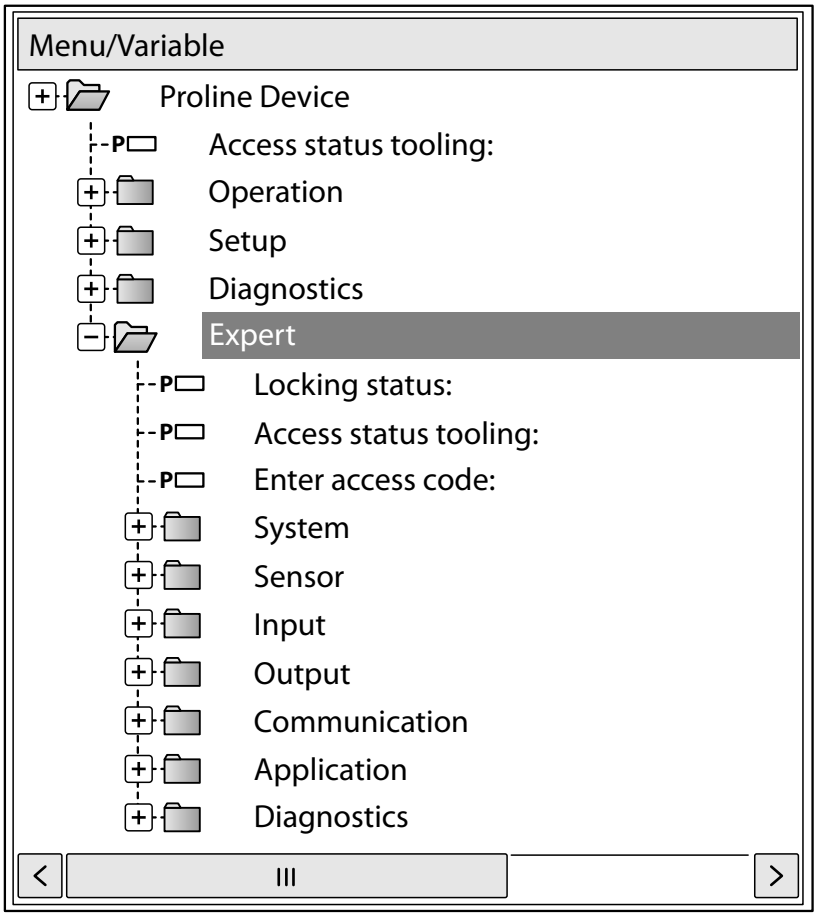
GP01049D/06/EN/01.15
71289151

Valid as of version
03.00.zz (Device firmware)

Description of Device Parameters
Dosimag

Electromagnetic flowmeter



Endress+Hauser
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1 Document information

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.

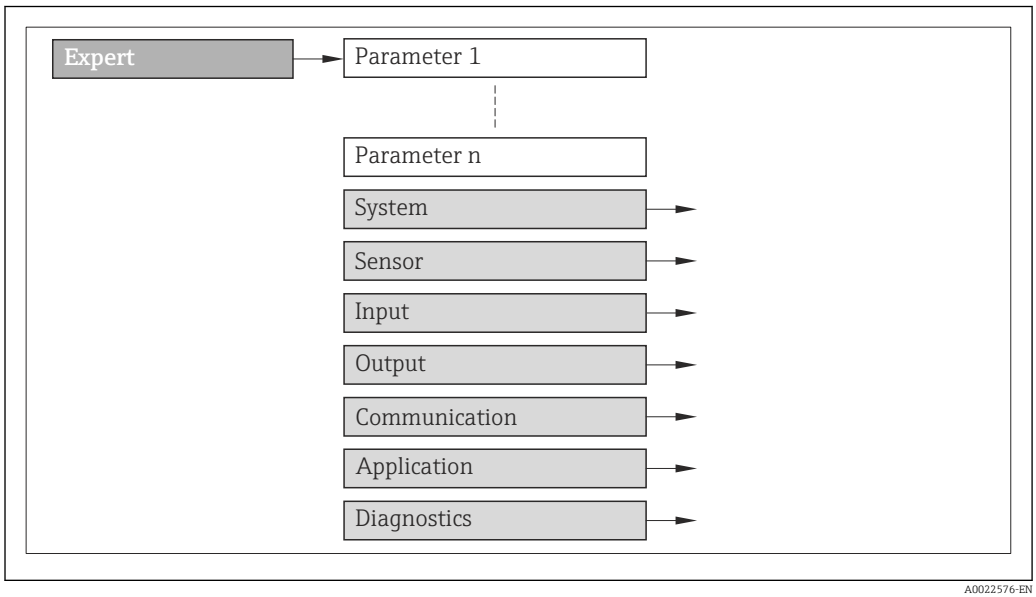
1.2 Target group

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

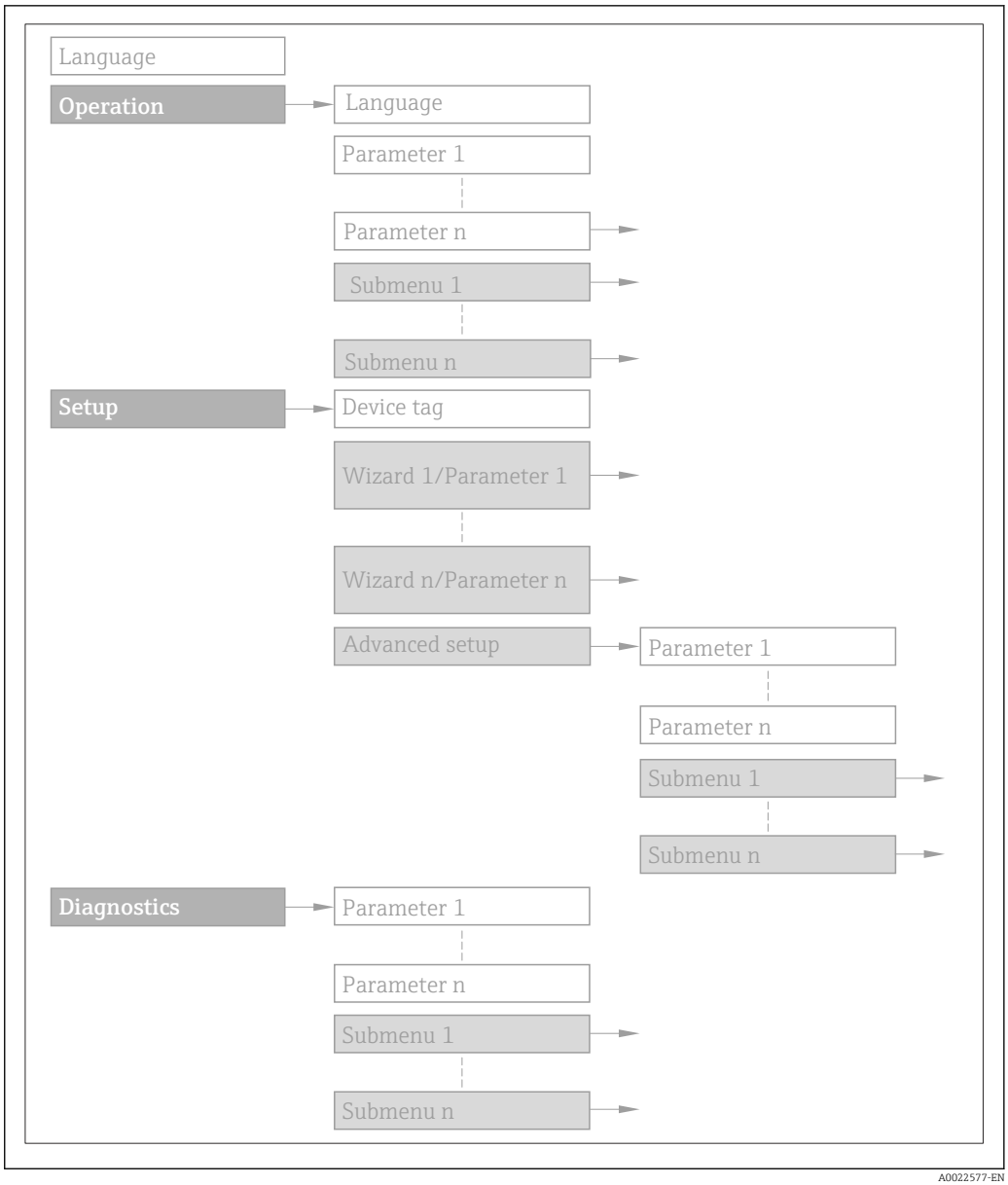
1.3.1 Information on the document structure

The document lists the submenus and their parameters according to the structure from the **Expert** menu (→ 🖹 7).



1 Sample graphic

For information on the arrangement of the parameters according to the structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu (→ 🖹 53), along with a brief description, see the Operating Instructions for the device.



2 *Sample graphic*

For information about the operating philosophy, see the "Operating philosophy" chapter in the device's 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
Options	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

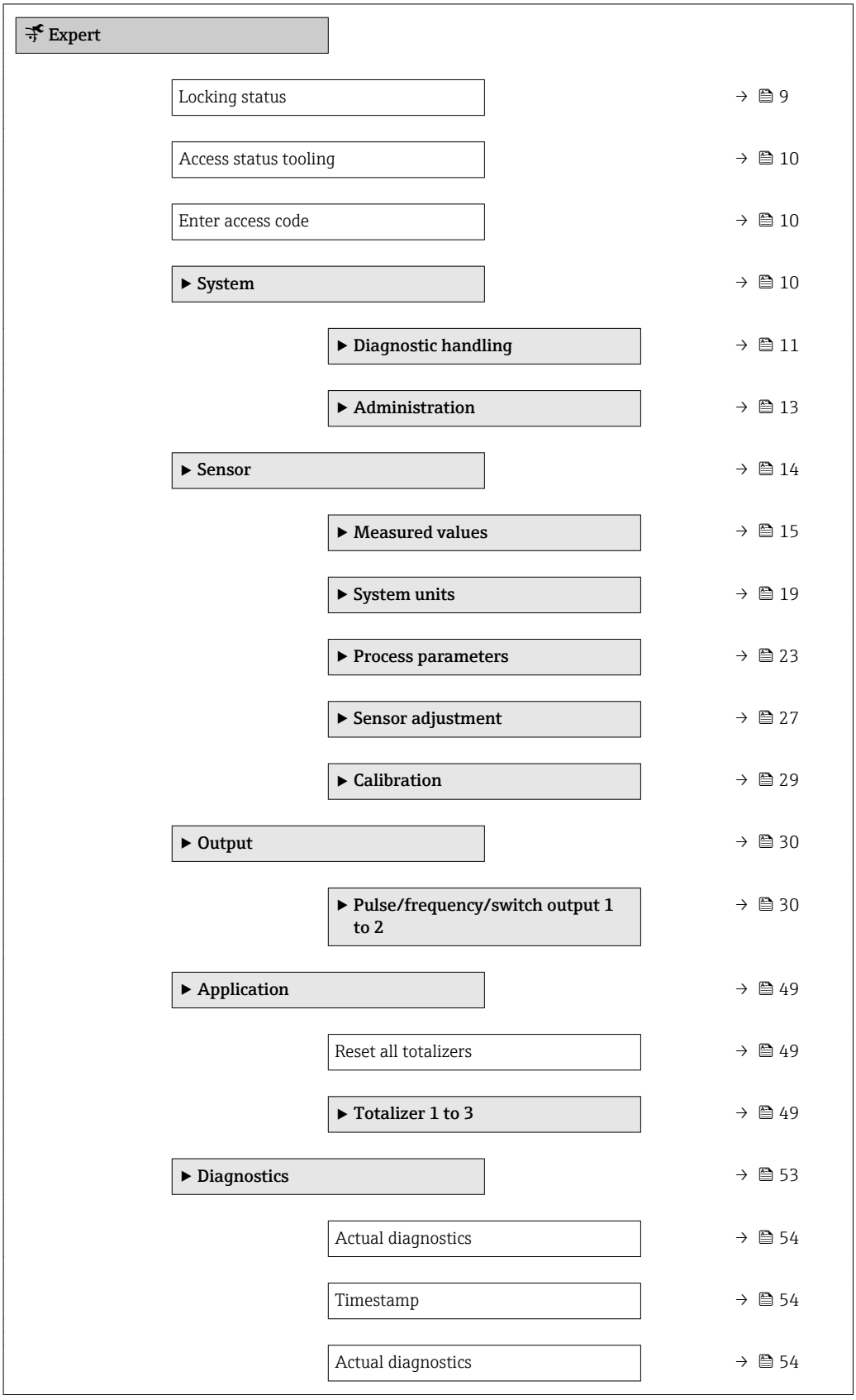
Symbol	Meaning
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Operation via operating tool
	Write-protected parameter

