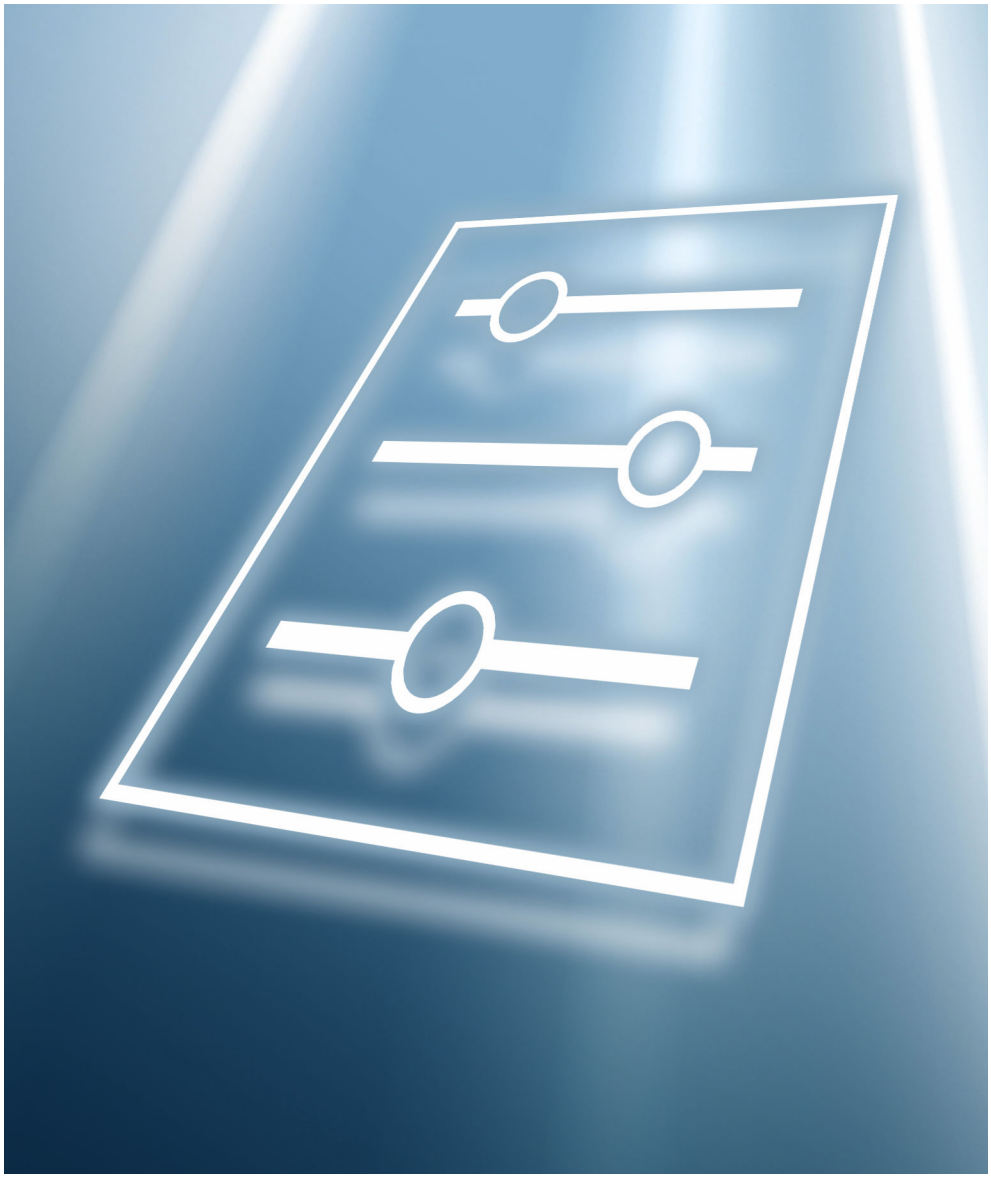
GP01158D/06/EN/02.22-00
71575137
2022-08-01

Valid as of version
01.00.zz (Device firmware)

Description of Device Parameters
Proline Promag 10

Electromagnetic flowmeter
Modbus RS485



Endress+Hauser
People for Process Automation

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1 About this document

1.1 Document function

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

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

Types of information

✓✓ Preferred procedures, processes or actions

✓ Permitted procedures, processes or actions

✗ Forbidden procedures, processes or actions

ℹ Additional information

Reference to documentation

Reference to page

Reference to graphic

1.3.2 Information on the document structure

The parameters of all the operating menus and the commissioning wizard are described in this document.

- **Guidance** menu with the **Commissioning** wizard (→ 🖹 6), which guides the user automatically through all the device parameters that are required for commissioning
- **Application** menu (→ 🖹 49)
- **Diagnostics** menu (→ 🖹 29)
- **System** menu (→ 🖹 90)

1.3.3 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 abbreviated to the form in which they appear on the display and in the operating tool.
Prerequisite	The parameter is only available under these specific conditions
Description	Description of the parameter function
Selection	List of the individual options for the parameter ▪ Option 1 ▪ Option 2
User entry	Input range for the parameter
User interface	Display value/data for the parameter
Additional information	Additional explanations (e.g. in examples): ▪ On individual options ▪ On display values/data ▪ On the input range ▪ On the parameter function

1.4 Associated documentation

Technical Information	Overview of the device with the most important technical data.
Operating Instructions	All the information that is required in the various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal as well as the technical data and dimensions.
Sensor Brief Operating Instructions	Incoming acceptance, transport, storage and mounting of the device.
Transmitter Brief Operating Instructions	Electrical connection and commissioning of the device.
Description of Parameters	Detailed explanation of the menus and parameters.
Safety Instructions	Documents for the use of the device in hazardous areas.
Special Documentation	Documents with more detailed information on specific topics.
Installation Instructions	Installation of spare parts and accessories.

The related documentation is available online:

W@M Device Viewer	On the www.endress.com/deviceviewer website, enter the serial number of the device: nameplate
Endress+Hauser Operations App	▶ Scan the Data Matrix code: nameplate ▶ Enter the serial number of the device: nameplate

2 "Guidance" menu

Main functions for use – from fast and safe commissioning to guided support during operation.

Navigation Guidance

Guidance		
	▶ Commissioning	→ 6

2.1 "Commissioning" wizard

Complete this wizard to commission the device. NOTE: If you exit the wizard beforehand, the changes you made will be saved. For this reason, the device may be in an undefined state! In this case, reset the device to the default settings.

Navigation Guidance → Commissioning

▶ Commissioning		
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2.1.1 Device identification

Navigation Guidance → Commissioning

Device tag

Navigation Guidance → Commissioning → Device tag

Description Enter a unique designation for the measuring point to be able to easily identify it within the plant.

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

Serial number

Navigation Guidance → Commissioning → Serial number

Description Displays the serial number of the measuring device. The serial number can be used to identify the measuring device and to retrieve further information on the measuring device, such as the related documentation, via the Device Viewer or Operations app.

Additional information:
The serial number can also be found on the nameplate of the sensor and transmitter.

User interface Character string comprising numbers, letters and special characters

Firmware version

Navigation Guidance → Commissioning → Firmware version

Description Displays the device firmware version installed.

User interface Character string comprising numbers, letters and special characters

Device name

Navigation Guidance → Commissioning → Device name

Description Displays the name of the transmitter.

Additional information:
The name can also be found on the transmitter's nameplate.

User interface Character string comprising numbers, letters and special characters

2.1.2 System units

Navigation Guidance → Commissioning

Volume flow unit	

Navigation Guidance → Commissioning → Volume flow unit

Description Select volume flow unit.

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
- $MMft^3/s$
- $MMft^3/min$
- $MMft^3/h$
- Mft^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)
- 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)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)

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

Volume unit

Navigation Guidance → Commissioning → Volume unit

Description Select volume unit.

