Displays the density currently measured.
User interface	Signed floating-point number
Additional information	*Dependency*
	ℹ️ The unit is taken from the **Density unit** parameter (→ 🕮 28)

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*
	ℹ️ The unit is taken from the **Temperature unit** parameter (→ 🕮 28)

Totalizer

Navigation   🖵   Expert → Sensor → Measured val. → Totalizer

▸ Totalizer	
Totalizer val. 1 to n	→ 🕮 22
Tot. overflow 1 to n	→ 🕮 22

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 (→ 🖺 62) of the **Totalizer 1 to n** submenu: • Volume flow • Mass flow
Description	Displays the current totalizer reading.
User interface	Signed floating-point number
Additional information	*Description* As it is only possible to display a maximum of 7 digits in the operating tool, the current counter value is the sum of the totalizer value and the overflow value from the **Tot. overflow 1 to n** parameter if the display range is exceeded. ℹ️ In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 🖺 66). *Display* 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 (→ 🖺 64). ℹ️ The unit of the selected process variable is specified for the totalizer depending on the selection made in the **Assign variable** parameter (→ 🖺 62): • **Volume flow** option: **Volume flow unit** parameter (→ 🖺 25) • **Mass flow** option: **Mass flow unit** parameter (→ 🖺 24) *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 (→ 🖺 62) of the **Totalizer 1 to n** submenu: • Volume flow • Mass flow
Description	Displays the current totalizer overflow.
User interface	Integer with sign

Additional information	*Description*

If the current totalizer reading exceeds 7 digits, which is the maximum value range that can be displayed by the operating tool, the value above this range is output as an overflow. The current totalizer value is therefore the sum of the overflow value and the totalizer value from the **Totalizer val. 1 to n** parameter.

Display

The unit of the selected process variable is specified for the totalizer depending on the selection made in the **Assign variable** parameter (→ 🖹 62):
- **Volume flow** option: **Volume flow unit** parameter (→ 🖹 25)
- **Mass flow** option: **Mass flow unit** parameter (→ 🖹 24)

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: $1\,968\,457\ \text{m}^3$
- Value in the **Tot. overflow 1** parameter: $2 \cdot 10^7$ (2 overflows) = $20\,000\,000\ [\text{m}^3]$
- Current totalizer reading: $21\,968\,457\ \text{m}^3$

"Input values" submenu

Navigation   🖳   Expert → Sensor → Measured val. → Input values

▸ **Input values**	
Val. status inp.	→ 🖹 23
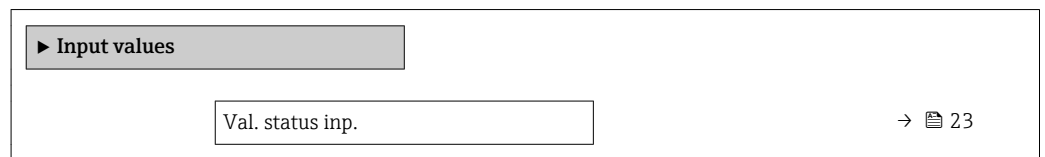
Val. status inp.

Navigation	🖳 Expert → Sensor → Measured val. → Input values → Val. status inp.
Description	Displays the current input signal level.
User interface	• High • Low

3.2.2 "System units" submenu

Navigation   ▣   Expert → Sensor → System units

▶ System units	
Mass flow unit	→ 🖺 24
Mass unit	→ 🖺 25
Volume flow unit	→ 🖺 25
Volume unit	→ 🖺 27
Density unit	→ 🖺 28
Temperature unit	→ 🖺 28
Date/time format	→ 🖺 29
▶ User-spec. units	→ 🖺 29

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:
- g/s
- oz/s

Additional information	*Result*

The selected unit applies for:
- **RawMassFlow** parameter (→ 🗎 51)
- **Mass flow** parameter (→ 🗎 20)

Selection

ℹ️ For an explanation of the abbreviated units: → 🗎 102

Customer-specific units

ℹ️ The unit for the customer-specific mass is specified in the **Mass text** parameter (→ 🗎 30).

Mass unit 🔒

Navigation	▣ Expert → Sensor → System units → Mass unit
Description	Use this function to select the unit for the mass.

Selection	*SI units*	*US units*
	▪ g	▪ oz
	▪ kg	▪ lb
	▪ t	▪ STon
	Custom-specific units	
	User mass	

Factory setting	Country-specific:
	▪ kg
	▪ lb

Factory setting	Country-specific:
	▪ g
	▪ oz

Additional information	*Selection*

ℹ️ For an explanation of the abbreviated units: → 🗎 102

Customer-specific units

ℹ️ The unit for the customer-specific mass is specified in the **Mass text** parameter (→ 🗎 30).

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
- cm³/s
- cm³/min
- cm³/h
- cm³/d
- dm³/s
- dm³/min
- dm³/h
- dm³/d
- m³/s
- m³/min
- m³/h
- m³/d
- ml/s
- ml/min
- ml/h
- ml/d
- l/s
- l/min
- l/h
- l/d
- hl/s
- hl/min
- hl/h
- hl/d
- Ml/s
- Ml/min
- Ml/h
- Ml/d

US units
- af/s
- af/min
- af/h
- af/d
- ft³/s
- ft³/min
- ft³/h
- ft³/d
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)
- gal/s (us)
- gal/min (us)
- gal/h (us)
- gal/d (us)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)
- Mgal/s (us)
- Mgal/min (us)
- Mgal/h (us)
- Mgal/d (us)
- bbl/s (us;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:
- ml/s
- fl oz/s (us)

Additional information   *Result*

                          The selected unit applies for:
                          Volume flow parameter (→ 🖺 20)

                          Selection

                          🛈 For an explanation of the abbreviated units: → 🖺 102

                          Customer-specific units

                          🛈 The unit for the customer-specific volume is specified in the **Volume text** parameter
                          (→ 🖺 31).

Volume unit	🔒

Navigation   🖿 Expert → Sensor → System units → Volume unit

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

Selection   *SI units*   *US units*   *Imperial units*
                         • cm³   • af   • gal (imp)
                         • dm³   • ft³   • Mgal (imp)
                         • m³   • fl oz (us)   • bbl (imp;beer)
                         • ml   • gal (us)   • bbl (imp;oil)
                         • l   • kgal (us)
                         • hl   • Mgal (us)
                         • Ml Mega   • bbl (us;oil)
                                                      • bbl (us;liq.)
                                                      • bbl (us;beer)
                                                      • bbl (us;tank)

                         Custom-specific units
                         User vol.

Factory setting   Country-specific:
                         • l
                         • gal (us)

Factory setting   Country-specific:
                         • ml
                         • fl oz (us)

Additional information   *Selection*

                         🛈 For an explanation of the abbreviated units: → 🖺 102

                         Customer-specific units

                         🛈 The unit for the customer-specific volume is specified in the **Volume text** parameter
                         (→ 🖺 31).

Density unit	⌾

Navigation	⊟ Expert → Sensor → System units → Density unit

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

Selection	*SI units*	*US units*	*Imperial units*
	• g/cm³	• lb/ft³	• lb/gal (imp)
	• g/m³	• lb/gal (us)	• lb/bbl (imp;beer)
	• g/ml	• lb/bbl (us;liq.)	• lb/bbl (imp;oil)
	• kg/dm³	• lb/bbl (us;beer)	
	• kg/l	• lb/bbl (us;oil)	
	• kg/m³	• lb/bbl (us;tank)	
	• SD4℃		
	• SD15℃		
	• SD20℃		
	• SG4℃		
	• SG15℃		
	• SG20℃		
	Custom-specific units		
	User dens.		

Factory setting	Country-specific:
	• kg/l
	• g/cm³

Additional information	*Result*
	The selected unit applies for:
	Density parameter (→ 🖺 21)
	Selection
	• SD = specific density
	The specific density is the ratio of the medium density to the water density at a water temperature of +4 ℃ (+39 ℉), +15 ℃ (+59 ℉), +20 ℃ (+68 ℉).
	• SG = specific gravity
	The specific gravity is the ratio of the medium density to the water density at a water temperature of +4 ℃ (+39 ℉), +15 ℃ (+59 ℉), +20 ℃ (+68 ℉).
	ℹ️ For an explanation of the abbreviated units: → 🖺 102
	Customer-specific units
	ℹ️ The unit for the customer-specific density is specified in the **Density text** parameter (→ 🖺 31).

Temperature unit	⌾

Navigation	⊟ Expert → Sensor → System units → Temperature unit

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

Selection	*SI units*	*US units*
	▪ ℃	▪ ℉
	▪ K	▪ ℉R

Factory setting   Country-specific:
▪ ℃
▪ ℉

Additional information   *Result*

The selected unit applies for:
▪ **Maximum value** parameter (→ 🕮 97)
▪ **Minimum value** parameter (→ 🕮 97)
▪ **Temperature** parameter (→ 🕮 21)

Selection

ℹ️ For an explanation of the abbreviated units: → 🕮 102

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*

ℹ️ For an explanation of the abbreviated units: → 🕮 102

"User-spec. units" submenu

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

▸ **User-spec. units**		
	Mass text	→ 🕮 30
	Mass factor	→ 🕮 30
	Volume text	→ 🕮 31

Volume factor	→ 🖺 31
Density text	→ 🖺 31
Density offset	→ 🖺 32
Density factor	→ 🖺 32

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 (→ 🖺 24)
> • **Mass unit** parameter (→ 🖺 25)

Example

If the text CENT for "centner" is entered, the following options are displayed in the picklist for the **Mass flow unit** parameter (→ 🖺 24):
- 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 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*

ℹ The defined unit is shown as an option in the choose list of the following parameters:
- **Volume flow unit** parameter (→ 🗎 25)
- **Volume unit** parameter (→ 🗎 27)

Example

If the text GLAS is entered, the choose list of the **Volume flow unit** parameter (→ 🗎 25) 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 for the user-specific volume and 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*

ℹ️ The defined unit is shown as an option in the choose list of the **Density unit** parameter (→ 🖺 28).

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.

ℹ️ Value in user-specific unit = (factor × value in kg/m^3) + 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

3.2.3   "Process param." submenu

Navigation   ▣   Expert → Sensor → Process param.

▸ Process param.		
Flow damping		→ 🖺 33
Density damping		→ 🖺 33
Temp. damping		→ 🖺 34
Flow override		→ 🖺 34

► Low flow cut off	→ 🗏 35
► Partial pipe det	→ 🗏 38

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*

ℹ️
- The damping is performed by a PT1 element [1].
- Flow damping is not recommended (entry 0 s) for very short batches with a batch time t_{fill} < 5 s.

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

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

Result

ℹ️ The damping affects the following variables of the device:
- Low flow cut off → 🗏 35
- Totalizer → 🗏 62

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

---

1)   Proportional behavior with first-order lag

Additional information	*Description*
	ℹ The damping is performed by a PT1 element [2].
	ℹ Density damping is not relevant for most applications.

User entry

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

ℹ 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*
	ℹ The damping is performed by a PT1 element [3].
	ℹ Temperature damping is not relevant for most applications.

User entry

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

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

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

---

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

Additional information   *Result*

This setting affects all the functions of the measuring device.

Positive zero return is not relevant for most applications.

Description

The mass flow and therefore also the volume flow are set to **0**.

Flow override is active
- The diagnostic message diagnostic message △**C453 Flow override** is displayed.
- Output values
  – Output: 0
  – Temperature: continues to be output
  – Totalizers 1-3: stop being totalized

The **Flow override** option can also be activated in the **Status input** submenu: **Assign stat.inp.** parameter (→ 🖺 53).

"Low flow cut off" submenu

Low flow cut off is an important function for many applications to shut out inherent noise from the measuring device and the application in the lower measuring range. If the flow drops below a certain minimum value, the value is set to **0** so that the flow signal can be kept at the zero point between two batches.