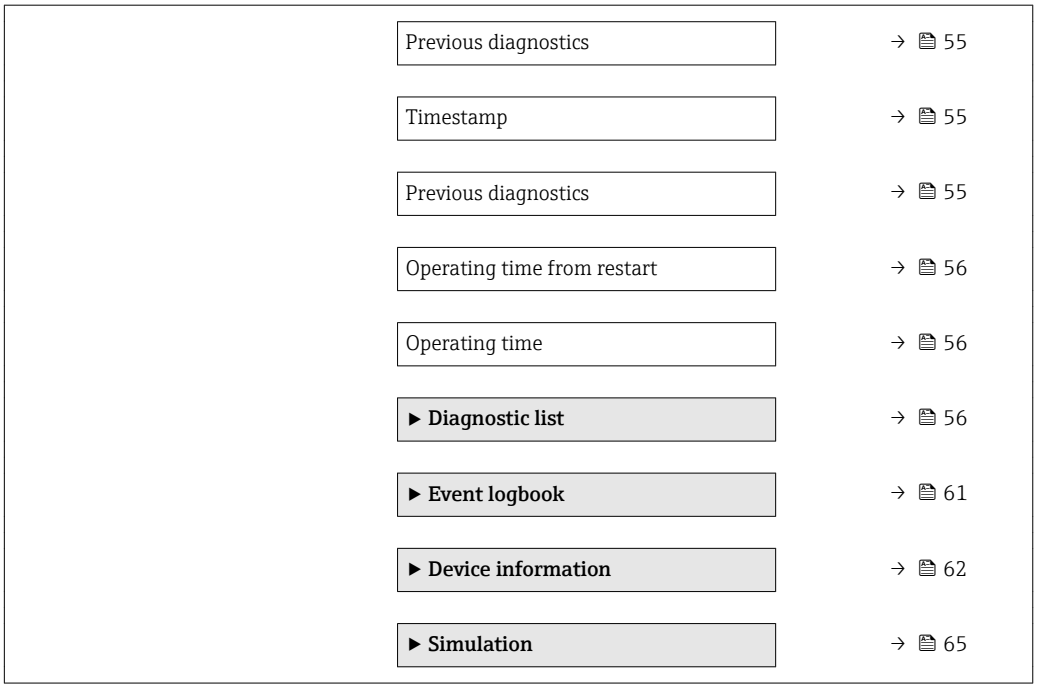
1.4.2 Symbols in graphics

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

2 Overview of the Expert operating menu

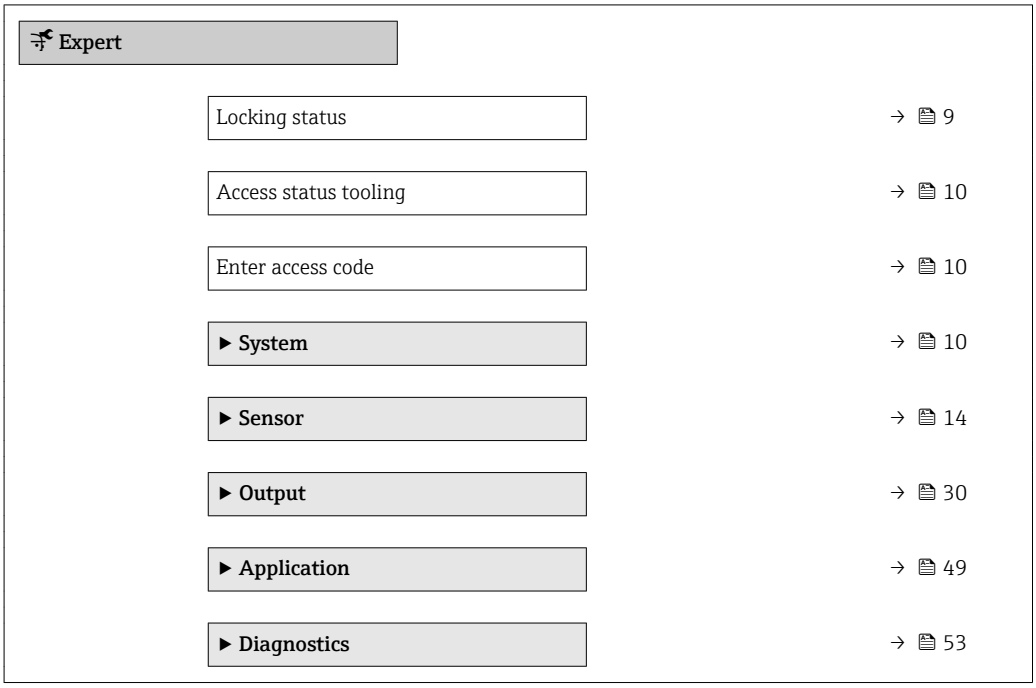
The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.




Previous diagnostics
→ 55
Timestamp
→ 55
Previous diagnostics
→ 55
Operating time from restart
→ 56
Operating time
→ 56
▶ Diagnostic list
→ 56
▶ Event logbook
→ 61
▶ Device information
→ 62
▶ Simulation
→ 65

3 Description of device parameters

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



Locking status

Navigation Expert → Locking status

Description Use this function to view the active write protection.

User interface Temporarily locked

Additional information *Display*

In the operating tool all active types of write protection are selected.

If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 9).

"Temporarily locked" option (priority 3)

Write access to the parameters is temporarily lock due to device-internal processing (e.g. data upload/download, reset). Once the internal processing has been completed, the parameters can be changed once again.

Access status tooling

Navigation Expert → Access stat.tool

Description Use this function to view the access authorization to the parameters via the operating tool.

User interface
- Operator
- Maintenance

Factory setting Maintenance

Additional information *Description*

The access authorization can be modified via the **Enter access code** parameter.

If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 9).

Display

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

Enter access code

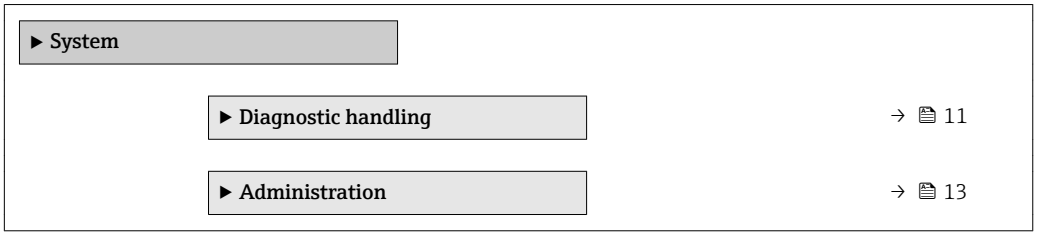
Navigation Expert → Ent. access code

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

User entry 0 to 9 999

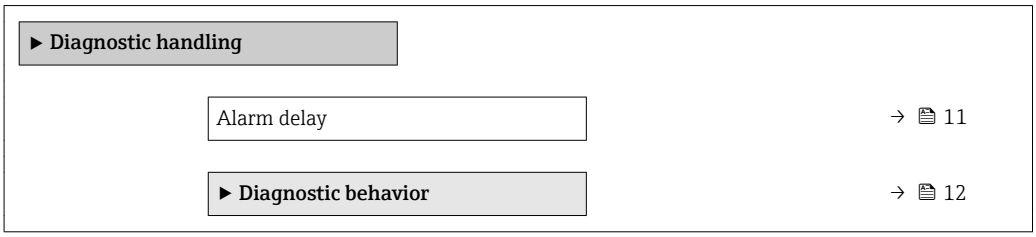
3.1 "System" submenu

Navigation Expert → System



3.1.1 "Diagnostic handling" submenu

Navigation Expert → System → Diagn. handling



Alarm delay

Navigation Expert → System → Diagn. handling → Alarm delay

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

The diagnostic message is reset without a time delay.

User entry 0 to 60 s

Factory setting 0 s

Additional information *Description*

This setting affects the following diagnostic messages:
- 004 Sensor
- 062 Sensor connection
- 082 Data storage
- 083 Memory content
- 242 Software incompatible
- 270 Main electronic failure
- 272 Main electronic failure
- 273 Main electronic failure
- 281 Electronic initialization
- 311 Electronic failure
- 322 Electronic drift
- 442 Frequency output 1 to 2
- 443 Pulse output 1 to 2
- 453 Flow override
- 500 Electrode difference voltage too high
- 832 Electronic temperature too high
- 833 Electronic temperature too low
- 834 Process temperature too high
- 835 Process temperature too low
- 937 EMC interference
- 938 EMC interference

"Diagnostic behavior" submenu

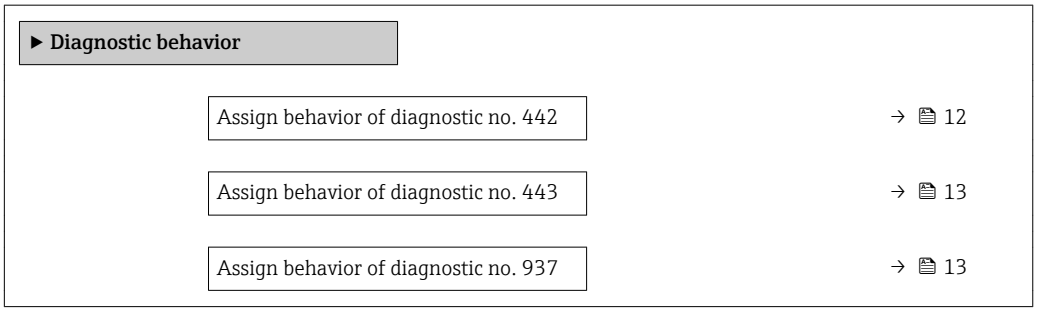
For a list of all the diagnostic events, see the Operating Instructions for the device.

Modifying the diagnostic behavior of a diagnostic event. Each diagnostic event is assigned a certain diagnostic behavior at the factory. The user can change this assignment for certain diagnostics events.

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

- **Off** option
  The device continues to measure. The diagnostic event is ignored; it is neither entered into the Event logbook, nor is a diagnostic message generated.
- **Alarm** option
  The device continues to measure. The signal outputs assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues to measure. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues to measure. The diagnostic message is only entered in the **Event logbook** submenu (→ 61).

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



Assign behavior of diagnostic no. 442 (Frequency output 1 to 2)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 442

Prerequsite The measuring device has a pulse/frequency/switch output.

Description Use this function to change the diagnostic behavior of the diagnostic message **442 Frequency output 1 to 2**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available, see → 12

Assign behavior of diagnostic no. 443 (Pulse output 1 to 2)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 443

Prerequsite The measuring device has a pulse/frequency/switch output.

Description Use this function to change the diagnostic behavior of the diagnostic message **443 Pulse output 1 to 2**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available, see → 12

Assign behavior of diagnostic no. 937 (EMC interference)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 937

Description Use this function to change the diagnostic behavior of the diagnostic message **937 EMC interference**.

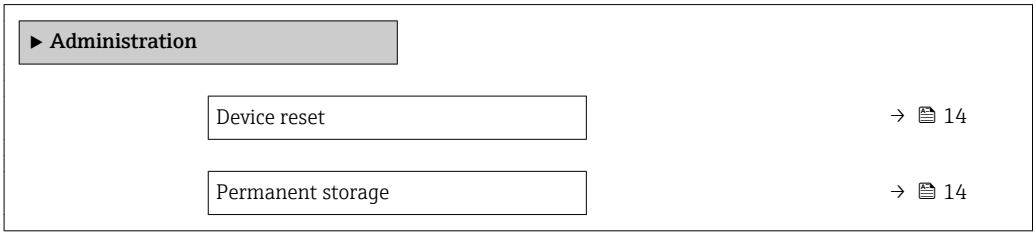
Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 12

3.1.2 "Administration" submenu

Navigation Expert → System → Administration



Device reset

Navigation Expert → System → Administration → Device reset

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

Selection
- Cancel
- To delivery settings
- Restart device

Factory setting Cancel

Additional information

"Cancel" option

No action is executed and the user exits the parameter.

"To delivery settings" option

All the parameters are reset to their factory settings.

"Restart device" option

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

Permanent storage

Navigation Expert → System → Administration → Perm. storage

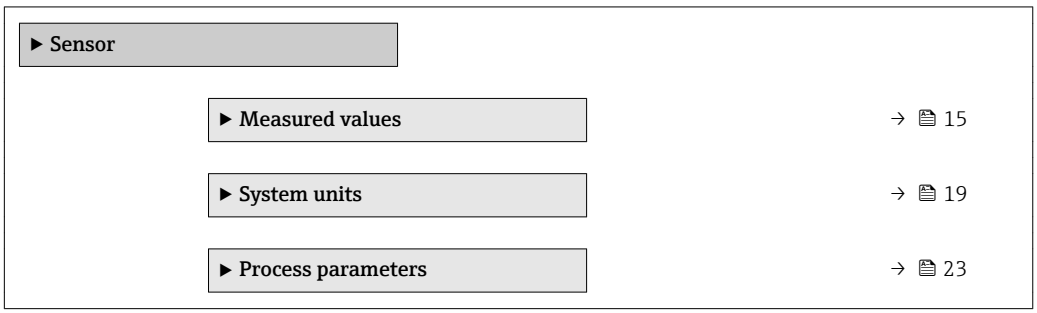
Description Use this function to switch permanent storage on and off.