Selection

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

US units
- af
- ft^3
- Mft^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)

Mass flow unit

Navigation Guidance → Commissioning → Mass flow unit

Description Select mass flow unit.

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

Mass unit

Navigation Guidance → Commissioning → Mass unit

Description Select mass unit.

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

Density unit

Navigation Guidance → Commissioning → Density unit

Description Select density unit.

Selection

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

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

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

Temperature unit

Navigation Guidance → Commissioning → Temperature unit

Prerequisite Temperature measurement is only optionally available for Promag H 10 (5HBB): Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CI (medium temperature measurement)

Description Select temperature unit.

Selection

SI units
- °C
- K

US units
- °F
- °R

Conductivity unit

Navigation Guidance → Commissioning → Conductiv. unit

Prerequisite Conductivity measurement is switched on in the **Conductivity measurement** parameter (→ 64).

Conductivity measurement is only optionally available: Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CX (conductivity measurement)

Description Select conductivity unit.

Selection

SI units
- nS/cm
- µS/cm
- µS/m
- µS/mm
- mS/m
- mS/cm
- S/cm
- S/m
- kS/m
- MS/m

2.1.3 Totalizer 1 to n

Navigation Guidance → Commissioning

Assign process variable

Navigation Guidance → Commissioning → Assign variable

Description Select process variable for totalizer.

Additional information:
If the option selected is changed, the device resets the totalizer to "0".

Selection
- Off
- Volume flow
- Mass flow

Unit totalizer 1 to n

Navigation Guidance → Commissioning → Unit totalizer 1 to n

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Select process variable totalizer unit.

Selection

SI units
- g *
- kg *
- t *

US units
- oz *
- lb *
- STon *

* Visibility depends on order options or device settings

or

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

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

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

* Visibility depends on order options or device settings

or

Other units
None *

* Visibility depends on order options or device settings

Additional information

Description

The unit is selected separately for each totalizer. The unit is independent of the option selected in the **System units** submenu (→ 🖹 53).

Selection

The selection is dependent on the process variable selected in the **Assign process variable** parameter (→ 🖹 13).

Totalizer operation mode

Navigation Guidance → Commissioning → Operation mode

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Select totalizer calculation mode.

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

Additional information

Selection

- **Net flow total** option
  The flow values in the forward and reverse flow directions are totalized and netted against each other. Net flow is recorded in the flow direction.
- **Forward flow total** option
  Only the flow in the forward flow direction is totalized.
- **Reverse flow total** option
  Only the flow in the reverse flow direction is totalized (= reverse flow quantity).

Failure mode

Navigation Guidance → Commissioning → Failure mode

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Specify how the totalizer should behave in the event of a device alarm.

Additional information:
The failsafe mode that applies to any other totalizers or outputs is specified separately in other parameters and is not impacted by this setting.

Selection
- Stop
- Actual value
- Last valid value

Additional information *Selection*
- **Stop** option
  The totalizer is stopped in the event of a device alarm.
- **Actual value** option
  The totalizer continues to totalize based on the current value measured; the device alarm is ignored.
- **Last valid value** option
  The totalizer continues to totalize based on the last valid value measured before the device alarm occurred.

2.1.4 Process parameters

Navigation Guidance → Commissioning

Flow damping

Navigation Guidance → Commissioning → Flow damping

Description Enter value for damping of the flow measured value in order to reduce the variability of the flow measured value when exposed to interference.

Additional information:
The depth of the flow filter is determined by this setting. As the filter depth increases, so does the reaction time of the device.
- Value = 0: No damping. Damping of 0 is not recommended, as the measuring signal is then so noisy that it is almost impossible to perform a measurement.
- Value > 0: Damping increases

Optimal damping depends on the measuring period.

Damping impacts the following measuring device variables:
- Outputs
- Low flow cut off
- Totalizers

User entry 0 to 15

2.1.5 Measurement conditions

Pressure shock suppression

Navigation Guidance → Commissioning

Pressure shock suppression	

Navigation Guidance → Commissioning → Pres. shock sup.

Description Enter time frame for signal suppression (= pressure shock suppression active), for example to prevent the device from registering flow movements in the pipe when a valve is closed.

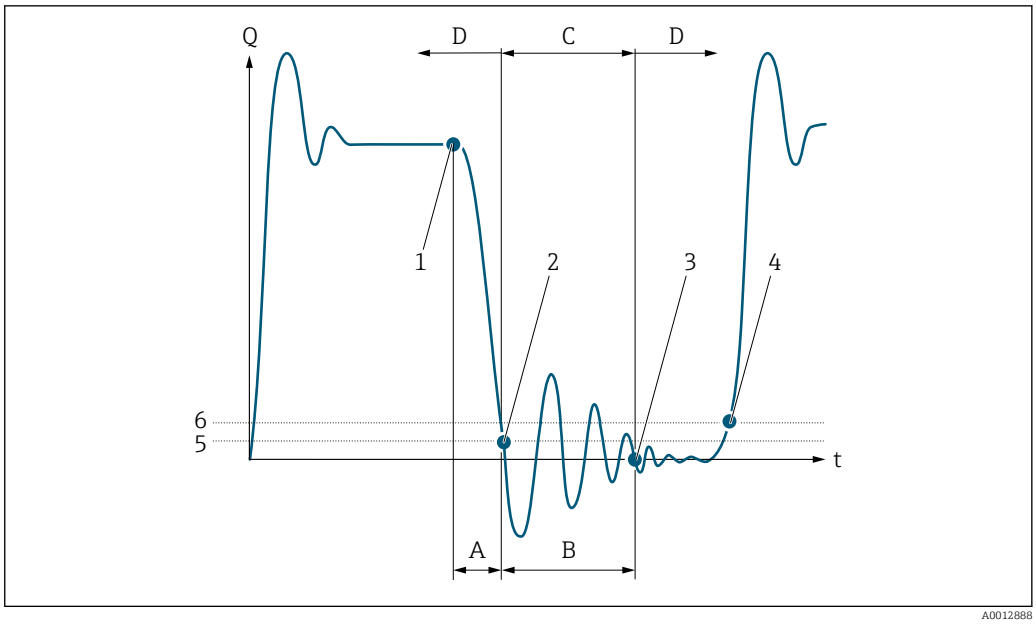
Additional information:
Pressure schock suppression is activated when the flow rate drops below the on value for low flow cutoff. Output values when pressure shock suppression is active:
- Flow: 0
- Totalizer: Last valid value

Pressure shock suppression is deactivated when:
- The time frame specified has elapsed and
- Flow exceeds the off value for low flow cutoff

User entry 0 to 100 s

Additional information *Example*

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



Q Flow
t Time
A After run
B Pressure shock
C Pressure shock suppression active 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

Low flow cut off

Navigation Guidance → Commissioning

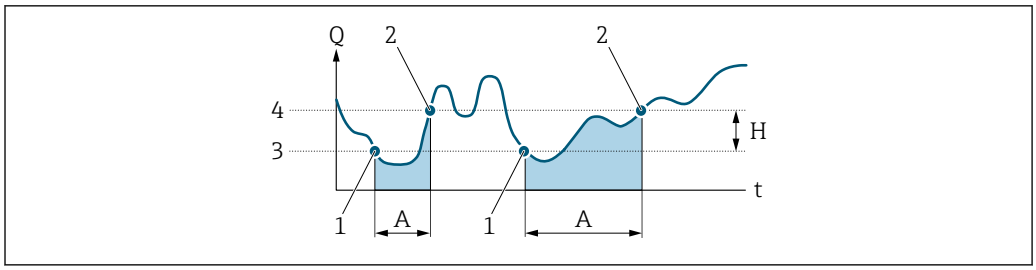
Low flow cut off

Navigation Guidance → Commissioning → Low flow cut off

Description Select process variable for low flow cut off to activate low flow cut off.