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

► Low flow cut off	
Assign variable	→ 🖺 35
On value	→ 🖺 36
Off value	→ 🖺 36
Pres. shock sup.	→ 🖺 37

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

Factory setting	Mass flow

Additional information	*Description*
	As soon as low flow cut off is activated, the mass flow and volume flow are forced to adopt the value 0, regardless of the option selected.

On value   🔒

Navigation	☐ Expert → Sensor → Process param. → Low flow cut off → On value
Prerequisite	A process variable is selected in the **Assign variable** parameter (→ 🖺 35).
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 → 🖺 36.
User entry	Positive floating-point number
Factory setting	For liquids: depends on country and nominal diameter → 🖺 100
Additional information	*Dependency*
	The unit depends on the process variable selected in the **Assign variable** parameter (→ 🖺 35).

Off value   🔒

Navigation	☐ Expert → Sensor → Process param. → Low flow cut off → Off value
Prerequisite	A process variable is selected in the **Assign variable** parameter (→ 🖺 35).
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→ 🖺 36.
User entry	0 to 100.0 %
Factory setting	50 %
Additional information	*Example*
	• **On value** parameter (→ 🖺 36): 2 g/s • **Off value** parameter (→ 🖺 36): 50 % • Switch-off value: 3 g/s
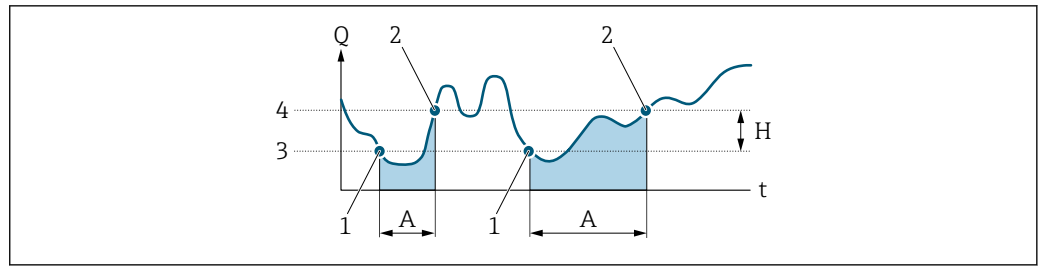
A0012887

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   A process variable is selected in the **Assign variable** parameter (→ 🖺 35).

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.
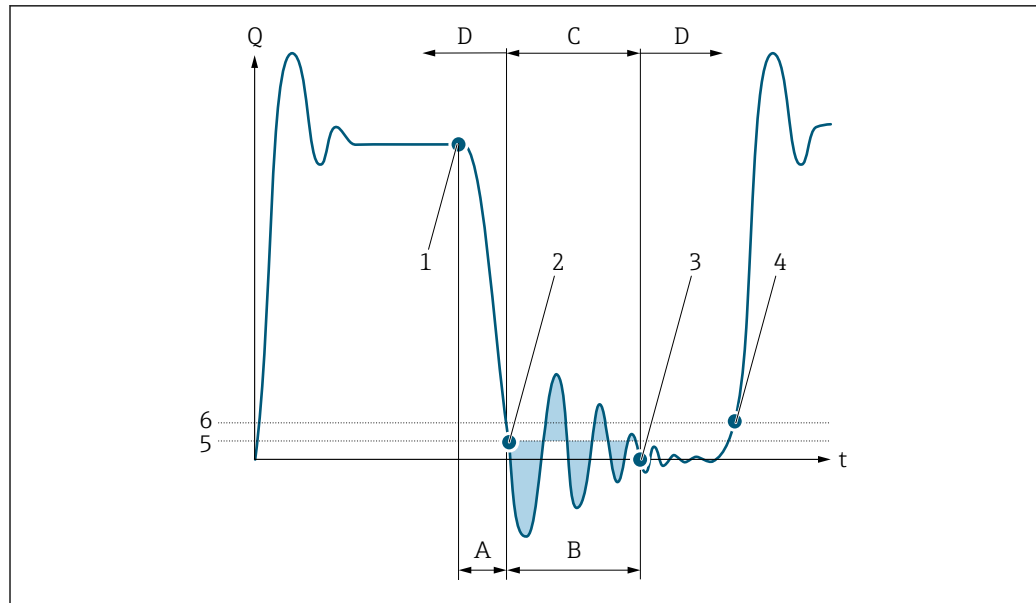
A0012888

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

Using density measurement, the measuring device can monitor whether the measuring pipe is empty or only partially filled. Therefore partially filled pipe monitoring is an important function for many applications.

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

▶ **Partial pipe det**	
Assign variable	→ 🗎 39
Low value	→ 🗎 39
High value	→ 🗎 39
Response time	→ 🗎 40
Max. damping	→ 🗎 40

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.
Selection	• Off • Density
Factory setting	Off

Low value	🔒

Navigation	⊟ Expert → Sensor → Process param. → Partial pipe det → Low value
Prerequisite	A process variable is selected in the **Assign variable** parameter (→ 🖺 39).
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	Country-specific: • 200 kg/m³ • 12.5 lb/ft³
Additional information	*User entry* The lower limit value must be less than the upper limit value defined in the **High value** parameter (→ 🖺 39). ℹ The unit depends on the process variable selected in the **Assign variable** parameter (→ 🖺 39). *Limit value* ℹ If the displayed value is outside the limit value, the measuring device displays the diagnostic message ⚠**S862 Partly filled**.

High value	🔒

Navigation	⊟ Expert → Sensor → Process param. → Partial pipe det → High value
Prerequisite	A process variable is selected in the **Assign variable** parameter (→ 🖺 39).
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	Country-specific: • 6 000 kg/m³ • 374.6 lb/ft³

Additional information	*Description*
	ⓘ Not relevant to most applications.
	User entry
	The upper limit value must be greater than the lower limit value defined in the **Low value** parameter (→ 🖹 39).
	ⓘ The unit depends on the process variable selected in the **Assign variable** parameter (→ 🖹 39).
	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	A process variable is selected in the **Assign variable** parameter (→ 🖹 39).
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	In the **Assign variable** parameter (→ 🖹 39), the **Density** option is selected.
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 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.

ℹ️ Not relevant to most applications.

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   "Sensor adjustm." submenu

Navigation   ▤   Expert → Sensor → Sensor adjustm.

▸ Sensor adjustm.		
	Install. direct.	→ 🕮 41
	▸ Zero point adj.	→ 🕮 42
	▸ Variable adjust	→ 🕮 43

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*

ℹ️ 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

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

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

▶ Zero point adj.		
	Zero point adj.	→ 🕮 42
	Progress	→ 🕮 43
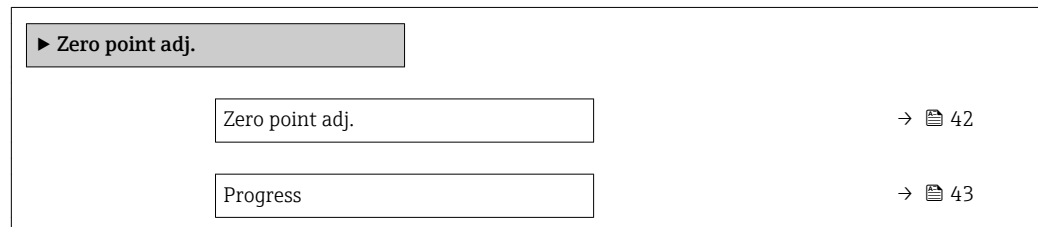
Zero point adj.   🔒

Navigation	🖳 Expert → Sensor → Sensor adjustm. → Zero point adj. → Zero point adj.
Description	Use this function to select the start of the zero point adjustment.
	ℹ️ Observe conditions → 🕮 42.
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

▶ Variable adjust		
	Mass flow offset	→ 🖺 43
	Mass flow factor	→ 🖺 44
	Vol. flow offset	→ 🖺 44
	Vol. flow factor	→ 🖺 44
	Density offset	→ 🖺 45
	Density factor	→ 🖺 45
	Temp. offset	→ 🖺 45
	Temp. factor	→ 🖺 46

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*

ℹ️ 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 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*
	ℹ️ 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 m³/s.
User entry	Signed floating-point number
Factory setting	0 m³/s
Additional information	*Description*
	ℹ️ 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 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*
	ℹ️ 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/m³.
User entry	Signed floating-point number
Factory setting	0 kg/m³
Additional information	*Description*

    ℹ️ 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*

    ℹ️ 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*

    ℹ️ 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

3.2.5   "Calibration" submenu

  • The Cal. factor (→ 🖺 46) and the Zero point (→ 🖺 47) display the values that were determined during the factory calibration of the mass flow.
  • C0 to 5 (→ 🖺 47) displays the values that were determined during the factory calibration of the density.
  • The volume flow is calculated using the mass flow and the density.

Navigation   ⊡   Expert → Sensor → Calibration

► Calibration	
Cal. factor	→ 🖺 46
Zero point	→ 🖺 47
Nominal diameter	→ 🖺 47
C0 to 5	→ 🖺 47

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*

ℹ 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

3.2.6   "Testpoints" submenu

ℹ • The **Testpoints** submenu (→ 🖺 47) 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

► Testpoints		
Osc. freq. 0 to 1	→ 🕮	48
Freq. fluct. 0 to 1	→ 🕮	49
Osc. ampl. 0 to 1	→ 🕮	49
Osc. damping 0 to 1	→ 🕮	49
Damping fluct 0 to 1	→ 🕮	50
Signal asymmetry	→ 🕮	50
Exc. current 0 to 1	→ 🕮	51
RawMassFlow	→ 🕮	51

Osc. freq. 0 to 1

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

Prerequisite   The values for this parameter are defined for the Promass I and Promass Q product versions.

Description   Displays the current oscillation frequency.

User interface   Positive floating point number

Additional information   *Typical values*

ℹ️ The resonance frequency values indicated below are typical values and only serve as a guide.

DN		f_{Air}	f_{Water}
[mm]	[in]	[Hz]	[Hz]
8	$^3/_8$	569	515
15	½	687	594
25	1	825	697

Checking the sensor

1. Fill the measuring tube with water (at ambient temperature and a pressure of 15 psi).

2. Compare the current measured value with the values on the calibration report.
   ↳ A deviation of ±0.5 Hz is not typical and can indicate deposit buildup in the measuring tube, corrosion or abrasion.

Freq. fluct. 0 to 1

Navigation	▣ Expert → Sensor → Testpoints → Freq. fluct. 0 to 1
Prerequisite	The values for this parameter are defined for the Promass I and Promass Q product versions.
Description	Displays the current frequency fluctuation.
User interface	Signed floating-point number
Additional information	*Typical values*

- Low fluctuation < 0.001: homogeneous medium
- High fluctuation > 0.1: inhomogeneous medium

Osc. ampl. 0 to 1

Navigation	▣ Expert → Sensor → Testpoints → Osc. ampl. 0 to 1
Prerequisite	The values for this parameter are defined for the Promass I and Promass Q product versions.
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).

This value can be very low under extreme conditions. If the value is halved, the repeatability rate is twice as bad.

Limit values

5 %

Osc. damping 0 to 1

Navigation	▣ Expert → Sensor → Testpoints → Osc. damping 0 to 1
Prerequisite	The values for this parameter are defined for the Promass I and Promass Q product versions.
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 current. Oscillation damping is the ratio between the excitation current and the absolute oscillation amplitude.

Example

0.002 A/12.5 µm = 160 A/m

Typical values

- Low oscillation damping < 500 A/m: homogeneous medium
- High oscillation damping > 1 000 A/m: inhomogeneous medium

Damping fluct 0 to 1

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

Prerequisite	The values for this parameter are defined for the Promass I and Promass Q product versions.

Description	Displays the current fluctuation of tube damping.