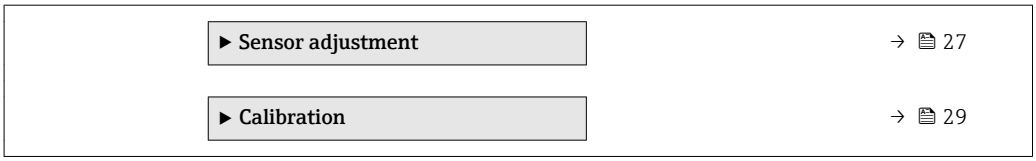
Selection
- Off
- On

Factory setting On

3.2 "Sensor" submenu

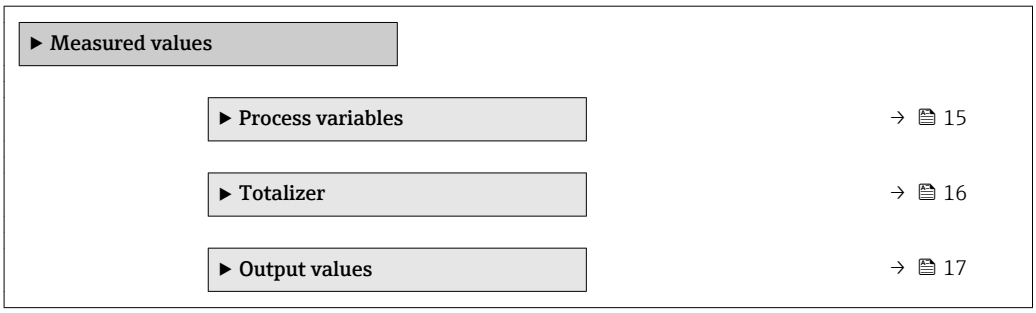
Navigation Expert → Sensor





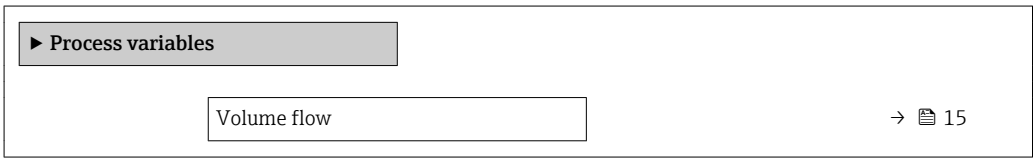
3.2.1 "Measured values" submenu

Navigation Expert → Sensor → Measured val.



"Process variables" submenu

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



Volume flow

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

Description Use this function to view the volume flow currently measured.

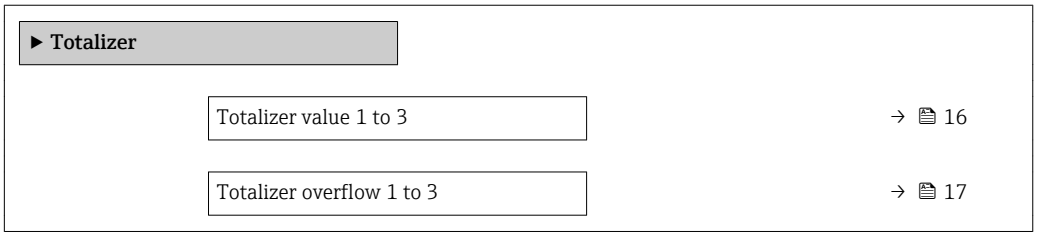
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Volume flow unit** parameter (→ 19)

Totalizer

Navigation Expert → Sensor → Measured val. → Totalizer



Totalizer value 1 to 3

Navigation Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to 3

Prerequsite In the **Assign process variable** parameter (→ 50) of the **Totalizer 1 to 3** submenu, the **Volume flow** option is selected.

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, the current counter value is the sum of the totalizer value and the overflow value from the **Totalizer overflow 1 to 3** parameter if the display range is exceeded.

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 52).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Totalizer operation mode** parameter (→ 51).

The unit of the selected process variable is specified for the totalizer in the **Assign process variable** parameter. If the following is selected in the **Assign process variable** parameter:
Volume flow option: **Volume flow unit** parameter (→ 19)

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range:
- Value in the **Totalizer value 1** parameter: 196 845.7 m^3
- Value in the **Totalizer overflow 1** parameter: $1 \cdot 10^7$ (1 overflow) = 10 000 000 [m^3]
- Current totalizer reading: 10 196 845.7 m^3

Totalizer overflow 1 to 3

Navigation Expert → Sensor → Measured val. → Totalizer → Tot. overflow 1 to 3

Prerequsite In the **Assign process variable** parameter (→ 50) of the **Totalizer 1 to 3** submenu, the **Volume flow** option is selected.

Description Displays the current totalizer overflow.

User interface Integer with sign

Additional information

Description

If the current reading has more than 7 digits, which is the maximum value range that can be displayed, the value above this range is given as an overflow. The current totalizer value is therefore the sum of the overflow value and the totalizer value from the **Totalizer value 1 to 3** parameter.

User interface

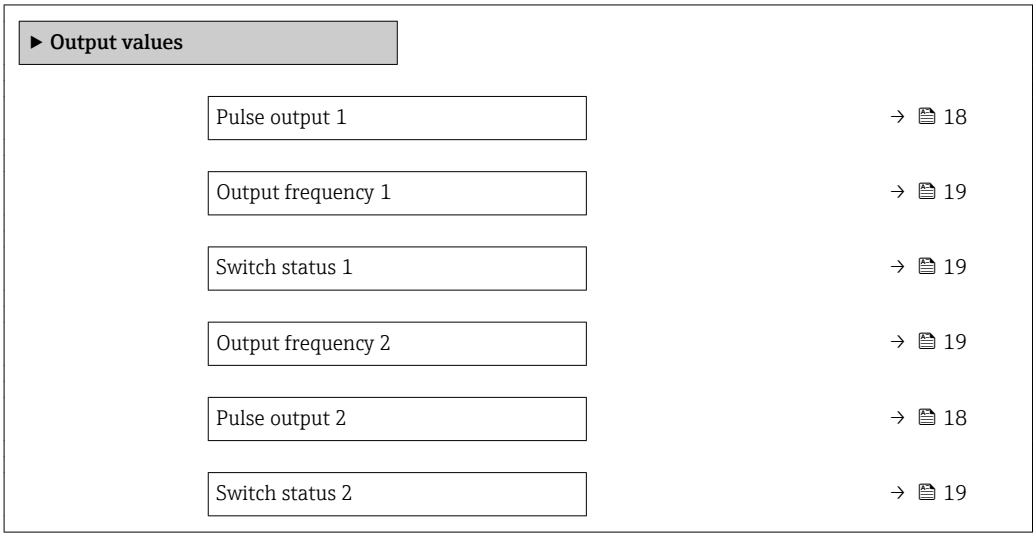
The unit of the selected process variable is specified for the totalizer in the **Assign process variable** parameter. If the following is selected in the **Assign process variable** parameter:
Volume flow option: **Volume flow unit** parameter (→ 19)

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range:
- Value in the **Totalizer value 1** parameter: 196 845.7 m^3
- Value in the **Totalizer overflow 1** parameter: $2 \cdot 10^7$ (2 overflows) = 20 000 000 [m^3]
- Current totalizer reading: 20 196 845.7 m^3

"Output values" submenu

Navigation Expert → Sensor → Measured val. → Output values



Pulse output

Navigation Expert → Sensor → Measured val. → Output values → Pulse output 1 to 2

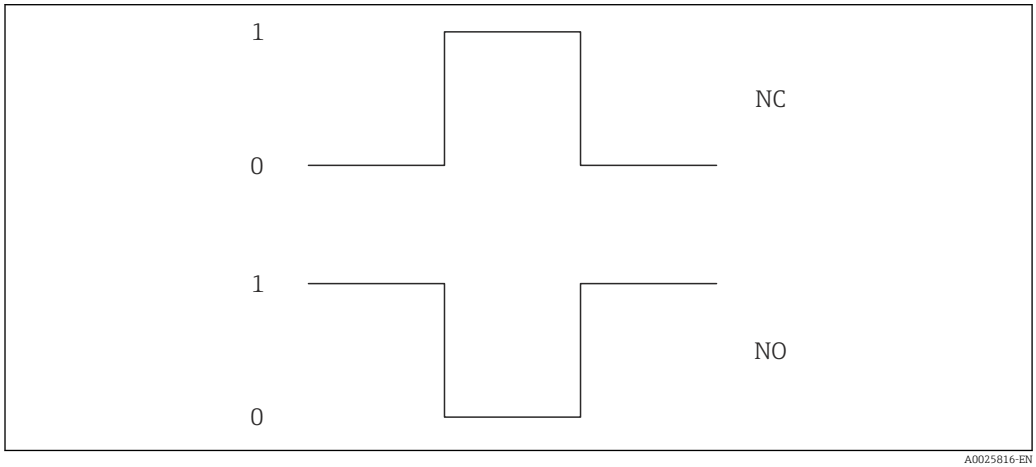
Prerequisite One of the following options is selected in the **Operating mode** parameter (→ 31):
- Pulse
- Automatic pulse

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

- The pulse output is an open emitter output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.
- The **Value per pulse** parameter (→ 34) and the **Pulse width** parameter (→ 35) (Operating mode (→ 31) Pulse) can be used to define the value (i.e. the amount of the measured value that corresponds to a pulse) and the duration of the pulse.



0 Non-conductive
1 Conductive
NC Normally closed
NO Normally opened

The output behavior can be inverted via the **Invert output signal** parameter (→ 48), i.e, the transistor is not conductive for the duration of the pulse.

In addition, the behavior of the output in the event of an error (**Failure mode** parameter (→ 36)) can be configured.

The duration of the pulses must be defined as a function of the input card used. The pulse(s) must not exceed the maximum input frequency of the counter card.

Output frequency

Navigation Expert → Sensor → Measured val. → Output values → Output freq. 1 to 2

Prerequsite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected.

Description Displays the actual value of the output frequency which is currently measured.

User interface 0.0 to 10 000.0 Hz

Switch status

Navigation Expert → Sensor → Measured val. → Output values → Switch status 1 to 2

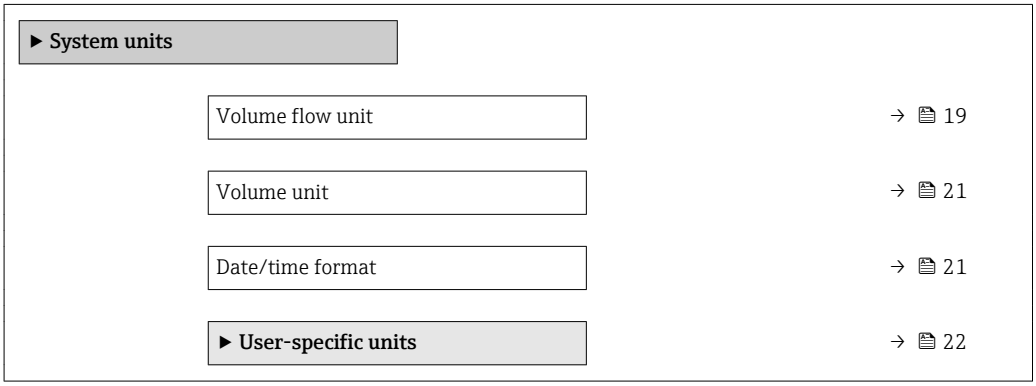
Prerequsite In the **Operating mode** parameter (→ 31), the **Switch** option is selected.

Description Displays the current switch status of the status output.

User interface
- Open
- Closed

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units



Volume flow unit

Navigation Expert → Sensor → System units → Volume flow unit

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

Selection

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

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

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

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

Factory setting

Country-specific:
- ml/s
- fl oz/s (us)

Additional information

Result

The selected unit applies for:
Volume flow parameter (→ 15)

Options

For an explanation of the abbreviated units: → 70

Customer-specific units

The unit for the customer-specific volume is specified in the **User volume text** parameter (→ 22).

Volume unit

Navigation Expert → Sensor → System units → Volume unit

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

Selection

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

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

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

Custom-specific units
User vol.

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

Additional information

Options

For an explanation of the abbreviated units: → 70

Customer-specific units

The unit for the customer-specific volume is specified in the **User volume text** parameter (→ 22).

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

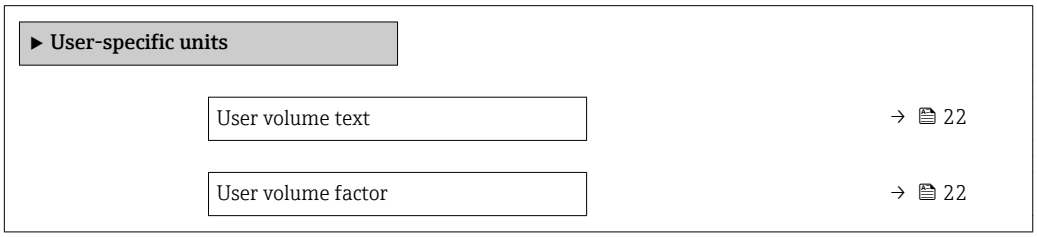
Factory setting dd.mm.yy hh:mm

Additional information *Selection*

For an explanation of the abbreviated units: → 70

"User-specific units" submenu

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



User volume text

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

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

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

Factory setting User vol.

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Volume flow unit** parameter (→ 19)
- **Volume unit** parameter (→ 21)

Example

If the text GLAS is entered, the choose list of the **Volume flow unit** parameter (→ 19) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

User volume factor

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

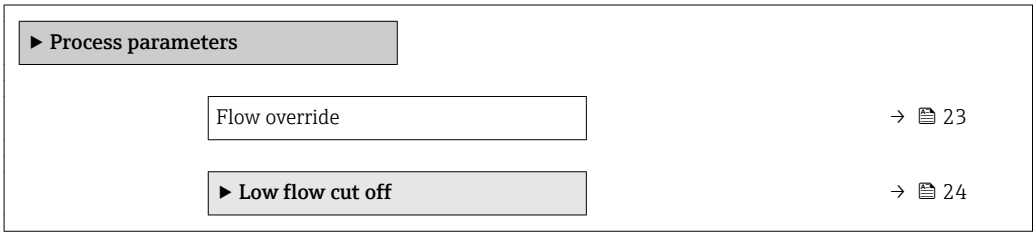
Description Use this function to enter a quantity factor for the user-specific volume and volume flow unit.