Selection
- Off
- Volume flow
- Mass flow

Additional information Description



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

On value low flow cutoff

Navigation Guidance → Commissioning → On value

Description Enter on value to switch on low flow cut off.

Value = 0: No low flow cut off
Value > 0: Low flow cut off is activated

User entry Positive floating-point number

Off value low flow cutoff

Navigation Guidance → Commissioning → Off value

Description Enter off value to switch off low flow cut off. The off value is entered as a positive hysteresis with respect to the on value.

User entry 0 to 100.0 %

Empty pipe detection

Navigation Guidance → Commissioning

Empty pipe detection	
Navigation	Guidance → Commissioning → Empty pipe det.
Description	Switch empty pipe detection on or off. Switch on empty pipe detection to detect a partially filled or empty measuring tube.
Selection	▪ Off ▪ On

Empty pipe adjust value	
Navigation	Guidance → Commissioning → Empty pipe value
Description	Displays adjustment value when the measuring tube is empty. NOTE Users logged on in the Service role have write access!
User interface	Positive floating-point number

Full pipe adjust value	
Navigation	Guidance → Commissioning → Full pipe value
Description	Displays adjustment value when the measuring tube is full. NOTE Users logged on in the Service role have write access!
User interface	Positive floating-point number

2.1.6 Current output

Navigation Guidance → Commissioning

Process variable current output

Navigation Guidance → Commissioning → Proc.var. outp

Description Select process variable for current output

Selection
- Off *
- Mass flow
- Conductivity *
- Corrected conductivity *
- Volume flow
- Temperature *
- Noise *
- Coil current shot time *

Current range output

Navigation Guidance → Commissioning → Curr.range out

Description Select the current range for the measured value output and the upper and lower fault condition signal level.

Additional information:
- The measured value range is specified in the "Lower range value output " parameter and the "Upper range value output " parameter.
- If the measured value lies outside the scaled measured value range, diagnostic message "441 Current output faulty" is generated.
- In the event of a device alarm, the current output adopts the behavior specified in the "Failure behavior current output " parameter.

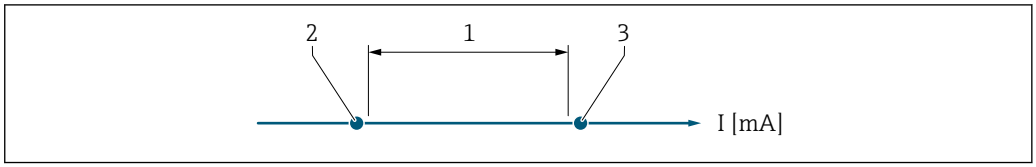
Selection
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- Fixed value

Additional information *Selection*
- **4...20 mA NE (3.8...20.5 mA)** option
  Select this option to set the current range in accordance with NAMUR recommendation NE43.
- **Fixed value** option
  Select this option to set the current output to a current value instead of a range.

The current value is defined in the **Fixed current** parameter (→ 23).

* Visibility depends on order options or device settings

The graphic shows the relationship between the current range for the output of the process value and the lower and upper alarm levels:



1 Current range for process value
2 Lower level for signal on alarm
3 Upper level for signal on alarm

Selection (current range for process value)	Lower level for signal on alarm	Upper level for signal on alarm
4...20 mA NE (3.8...20.5 mA)	< 3.6 mA	> 21.5 mA
4...20 mA US (3.9...20.8 mA)		
4...20 mA (4... 20.5 mA)		

Lower range value output

Navigation Guidance → Commissioning → Low.range outp

Prerequisite In the **Current range output** parameter, one of the following options is selected:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)

Description Enter lower range value for the measured value range.

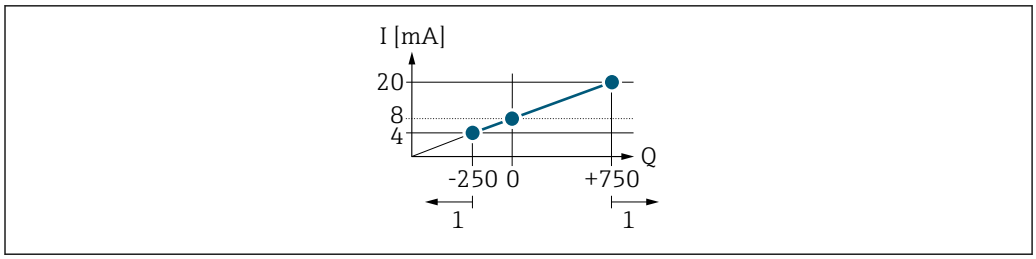
Additional information:
- Depending on the setting selected for the "Measuring mode current output " parameter, the value specified for this parameter and the "Upper range value output " parameter must have the same algebraic sign or not.
- As a rule, the lower range value is scaled to be lower than the upper range value. As a result, the behavior of the current output is proportional to the process variable assigned. If the lower range value is scaled to be higher than the upper range value, then the behavior of the current output will be inversely proportional to the process variable assigend.

User entry Signed floating-point number

Additional information Examples of the behavior, depending on the option selected in the **Measuring mode current output** parameter (→ 75).

Example: Measuring mode with "Forward flow" option

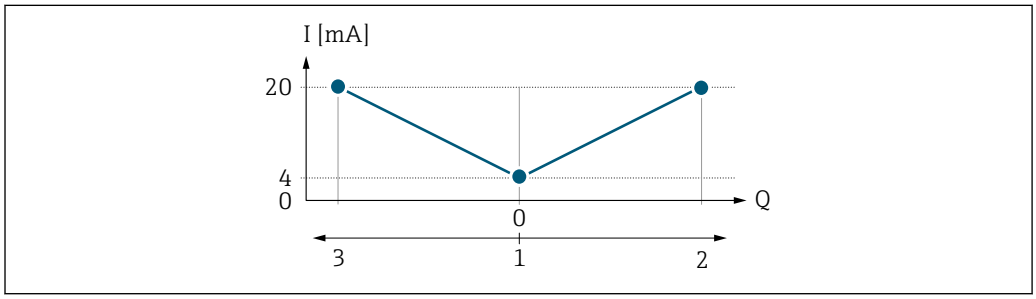
- **Lower range value output** parameter (→ 21) = not equal to zero flow (e.g. −250 m3/h)
- **Upper range value output** parameter (→ 22) = not equal to zero flow (e.g. +750 m3/h)
- Calculated current value = 8 mA at zero flow



Q Flow
I Current
1 Measuring range is exceeded or undershot

The linear operational range of the measuring device is defined by the values entered for the **Lower range value output** parameter (→ 21) and **Upper range value output** parameter (→ 22), and by the selected current range.

Example: Measuring mode with the "Forward/Reverse flow" option



Q Flow
I Current
1 Value assigned to 0/4 mA current
2 Forward flow
3 Reverse flow

The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **Lower range value output** parameter (→ 21) and **Upper range value output** parameter (→ 22) must have the same algebraic sign.

The value for the **Upper range value output** parameter (→ 22) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (→ 22) (e.g. forward flow).

Example: Measuring mode with the "Reverse flow compensation" option

If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s.

Upper range value output

Navigation Guidance → Commissioning → Upp.range outp

Prerequisite In the **Current range output** parameter, one of the following options is selected:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)

Description Enter upper range value for the measured value range.

User entry Signed floating-point number

Additional information Examples of the behavior, depending on the option selected in the **Measuring mode current output** parameter: **Lower range value output** parameter (→ 21):

Damping current output

Navigation Guidance → Commissioning → Damp.curr.outp

Prerequisite A process variable is selected in the **Process variable current output** parameter and one of the following options is selected in the **Current range output** parameter:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)

Description Enter time constant (PT1 element) to set the reaction time of the output signal to fluctuations in the measured value caused by process conditions.

Additional information:
- The smaller the time constant the faster the output reacts to fluctuations in the measured value.
- If the time constant is 0, damping is deactivated.