User interface	Signed floating-point number

Additional information	*Typical values*

- Low fluctuation < 1: homogeneous medium
- High fluctuation > 10: inhomogeneous medium

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.

Typical value

- ±10 %
- A change > ±10 % can indicate deposit buildup in the measuring tubes, corrosion or abrasion.

Exc. current 0 to 1

Navigation	🖥 Expert → Sensor → Testpoints → Exc. current 0 to 1
Prerequisite	The values for this parameter are defined for the Promass I and Promass Q product versions.
Description	Displays the effective excitation current.
User interface	Signed floating-point number
Additional information	**NOTICE!**

The maximum available excitation current has been reached when the oscillation amplitude shown is less than 100 %.

Typical values

- Low excitation current < 5 mA: homogeneous medium
- High excitation current of 25 mA: inhomogeneous medium

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

ℹ The unit is taken from the **Mass flow unit** parameter (→ 🖺 24)

3.2.7 "Supervision" submenu

Navigation   🖥   Expert → Sensor → Supervision

▶ Supervision	
Limit tube damp.	→ 🖺 52
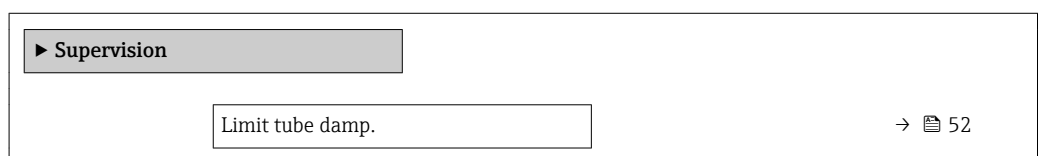
Limit tube damp.	🔒

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   "Input" submenu

Navigation   ⊟   Expert → Input

▶ **Input**		
	▶ Status input	→ 🗎 52

3.3.1   "Status input" submenu

Navigation   ⊟   Expert → Input → Status input

▶ **Status input**		
	Assign stat.inp.	→ 🗎 53
	Val. status inp.	→ 🗎 53
	Active level	→ 🗎 54
	Response time	→ 🗎 54

Assign stat.inp.	🔒

Navigation	🖥 Expert → Input → Status input → Assign stat.inp.

Prerequisite	Start condition for a batching process: • There is no diagnostic message from the **Alarm** category. • The batch quantity must be > **0**. • In the **SwitchOutFunct** parameter (→ 🖳 72), the **Batching** option is selected.

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

Selection	• Off • Start batch • Start&stop batch • Reset totaliz. 1 • Reset totaliz. 2 • Reset totaliz. 3 • Reset all tot. • Flow override

Factory setting	Off

Additional information	*Selection*
	• Off The status input is switched off. • Start batch A pulse initiates a batching process if there is none running and if the other start conditions have also been met. • Start&stop batch A pulse either initiates a batching process if none is running and if the other start conditions have also been met, or it stops an ongoing batching process. A new drip quantity and a new drip correction quantity are not calculated in this case (averaging and single outliers). • Reset totaliz. 1...3 The individual totalizers are reset. • Reset all tot. All totalizers are reset. • Flow override The Flow override (→ 🖳 34) is activated.
	ℹ Note on the Flow override (→ 🖳 34): • The Flow override (→ 🖳 34) is enabled as long as the level is at the status input (continuous signal). • All other assignments react to a change in level (pulse) at the status input.

Val. status inp.	

Navigation	🖥 Expert → Input → Status input → Val. status inp.

Description	Displays the current input signal level.

User interface	• High • Low

Active level	⌂

Navigation	⊟ Expert → Input → Status input → Active level
Description	Use this function to determine the input signal level at which the assigned function is activated.
Selection	• High • Low
Factory setting	High

Response time	⌂

Navigation	⊟ Expert → Input → Status input → Response time
Description	Use this function to enter the minimum time period for which the input signal level must be present before the selected function is activated.
User entry	10 to 200 ms
Factory setting	50 ms

3.4   "Communication" submenu

Navigation   ⊟   Expert → Communication

▶ Communication	
▶ Modbus config.	→ 🕮 54
▶ Modbus info	→ 🕮 60
▶ Modbus data map	→ 🕮 60

3.4.1   "Modbus config." submenu

Navigation   ⊟   Expert → Communication → Modbus config.

▶ Modbus config.	
Bus address	→ 🕮 55
Baudrate	→ 🕮 55

Data trans. mode	→ 🗎 56
Parity	→ 🗎 56
Byte order	→ 🗎 56
Telegram delay	→ 🗎 58
Assign diag. beh	→ 🗎 58
Failure mode	→ 🗎 59
Interpreter mode	→ 🗎 59

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

Additional information   *Description*

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

Changing the byte sequence in the host system often requires a extensive knowledge and significant programming efforts. Endress+Hauser introduced the **Byte order** parameter (→ 🖺 56) for this reason.

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

Byte transmission sequence

Byte addressing, i.e. the transmission sequence of the bytes, is not specified in the Modbus specification. For this reason, it is important to coordinate or match the addressing method between the master and slave during commissioning. This can be configured in the measuring device using the **Byte order** parameter (→ 🖺 56).

The bytes are transmitted depending on the selection in the **Byte order** parameter (→ 🖺 56):

FLOAT				
	Sequence			
Options	1.	2.	3.	4.
1 – 0 – 3 – 2 *	Byte 1 (MMMMMMMM)	Byte 0 (MMMMMMMM)	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM)
0 – 1 – 2 – 3	Byte 0 (MMMMMMMM)	Byte 1 (MMMMMMMM)	Byte 2 (EMMMMMMM)	Byte 3 (SEEEEEEE)
2 – 3 – 0 – 1	Byte 2 (EMMMMMMM)	Byte 3 (SEEEEEEE)	Byte 0 (MMMMMMM)	Byte 1 (MMMMMMM)
3 – 2 – 1 – 0	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM)	Byte 1 (MMMMMMMM)	Byte 0 (MMMMMMMM)
* = factory setting, S = sign, E = exponent, M = mantissa				

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

STRING
Presentation taking the example of a device parameter with a data length of 18 bytes.

Options	Sequence				
	1.	2.	…	17.	18.
1 – **0** – 3 – 2 * 3 – 2 – **1** – **0**	Byte 17 (MSB)	Byte 16	…	Byte 1	Byte 0 (LSB)
0 – **1** – 2 – 3 2 – 3 – **0** – **1**	Byte 16	Byte 17 (MSB)	…	Byte 0 (LSB)	Byte 1
* = factory setting, MSB = most significant byte, LSB = least significant byte					

Telegram delay

Navigation   Expert → Communication → Modbus config. → Telegram delay

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 (→ 🖺 59).
• Warning
  The device continues to measure. A diagnostic message is generated. The signal outputs assume the alarm condition specified in **Failure mode** parameter (→ 🖺 59).
• Alarm
  The device continues to measure. A diagnostic message is generated. The signal outputs assume the alarm condition specified in **Failure mode** parameter (→ 🖺 59).

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.
	
	ℹ This effect of this parameter depends on the option selected in the **Assign diag. beh** parameter (→ 🗎 58).

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
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.

---

4)   Not a Number

3.4.2 "Modbus info" submenu

Navigation   ▦   Expert → Communication → Modbus info

▸ Modbus info	
Device ID	→ 🖺 60
Device revision	→ 🖺 60

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

3.4.3 "Modbus data map" submenu

Navigation   ▦   Expert → Communication → Modbus data map

▸ Modbus data map	
Scan list reg.0 to 15	→ 🖺 60

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.
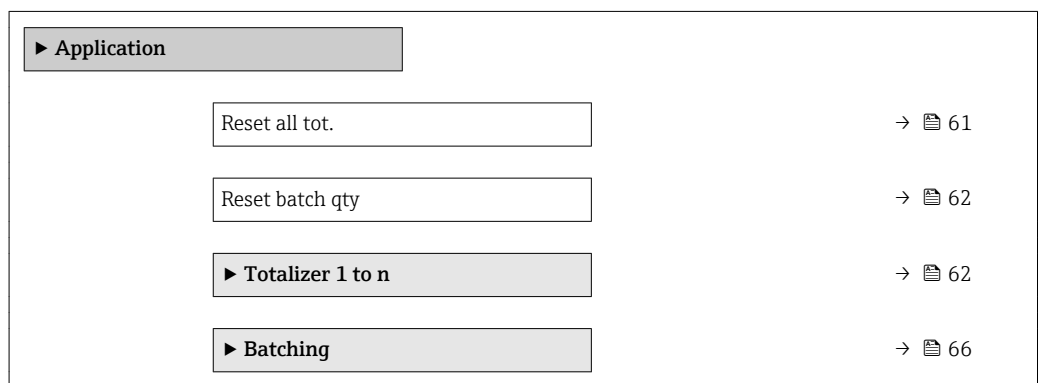
User entry   1 to 65 535

Factory setting   1

3.5   "Application" submenu

Navigation   ▣   Expert → Application

▸ Application	
Reset all tot.	→ 🖹 61
Reset batch qty	→ 🖹 62
▸ Totalizer 1 to n	→ 🖹 62
▸ Batching	→ 🖹 66

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*

Options	Description
Cancel	No action is executed and the user exits the parameter.
Reset + totalize	Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totalized.

Reset batch qty	🔒

Navigation	⊞ Expert → Application → Reset batch qty

Description	Use this function to reset the Overall quantity (→ 🗐 70) and the **Batch counter** parameter (→ 🗐 68) to **0**.

Selection	• Reset • Cancel

Factory setting	Cancel

Additional information	*Options*
	• Reset The Overall quantity (→ 🗐 70) and the **Batch counter** parameter (→ 🗐 68) are reset to **0** and restarted. • Cancel No action is executed and the user exits the parameter.

3.5.1   "Totalizer 1 to n" submenu

Navigation   ⊞   Expert → Application → Totalizer 1 to n

▶ Totalizer 1 to n	
Assign variable	→ 🗐 62
Mass unit	→ 🗐 63
Volume unit	→ 🗐 63
Operation mode	→ 🗐 64
Control Tot. 1 to n	→ 🗐 65
Preset value 1 to n	→ 🗐 65
Failure mode	→ 🗐 66

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
	• Volume flow
	• Mass flow

Factory setting	Mass flow

Additional information	*Description*

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

Selection

If the **Off** option is selected, only **Assign variable** parameter (→ 🗎 62) 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 (→ 🗎 62) of the **Totalizer 1 to n** submenu.

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

Selection	*SI units*	*US units*
	• g	• oz
	• kg	• lb
	• t	• STon
	Custom-specific units	
	User mass	

Factory setting	Country-specific:
	• kg
	• lb

Factory setting	Country-specific:
	• g
	• oz

Additional information	*Selection*

ℹ️ For an explanation of the abbreviated units: → 🗎 102

Volume unit   🔒

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

Prerequisite	The **Volume flow** option is selected in the **Assign variable** parameter (→ 🗎 62) of the **Totalizer 1 to n** submenu.

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

Selection	*SI units*	*US units*	*Imperial units*
	• cm³	• af	• gal (imp)
	• dm³	• ft³	• Mgal (imp)
	• m³	• fl oz (us)	• bbl (imp;beer)
	• ml	• gal (us)	• bbl (imp;oil)
	• l	• kgal (us)	
	• hl	• Mgal (us)	
	• Ml Mega	• bbl (us;oil)	
		• bbl (us;liq.)	
		• bbl (us;beer)	
		• bbl (us;tank)	

Custom-specific units
User vol.

Factory setting	Country-specific: • l • gal (us)

Factory setting	Country-specific: • ml • fl oz (us)

Additional information	*Selection*

For an explanation of the abbreviated units: → 🖺 102

Operation mode   ⓐ

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

Prerequisite	A process variable is selected in the **Assign variable** parameter (→ 🖺 62) of the **Totalizer 1 to n** submenu.