User entry Signed floating-point number

Factory setting 1.0

3.2.3 "Process parameters" submenu

Navigation Expert → Sensor → Process param.



Flow override

Navigation Expert → Sensor → Process param. → Flow override

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

Selection
- Off
- On

Factory setting Off

Additional information

Effect

This setting affects all the functions of the measuring device.

Positive zero return is not relevant for most applications.

Description

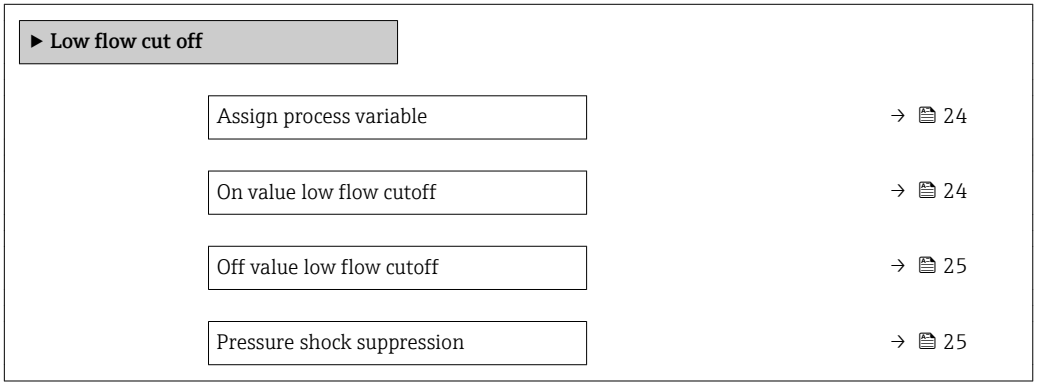
The volume flow is set to **0**.

Flow override is active
- The diagnostic message diagnostic message ⚠**C453 Flow override** is displayed.
- Output values
  - Output: 0
  - Temperature: proceeding output
  - Totalizers 1-3: Stop being totalized

"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



Assign process 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
- Volume flow

Factory setting Volume flow

On value low flow cutoff

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

Prerequisite In the **Assign process variable** parameter (→ 24), the **Volume flow** option is selected.

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 → 25.

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter → 68

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign process variable** parameter (→ 24).

Off value low flow cutoff

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

Prerequsite In the **Assign process variable** parameter (→ 24), the **Volume flow** option is selected.

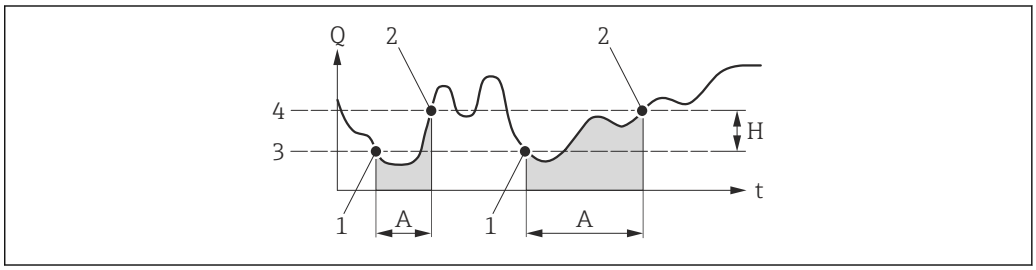
Description Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value→ 24.

User entry 0 to 100.0 %

Factory setting 50 %

Additional information *Example*

- **On value low flow cutoff** parameter (→ 24): 2 g/s
- **Off value low flow cutoff** parameter (→ 25): 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

Pressure shock suppression

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

Prerequsite In the **Assign process variable** parameter (→ 24), the **Volume flow** option is selected.

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

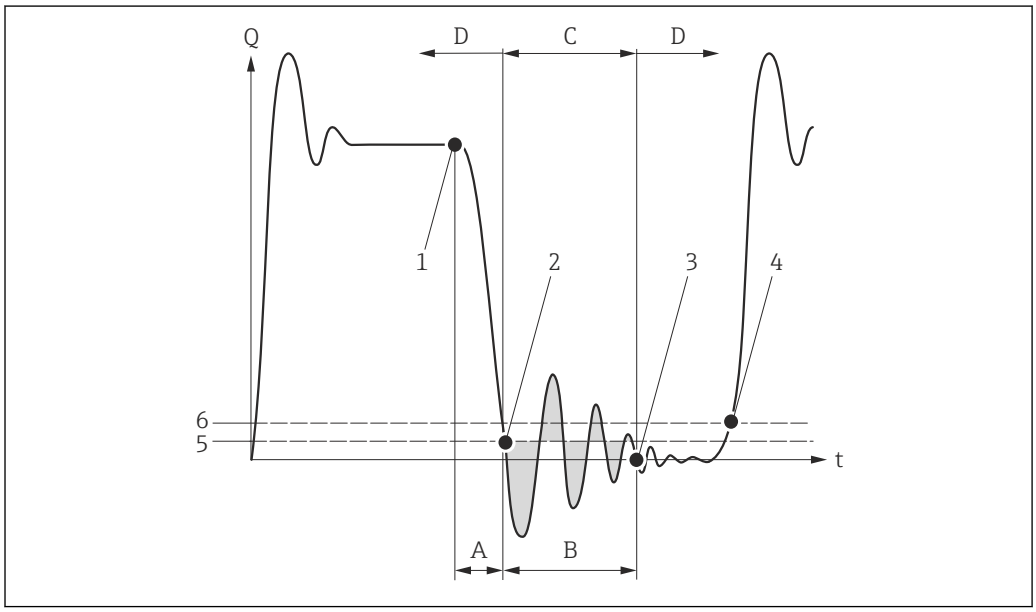
- Prerequisite:
  Flow rate < on-value of low flow cut off
- Output values
  - Flow displayed: 0
  - Totalizer: the totalizers are pegged at the last correct value

Pressure shock suppression is disabled

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

Example

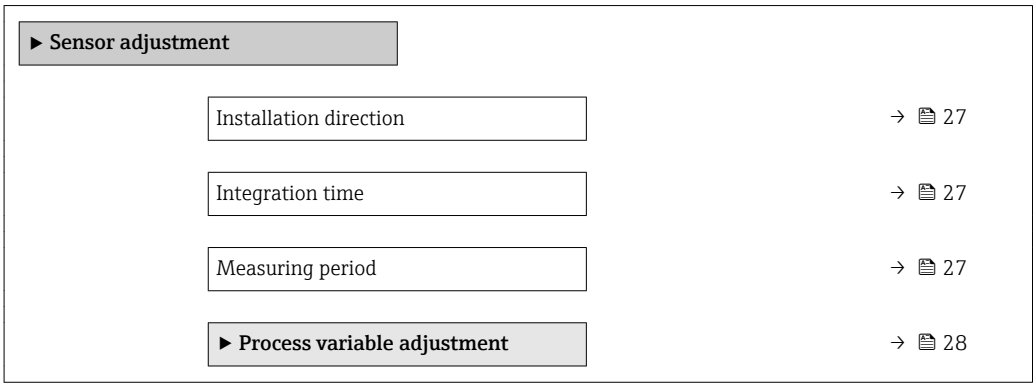
When closing a valve, momentarily strong fluid movements may occur in the pipeline, which are registered by the measuring system. These totalized flow values lead to a false totalizer status, particularly during batching processes.



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

3.2.4 "Sensor adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm.



Installation direction

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

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

Selection
- Flow in arrow direction
- Flow against arrow direction

Factory setting Flow in arrow direction

Additional information *Description*

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

Integration time

Navigation Expert → Sensor → Sensor adjustm. → Integration time

Description Display the duration of an integration cycle.

User interface 1 to 65 ms

Factory setting 5 ms

Measuring period

Navigation Expert → Sensor → Sensor adjustm. → Measuring period

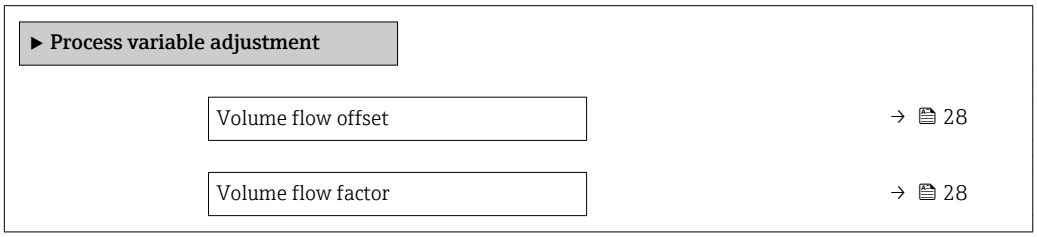
Description Display the time of a full measuring period.

User interface 6 to 80 ms

Factory setting 12.5 ms

"Process variable adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust



Volume flow offset

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

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

User entry Signed floating-point number

Factory setting 0 m^3/s

Additional information *Description*

Corrected value = (factor × value) + offset

Volume 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

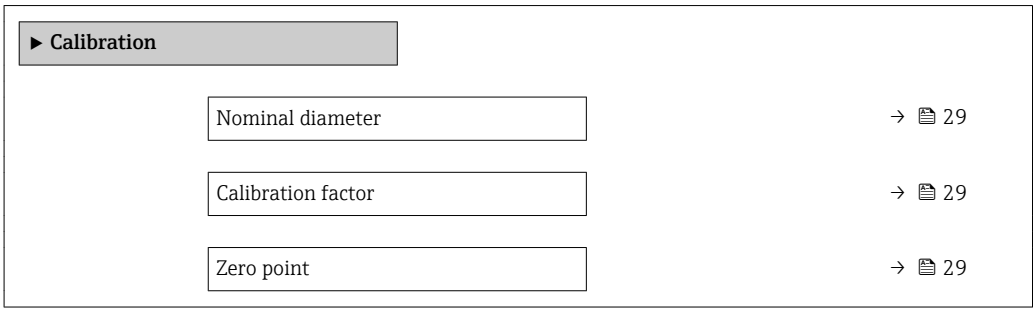
Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

3.2.5 "Calibration" submenu

Navigation Expert → Sensor → Calibration



Nominal diameter

Navigation Expert → Sensor → Calibration → Nominal diameter

Description Displays the nominal diameter of the sensor.

User interface DNxx / x"

Factory setting Depends on the size of the sensor

Additional information *Description*

The value is also specified on the sensor nameplate.

Calibration factor

Navigation Expert → Sensor → Calibration → Cal. factor

Description Displays the current calibration factor for the sensor.

User interface Positive floating-point number

Factory setting Depends on nominal diameter and calibration.

Zero point

Navigation Expert → Sensor → Calibration → Zero point

Description This function shows the zero point correction value for the sensor.

User interface Signed floating-point number

Factory setting Depends on nominal diameter and calibration

3.3 "Output" submenu

Navigation Expert → Output

▶ **Output**		
	▶ **Pulse/frequency/switch output 1 to 2**	→ 30

3.3.1 "Pulse/frequency/switch output 1 to 2" submenu

Navigation Expert → Output → PFS output 1 to 2

▶ **Pulse/frequency/switch output 1 to 2**		
	Operating mode	→ 31
	Channel 2	→ 33
	Assign pulse output	→ 34
	Value per pulse	→ 34
	Pulse width	→ 35
	Measuring mode	→ 36
	Failure mode	→ 36
	Pulse output	→ 37
	Assign frequency output	→ 38
	Minimum frequency value	→ 38
	Maximum frequency value	→ 39
	Measuring value at maximum frequency	→ 39
	Measuring mode	→ 39
	Damping output	→ 41

Operating mode

Navigation Expert → Output → PFS output 1 to 2 → Operating mode

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

Selection
- Off
- Pulse
- Automatic pulse
- Frequency
- Switch

Factory setting
- Pulse/freq./switch output 1: **Pulse** option
- Pulse/freq./switch output 2: **Switch** option

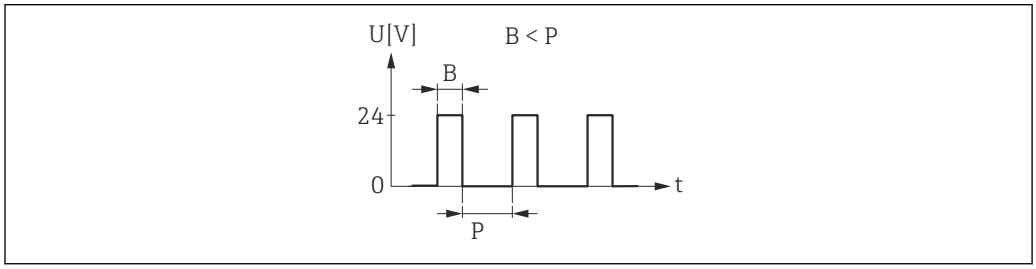
Additional information *"Off" option*

The pulse/frequency/switch output is not used.

"Pulse" option

Quantity-dependent pulse with configurable pulse width
- Whenever a specific volume is reached (pulse value), a pulse is output, the duration of which was set previously (pulse width).
- The pulses are never shorter than the set duration.
- This option is used for most batching applications.
- Depending on the setting, when using this option it is important that the recorder can detect pulses that are output at a pulse rate of 10 kHz.