User entry 0.0 to 999.9 s

Fixed current

Navigation Guidance → Commissioning → Fixed current

Prerequisite In the **Current range output** parameter in the **Current output 1** submenu, the **Fixed value** option is selected.

Description Enter the value for the "Fixed value" option.

User entry 3.59 to 21.5 mA

Failure behavior current output

Navigation Guidance → Commissioning → Fail.behav.out

Prerequisite A process variable is selected in the **Process variable current output** parameter and one of the following options is selected in the **Current range output** parameter:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)

Description Specify how the output should behave in the event of a device alarm.

Selection
- Min.
- Max.
- Last valid value
- Actual value
- Fixed value

Additional information *Selection*

- **Min.** option
  The current output outputs the lower fault condition signal level for the specified current range.
  Additional information:
  The current range is specified in the "Current range output " parameter.
- **Max.** option
  The current output outputs the upper fault condition signal level for the specified current range.
  Additional information:
  The current range is specified in the "Current range output " parameter.
- **Last valid value** option
  The current output outputs the last valid value measured before the device alarm occurred.
- **Actual value** option
  The current output outputs the flow value currently measured. The device alarm is ignored.
- **Fixed value** option
  The current output outputs the value specified.
  Additional information:
  The value is specified in the "Failure current " parameter.

Failure current

Navigation Guidance → Commissioning → Fail. current

Prerequisite In the **Failure behavior current output** parameter in the **Current output 1** submenu, the **Fixed value** option is selected.

Description Enter the value for the "Fixed value" option in the "Failure behavior current output " parameter.

User entry 3.59 to 21.5 mA

2.1.7 Display

Navigation Guidance → Commissioning

Value 1 display

Navigation Guidance → Commissioning → Value 1 display

Description Select the measured value that is displayed first on the local display.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

Selection
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Value 2 display

Navigation Guidance → Commissioning → Value 2 display

Description Select the measured value that is shown second on the local display.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

Selection
- None
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *
- Totalizer 1
- Totalizer 2
- Totalizer 3

* Visibility depends on order options or device settings

Value 3 display

Navigation Guidance → Commissioning → Value 3 display

Description Select the measured value that is shown third on the local display.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

Selection
- None
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Value 4 display

Navigation Guidance → Commissioning → Value 4 display

Description Select the measured value that is shown fourth on the local display.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

Selection
- None
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Display damping

Navigation Guidance → Commissioning → Display damping

Description Enter time constant (PT1 element) to set reaction time of the display to fluctuations in the measured value.

Additional information:
- The smaller the time constant the faster the display reacts to fluctuations in the measured value.
- If the time constant is set to 0, damping is deactivated.

* Visibility depends on order options or device settings

User entry 0.0 to 999.9 s

2.1.8 Date/time

Navigation Guidance → Commissioning

Time format

Navigation Guidance → Commissioning → Time format

Description Select time format.

Selection
- 24 h
- 12 h AM/PM

Time zone

Navigation Guidance → Commissioning → Time zone

Description Select the time zone. Every time the time zone is changed, a logbook entry is created.

Selection

Other units
- UTC-12:00
- UTC-11:00
- UTC-10:00
- UTC-09:30
- UTC-09:00
- UTC-08:00
- UTC-07:00
- UTC-06:00
- UTC-05:00
- UTC-04:00
- UTC-03:30
- UTC-03:00
- UTC-02:00
- UTC-01:00
- UTC 00:00
- UTC+01:00
- UTC+02:00
- UTC+03:00
- UTC+03:30
- UTC+04:00
- UTC+04:30
- UTC+05:00
- UTC+05:30
- UTC+05:45
- UTC+06:00
- UTC+06:30
- UTC+07:00
- UTC+08:00
- UTC+08:45
- UTC+09:00
- UTC+09:30
- UTC+10:00
- UTC+10:30
- UTC+11:00
- UTC+12:00
- UTC+12:45
- UTC+13:00
- UTC+14:00

Set date/time

Navigation Guidance → Commissioning → Set date/time

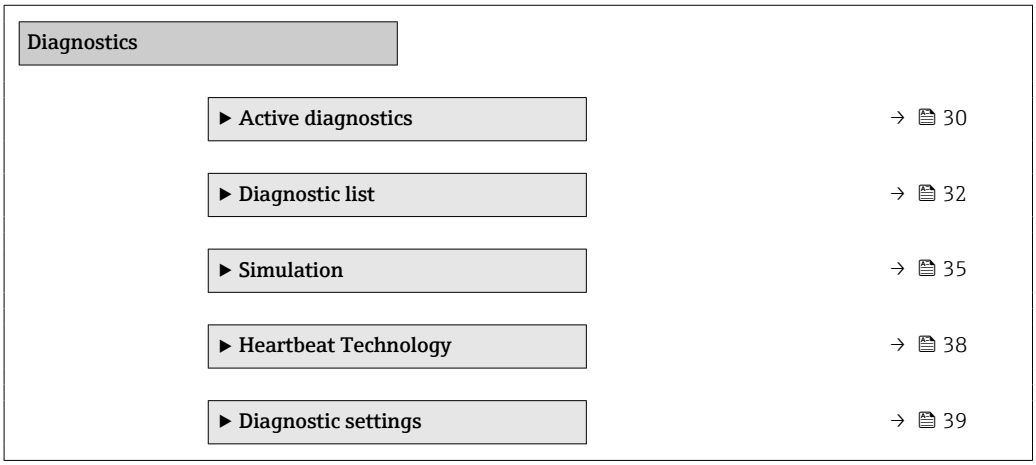
Description Set the date and local time. Every time the date or time is changed, a logbook entry is created.

User entry Date and time

3 "Diagnostics" menu

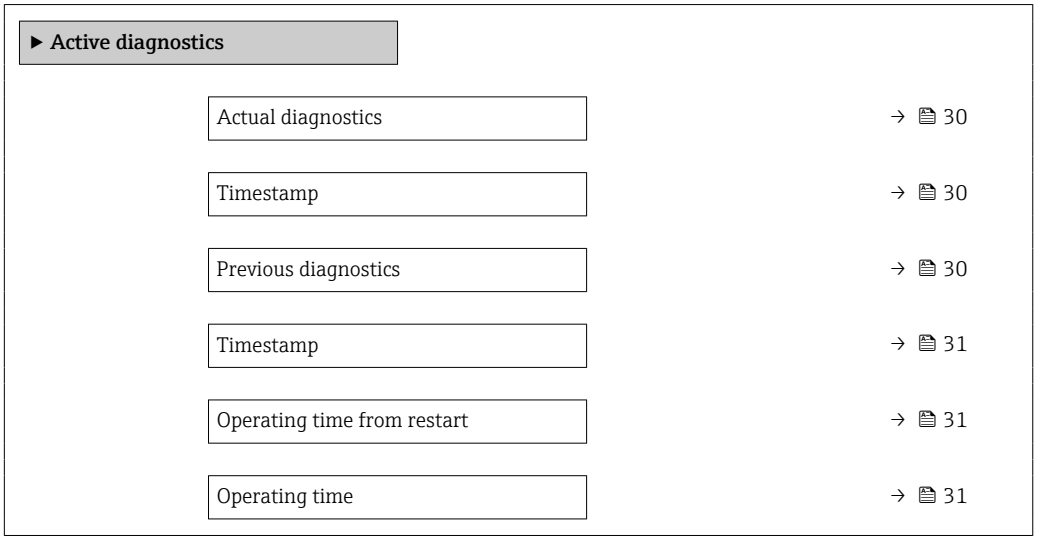
Troubleshooting and preventive maintenance – settings for device behavior during process and device events as well as assistance and measures for diagnostic purposes.

Navigation Diagnostics



3.1 "Actual diagnostics" submenu

Navigation Diagnostics → Active diagnos.