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

Control Tot. 1 to n

Navigation	⊟ Expert → Application → Totalizer 1 to n → Control Tot. 1 to n
Prerequisite	A process variable is selected in the **Assign variable** parameter (→ 🖺 62) of the **Totalizer 1 to n** submenu.
Description	Use this function to select the control of totalizer value 1-3.
Selection	• Totalize • Reset + hold • Preset + hold • Reset + totalize • Preset+totalize • Hold
Factory setting	Totalize

Additional information   *Selection*

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

Preset value 1 to n

Navigation	⊟ Expert → Application → Totalizer 1 to n → Preset value 1 to n
Prerequisite	A process variable is selected in the **Assign variable** parameter (→ 🖺 62) of the **Totalizer 1 to n** submenu.
Description	Use this function to enter a start value for the Totalizer 1 to n.
User entry	Signed floating-point number
Factory setting	Country-specific: • 0 kg • 0 lb

Additional information *User entry*

ℹ The unit of the selected process variable is specified for the totalizer depending on the selection made in the **Assign variable** parameter (→ 📄 62):
  • **Volume flow** option: **Volume flow unit** parameter (→ 📄 25)
  • **Mass flow** option: **Mass flow unit** parameter (→ 📄 24)

Example

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

Failure mode	🔒

Navigation	▣ Expert → Application → Totalizer 1 to n → Failure mode
Prerequisite	A process variable is selected in the **Assign variable** parameter (→ 📄 62) of the **Totalizer 1 to n** submenu.
Description	Use this function to select how a totalizer behaves in the event of a device alarm.
Selection	• Stop • Actual value • Last valid value
Factory setting	Stop
Additional information	*Description*

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

Selection

  • Stop
    The totalizer is stopped in the event of a device alarm.
  • Actual value
    The totalizer continues to count based on the actual 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.

3.5.2   "Batching" submenu

ℹ • Any change to the configuration only becomes effective for the next batching process, i.e. a batching process that is running is finished with the configuration it was started with.
  • Parameters that are not relevant in relation to other parameters retain their value nevertheless. As soon as such parameters become relevant, they are processed further with this value.

‣ Batching		
	‣ Operation	→ 🗏 67
	‣ Configuration	→ 🗏 73

"Operation" submenu

‣ Operation		
	Batch control	→ 🗏 68
	Batch counter	→ 🗏 68
	Last batch qty	→ 🗏 68
	Last drip qty	→ 🗏 69
	Last batch time	→ 🗏 69
	Last close time	→ 🗏 70
	Curr. drip corr.	→ 🗏 70
	Overall quantity	→ 🗏 70
	Overfl.num.batch	→ 🗏 71
	Batch unit	→ 🗏 71
	SwitchOutFunct 1	→ 🗏 72
	Switch status 1	→ 🗏 72
	SwitchOutFunct 2	→ 🗏 72
	Switch status 2	→ 🗏 72

Batch control	🔒

Navigation	☐ ⊞ Expert → Application → Batching → Operation → Batch control
Description	Use this function to control the batching process.
Selection	• Start • Stop
Factory setting	Stop
Additional information	*"Start" option*

• The display of the amount currently measured is reset to 0.
• If a diagnostic message (alarm) occurs during an ongoing batching process, the batching process is canceled as an emergency measure.
• If a batching process is in progress, the **Start** option does not have any effect.
• The batching process is started when the necessary conditions have been met:
  – There is no diagnostic event pending (with the exception of the maximum batch time and maximum flow rate being exceeded)
  – Target quantity is greater than 0.
  – The last batching process has been completed (including possible blow out).

"Stop" option

• The batching process is canceled as an emergency measure.
• A new drip quantity and a new drip correction quantity are not calculated (averaging and single outliers).
• The number of batching processes is increased by 1.
• If no batching process is in progress, the **Stop** option does not have any effect.

Batch counter	

Navigation	☐ ⊞ Expert → Application → Batching → Operation → Batch counter
Description	Use this function to display the number of batching processes.
User interface	Positive integer
Additional information	*Description*

This number is updated each time a batching process is completed. The Batch counter (→ 🖺 68) is reset to **0** if a new batch profile is selected or if the assignment of the measured variable changes.

Last batch qty	

Navigation	☐ ⊞ Expert → Application → Batching → Operation → Last batch qty
Description	Use this function to display the total amount measured including the drip quantity from the last batching process.

| User interface | Signed floating-point number |

Additional information   *Description*

This total is updated each time a batching process is completed and is automatically reset when a new batching process starts.

Dependency

ℹ The unit is taken from: **Batch unit** parameter (→ 🗎 71)

Last drip qty

| Navigation | 🖳 | Expert → Application → Batching → Operation → Last drip qty |

Description   Use this function to display the drip quantity of the last batching process in the configured batch unit.

User interface   Signed floating-point number

Additional information   *Description*

This amount is updated each time a batching process is completed and is automatically reset when a new batching process starts. The parameter is saved and, following a restart, is used for drip quantity correction.

Dependency

ℹ The unit is taken from: **Batch unit** parameter (→ 🗎 71)

Last batch time

| Navigation | 🖳 | Expert → Application → Batching → Operation → Last batch time |

Description   Displays the duration (in seconds) of the last batch up to the end of drip quantity measurement.

User interface   Positive floating-point number

Additional information   *Description*

This time is updated after the end of a batch and automatically reset each time a new batching process is started.

Last close time

Navigation	▤ Expert → Application → Batching → Operation → Last close time
Description	Displays the closing duration (in ms) for the last batch from the switch-off time up to the end of drip quantity measurement.
User interface	Positive floating-point number
Additional information	*Description*
	This time is updated after the end of a batch and automatically reset each time a new batching process is started.

Curr. drip corr.

Navigation	▤ Expert → Application → Batching → Operation → Curr. drip corr.
Description	Use this function to display the drip correction quantity for the next batching process.
User interface	Signed floating-point number
Additional information	*Description*
	Following a restart, the value corresponds to the value of the last drip quantity that was saved.
	Dependency
	🛈 The unit is taken from: **Batch unit** parameter (→ 🕮 71)

Overall quantity   🔒

Navigation	▤ Expert → Application → Batching → Operation → Overall quantity
Description	Use this function to display the total quantity measured for all batching processes.
User interface	Signed floating-point number
Additional information	*Description*
	As only a maximum of 7 digits can be displayed, the current totalizer reading in the event of the display range being exceeded is the sum of theOverall quantity and the Overfl.num.batch.

This number is updated each time a batching process is completed. The Overall quantity
(→ 🖺 70) is reset to **0** if a new batch profile is selected or if the assignment of the
measured variable changes.

Example

Calculation of the current totalizer reading when the 7-digit display range is exceeded:
- Value in the **Overall quantity** parameter: 196 845.7 ml
- Value in the **Overfl.num.batch** parameter: $2 \cdot 10^7$ (2 overflows) = 20 000 000 [ml]
- Current totalizer reading: 20 196 845.7 ml

Dependency

The unit is taken from: **Batch unit** parameter (→ 🖺 71)

Overfl.num.batch   🔒

Navigation	🖳 Expert → Application → Batching → Operation → Overfl.num.batch
Description	Use this function to display the number of overflows for the overall batching quantity.
User interface	–32 000.0 to 32 000.0
Additional information	*Description*

If the current totalizer reading has more than 7 digits, which is the maximum value range
that can be displayed, the value above this range is output as an overflow. The current
totalizer reading is thus the sum of the Overfl.num.batch and the Overall quantity.

Example

Calculation of the current totalizer reading when the 7-digit display range is exceeded:
- Value in the **Overall quantity** parameter: 196 845.7 ml
- Value in the **Overfl.num.batch** parameter: $2 \cdot 10^7$ (2 overflows) = 20 000 000 [ml]
- Current totalizer reading: 20 196 845.7 ml

Batch unit

Navigation	🖳 Expert → Application → Batching → Operation → Batch unit
Description	Displays the selected unit from the batch profile.

User interface

SI units
- kg
- l
- g
- dm³
- cm³
- ml

US units
- oz
- lb
- ft³
- fl oz (us)
- gal (us)

Custom-specific units
- User mass
- User vol.

Additional information   *Effect*

The selected unit applies for:
• Overall quantity (→ 🖺 70)
• Curr. drip corr. (→ 🖺 70)
• Last batch qty (→ 🖺 68)
• Last drip qty (→ 🖺 69)

SwitchOutFunct 1 to n

Navigation	⊟ Expert → Application → Batching → Operation → SwitchOutFunct 1 to n
Description	Use this function to select a function for the switch output.
Selection	• Close • Open • Batching
Factory setting	• Batching (SwitchOutFunct 1) • Open (SwitchOutFunct 2)
Additional information	*Selection*

• Close
  The switch output is permanently switched on.
• Open
  The switch output is permanently switched off.
• Batching
  The switch output is used for batching purposes.
  – Switch output 1 is permanently assigned to the first batch level.
  – The second switch output is assigned to either the second batch level or the blow out.
  – If a batching process is ongoing, the **Open** option and the **Close** option do not have any effect.

Switch status 1 to n

Navigation	⊟ Expert → Application → Batching → Operation → Switch status 1 to n
Description	Displays the current status of the switch output.
User interface	• Closed • Open
Additional information	*User interface*

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

"Configuration" submenu

Navigation　　　　▣　　Expert → Application → Batching → Configuration

```
▸ Configuration

        Batch profile                                    → 🖹 73

        ▸ Batch profile 1 to n                           → 🖹 73
```

Batch profile　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　🔒

Navigation　　　　　　▣　Expert → Application → Batching → Configuration → Batch profile

Description　　　　　　Use this function to select the right profile for the medium that was configured by the customer.

Selection　　　　　　　• Profile 1
　　　　　　　　　　　　• Profile 2
　　　　　　　　　　　　• Profile 3
　　　　　　　　　　　　• Profile 4
　　　　　　　　　　　　• Profile 5
　　　　　　　　　　　　• Profile 6

Factory setting　　　　Profile 1

"Batch profile 1 to n" submenu

Navigation　　　　▣　Expert → Application → Batching → Configuration → Batch profile 1 to n

```
▸ Batch profile 1 to n

        Input selector                                   → 🖹 74

        Batch unit                                       → 🖹 75

        Batch quantity                                   → 🖹 75

        Meas. time drip                                  → 🖹 76

        Fixed comp. qty                                  → 🖹 76

        Drip correction                                  → 🖹 77
```

FilterDripMedian	→ 🖻 78
Avg drip correc	→ 🖻 78
Batch levels	→ 🖻 79
Start level 2	→ 🖻 80
Stop level 2	→ 🖻 80
Blow out delay	→ 🖻 81
Blow out durat.	→ 🖻 81
Max. batch time	→ 🖻 81
Max. flow rate	→ 🖻 82
Disab.PressShock	→ 🖻 82

Input selector   🔒

Navigation   🖳   Expert → Application → Batching → Configuration → Batch profile 1 to n → Input selector

Description   Use this function to assign a measured variable for the batch profile.

Selection   • Off
                • Mass flow
                • Volume flow

Factory setting   Mass flow

Additional information *Options*

                • Off
                  The profile is not active.
                • Mass flow
                  Mass flow is assigned as a measured variable.
                • Volume flow
                  Volume flow is assigned as a measured variable.

        🛈   • In the event of a change to the assignment, the following parameters are reset to
                   the factory setting:
                   – Batch quantity (→ 🖻 75)
                   – Fixed comp. qty (→ 🖻 76)
                   – Max. flow rate (→ 🖻 82)
                • In addition, the **Batch unit** parameter (→ 🖻 75) is automatically changed to a
                  valid value:
                   – For the **Mass flow** option option: unit g
                   – For the **Volume flow** option option: unit ml

Batch unit	🔒

Navigation	🔲 Expert → Application → Batching → Configuration → Batch profile 1 to n → Batch unit

Prerequisite	One of the following options is selected in the **Input selector** parameter (→ 🗎 74): • Mass flow • Volume flow

Description	Use this function to select the unit for the process variable in the batch profile.