Example
- Flow rate approx. 100 g/s
- Pulse value 0.1 g
- Pulse width 0.05 ms
- Pulse rate 1 000 Impuls/s



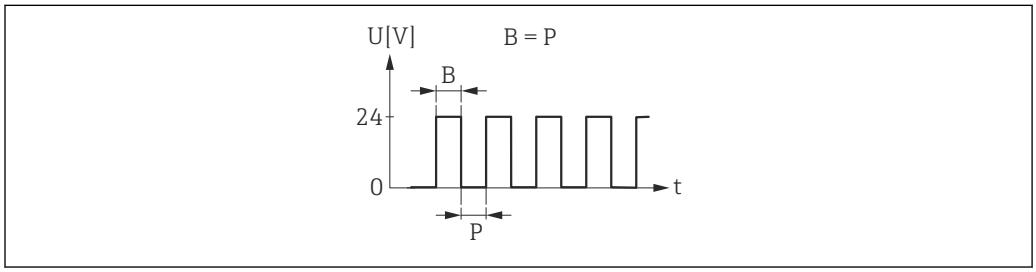
3 Quantity-proportional pulse (pulse value) with pulse width to be configured

B Pulse width entered
P Pauses between the individual pulses

"Automatic pulse" option

Quantity-proportional pulse with on/off ratio of 1:1
- This is used if the duration of the active pulse is not known.
- Whenever a specific volume is reached (pulse value), a pulse with a pulse-off ratio of 1:1 is output.
- In this case, the pulse width is not relevant.
- When using this option, it is important that the recorder can detect pulses that are output at a pulse rate of 10 kHz.

Example
- Flow rate approx. 100 g/s
- Pulse value 0.1 g
- Automatic pulse width
- Pulse rate approx. 1 000 Impuls/s



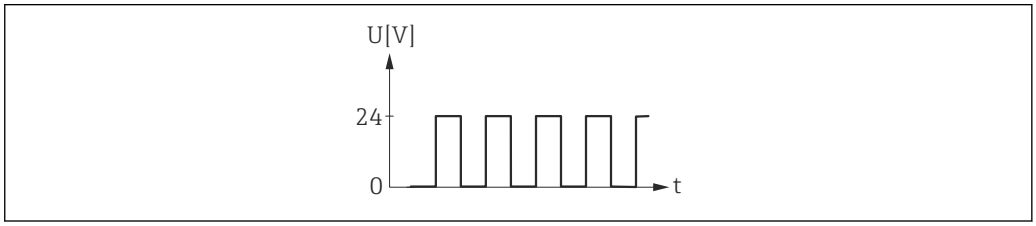
4 Quantity-proportional pulse (pulse value) with automatic pulse width

B Automatic pulse width
P Pauses between the individual pulses

"Frequency" option

Flow-proportional frequency output with 1:1 on/off ratio
An output frequency is output that is proportional to the value of the volume flow process variable.

Example
- Flow rate approx. 100 g/s
- Max. frequency 10 kHz
- Flow rate at max. frequency 1 000 g/s
- Output frequency approx. 1 000 Hz

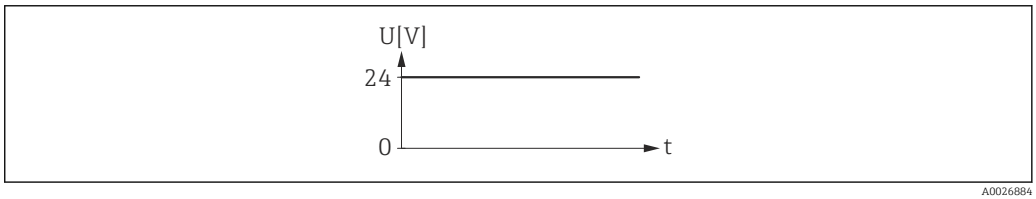


5 Flow-proportional frequency output

"Switch" option

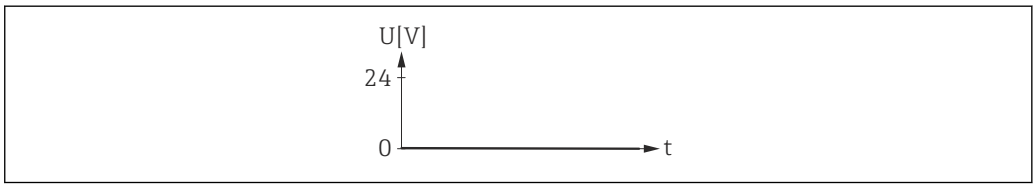
Switch to indicate a state (e.g. alarm or warning if a limit value is reached)

Example
Alarm response without alarm



6 No alarm, high level

Example
Alarm response in case of alarm



7 Alarm, low level

Channel 2

Navigation Expert → Output → PFS output 1 to 2 → Channel 2

Prerequsite The **Pulse** option is selected in the **Operating mode** parameter (→ 31).

Description Use this function to output a redundant pulse with or without a time delay With this setting, switch output 2 can be used as a redundant output. This is used primarily in metrological applications.

Selection
- Off
- Redundant 0°
- Redundant 90°
- Redundant 180°

Factory setting Off

Additional information *Options*
- Off
  Pulse output 2 is not used.
- Redundant 0°
  Redundant pulses are output without a time delay.
- Redundant 90°
  Redundant pulses are output with a time delay of half a pulse width.
- Redundant 180°
  Redundant pulses are output with a time delay of a full pulse width.

Assign pulse output

Navigation Expert → Output → PFS output 1 to 2 → Assign pulse

Prerequsite One of the following options is selected in the **Operating mode** parameter (→ 31):
- Pulse
- Automatic pulse

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

Selection
- Off
- Volume flow

Factory setting Off

Value per pulse

Navigation Expert → Output → PFS output 1 to 2 → Value per pulse

Prerequsite One of the following options is selected in the **Operating mode** parameter (→ 31):
- Pulse
- Automatic pulse

In the **Assign pulse output** parameter (→ 34), the **Volume flow** option is selected.

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

User entry Signed floating-point number

Factory setting

Depends on the nominal diameter:
- DN 4 (1/8"): 0.005 ml (0.0002 fl oz)
- DN 8 (3/8"): 0.02 ml (0.001 fl oz)
- DN 15 (½"): 0.1 ml (0.004 fl oz)
- DN 15K (½K"): 0.1 ml (0.004 fl oz)
- DN 25 (1"): 0.2 ml (0.007 fl oz)

Additional information

User entry

Weighting of the pulse output with a quantity.

The lower the pulse value, the
- better the resolution.
- the higher the frequency of the pulse response.

Pulse width

Navigation

Expert → Output → PFS output 1 to 2 → Pulse width

Prerequsite

In the **Operating mode** parameter (→ 31), the **Pulse** option is selected and in the **Assign pulse output** parameter (→ 34), the **Volume flow** option is selected.

Description

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

User entry

0.05 to 3.75 ms

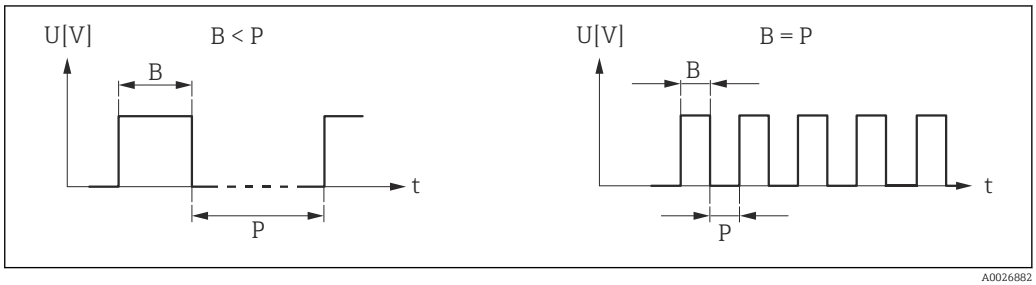
Factory setting

0.05 ms

Additional information

Description

- Define how long a pulse is (duration).
- The duration must be defined depending on the input card used.
- The maximum pulse rate is defined by f_{max} = 1 / (2 × pulse width).
- The interval between two pulses lasts at least as long as the set pulse width.
- The maximum flow is defined by Q_{max} = f_{max} × pulse value.
- If the flow exceeds these limit values, the measuring device displays the diagnostic message ⚠**S443 Pulse output 1 to 2**.



B Pulse width entered
P Intervals between the individual pulses

Example

- Pulse value: 0.1 g
- Pulse width: 0.1 ms
- f_{max}: 1 / (2 × 0.1 ms) = 5 kHz
- Q_{max}: 5 kHz × 0.1 g = 0.5 kg/s

The pulse width is not relevant for **Automatic pulse** option.

Measuring mode

Navigation Expert → Output → PFS output 1 to 2 → Measuring mode

Prerequisite One of the following options is selected in the **Operating mode** parameter (→ 31):
- Pulse
- Automatic pulse

In the **Assign pulse output** parameter (→ 34), the **Volume flow** option is selected.

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

Selection
- Forward flow
- Forward/Reverse flow
- Reverse flow

Factory setting Forward flow

Additional information *Selection*

- Forward flow
  Positive flow is output, negative flow is not output.
- Forward/Reverse flow
  Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
- Reverse flow
  Negative flow is output, positive flow is not output.

For a detailed description of the options available, see the **Measuring mode** parameter (→ 39)

Failure mode

Navigation Expert → Output → PFS output 1 to 2 → Failure mode

Prerequisite One of the following options is selected in the **Operating mode** parameter (→ 31):
- Pulse
- Automatic pulse

In the **Assign pulse output** parameter (→ 34), the **Volume flow** option is selected.

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

Selection
- Actual value
- No pulses

Factory setting
Actual value

Additional information
Description

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

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

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

Pulse output

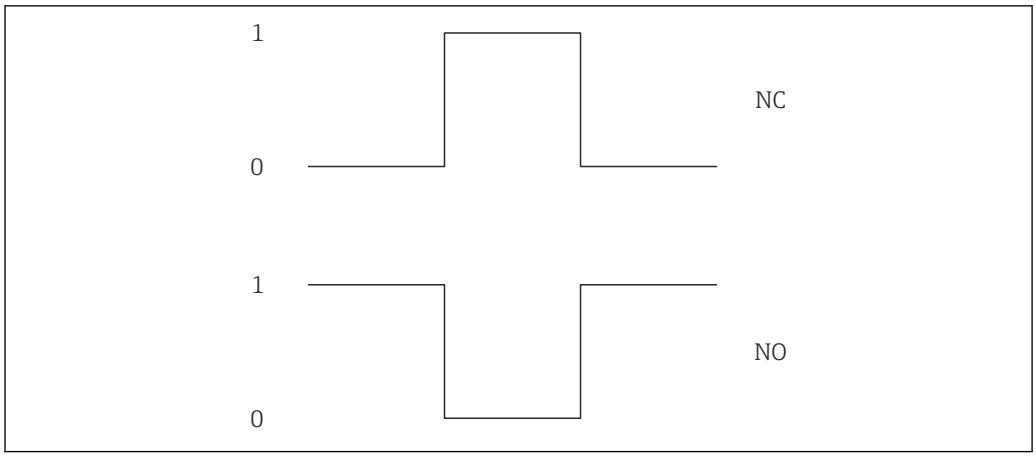
Navigation
Expert → Output → PFS output 1 to 2 → Pulse output 1 to 2

Prerequsite
One of the following options is selected in the **Operating mode** parameter (→ 31):
- Pulse
- Automatic pulse

Description
Displays the pulse frequency currently output.

User interface
Positive floating-point number

Additional information
Description
- The pulse output is an open emitter output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.
- The **Value per pulse** parameter (→ 34) and the **Pulse width** parameter (→ 35) (Operating mode (→ 31) Pulse) can be used to define the value (i.e. the amount of the measured value that corresponds to a pulse) and the duration of the pulse.



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

The output behavior can be reversed via the **Invert output signal** parameter (→ 48), i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of an error (**Failure mode** parameter (→ 36)) can be configured.

The duration of the pulses must be defined as a function of the input card used. The pulse(s) must not exceed the maximum input frequency of the counter card.

Assign frequency output

Navigation Expert → Output → PFS output 1 to 2 → Assign freq.

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 31).

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

Selection
- Off
- Volume flow

Factory setting Off

Minimum frequency value

Navigation Expert → Output → PFS output 1 to 2 → Min. freq. value

Prerequisite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected and in the **Assign frequency output** parameter (→ 38), the **Volume flow** option is selected.

Description Use this function to enter the start value frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 0.0 Hz

Maximum frequency value

Navigation Expert → Output → PFS output 1 to 2 → Max. freq. value

Prerequsite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected and in the **Assign frequency output** parameter (→ 38), the **Volume flow** option is selected.

Description Use this function to enter the end value frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 10 000.0 Hz

Measuring value at maximum frequency

Navigation Expert → Output → PFS output 1 to 2 → Val. at max.freq

Prerequsite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected and in the **Assign frequency output** parameter (→ 38), the **Volume flow** option is selected.

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information

Description

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

Dependency

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 38).

Measuring mode

Navigation Expert → Output → PFS output 1 to 2 → Measuring mode

Prerequsite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected and in the **Assign frequency output** parameter (→ 38), the **Volume flow** option is selected.