Actual diagnostics

Navigation Diagnostics → Active diagnos. → Actual diagnos.

Prerequisite A diagnostic event has occurred.

Description Displays the currently active diagnostic message.

If there is more than one pending diagnostic event, the message for the diagnostic event with the highest priority is displayed.

User interface Positive integer

Timestamp

Navigation Diagnostics → Active diagnos. → Timestamp

Description Displays the timestamp for the currently active diagnostic message.

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

Previous diagnostics

Navigation Diagnostics → Active diagnos. → Prev.diagnostics

Prerequisite At least two diagnostic events have already occurred.

Description Displays the diagnostic message for the last diagnostic event that has ended.

User interface Positive integer

Timestamp

Navigation Diagnostics → Active diagnos. → Timestamp

Description Displays the timestamp of the diagnostic message generated for the last diagnostic event that has ended.

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

Operating time from restart

Navigation Diagnostics → Active diagnos. → Time fr. restart

Description Indicates how long the device has been in operation since the last time the device was restarted.

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

Operating time

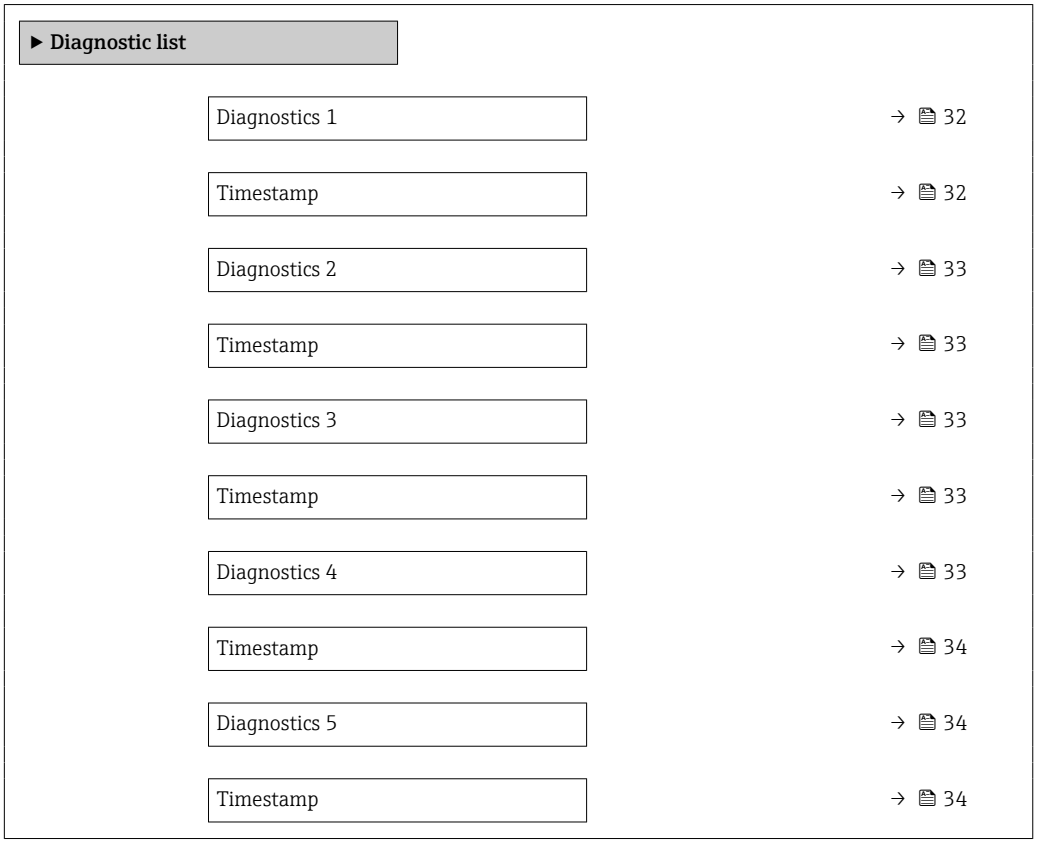
Navigation Diagnostics → Active diagnos. → Operating time

Description Indicates how long the device has been in operation.

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

3.2 "Diagnostic list" submenu

Navigation Diagnostics → Diagnostic list



Diagnostics 1

Navigation Diagnostics → Diagnostic list → Diagnostics 1

Description Displays the currently active diagnostic message with the highest priority.

User interface Positive integer

Timestamp

Navigation Diagnostics → Diagnostic list → Timestamp

Description Displays the timestamp for the diagnostic message with the highest priority.

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

Diagnostics 2

Navigation Diagnostics → Diagnostic list → Diagnostics 2

Description Displays the currently active diagnostic message with the second highest priority.

User interface Positive integer

Timestamp

Navigation Diagnostics → Diagnostic list → Timestamp

Description Displays the timestamp for the diagnostic message with the second highest priority.

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

Diagnostics 3

Navigation Diagnostics → Diagnostic list → Diagnostics 3

Description Displays the currently active diagnostic message with the third highest priority.

User interface Positive integer

Timestamp

Navigation Diagnostics → Diagnostic list → Timestamp

Description Displays the timestamp for the diagnostic message with the third highest priority.

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

Diagnostics 4

Navigation Diagnostics → Diagnostic list → Diagnostics 4

Description Displays the currently active diagnostic message with the fourth highest priority.

User interface Positive integer

Timestamp

Navigation Diagnostics → Diagnostic list → Timestamp

Description Displays the timestamp for the diagnostic message with the fourth highest priority.

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

Diagnostics 5

Navigation Diagnostics → Diagnostic list → Diagnostics 5

Description Displays the currently active diagnostic message with the fifth-highest priority.

User interface Positive integer

Timestamp

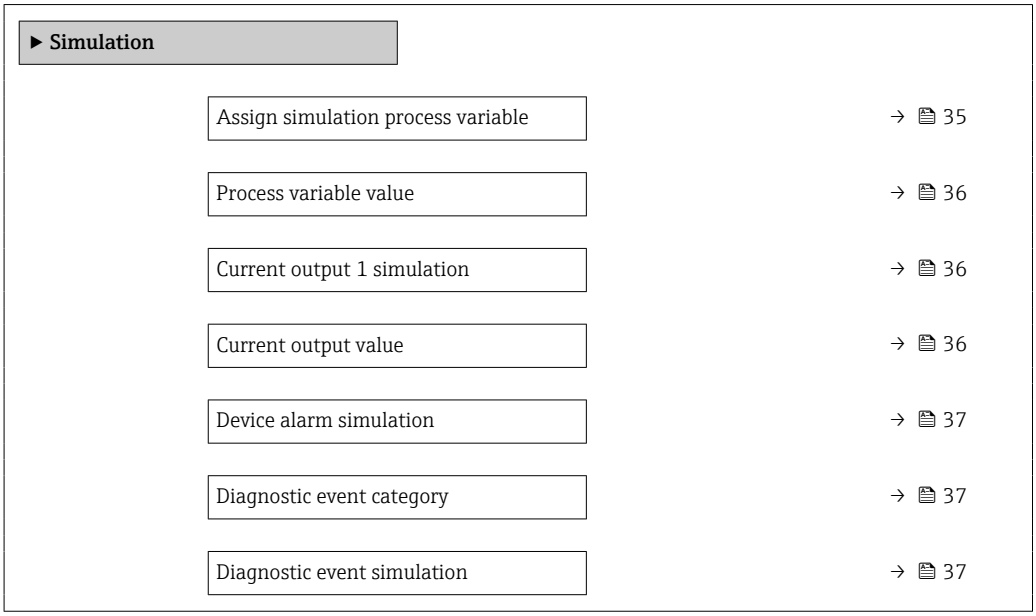
Navigation Diagnostics → Diagnostic list → Timestamp

Description Displays the timestamp for the diagnostic message with the fifth highest priority.