Selection	*SI units* • kg • g	*US units* • oz • lb
	Custom-specific units User mass	
	or	
	SI units • l • dm³ • cm³ • ml	*US units* • ft³ • fl oz (us) • gal (us)
	Custom-specific units User vol.	

Factory setting	Depending on country: • g (Mass flow) • oz (Mass flow)

Additional information	*Result*

> ℹ️ The selected unit applies for:
> • Batch quantity (→ 🗎 75)
> • Fixed comp. qty (→ 🗎 76)
> • Batch unit (→ 🗎 71)

Batch quantity	🔒

Navigation	🔲 Expert → Application → Batching → Configuration → Batch profile 1 to n → Batch quantity

Prerequisite	One of the following options is selected in the **Input selector** parameter (→ 🗎 74): • Mass flow • Volume flow

Description	Use this function to enter the batch quantity in the specified batch unit of the selected measured variable.

User entry	Positive floating-point number

Factory setting   Depending on country:
                                      • 0 g
                                      • 0 oz

Additional information   *Dependency*

ℹ️   The unit is taken from: **Batch unit** parameter (→ 🖺 75)

Meas. time drip   🔒

Navigation   ☐   Expert → Application → Batching → Configuration → Batch profile 1 to n → Meas.
                                          time drip

Prerequisite   One of the following options is selected in the **Input selector** parameter (→ 🖺 74):
                                      • Mass flow
                                      • Volume flow

Description   Use this function to enter the time used for drip quantity measurement.

User entry   0.01 to 100 s

Factory setting   1 s

Fixed comp. qty   🔒

Navigation   ☐   Expert → Application → Batching → Configuration → Batch profile 1 to n → Fixed
                                          comp. qty

Prerequisite   One of the following options is selected in the **Input selector** parameter (→ 🖺 74):
                                      • Mass flow
                                      • Volume flow

Description   Use this function to enter a fixed correction quantity in the set batch unit for the selected
                                      measured variable.

User entry   Signed floating-point number

Factory setting   Country-specific:
                                      • 0 g
                                      • 0 oz

Additional information   *Dependency*

                                      How this parameter functions depends on the option selected in the **Drip correction**
                                      parameter (→ 🖺 77).

If the following option is selected in the **Drip correction** parameter (→ 🖺 77):
• Off
  – The Fixed comp. qty (→ 🖺 76) is subtracted from the Batch quantity (→ 🖺 75). The result is the target batch quantity.
  – The target quantity must be greater than 0.
  – If the target quantity is 0, batching cannot be started.
• **Fixed time** option or **Time/LowFlCutOff** option
  – The Fixed comp. qty (→ 🖺 76) does not directly affect the target batch quantity. Instead it is used for the value of the drip correction quantity for the next batch.
  – However, this is only the case if the **Curr. drip corr.** parameter (→ 🖺 70) was 0 before batching and therefore the drip quantity has not yet been recorded.
  – If the Fixed comp. qty (→ 🖺 76) is set to a value not equal to 0, this value is used as the drip correction quantity for the first batch.
  – If the Fixed comp. qty (→ 🖺 76) is set to 0, a drip correction quantity of 10 % of the Batch quantity (→ 🖺 75) is adopted for the first batch.

ℹ️ The unit is taken from: **Batch unit** parameter (→ 🖺 75)

Drip correction	🔒

Navigation	🖥 Expert → Application → Batching → Configuration → Batch profile 1 to n → Drip correction
Prerequisite	One of the following options is selected in the **Input selector** parameter (→ 🖺 74): • Mass flow • Volume flow
Description	Use this function to select the mode for implementing a drip correction.
Selection	• Off • Fixed time • Time/LowFlCutOff
Factory setting	Off
Additional information	*Options* • Off No drip correction is performed. • Fixed time The Fixed time corresponds to the value that was entered in the **Meas. time drip** parameter (→ 🖺 76). The drip quantity is the quantity that is measured from the time of switch-off until a fixed time has expired. When measurement of the drip quantity is complete, this is the end of the batching process without the possibility of blowing out the valve. • Time/LowFlCutOff The drip quantity is the quantity that is measured from the time of switch-off until the low flow cut off is activated or until a specified time has expired.

FilterDripMedian		🔒

Navigation	☐	Expert → Application → Batching → Configuration → Batch profile 1 to n → FilterDripMedian

Prerequisite	The following conditions are met:
	• In the **Input selector** parameter (→ 🖺 74), the **Mass flow** option or the **Volume flow** option is selected.
	• In the **Drip correction** parameter (→ 🖺 77), the **Fixed time** option or the **Time/ LowFlCutOff** option is selected.

Description	Use this function to select the filter depth of the drip median for the batch profile.

Selection	• Off
	• Median 3
	• Median 5
	• Median 7

Factory setting	Median 5

Avg drip correc		🔒

Navigation	☐	Expert → Application → Batching → Configuration → Batch profile 1 to n → Avg drip correc

Prerequisite	The following conditions are met:
	• In the **Input selector** parameter (→ 🖺 74), the **Mass flow** option or the **Volume flow** option is selected.
	• In the **Drip correction** parameter (→ 🖺 77), the **Fixed time** option or the **Time/ LowFlCutOff** option is selected.

Description	Use this function to enter the number of batches used to obtain the median drip quantity.

User entry	1 to 100

Factory setting	5

Additional information	*Description*
	The individual drip quantities are averaged in a stepless manner over the number entered. The result is the drip correction quantity. This is subtracted from the target quantity for the next batch, resulting in the switch-off quantity. The averaging is performed with a PT1 element [5]. The first drip correction quantity determined initializes the filter. The switch-off time is reached when the quantity measured since the start is equal to the switch-off quantity.

---

5) Proportional behavior with first-order lag

Batch levels	🔒

Navigation	🖳 Expert → Application → Batching → Configuration → Batch profile 1 to n → Batch levels
Prerequisite	In the **Input selector** parameter (→ 🖺 74), one of the following options is selected: • Mass flow • Volume flow
Description	Use this function to select the number of levels for the batch.
Selection	• One-level • Two-level • 1level+blow out
Factory setting	One-level
Additional information	*Selection*

        • One-level
         Only switch output 1 is active.
        • Two-level
         Switch output 2 is also active (second level).
        • 1level+blow out
         Switch output 2 is also active (blow out valve after batching). The starting point of the first level is implicitly 0 % of the target value. The finishing point of the first level is implicitly 100 % of the target value.

Example

The example explains the parameterization of various batching functions with the input format in % for the valve switch points.

The following batch is to be implemented:
• Two-level batch with a total batching quantity of 15 kg
• Rough batching quantity of 3 to 12 kg, valve opens once 20 % (3 kg) of the batching quantity is reached and closes once 80 % (12 kg) is reached.
• Valve 1 opens at the start of batching and closes (automatically) once the batching quantity (15 kg) is reached.
• The values should be input as percentages (%).
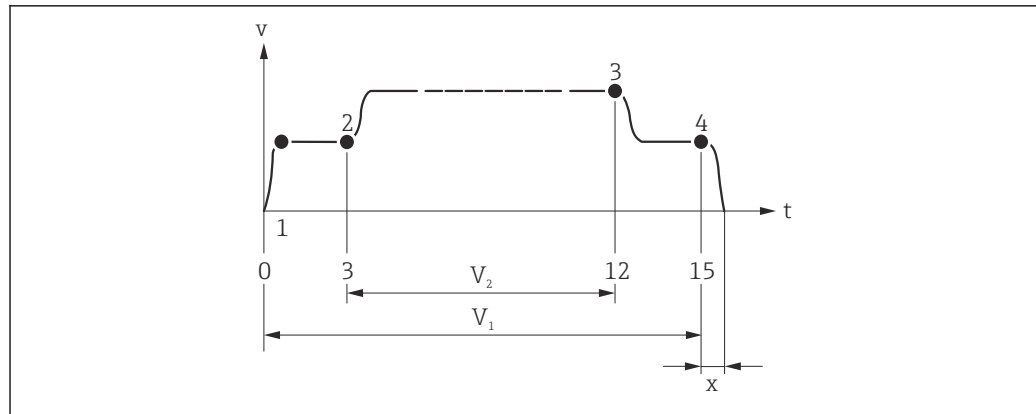
v   *Flow velocity [m/s]*
t   *Time*
V₁   *Valve 1 open*
V₂   *Valve 2 open*
1   *Valve 1 opens: start batching*
2   *Valve 2 opens: start rough batching*
3   *Valve 2 closes: rough batching quantity reached*
4   *Valve 1 closes: end of batching*
x   *Drip quantity*

Start level 2

Navigation	▣ Expert → Application → Batching → Configuration → Batch profile 1 to n → Start level 2
Prerequisite	The following conditions are met: • In the **Input selector** parameter (→ 🗎 74), the **Mass flow** option or the **Volume flow** option is selected. • In the **Batch levels** parameter (→ 🗎 79), the **Two-level** option is selected.
Description	Use this function to enter the starting point of the second level in % of the target value. The starting point must always be smaller than the finishing point.
User entry	0 to 100 %
Factory setting	0 %

Stop level 2

Navigation	▣ Expert → Application → Batching → Configuration → Batch profile 1 to n → Stop level 2
Prerequisite	The following conditions are met: • In the **Input selector** parameter (→ 🗎 74), the **Mass flow** option or the **Volume flow** option is selected. • In the **Batch levels** parameter (→ 🗎 79), the **Two-level** option is selected.
Description	Use this function to enter the finishing point of the second level in % of the target value. The finishing point must always be greater than the starting point.

User entry	0 to 100 %

Factory setting	100 %

Blow out delay

Navigation	⊡ Expert → Application → Batching → Configuration → Batch profile 1 to n → Blow out delay

Prerequisite	The following conditions are met: • In the **Input selector** parameter (→ 🖷 74), the **Mass flow** option or the **Volume flow** option is selected. • In the **Batch levels** parameter (→ 🖷 79), the **1level+blow out** option is selected.

Description	Use this function to enter the delay for blow-out at the end of batching.

User entry	0 to 100 s

Factory setting	0 s

Blow out durat.

Navigation	⊡ Expert → Application → Batching → Configuration → Batch profile 1 to n → Blow out durat.

Prerequisite	The following conditions are met: • In the **Input selector** parameter (→ 🖷 74), the **Mass flow** option or the **Volume flow** option is selected. • In the **Batch levels** parameter (→ 🖷 79), the **1level+blow out** option is selected.

Description	Use this function to enter the duration for blow-out at the end of batching.

User entry	0 to 100 s

Factory setting	1 s

Max. batch time

Navigation	⊡ Expert → Application → Batching → Configuration → Batch profile 1 to n → Max. batch time

Prerequisite	In the **Input selector** parameter (→ 🖷 74), one of the following options is selected: • Mass flow • Volume flow

Description	Use this function to enter the maximum batch time.

User entry	0 to 10⁶ s

Factory setting	0 s

Additional information   *Description*

If the maximum batch time expires before the switch-off amount is reached, the batching process is canceled as an emergency measure. A value of 0 means that the maximum batch time is not monitored.

⚠ If batching is canceled in this way, the measuring device displays the diagnostic message △**F991 Max. flow rate**. The diagnostic message is canceled when the next batch starts. Neither a new drip quantity nor a new drip correction quantity are calculated (averaging and single outliers).

Max. flow rate   🔒

Navigation	▣ Expert → Application → Batching → Configuration → Batch profile 1 to n → Max. flow rate

Prerequisite	In the **Input selector** parameter (→ 🖺 74), one of the following options is selected: • Mass flow • Volume flow

Description	Use this function to enter the maximum flow during batching.