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

Selection

- Forward flow
- Forward/Reverse flow
- Reverse flow

Factory setting

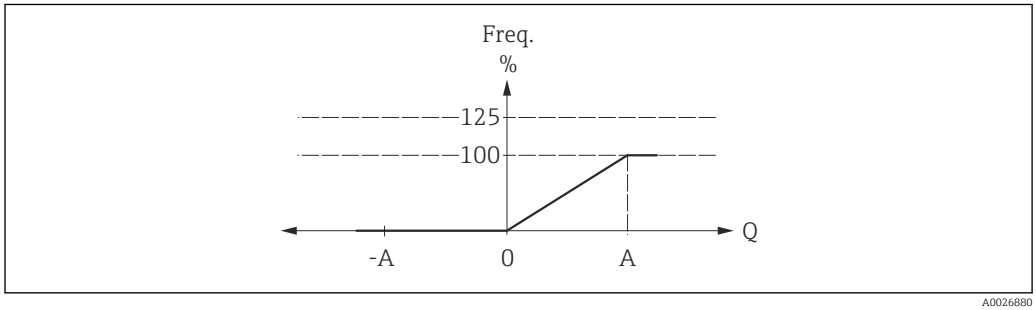
Forward flow

Additional information

"Forward flow" option

The frequency output signal is proportional to the measured variable assigned. The measuring range is defined by the value that is assigned to the Measuring value at maximum frequency (A). The measured value for the minimum frequency is implicitly 0.

The flow components outside the scaled measuring range are taken into account for signal output as follows:
Measuring value at maximum frequency = 10kg/h
– If the effective flow exceeds the measured value A, the diagnostic message ⚠**S442 Frequency output 1 to 2** is displayed. If the value is exceeded, the frequency remains at the maximum frequency, or at the failure frequency according to the configuration.
– If the value is undershot, i.e. flow is negative, 0 Hz is output and no diagnostic message is displayed.

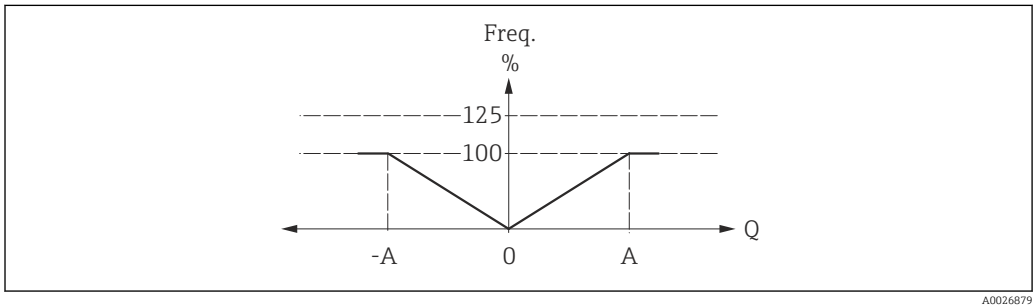


A Measuring value at maximum frequency

"Forward/Reverse flow" option

The frequency output signal is independent of the direction of flow (absolute amount of the measured variable). The flow direction can be output via the configurable switch outputs.

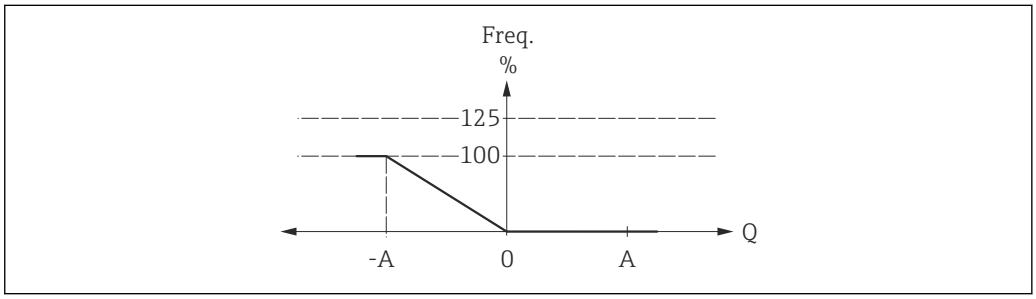
The flow components outside the scaled measuring range are taken into account for signal output as follows:
If the effective flow exceeds the absolute value A, the diagnostic message ⚠**S442 Frequency output 1 to 2** is displayed. If the value is exceeded, the frequency remains at the maximum frequency, or at the failure frequency according to the configuration.



A Measuring value at maximum frequency

"Reverse flow" option

The flow components outside the scaled measuring range are taken into account for signal output as follows:
- If the effective flow drops below the value A (normally a negative value for reverse flow), the diagnostic message ⚠**S442 Frequency output 1 to 2** is displayed. If the value is undershot, the frequency remains at the maximum frequency, or at the failure frequency according to the configuration.
- If the value is exceeded, i.e. flow is positive, 0 Hz is output and no diagnostic message is displayed.



A Measuring value at maximum frequency

Damping output

Navigation Expert → Output → PFS output 1 to 2 → Damping out.

Prerequsite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected and in the **Assign frequency output** parameter (→ 38), the **Volume flow** option is selected.

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

User entry 0 to 999.9 s

Factory setting 0.0 s

Additional information *Description*

Use this function to enter a time constant (PT1 element) for frequency output damping. The frequency output is subject to separate damping that is independent of all preceding time constants.

This damping is not recommended for applications with high-speed filling $t_{fill} < 5$ s.

Failure mode

Navigation Expert → Output → PFS output 1 to 2 → Failure mode

Prerequsite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected and in the **Assign frequency output** parameter (→ 38), the **Volume flow** option is selected.

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

Selection
- Actual value
- Defined value
- 0 Hz

Factory setting 0 Hz

Additional information *Options*

- Actual value
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The fault is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. This Failure frequency (→ 42) replaces the current measured value and the alarm can be bypassed as a result. The actual measurement is switched off for the duration of the alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

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

Failure frequency

Navigation Expert → Output → PFS output 1 to 2 → Failure freq.

Prerequsite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected and in the **Assign frequency output** parameter (→ 38), the **Volume flow** option is selected.

Description Use this function to enter the value for the frequency output in the event of a device alarm in order to bypass the alarm.

User entry 0.0 to 10 000.0 Hz

Factory setting 0.0 Hz

Output frequency

Navigation Expert → Output → PFS output 1 to 2 → Output freq. 1 to 2

Prerequsite In the **Operating mode** parameter (→ 31), the **Frequency** option is selected.

Description Displays the actual value of the output frequency which is currently measured.

User interface 0.0 to 10 000.0 Hz

Switch output function

Navigation Expert → Output → PFS output 1 to 2 → Switch out funct

Prerequsite The **Switch** option is selected in the **Operating mode** parameter (→ 31).

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

Selection
- Off
- On
- Diagnostic behavior
- Limit
- Flow direction check
- Status

Factory setting Off

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

Assign diagnostic behavior

Navigation Expert → Output → PFS output 1 to 2 → Assign diag. beh

Prerequsite
- The **Switch** option is selected in the **Operating mode** parameter (→ 31).
- The **Diagnostic behavior** option is selected in the **Switch output function** parameter (→ 43).

Description Use this function to select the diagnostic event category that is displayed for the switch output.

Selection
- Alarm
- Alarm or warning
- Warning

Factory setting Alarm

Additional information *Description*

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

Options

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

Assign limit

Navigation Expert → Output → PFS output 1 to 2 → Assign limit

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 31).
- The **Limit** option is selected in the **Switch output function** parameter (→ 43).

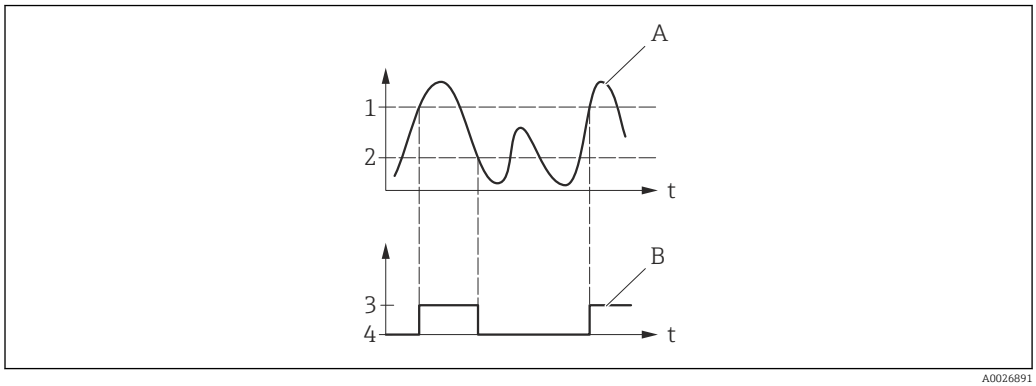
Description Use this function to select a process variable for the limit function.

Selection Volume flow

Factory setting Volume flow

Additional information *Description*

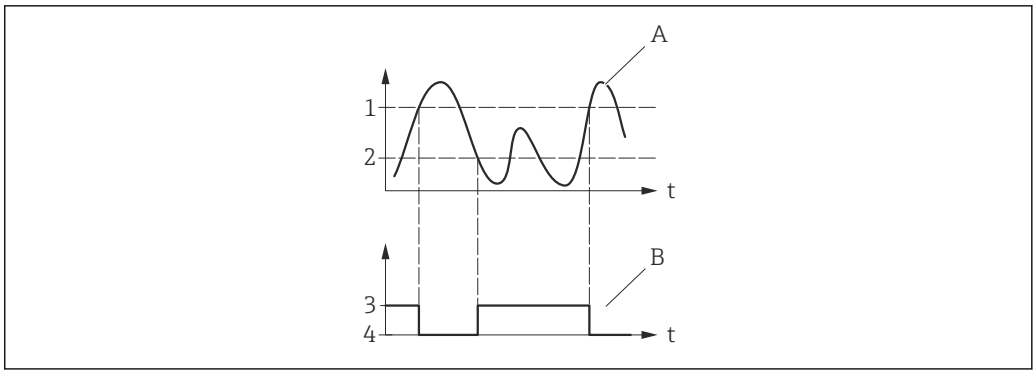
Behavior of status output when Switch-on value > Switch-off value:
- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive



A0026891

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

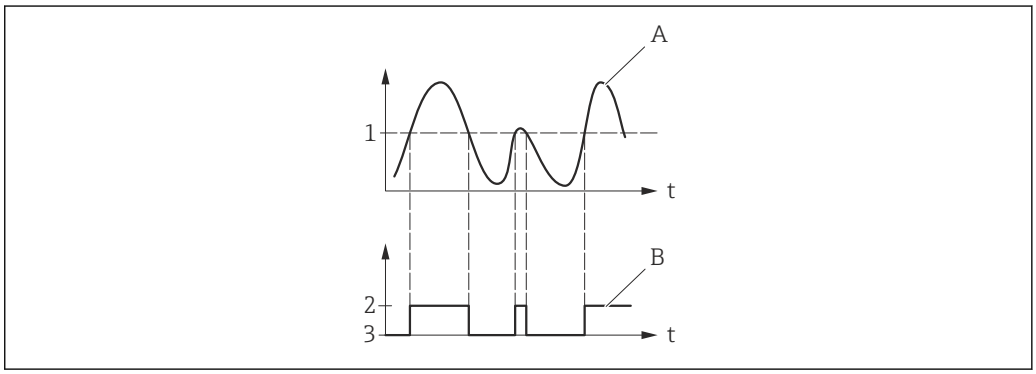
Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive



A0026892

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

Behavior of status output when Switch-on value = Switch-off value:
- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive



A0026893

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

Switch-on value

Navigation Expert → Output → PFS output 1 to 2 → Switch-on value

Prerequsite
- The **Switch** option is selected in the **Operating mode** parameter (→ 31).
- The **Limit** option is selected in the **Switch output function** parameter (→ 43).

Description Use this function to enter the measured value for the switch-on point.

User entry Signed floating-point number

Factory setting Country-specific:
- 0 ml/s
- 0 fl oz/s

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 44).

Switch-off value

Navigation Expert → Output → PFS output 1 to 2 → Switch-off value

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ 31).
- The **Limit** option is selected in the **Switch output function** parameter (→ 43).

Description Use this function to enter the measured value for the switch-off point.

User entry Signed floating-point number

Factory setting

Country-specific:
- 0 ml/s
- 0 fl oz/s

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 44).

Assign flow direction check

Navigation Expert → Output → PFS output 1 to 2 → Assign dir.check

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ 31).
- The **Flow direction check** option is selected in the **Switch output function** parameter (→ 43).

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

Selection

- Off
- Volume flow

Factory setting Volume flow

Additional information *Description*

If the value of the assigned process variable is ≥ 0, the status output is conductive. Otherwise, the switch output is non-conductive.

Assign status

Navigation Expert → Output → PFS output 1 to 2 → Assign status

Prerequsite
- The **Switch** option is selected in the **Operating mode** parameter (→ 31).
- The **Status** option is selected in the **Switch output function** parameter (→ 43).

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

Selection Low flow cut off

Factory setting Low flow cut off

Additional information *Options*

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

Failure mode

Navigation Expert → Output → PFS output 1 to 2 → Failure mode

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

Selection
- Actual status
- Open
- Closed

Factory setting Open

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

Switch status

Navigation Expert → Output → PFS output 1 to 2 → Switch status 1 to 2

Prerequsite In the **Operating mode** parameter (→ 31), the **Switch** option is selected.

Description Displays the current switch status of the status output.

User interface
- Open
- Closed

Additional information *Selection*
- Open
  The switch output is not conductive.
- Closed
  The switch output is conductive.