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

3.3 "Simulation" submenu

Navigation Diagnostics → Simulation



Assign simulation process variable

Navigation Diagnostics → Simulation → Assign proc.var.

Description Select a process variable for the simulation, thereby activating it.

Selection
- Off
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *

Additional information *Description*

The display alternates between the measured value and a diagnostics message of the "function check" category (C) when simulation is active.

* Visibility depends on order options or device settings

Process variable value

Navigation Diagnostics → Simulation → Proc. var. value

Description Enter the simulation value for the selected process variable. Processing of measured values downstream as well as the signal ouput follow this value. In this way, it is possibe to verify whether the measuring device has been configured correctly.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

User entry Signed floating-point number

Current output 1 simulation

Navigation Diagnostics → Simulation → Curr.outp 1 sim.

Description Switch simulation of the current output on or off.

Additional information:
When simulation is on, the current output signal is set to the value specified in the "Current output value" parameter.

Selection
- Off
- On

Additional information *Description*

The display alternates between the measured value and a diagnostics message of the "function check" category (C) when simulation is active.

Current output value

Navigation Diagnostics → Simulation → Curr.outp val.

Description Enter the current value for the simulation. In this manner, it is possible to verify the current output is configured correctly and downstream processing units are functioning properly.

Additional information:
The valid input range is determined by the "Current range output " parameter.

User entry 3.59 to 21.5 mA

Device alarm simulation

Navigation Diagnostics → Simulation → Dev. alarm sim.

Description Switch the device alarm simulation on or off.

While simulation is in progress, the display alternates between the measured value and a diagnostic message of the Function Check (C) category.

Selection
- Off
- On

Diagnostic event category

Navigation Diagnostics → Simulation → Event category

Description Select the category of diagnostic events that should be available for selection in the "Diagnostic event simulation" parameter.

Selection
- Sensor
- Electronics
- Configuration
- Process

Diagnostic event simulation

Navigation Diagnostics → Simulation → Diag. event sim.

Description Select the diagnostic event to simulate.

Selection Off

3.4 "Heartbeat Technology" submenu

The **Heartbeat Technology** submenu (→ 38) is only available with the optional "Heartbeat Verification + Monitoring" application package.
- Order code for: Application package
- Option: EB "Heartbeat Verification + Monitoring"

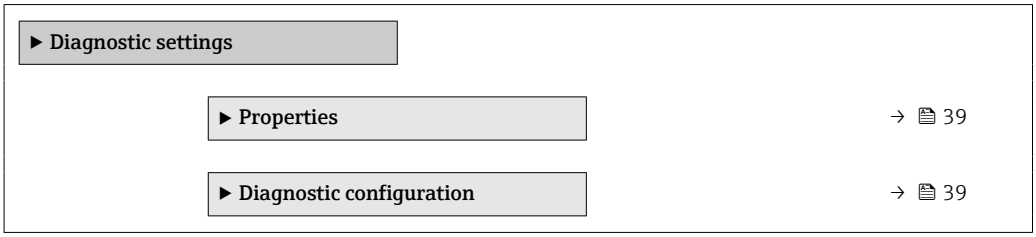
Detailed information and all descriptions of the device parameters of the application package are available in the "Heartbeat Verification + Monitoring" Special Documentation

Navigation Diagnostics → HBT

▶ **Heartbeat Technology**

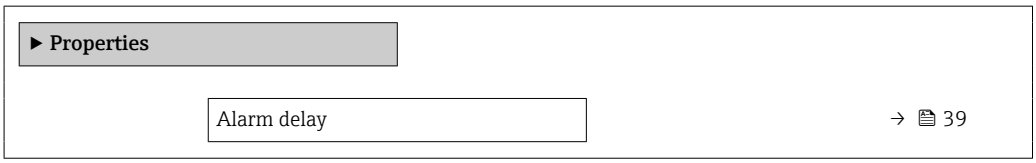
3.5 "Diagnostic settings" submenu

Navigation Diagnostics → Diag. settings



3.5.1 "Properties" submenu

Navigation Diagnostics → Diag. settings → Properties



Alarm delay

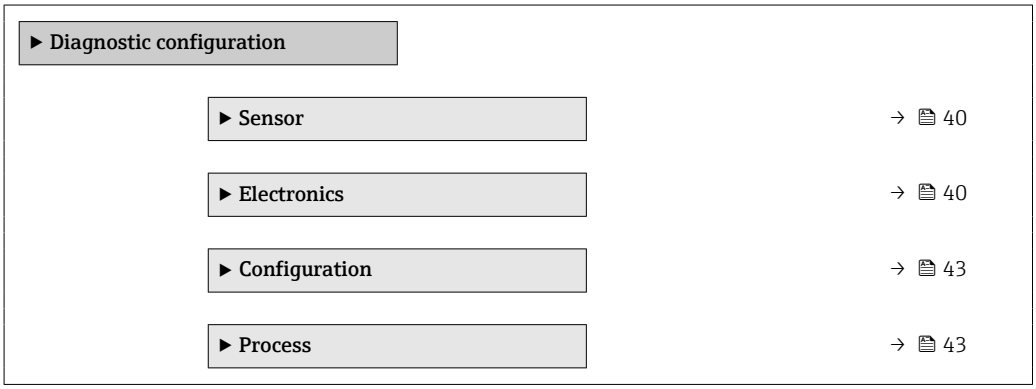
Navigation Diagnostics → Diag. settings → Properties → Alarm delay

Description Enter a duration for the alarm delay. When a diagnostic event of the "Alarm" category occurs, the diagnostic message is not generated until the delay has elapsed.

User entry 0 to 60 s

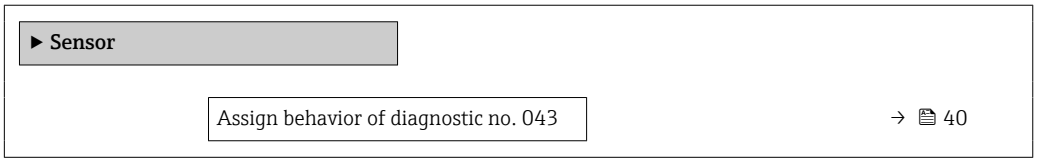
3.5.2 "Diagnostic configuration" submenu

Navigation Diagnostics → Diag. settings → Diag. config.



"Sensor" submenu

Navigation Diagnostics → Diag. settings → Diag. config. → Sensor



Assign behavior of diagnostic no. 043

Navigation Diagnostics → Diag. settings → Diag. config. → Sensor → Diagnostic no. 043

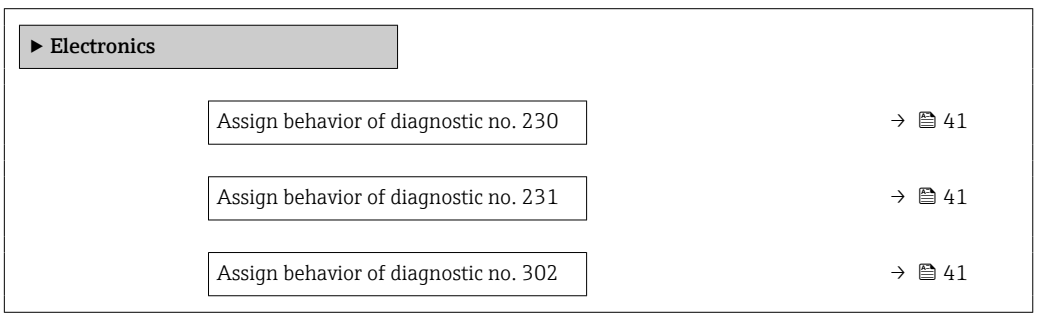
Description Select behavior for diagnostic event "043 Sensor short circuit detected".