User entry	Positive floating-point number

Factory setting	0

Additional information   *Description*

If the maximum flow is exceeded during batching, the batching process is canceled as an emergency measure. A value of 0 means that the maximum flow is not monitored.

⚠ If batching is canceled in this way, the measuring device displays the diagnostic message △**F991 Max. flow rate**. The diagnostic message is canceled when the next batch starts. Neither a new drip quantity nor a new drip correction quantity are calculated (averaging and single outliers).

Dependency

⚠ The unit depends on the process variable selected in the **Input selector** parameter (→ 🖺 74).

Disab.PressShock   🔒

Navigation	▣ Expert → Application → Batching → Configuration → Batch profile 1 to n → Disab.PressShock

Prerequisite	In the **Input selector** parameter (→ 🖺 74), one of the following options is selected: • Mass flow • Volume flow

Description   Use this function to enter a time (in seconds) in which pressure shock suppression is not active after starting a batching process.

User entry   0 to 100 s

Factory setting   0 s

Additional information   *Description*
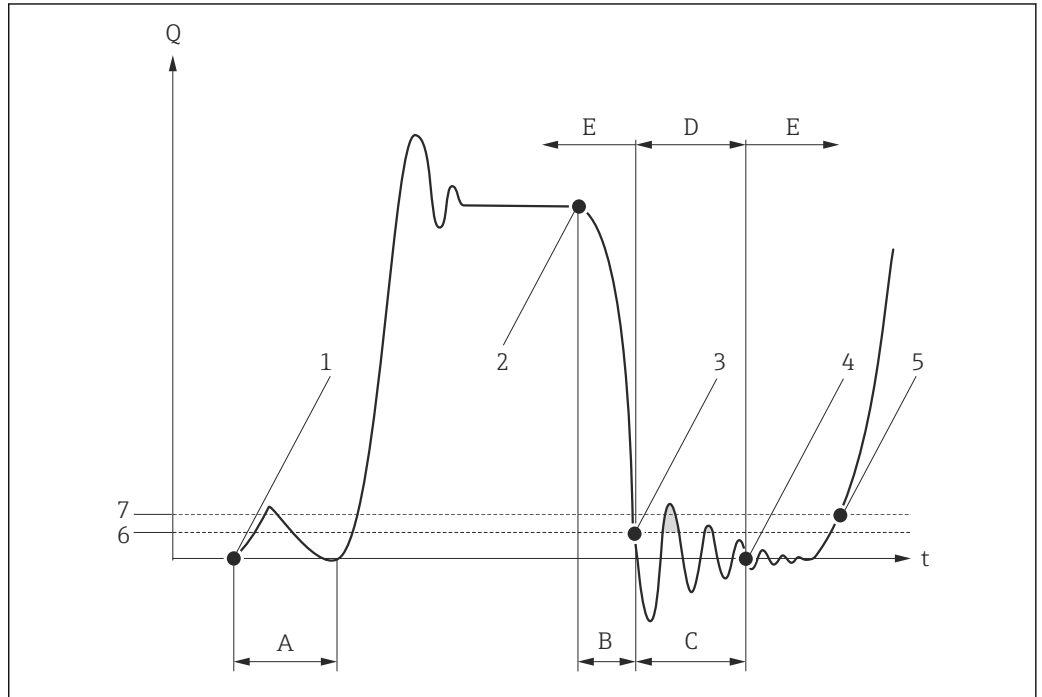
A0026869

Q   Flow
t   Time
A   Disable time pressure shock suppression
B   Drip
C   Pressure shock
D   Pressure shock suppression active
E   Pressure shock suppression inactive
1   Valve opens
2   Valve closes
3   Flow falls below the on-value of the low flow cut off: pressure shock suppression is activated
4   The time entered has elapsed: pressure shock suppression is deactivated
5   The actual flow value is now displayed and output
6   On value for low flow cut off
7   Off value for low flow cut off

3.6   "Diagnostics" submenu

Navigation   ▤   Expert → Diagnostics

▸ Diagnostics	
Actual diagnos.	→ 🖻 84

Timestamp	→ 🕮 85	
Actual diagnos.	→ 🕮 85	
Prev.diagnostics	→ 🕮 85	
Timestamp	→ 🕮 86	
Prev.diagnostics	→ 🕮 86	
Time fr. restart	→ 🕮 86	
Operating time	→ 🕮 86	
▶ Diagnostic list	→ 🕮 87	
▶ Event logbook	→ 🕮 92	
▶ Device info	→ 🕮 93	
▶ Min/max val.	→ 🕮 96	
▶ Simulation	→ 🕮 97	

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*

ℹ️ Additional pending diagnostic messages can be viewed in the **Diagnostic list** submenu (→ 🕮 87).

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 (→ 🖺 84).

Example

For the display format:
24d12h13m00s

Actual diagnos.

Navigation	▣ Expert → Diagnostics → Actual diagnos.
Prerequisite	A diagnostic event has occurred.
Description	Displays the service ID of the current diagnostic message.
User interface	0 to 65 535

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*

ℹ The diagnostic message can be viewed via the **Prev.diagnostics** parameter (→ 🖺 85).

Example

For the display format:
24d12h13m00s

Prev.diagnostics

Navigation	☒ Expert → Diagnostics → Prev.diagnostics
Prerequisite	Two diagnostic events have already occurred.
Description	Displays the service ID of the diagnostic message that occurred before the current diagnostic message.
User interface	0 to 65 535

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.

3.6.1   "Diagnostic list" submenu

Navigation   ▣   Expert → Diagnostics → Diagnostic list

‣ Diagnostic list	
Diagnostics 1	→ 🖹 87
Diagnostics 1	→ 🖹 88
Timestamp	→ 🖹 88
Diagnostics 2	→ 🖹 88
Diagnostics 2	→ 🖹 89
Timestamp	→ 🖹 89
Diagnostics 3	→ 🖹 89
Diagnostics 3	→ 🖹 89
Timestamp	→ 🖹 90
Diagnostics 4	→ 🖹 90
Diagnostics 4	→ 🖹 90
Timestamp	→ 🖹 90
Diagnostics 5	→ 🖹 91
Diagnostics 5	→ 🖹 91
Timestamp	→ 🖹 91

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:
- ⚠S442 Freq. output
- ⊗F276 I/O module

Diagnostics 1

| Navigation | ⊞ | Expert → Diagnostics → Diagnostic list → Diagnostics 1 |

| Description | Displays the service ID of the current diagnostic message with the highest priority. |

| User interface | 0 to 65 535 |

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 (→ 🗎 87).

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:
- ⚠S442 Freq. output
- ⊗F276 I/O module

Diagnostics 2

Navigation	⊟ Expert → Diagnostics → Diagnostic list → Diagnostics 2
Description	Displays the service ID of the current diagnostic message with the second-highest priority.
User interface	0 to 65 535

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 (→ 🕮 88).
	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: • ⚠S442 Freq. output • ⊗F276 I/O module

Diagnostics 3

Navigation	⊟ Expert → Diagnostics → Diagnostic list → Diagnostics 3
Description	Displays the service ID of the current diagnostic message with the third-highest priority.
User interface	0 to 65 535

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 (→ 🖺 89).

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:
- ⚠S442 Freq. output
- ⊗F276 I/O module

Diagnostics 4

Navigation	⊟ Expert → Diagnostics → Diagnostic list → Diagnostics 4
Description	Displays the service ID of the current diagnostic message with the fourth-highest priority.
User interface	0 to 65 535

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 (→ 🖺 90).

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:
- ⚠S442 Freq. output
- ⊗F276 I/O module

Diagnostics 5

Navigation	▨	Expert → Diagnostics → Diagnostic list → Diagnostics 5

Description	Displays the service ID of the current diagnostic message with the fifth-highest priority.

User interface	0 to 65 535

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*

ℹ The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 🖹 91).

Example

For the display format:
24d12h13m00s

3.6.2   "Event logbook" submenu

Navigation   🖳   Expert → Diagnostics → Event logbook

▶ **Event logbook**	
Filter options	→ 🖹 92
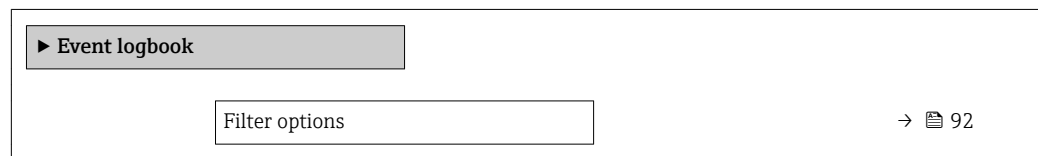
Filter options   🖻

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*

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

3.6.3 "Device info" submenu

Navigation   ⊞   Expert → Diagnostics → Device info

```
▶ Device info

                    Device tag                              →  🖺 93

                    Serial number                           →  🖺 93

                    Firmware version                        →  🖺 94

                    Device name                             →  🖺 94

                    Order code                              →  🖺 94

                    Ext. order cd. 1                        →  🖺 95

                    Ext. order cd. 2                        →  🖺 95

                    Ext. order cd. 3                        →  🖺 95

                    ENP version                             →  🖺 96

                    Config. counter
```

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   Dosimass

Serial number

Navigation   ⊞   Expert → Diagnostics → Device info → Serial number

Description   Displays the serial number of the measuring device.

                        ℹ️ It can also be found on the nameplate.

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

Additional information   *Description*

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

Firmware version

Navigation   Expert → Diagnostics → Device info → Firmware version

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 measuring device. It can also be found on the nameplate.

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

Factory setting   Dosimass

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*

> It can be found in the "Order code" field on the nameplate.

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.

It can be found in the "Ext. ord. cd." field on the nameplate.

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 (→ 🗎 95)

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 (→ 🗎 95)

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.

3.6.4 "Min/max val." submenu

Navigation   Expert → Diagnostics → Min/max val.

```
▶ Min/max val.

              Reset min/max                        → 🖹 96

              ▶ Medium temp.                       → 🖹 97
```
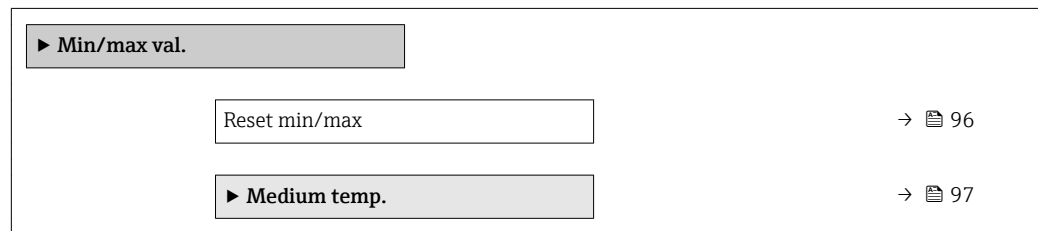
Reset min/max		🔒

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
Factory setting		Cancel

"Medium temp." submenu

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

```
▸ Medium temp.

        Minimum value                                    →  🖺 97

        Maximum value                                    →  🖺 97
```

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 (→ 🖺 28)

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 (→ 🖺 28)

3.6.5 "Simulation" submenu

Navigation   🖳   Expert → Diagnostics → Simulation

```
▸ Simulation

        Assign proc.var.                                 →  🖺 98
```

Value proc. var.	→ 🗎 98
Sim. alarm	→ 🗎 99

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 • Density • Temperature
Factory setting	Off
Additional information	*Description*

ℹ The simulation value of the process variable selected is defined in the **Value proc. var.** parameter (→ 🗎 98).