Invert output signal

Navigation Expert → Output → PFS output 1 to 2 → Invert outp.sig.

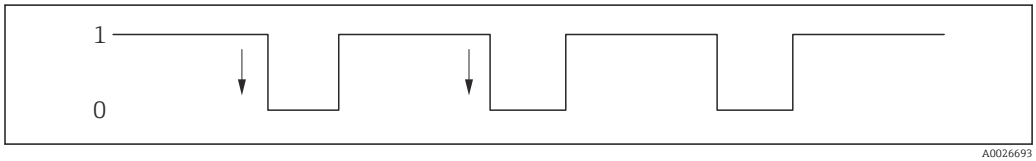
Description Use this function to select whether to invert the output signal.

Selection
- No
- Yes

Factory setting
- Pulse/freq./switch output 1: yes
- Pulse/freq./switch output 2: no

Additional information *Selection*

No option (passive - negative)



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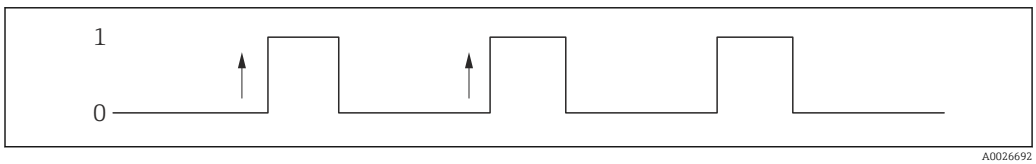
Yes option (passive - positive)



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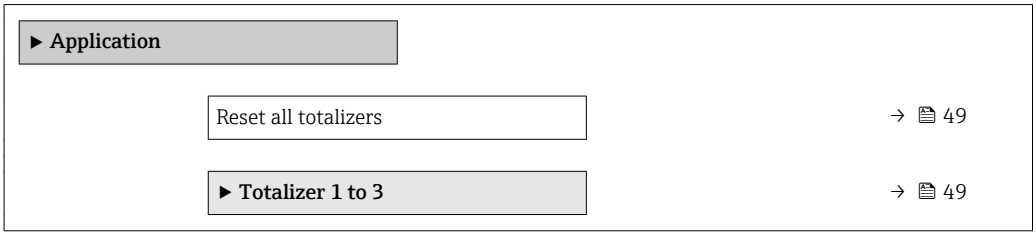
3.4 "Application" submenu

Navigation Expert → Application



Reset all totalizers

Navigation Expert → Application → Reset all tot.

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

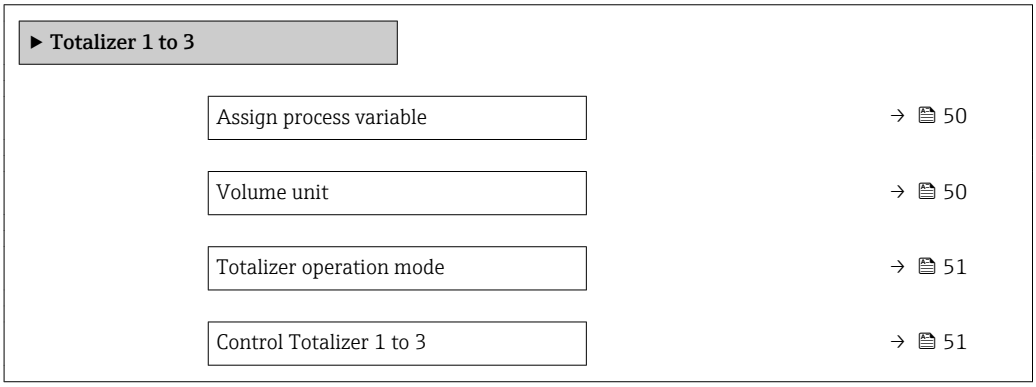
Selection
- Cancel
- Reset + totalize

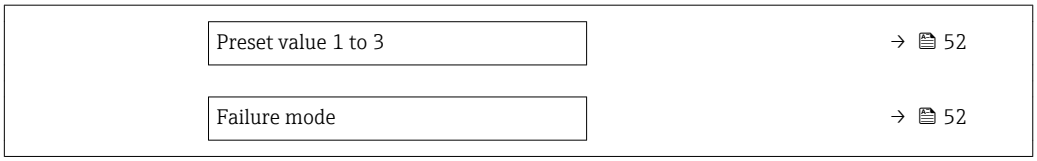
Factory setting Cancel

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

3.4.1 "Totalizer 1 to 3" submenu

Navigation Expert → Application → Totalizer 1 to 3





Assign process variable

Navigation Expert → Application → Totalizer 1 to 3 → Assign variable

Description Use this function to select a process variable for totalizer 1-3.

Selection
- Off
- Volume flow

Factory setting Volume flow

Additional information *Description*

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

Options

If the **Off** option is selected, only **Assign process variable** parameter (→ 50) is displayed in the **Totalizer 1 to 3** submenu. All other parameters in the submenu are hidden.

Volume unit

Navigation Expert → Application → Totalizer 1 to 3 → Volume unit

Prerequsite The **Volume flow** option is selected in the **Assign process variable** parameter (→ 50) of the **Totalizer 1 to 3** submenu.

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

Selection

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

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

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

Custom-specific units
User vol.

Factory setting Depending on country:
- ml
- fl oz (us)

Totalizer operation mode

Navigation Expert → Application → Totalizer 1 to 3 → Operation mode

Prerequsite In the **Assign process variable** parameter (→ 50) of the **Totalizer 1 to 3** submenu, the **Volume flow** option is selected.

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

Selection
- Net flow total
- Forward flow total
- Reverse flow total

Factory setting Net flow total

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

Control Totalizer 1 to 3

Navigation Expert → Application → Totalizer 1 to 3 → Control Tot. 1 to 3

Prerequsite In the **Assign process variable** parameter (→ 50) of the **Totalizer 1 to 3** submenu, the **Volume flow** option is selected.

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

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

Factory setting Totalize

Additional information *Options*

- Totalize
  The totalizer is started or continues totalizing with the current counter reading.
- Reset + hold
  The totaling process is stopped and the totalizer is reset to 0.
- Preset + hold
  The totaling process is stopped and the totalizer is set to its defined start value from the **Preset value** parameter (→ 52).
- 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 in the **Preset value** parameter (→ 52) and the totaling process is restarted.

Preset value 1 to 3

Navigation Expert → Application → Totalizer 1 to 3 → Preset value 1 to 3

Prerequisite In the **Assign process variable** parameter (→ 50) of the **Totalizer 1 to 3** submenu, the **Volume flow** option is selected.

Description Use this function to enter a start value for totalizer 1-3.

User entry Signed floating-point number

Factory setting Country-specific:
- 0 m^3
- 0 ft^3

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Assign process variable** parameter. If the following is selected in the **Assign process variable** parameter:
Volume flow option: **Volume flow unit** parameter (→ 19)

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 3 → Failure mode

Prerequisite In the **Assign process variable** parameter (→ 50) of the **Totalizer 1 to 3** submenu, the **Volume flow** option is selected.

Description Use this function to select how a totalizer behaves in an alarm condition.

Selection
- Stop
- Actual value
- Last valid value

Factory setting
Stop

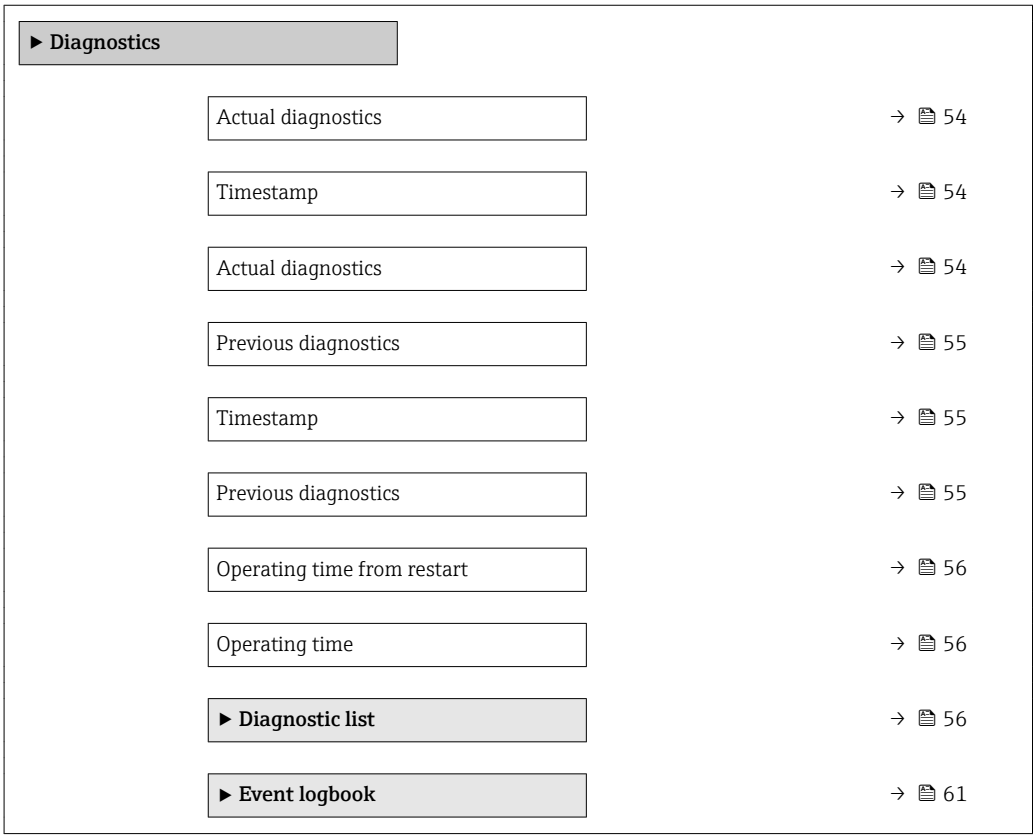
Additional information
Description

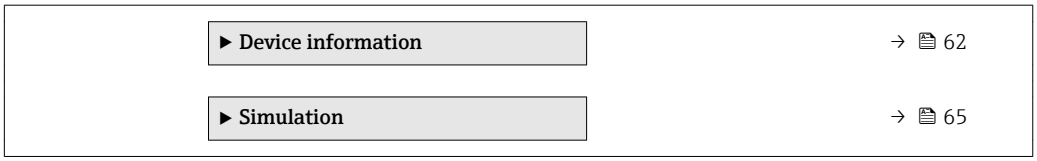
This setting does not affect the error response mode of other totalizers and the outputs. This is specified in separate parameters.

Options
- Stop
  Totalizing is stopped in an alarm condition.
- Actual value
  The totalizer continues to count based on the actual measured value; the error is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the error occurred.

3.5 "Diagnostics" submenu

Navigation Expert → Diagnostics





Actual diagnostics

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 *User interface*

Additional pending diagnostic messages can be shown in the **Diagnostic list** submenu (→ 56).

Example

For the display format:
⚠S442 Frequency output

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 *User interface*

The diagnostic message can be displayed via the **Actual diagnostics** parameter (→ 54).

Example

For the display format:
24d12h13m00s

Actual diagnostics

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

Previous diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics

Prerequsite 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:
⚠S442 Frequency output

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 *User interface*

The diagnostic message can be displayed via the **Previous diagnostics** parameter (→ 55).

Example

For the display format:
24d12h13m00s

Previous diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics

Prerequsite 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

Operating time from restart

Navigation Expert → Diagnostics → Time fr. restart

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

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

Operating time

Navigation Expert → Diagnostics → Operating time

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

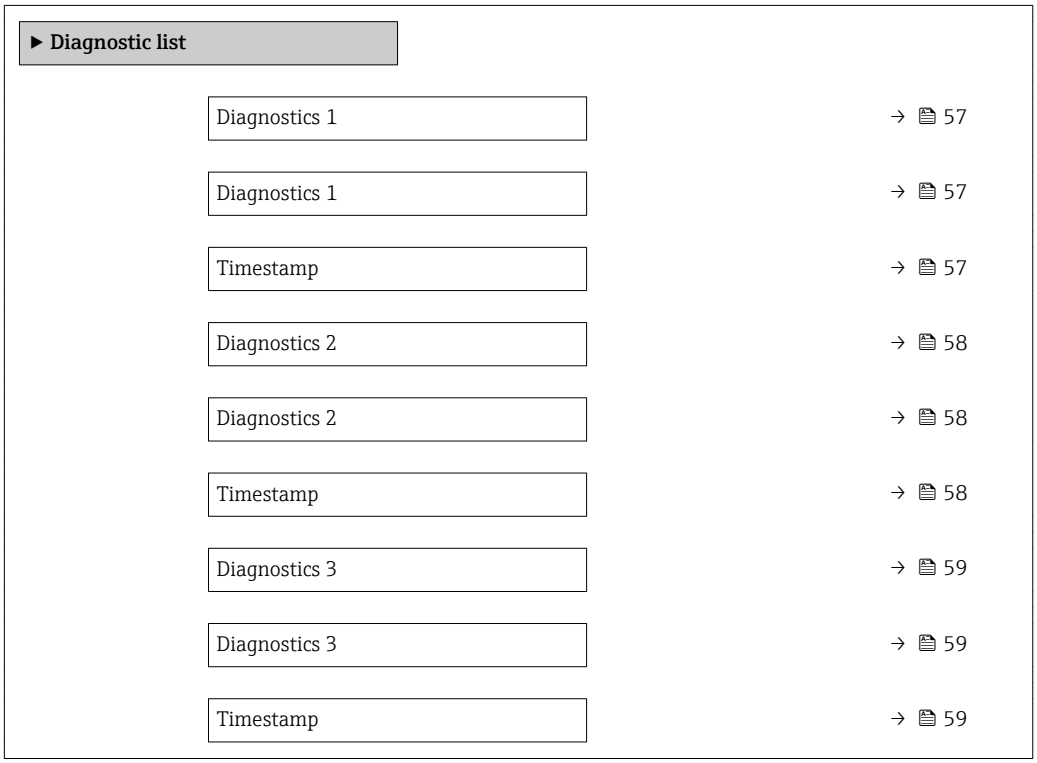
User interface Days (d), hours (h), minutes (m) and seconds (s)