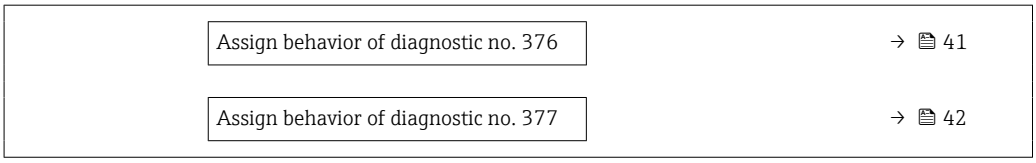
Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

"Electronics" submenu

Navigation Diagnostics → Diag. settings → Diag. config. → Electronics





Assign behavior of diagnostic no. 230

Navigation Diagnostics → Diag. settings → Diag. config. → Electronics → Diagnostic no. 230

Description Select behavior for diagnostic event "230 Date/time incorrect".

Selection
- Alarm
- Warning
- Logbook entry only

Assign behavior of diagnostic no. 231

Navigation Diagnostics → Diag. settings → Diag. config. → Electronics → Diagnostic no. 231

Description Select behavior for diagnostic event "231 Date/time not available".

Selection
- Alarm
- Warning
- Logbook entry only

Assign behavior of diagnostic no. 302

Navigation Diagnostics → Diag. settings → Diag. config. → Electronics → Diagnostic no. 302

Description Select behavior for diagnostic event "302 Device verification active".

Selection
- Off
- Warning
- Logbook entry only

Assign behavior of diagnostic no. 376

Navigation Diagnostics → Diag. settings → Diag. config. → Electronics → Diagnostic no. 376

Description Select behavior for diagnostic event "376 Main electronics faulty".

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 377

Navigation Diagnostics → Diag. settings → Diag. config. → Electronics → Diagnostic no. 377

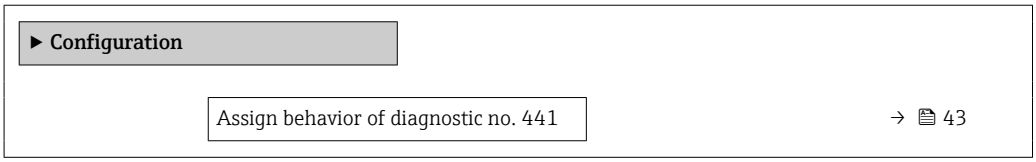
Description Select behavior for diagnostic event "377 Sensor electronics (ISEM) faulty".

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

"Configuration" submenu

Navigation Diagnostics → Diag. settings → Diag. config. → Configuration



Assign behavior of diagnostic no. 441

Navigation Diagnostics → Diag. settings → Diag. config. → Configuration → Diagnostic no. 441

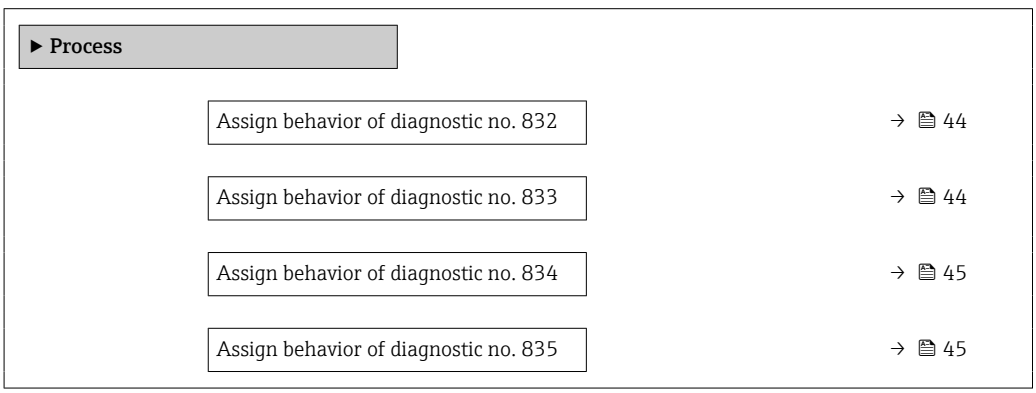
Description Select behavior for diagnostic event "441 Current output faulty".

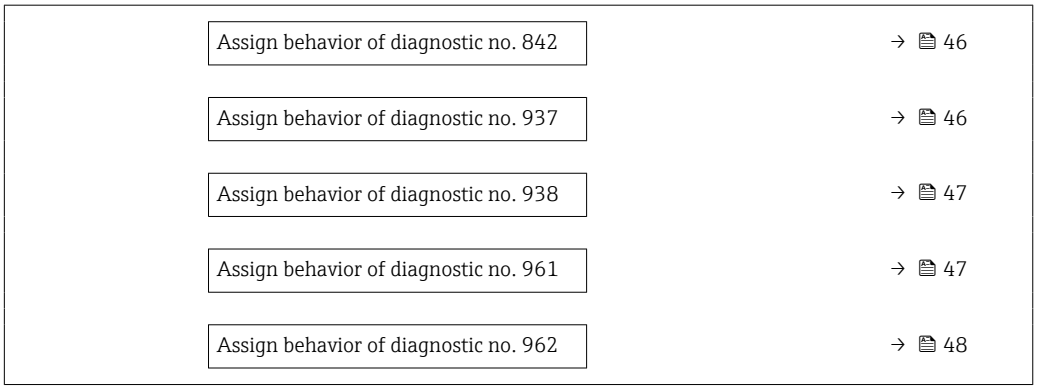
Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

"Process" submenu

Navigation Diagnostics → Diag. settings → Diag. config. → Process





Assign behavior of diagnostic no. 832

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 832

Description Select behavior for diagnostic event "832 Electronics temperature too high".

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*
- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 833

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 833

Description Select behavior for diagnostic event "833 Electronics temperature too low".

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 834

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 834

Description Select event category (status signal) for diagnostic event "834 Process temperature too high".

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 835

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 835

Description Select behavior for diagnostic event "835 Process temperature too low".

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 842

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 842

Description Select behavior for diagnostic event "842 Process value above limit".

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 937

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 937

Description Select behavior for diagnostic event "937 Sensor symmetry".

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 938

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 938

Description Select behavior for diagnostic event "938 EMC interference".

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 961

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 961

Description Select behavior for diagnostic event "961 Electrode potential out of specification".

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagnostic no. 962

Navigation Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 962

Description Select behavior for diagnostic event "962 Pipe empty".

Selection

- Off
- Alarm
- Warning
- Logbook entry only

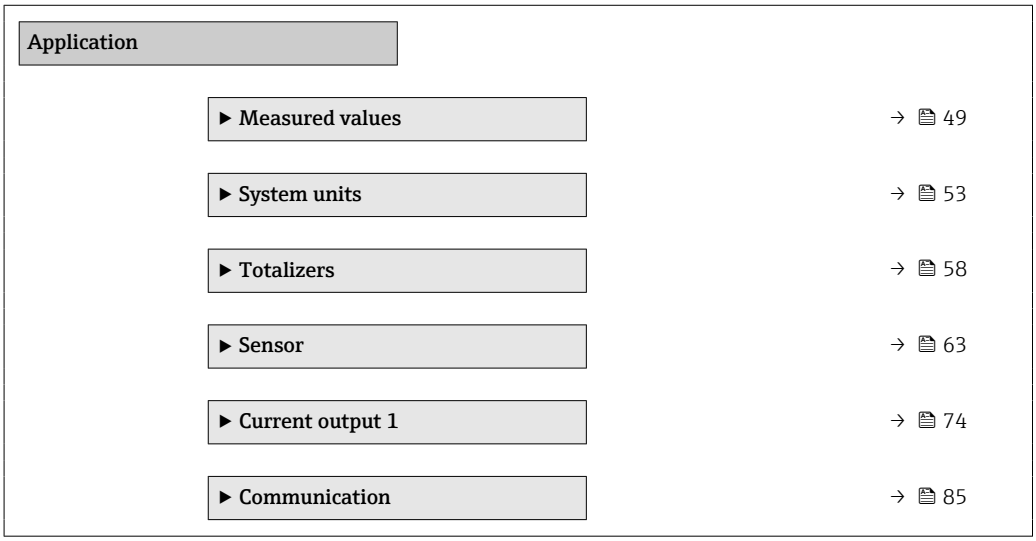
Additional information *Selection*

- **Off** option
  The diagnostic event is ignored and no diagnostic message is generated or logged.
- **Alarm** option
  The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