Value proc. var.   🔒

Navigation	🗒 Expert → Diagnostics → Simulation → Value proc. var.
Prerequisite	A process variable is selected in the **Assign proc.var.** parameter (→ 🗎 98).
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*

ℹ The unit of the displayed measured value is taken from the **System units** submenu (→ 🗎 24).

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

4   Country-specific factory settings

4.1   SI units

ℹ️ Not valid for USA and Canada.

4.1.1   System units

Mass	g
Mass flow	g/s
Volume	ml
Volume flow	ml/s
Density	kg/l
Temperature	°C

4.1.2   On value low flow cut off

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

Nominal diameter [mm]	On value low flow cut off for liquid [g/s]
8	2
15	7
25	20

4.2   US units

ℹ️ Only valid for USA and Canada.

4.2.1   System units

Mass	oz
Mass flow	oz/s
Volume	fl oz (us)
Volume flow	fl oz/s (us)
Density	g/cm³
Temperature	°F

4.2.2   On value low flow cut off

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

Nominal diameter [in]	On-value for liquid [oz/s]
$^3/_8$	0.08
½	0.25
1	0.7

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
	g/cm³, g/m³	Gram/volume unit
	kg/dm³, kg/l, kg/m³	Kilogram/volume unit
	SD4℃, SD15℃, SD20℃	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 ℃ (39 ℉), 15 ℃ (59 ℉), 20 ℃ (68 ℉).
	SG4℃, SG15℃, SG20℃	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 ℃ (39 ℉), 15 ℃ (59 ℉), 20 ℃ (68 ℉).
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
	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
	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
	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
	℃ , K	Celsius, Kelvin
Time	s, m, h, d, y	Second, minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
	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
Pressure	psi a	Pounds per square inch (absolute)
	psi g	Pounds per square inch (gauge)
Mass	oz, lb, STon	Ounce, pound, standard ton
	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
	lb/Sft³	Weight unit/standard volume unit
Corrected volume	Sft³, Sgal (us), Sbbl (us;liq.)	Standard cubic foot, standard gallon, standard barrel
	Sft³/s, Sft³/min, Sft³/h, Sft³/d	Standard cubic foot/time unit

Process variable	Units	Explanation
	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)
	℉, ℉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)
	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
	lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)	Pound/volume unit
Corrected volume	Sgal (imp)	Standard gallon
	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)
	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

Process variable	Units	Explanation
	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 (+) ℹ️ • 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.

Expert		
Locking status		→ 🖺 111
Access stat.tool		→ 🖺 111
Ent. access code		→ 🖺 111
▶ System		→ 🖺 112
▶ Diagn. handling		→ 🖺 112
Alarm delay		→ 🖺 112
▶ Diagn. behavior		→ 🖺 112
▶ Administration		→ 🖺 113
Device reset		→ 🖺 113
Perm. storage		→ 🖺 113
Device tag		→ 🖺 113
▶ Sensor		→ 🖺 113
▶ Measured val.		→ 🖺 113
▶ Process variab.		→ 🖺 113
▶ Totalizer		→ 🖺 113
▶ Input values		→ 🖺 114

‣ **System units**		→ 🕮 114
	Mass flow unit	→ 🕮 114
	Mass unit	→ 🕮 114
	Volume flow unit	→ 🕮 115
	Volume unit	→ 🕮 116
	Density unit	→ 🕮 116
	Temperature unit	→ 🕮 117
	Date/time format	→ 🕮 117
	‣ **User-spec. units**	→ 🕮 117
‣ **Process param.**		→ 🕮 117
	Flow damping	→ 🕮 117
	Density damping	→ 🕮 117
	Temp. damping	→ 🕮 117
	Flow override	→ 🕮 117
	‣ **Low flow cut off**	→ 🕮 117
	‣ **Partial pipe det**	→ 🕮 118
‣ **Sensor adjustm.**		→ 🕮 118
	Install. direct.	→ 🕮 118
	‣ **Zero point adj.**	→ 🕮 118
	‣ **Variable adjust**	→ 🕮 118
‣ **Calibration**		→ 🕮 118
	Cal. factor	→ 🕮 118
	Zero point	→ 🕮 118
	Nominal diameter	→ 🕮 119
	C0 to 5	→ 🕮 119

‣ Testpoints		→ 🕮 119
	Osc. freq. 0 to 1	→ 🕮 119
	Freq. fluct. 0 to 1	→ 🕮 119
	Osc. ampl. 0 to 1	→ 🕮 119
	Osc. damping 0 to 1	→ 🕮 119
	Damping fluct 0 to 1	→ 🕮 119
	Signal asymmetry	→ 🕮 119
	Exc. current 0 to 1	→ 🕮 119
	RawMassFlow	→ 🕮 119
‣ Supervision		→ 🕮 119
	Limit tube damp.	→ 🕮 119
‣ Input		→ 🕮 119
‣ Status input		→ 🕮 119
	Assign stat.inp.	→ 🕮 119
	Val. status inp.	→ 🕮 119
	Active level	→ 🕮 120
	Response time	→ 🕮 120
‣ Communication		→ 🕮 120
‣ Modbus config.		→ 🕮 120
	Bus address	→ 🕮 120
	Baudrate	→ 🕮 120
	Data trans. mode	→ 🕮 120
	Parity	→ 🕮 120
	Byte order	→ 🕮 120
	Telegram delay	→ 🕮 120

Actual diagnos.		→ 🕮 125
Prev.diagnostics		→ 🕮 125
Timestamp		→ 🕮 125
Prev.diagnostics		→ 🕮 125
Time fr. restart		→ 🕮 125
Operating time		→ 🕮 125
‣ Diagnostic list		→ 🕮 125
	Diagnostics 1	→ 🕮 125
	Diagnostics 1	→ 🕮 125
	Timestamp	→ 🕮 125
	Diagnostics 2	→ 🕮 126
	Diagnostics 2	→ 🕮 126
	Timestamp	→ 🕮 126
	Diagnostics 3	→ 🕮 126
	Diagnostics 3	→ 🕮 126
	Timestamp	→ 🕮 126
	Diagnostics 4	→ 🕮 126
	Diagnostics 4	→ 🕮 126
	Timestamp	→ 🕮 126
	Diagnostics 5	→ 🕮 126
	Diagnostics 5	→ 🕮 126
	Timestamp	→ 🕮 126
‣ Event logbook		→ 🕮 126
	Filter options	→ 🕮 126

6.3   Register information

Navigation: Expert					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🕮
Locking status	4918	Integer	Read	512 = Temp. locked	10
Access stat.tool	2178	Integer	Read	0 = Operator **1 = Maintenance**	11
Ent. access code	2177	Integer	Read / Write	Max. 16-digit character string comprising numbers, letters and special characters	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. 834	2761	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	14
Diagnostic no. 835	2760	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	15
Diagnostic no. 912	2758	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	15
Diagnostic no. 913	2754	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	15
Diagnostic no. 192	2022	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	16
Diagnostic no. 274	2755	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	16
Diagnostic no. 392	2023	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	16
Diagnostic no. 592	2024	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	17

Navigation: Expert → System → Diagn. handling → Diagn. behavior					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
Diagnostic no. 992	2021	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	17
Diagnostic no. 991	2809	Integer	Read / Write	0 = Off 1 = Logbook only **2 = Warning** 3 = Alarm	17

"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.	18
Perm. storage	6907	Integer	Read / Write	0 = Off **1 = On**	18
Device tag	4901 to 4908	String	Read / Write	Max. 16 characters, such as letters, numbers or special characters (e.g. @, %, /).	19

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	20
Volume flow	2009 to 2010	Float	Read	Signed floating-point number	20
Density	2013 to 2014	Float	Read	Signed floating-point number	21
Temperature	2017 to 2018	Float	Read	Signed floating-point number	21

"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	22
Tot. overflow 1 to n	1: 2612 to 2613 2: 2812 to 2813 3: 3012 to 3013	Float	Read	Integer with sign	22

"Input values" submenu

Navigation: Expert → Sensor → Measured val. → Input values					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 📖
Val. status inp.	2746	Integer	Read	0 = Low 1 = High	23

"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	24
Mass unit	2102	Integer	Read / Write	2 = t 5 = STon 6 = User mass **12 = g** [(+)] **13 = kg** [(+)] 14 = oz 15 = lb	25

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗏
Volume flow unit	2103	Integer	Read / Write	0 = cm³/s 1 = cm³/min 2 = cm³/h 3 = cm³/d 4 = dm³/s 5 = dm³/min 6 = dm³/h 7 = dm³/d 8 = m³/s 9 = m³/min 10 = m³/h 11 = m³/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 = ft³/s 37 = ft³/min 38 = ft³/h 39 = ft³/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)	25

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 = cm³ 1 = dm³ 2 = m³ **3 = ml** [(+)] **4 = l** [(+)] 5 = hl 6 = Ml Mega 8 = af 9 = ft³ 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)	27
Density unit	2107	Integer	Read / Write	0 = g/cm³ 2 = kg/dm³ **3 = kg/l** [(+)] 4 = kg/m³ 5 = SD4℃ 6 = SD15℃ 7 = SD20℃ 8 = SG4℃ 9 = SG15℃ 10 = SG20℃ 11 = lb/ft³ 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/m³ 22 = g/ml	28

Navigation: Expert → Sensor → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→ 🖺**
Temperature unit	2109	Integer	Read / Write	**0 = °C** ⁽⁺⁾ 1 = K 2 = °F 3 = °R	28
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	29

"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 (@, %, /)	30
Mass factor	2115 to 2116	Float	Read / Write	Signed floating-point number	30
Volume text	2542 to 2546	String	Read / Write	Max. 10 characters such as letters, numbers or special characters (@, %, /)	31
Volume factor	2119 to 2120	Float	Read / Write	Signed floating-point number	31
Density text	2549 to 2553	String	Read / Write	Max. 10 characters such as letters, numbers or special characters (@, %, /)	31
Density offset	2556 to 2557	Float	Read / Write	Signed floating-point number	32
Density factor	2123 to 2124	Float	Read / Write	Signed floating-point number	32

"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	33
Density damping	5508 to 5509	Float	Read / Write	0 to 999.9 s	33
Temp. damping	5127 to 5128	Float	Read / Write	0 to 999.9 s	34
Flow override	5503	Integer	Read / Write	**0 = Off** 1 = On	34

"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	35
On value	5138 to 5139	Float	Read / Write	Positive floating-point number	36
Off value	5104 to 5105	Float	Read / Write	0 to 100.0 %	36
Pres. shock sup.	5140 to 5141	Float	Read / Write	0 to 100 s	37

"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	39
Low value	5110 to 5111	Float	Read / Write	Signed floating-point number	39
High value	5112 to 5113	Float	Read / Write	Signed floating-point number	39
Response time	5108 to 5109	Float	Read / Write	0 to 100 s	40
Max. damping	2414 to 2415	Float	Read / Write	Positive floating-point number	40

"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	41

"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	42
Progress	6797	Integer	Read	0 to 100 %	43

"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	43
Mass flow factor	5519 to 5520	Float	Read / Write	Positive floating-point number	44
Vol. flow offset	5525 to 5526	Float	Read / Write	Signed floating-point number	44
Vol. flow factor	5523 to 5524	Float	Read / Write	Positive floating-point number	44
Density offset	5529 to 5530	Float	Read / Write	Signed floating-point number	45
Density factor	5527 to 5528	Float	Read / Write	Positive floating-point number	45
Temp. offset	5533 to 5534	Float	Read / Write	Signed floating-point number	45
Temp. factor	5531 to 5532	Float	Read / Write	Positive floating-point number	46

"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	46
Zero point	7527 to 7528	Float	Read / Write	Signed floating-point number	47

Navigation: Expert → Sensor → Calibration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🕮
Nominal diameter	2048 to 2057	String	Read	DNxx / x"	47
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	47