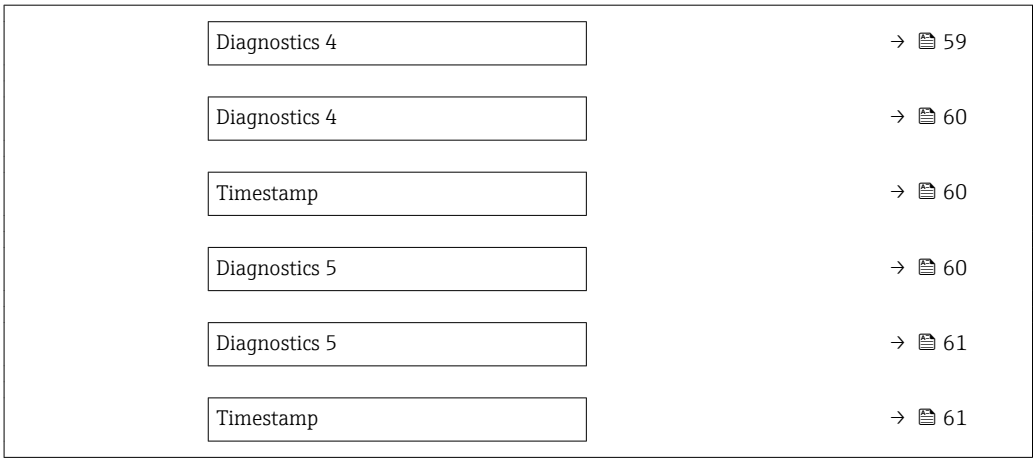
Additional information *User interface*

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

3.5.1 "Diagnostic list" submenu

Navigation Expert → Diagnostics → Diagnostic list





Diagnostics 1

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 1

Description Use this function to display 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 Frequency output
- ⊗F276 I/O module failure

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 *User interface*

The diagnostic message can be displayed via the **Diagnostics 1** parameter (→ 57).

Example

For the display format:
24d12h13m00s

Diagnostics 2

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 2

Description Use this function to display 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 Frequency output
- ⊗F276 I/O module failure

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 *User interface*

The diagnostic message can be displayed via the **Diagnostics 2** parameter (→ 58).

Example

For the display format:
24d12h13m00s

Diagnostics 3

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 3

Description Use this function to display 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 Frequency output
- ⊗F276 I/O module failure

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 *User interface*

The diagnostic message can be displayed via the **Diagnostics 3** parameter (→ 59).

Example

For the display format:
24d12h13m00s

Diagnostics 4

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 4

Description Use this function to display 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 Frequency output
- ⊗F276 I/O module failure

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 *User interface*

The diagnostic message can be displayed via the **Diagnostics 4** parameter (→ 59).

Example

For the display format:
24d12h13m00s

Diagnostics 5

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 5

Description Use this function to display 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 Frequency output
- ⊗F276 I/O module failure

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 *User interface*

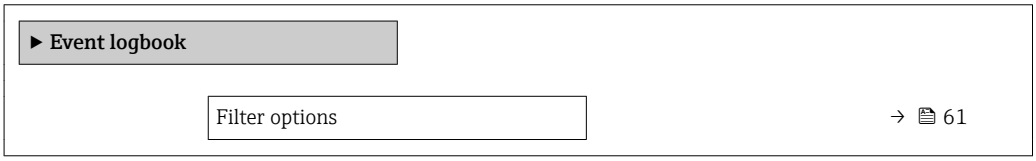
The diagnostic message can be displayed via the **Diagnostics 5** parameter (→ 60).

Example

For the display format:
24d12h13m00s

3.5.2 "Event logbook" submenu

Navigation Expert → Diagnostics → Event logbook



Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options

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

Selection
- All
- Failure (F)
- Function check (C)

- Out of specification (S)
- Maintenance required (M)
- Information (I)

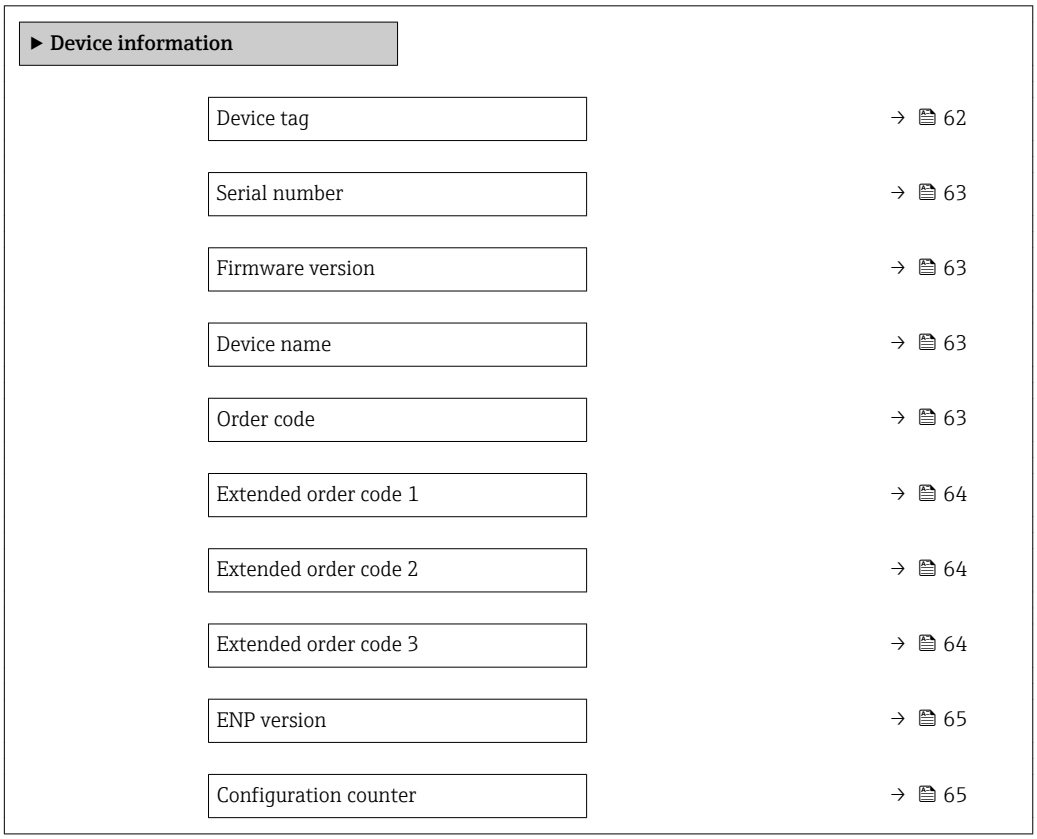
Factory setting All

Additional information *Description*

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

3.5.3 "Device information" submenu

Navigation Expert → Diagnostics → Device info



Device tag

Navigation Expert → Diagnostics → Device info → Device tag

Description Use this function to enter the unique name for the measuring point so that it can be identified quickly within the plant. The name is displayed in the header.

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

Factory setting Dosimag

Serial number

Navigation Expert → Diagnostics → Device info → Serial number

Description Displays the serial number of the measuring device.

It can also be found on the nameplate.

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

Additional information *Description*

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

Firmware version

Navigation Expert → Diagnostics → Device info → Firmware version

Description Displays the device firmware version installed.

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

Factory setting 03.00

Device name

Navigation Expert → Diagnostics → Device info → Device name

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

User interface Dosimag

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.

Extended order code 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.

Extended order code 2

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

Description For displaying the second part of the extended order code.

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 64)

Extended order code 3

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

Description For displaying the third part of the extended order code.

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 64)

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.

Configuration counter

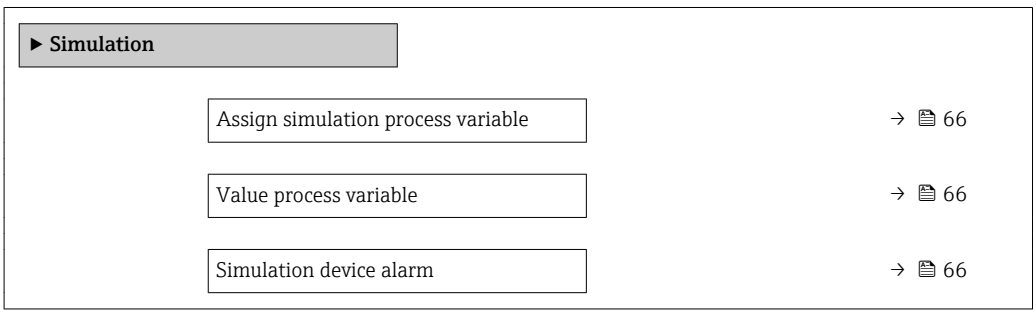
Navigation Expert → Diagnostics → Device info → Config. counter

Description Displays the number of parameter modifications for the device. When the user changes a parameter setting, this counter is incremented.

User interface 0 to 65 535

3.5.4 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation



Assign simulation process variable

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
- Volume flow

Factory setting Off

Additional information *Description*

The simulation value of the selected process variable is specified in the **Value process variable** parameter (→ 66).

Value process variable

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

Prerequsite In the **Assign simulation process variable** parameter (→ 66), the **Volume flow** option is selected.

Description Use this function to enter a simulation value for the selected process variable. Subsequent measured value processing and the signal output use this simulation value. In this way, users can verify whether the measuring device has been configured correctly.

User entry Depends on the process variable selected

Factory setting 0

Additional information *User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 19).

Simulation device 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

Additional information *Description*

In this way, users can verify the correct function of downstream switching units.

4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

Volume	ml
Volume flow	ml/s

4.1.2 On value low flow cut off

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

Nominal diameter [mm]	On value low flow cut off (v ~ 0.04 m/s) [ml/s]
4	0.5
8	2
15K [1)]	7
15	7
25	16

1) Conical version (corresponds to DN 12)

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

Volume	fl oz (us)
Volume flow	fl oz/s (us)

4.2.2 On value low flow cut off

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

Nominal diameter [in]	On value low flow cut off (v ~ 0.13 ft/s) [oz fl/s]
$^{5}/_{32}$	0.02
$^{5}/_{16}$	0.08
½K [1)]	0.25

Nominal diameter [in]	On value low flow cut off (v ~ 0.13 ft/s) [oz fl/s]
½	0.25
1	0.53

1) Conical version (corresponds to DN 12)

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Volume	cm^3, dm^3, m^3	Cubic centimeter, cubic decimeter, cubic meter
	ml, l, hl, Ml	Milliliter, liter, hectoliter, megaliter
Volume flow	cm^3/s, cm^3/min, cm^3/h, cm^3/d	Cubic centimeter/time unit
	dm^3/s, dm^3/min, dm^3/h, dm^3/d	Cubic decimeter/time unit
	m^3/s, m^3/min, m^3/h, m^3/d	Cubic meter/time unit
	ml/s, ml/min, ml/h, ml/d	Milliliter/time unit
	l/s, l/min, l/h, l/d	Liter/time unit
	hl/s, hl/min, hl/h, hl/d	Hectoliter/time unit
	Ml/s, Ml/min, Ml/h, Ml/d	Megaliter/time unit
Time	m, h, d, y	Minute, hour, day, year

5.2 US units

Process variable	**Units**	**Explanation**
Volume	af	Acre foot
	ft^3	Cubic foot
	fl oz (us), gal (us), kgal (us), Mgal (us)	Fluid ounce, gallon, kilogallon, million gallon
	bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)	Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)
Volume flow	af/s, af/min, af/h, af/d	Acre foot/time unit
	ft^3/s, ft^3/min, ft^3/h, ft^3/d	Cubic foot/time unit
	fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us)	Fluid ounce/time unit
	gal/s (us), gal/min (us), gal/h (us,) gal/d (us)	Gallon/time unit
	kgal/s (us), kgal/min (us), kgal/h (us,) kgal/d (us)	Kilogallon/time unit
	Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us)	Million gallon/time unit
	bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.)	Barrel/time unit (normal liquids) Normal liquids: 31.5 gal/bbl
	bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer)	Barrel /time unit (beer) Beer: 31.0 gal/bbl
	bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 42.0 gal/bbl
	bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank)	Barrel/time unit (filling tank) Filling tanks: 55.0 gal/bbl
Time	m, h, d, y	Minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

5.3 Imperial units

Process variable	Units	Explanation
Volume	gal (imp), Mgal (imp)	Gallon, mega gallon
	bbl (imp;beer), bbl (imp;oil)	Barrel (beer), barrel (petrochemicals)
Volume flow	gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)	Gallon/time unit
	Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)	Mega gallon/time unit
	bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)	Barrel /time unit (beer) Beer: 36.0 gal/bbl
	bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 34.97 gal/bbl
Time	m, h, d, y	Minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

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