"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	48
Freq. fluct. 0 to 1	0: 2498 to 2499 1: 2500 to 2501	Float	Read	Signed floating-point number	49
Osc. ampl. 0 to 1	0: 2449 to 2450 1: 2451 to 2452	Float	Read	Signed floating-point number	49
Osc. damping 0 to 1	0: 9505 to 9506 1: 9507 to 9508	Float	Read	Positive floating-point number	49
Damping fluct 0 to 1	0: 2502 to 2503 1: 2504 to 2505	Float	Read	Signed floating-point number	50
Signal asymmetry	2443 to 2444	Float	Read	Signed floating-point number	50
Exc. current 0 to 1	0: 9509 to 9510 1: 9511 to 9512	Float	Read	Signed floating-point number	51
RawMassFlow	10232 to 10233	Float	Read	Signed floating-point number	51

"Supervision" submenu

Navigation: Expert → Sensor → Supervision					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🕮
Limit tube damp.	4333 to 4334	Float	Read / Write	Positive floating-point number	52

6.3.3 "Input" submenu

"Status input" submenu

Navigation: Expert → Input → Status input					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🕮
Assign stat.inp.	2506	Integer	Read / Write	**0 = Off** 1 = Flow override 2 = Reset all tot. 3 = Reset totaliz. 1 4 = Reset totaliz. 2 5 = Reset totaliz. 3 6 = Start batch 7 = Start&stop batch	53
Val. status inp.	2746	Integer	Read	0 = Low 1 = High	53

Navigation: Expert → Input → Status input					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🖹
Active level	2530	Integer	Read / Write	0 = Low **1 = High**	54
Response time	3404 to 3405	Float	Read / Write	10 to 200 ms	54

### 6.3.4   "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	55
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	55
Data trans. mode	4913	Integer	Read / Write	**0 = RTU** 1 = ASCII	56
Parity	4914	Integer	Read / Write	**0 = Even** 1 = Odd 2 = None/2 stop bits 3 = None/1 stop bit	56
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**	56
Telegram delay	4916 to 4917	Float	Read / Write	0 to 100 ms	58
Assign diag. beh	4921	Integer	Read / Write	0 = Off 1 = Warning **2 = Alarm** 3 = Alarm or warning	58
Failure mode	4920	Integer	Read / Write	**0 = NaN value** 1 = Last valid value	59
Interpreter mode	4925	Integer	Read / Write	**0 = Standard** 1 = Ignore end bytes	59

"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	60
Device revision	4481	Integer	Read	4-digit hexadecimal number	60

"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	60

6.3.5   "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	61
Reset batch qty	2913	Integer	Read / Write	**0 = Cancel** 3 = Reset	62

"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	62
Mass unit	1: 2602 2: 2802 3: 3002	Integer	Read / Write	2 = t 5 = STon 6 = User mass **12 = g** [(+)] **13 = kg** [(+)] 14 = oz 15 = lb	63

Navigation: Expert → Application → Totalizer 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🖹
Volume unit	1: 2603 2: 2803 3: 3003	Integer	Read / Write	0 = cm³ 1 = dm³ 2 = m³ **3 = ml** [(+)] **4 = l** [(+)] 5 = hl 6 = Ml Mega 8 = af 9 = ft³ 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)	63
Operation mode	1: 2605 2: 2805 3: 3005	Integer	Read / Write	**0 = Net flow total** 1 = Forward total 2 = Reverse total	64
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 5 = Hold	65
Preset value 1 to n	1: 2590 to 2591 2: 2592 to 2593 3: 2594 to 2595	Float	Read / Write	Signed floating-point number	65
Failure mode	1: 2606 2: 2806 3: 3006	Integer	Read / Write	**0 = Stop** 1 = Actual value 2 = Last valid value	66

"Batching" submenu

"Operation" submenu

Navigation: Expert → Application → Batching → Operation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🖹
Batch control	2829	Integer	Read / Write	**0 = Stop** 6 = Start	68
Batch counter	3520	Integer	Read	Positive integer	68
Last batch qty	2844 to 2845	Float	Read	Signed floating-point number	68
Last drip qty	3238 to 3239	Float	Read	Signed floating-point number	69
Last batch time	2992 to 2993	Float	Read	Positive floating-point number	69
Last close time	2994 to 2995	Float	Read	Positive floating-point number	70
Curr. drip corr.	3240 to 3241	Float	Read	Signed floating-point number	70
Overall quantity	3262 to 3263	Float	Read	Signed floating-point number	70
Overfl.num.batch	3552 to 3553	Float	Read	−32 000.0 to 32 000.0	71

Navigation: Expert → Application → Batching → Operation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🖺
Batch unit	21295	Integer	Read	0 = cm³ 1 = dm³ 3 = ml 4 = l 6 = User mass 9 = ft³ 10 = fl oz (us) 11 = gal (us) 12 = g 13 = kg 14 = oz 15 = lb 21 = User vol.	71
SwitchOutFunct 1	2488	Integer	Read / Write	**0 = Batching** (+) 1 = Open 2 = Close	72
Switch status 1	3518	Integer	Read	1 = Open 2 = Closed	72
SwitchOutFunct 2	2489	Integer	Read / Write	**0 = Batching** (+) 1 = Open 2 = Close	72
Switch status 2	3519	Integer	Read	1 = Open 2 = Closed	72

"Configuration" submenu

Navigation: Expert → Application → Batching → Configuration					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🖺
Batch profile	3000	Integer	Read / Write	**0 = Profile 1** 1 = Profile 2 2 = Profile 3 3 = Profile 4 4 = Profile 5 5 = Profile 6	73

"Batch profile 1 to n" submenu

Navigation: Expert → Application → Batching → Configuration → Batch profile 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🖺
Input selector	1: 3580 2: 3581 3: 3582 4: 3583 5: 3584 6: 3585	Integer	Read / Write	0 = Off **1 = Mass flow** 2 = Volume flow	74
Batch unit	1: 3530 2: 3531 3: 3532 4: 3533 5: 3534 6: 3535	Integer	Read / Write	0 = cm³ 1 = dm³ 3 = ml 4 = l 6 = User mass 9 = ft³ 10 = fl oz (us) 11 = gal (us) **12 = g** (+) 13 = kg 14 = oz 15 = lb 21 = User vol.	75

Navigation: Expert → Application → Batching → Configuration → Batch profile 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🕮
Batch quantity	1: 3586 to 3587 2: 3588 to 3589 3: 3590 to 3591 4: 3592 to 3593 5: 3594 to 3595 6: 3596 to 3597	Float	Read / Write	Positive floating-point number	75
Meas. time drip	1: 3646 to 3647 2: 3648 to 3649 3: 3650 to 3651 4: 3652 to 3653 5: 3654 to 3655 6: 3656 to 3657	Float	Read / Write	0.01 to 100 s	76
Fixed comp. qty	1: 3634 to 3635 2: 3636 to 3637 3: 3638 to 3639 4: 3640 to 3641 5: 3642 to 3643 6: 3644 to 3645	Float	Read / Write	Signed floating-point number	76
Drip correction	1: 3880 2: 3881 3: 3882 4: 3883 5: 3884 6: 3885	Integer	Read / Write	**0 = Off** 1 = Fixed time 2 = Time/LowFlCutOff	77
FilterDripMedian	1: 3598 2: 3599 3: 3600 4: 3601 5: 3602 6: 3603	Integer	Read / Write	0 = Off 1 = Median 3 **2 = Median 5** 3 = Median 7	78
Avg drip correc	1: 3658 2: 3659 3: 3660 4: 3661 5: 3662 6: 3663	Integer	Read / Write	1 to 100	78
Batch levels	1: 3664 2: 3665 3: 3666 4: 3667 5: 3668 6: 3669	Integer	Read / Write	**0 = One-level** 1 = Two-level 2 = 1level+blow out	79
Start level 2	1: 3820 to 3821 2: 3822 to 3823 3: 3824 to 3825 4: 3826 to 3827 5: 3828 to 3829 6: 3830 to 3831	Float	Read / Write	0 to 100 %	80
Stop level 2	1: 3832 to 3833 2: 3834 to 3835 3: 3836 to 3837 4: 3838 to 3839 5: 3840 to 3841 6: 3842 to 3843	Float	Read / Write	0 to 100 %	80
Blow out delay	1: 3886 to 3887 2: 3888 to 3889 3: 3890 to 3891 4: 3892 to 3893 5: 3894 to 3895 6: 3896 to 3897	Float	Read / Write	0 to 100 s	81

Navigation: Expert → Application → Batching → Configuration → Batch profile 1 to n					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🖺
Blow out durat.	1: 3922 to 3923 2: 3924 to 3925 3: 3926 to 3927 4: 3928 to 3929 5: 3930 to 3931 6: 3932 to 3933	Float	Read / Write	0 to 100 s	81
Max. batch time	1: 3850 to 3851 2: 3852 to 3853 3: 3854 to 3855 4: 3856 to 3857 5: 3858 to 3859 6: 3860 to 3861	Float	Read / Write	0 to 10^6 s	81
Max. flow rate	1: 3862 to 3863 2: 3864 to 3865 3: 3866 to 3867 4: 3868 to 3869 5: 3870 to 3871 6: 3872 to 3873	Float	Read / Write	Positive floating-point number	82
Disab.PressShock	1: 3934 to 3935 2: 3936 to 3937 3: 3938 to 3939 4: 3940 to 3941 5: 3942 to 3943 6: 3944 to 3945	Float	Read / Write	0 to 100 s	82

6.3.6   "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.	84
Timestamp	2719	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	85
Actual diagnos.	20190	Integer	Read	0 to 65 535	85
Prev.diagnostics	2734	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	85
Timestamp	2068	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	86
Prev.diagnostics	20184	Integer	Read	0 to 65 535	86
Time fr. restart	2624	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	86
Operating time	2631	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	86

"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.	87
Diagnostics 1	20189	Integer	Read	0 to 65 535	88
Timestamp	2710	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	88

Navigation: Expert → Diagnostics → Diagnostic list					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
Diagnostics 2	2738	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	88
Diagnostics 2	20188	Integer	Read	0 to 65 535	89
Timestamp	2701	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	89
Diagnostics 3	2740	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	89
Diagnostics 3	20187	Integer	Read	0 to 65 535	89
Timestamp	2692	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	90
Diagnostics 4	2742	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	90
Diagnostics 4	20186	Integer	Read	0 to 65 535	90
Timestamp	2683	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	90
Diagnostics 5	2744	Integer	Read	Symbol for diagnostic behavior, diagnostic code and short message.	91
Diagnostics 5	20185	Integer	Read	0 to 65 535	91
Timestamp	2675	Integer	Read	Days (d), hours (h), minutes (m) and seconds (s)	91

"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**	92

"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 / Write	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).	93
Serial number	7003 to 7007.5	String	Read	Max. 11-digit character string comprising letters and numbers.	93
Firmware version	7277 to 7280	String	Read	Character string in the format xx.yy.zz	94
Device name	7263 to 7270	String	Read	Max. 32 characters such as letters or numbers.	94
Order code	2058 to 2067	String	Read	Character string composed of letters, numbers and certain punctuation marks (e.g. /).	94
Ext. order cd. 1	2212 to 2221	String	Read	Character string	95
Ext. order cd. 2	2222 to 2231	String	Read	Character string	95
Ext. order cd. 3	2232 to 2241	String	Read	Character string	95

Navigation: Expert → Diagnostics → Device info					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 🗎
ENP version	4003 to 4010	String	Read	Character string	96
Config. counter		Integer	Read		

"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**	96

"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	97
Maximum value	7531 to 7532	Float	Read	Signed floating-point number	97

"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 4 = Density 7 = Temperature	98
Value proc. var.	6814 to 6815	Float	Read / Write	Depends on the process variable selected	98
Sim. alarm	6812	Integer	Read / Write	**0 = Off** 1 = On	99

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