4 "Application" menu

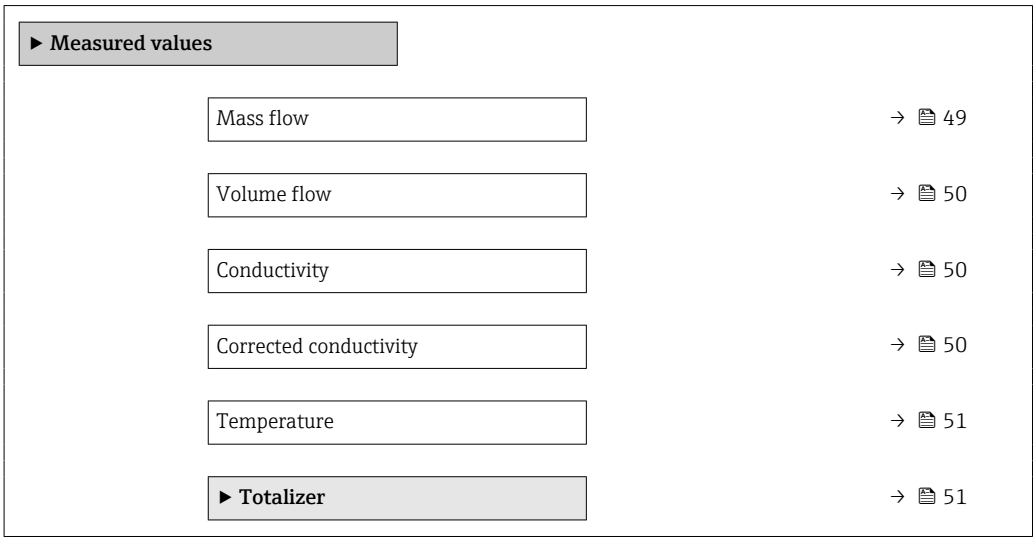
Targeted optimization to the application – comprehensive device settings from sensor technology to system integration for optimum application adaptation.

Navigation Application



4.1 "Measured values" submenu

Navigation Application → Measured values



Mass flow

Navigation Application → Measured values → Mass flow

Description Displays the mass flow currently calculated.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

User interface Signed floating-point number

Volume flow

Navigation Application → Measured values → Volume flow

Description Displays the volume flow currently measured.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

User interface Signed floating-point number

Conductivity

Navigation Application → Measured values → Conductivity

Prerequisite Conductivity measurement is switched on in the **Conductivity measurement** parameter (→ 64).

Conductivity measurement is only optionally available: Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CX (conductivity measurement)

Description Displays the conductivity currently measured.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

User interface Positive floating-point number

Corrected conductivity

Navigation Application → Measured values → CorrConductivity

Prerequisite Conductivity measurement is switched on in the **Conductivity measurement** parameter (→ 64).

Conductivity measurement is only optionally available: Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CX (conductivity measurement)

Description Displays the currently measured conductivity compensated for temperature.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

User interface Positive floating-point number

Temperature

Navigation Application → Measured values → Temperature

Prerequisite Temperature measurement is only optionally available for Promag H 10 (5HBB): Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CI (medium temperature measurement)

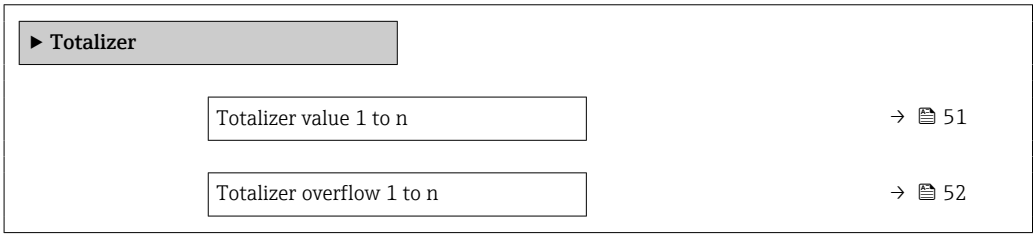
Description Displays the medium temperature currently measured.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

User interface Positive floating-point number

4.1.1 "Totalizer" submenu

Navigation Application → Measured values → Totalizer



Totalizer value 1 to n

Navigation Application → Measured values → Totalizer → Totalizer val. 1 to n

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Displays the current totalizer counter.

Additional information:
Since the operating tool cannot display figures with more than 7 digits, the current counter above this range equals the sum of the totalizer counter plus the overflow displayed for the "Totalizer overflow " parameter.

Example for how to calculate the current totalizer counter when the value exceeds the 7 digit display range limit of the operating tool:
- Value of "Totalizer value " parameter: 1,968,457 m^3
- Value of "Totalizer overflow " parameter: 1 × 107 m^3 = 10,000,000 m^3
- Current totalizer reading: 11,968,457 m^3

In the event of an error, the totalizer behaves as specified in the "Failure mode" parameter.

User interface Signed floating-point number

Totalizer overflow 1 to n

Navigation Application → Measured values → Totalizer → Tot. overflow 1 to n

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Displays the current totalizer overflow.

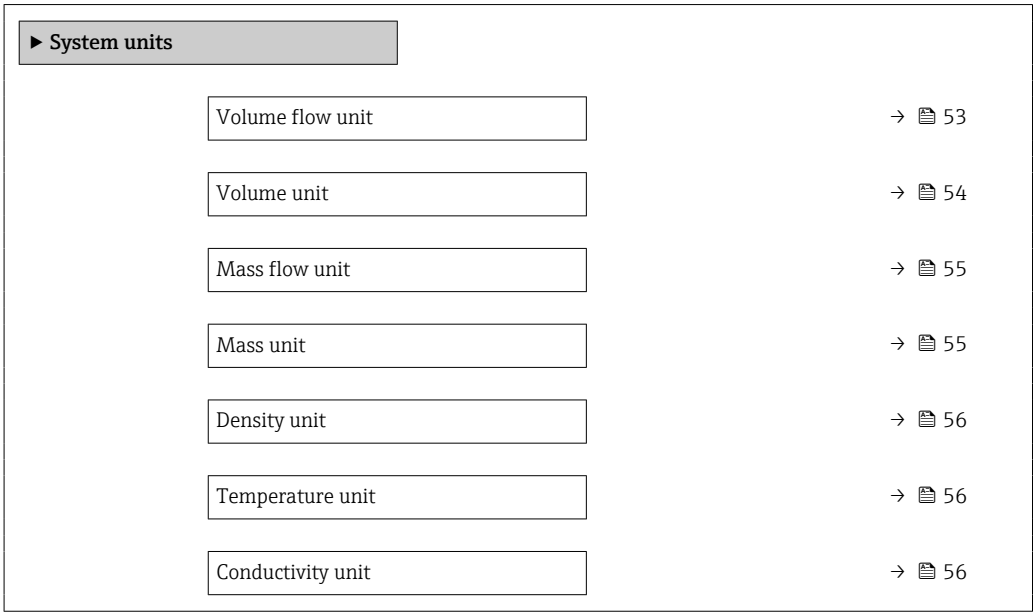
Additional information:
If the current totalizer counter exceeds the operating tool's maximum numerical display range of 7 digits, the amount above this range is expressed as an overflow. The current totalizer counter therefore equals the sum of the overflow and the totalizer value displayed in the "Totalizer value " parameter.

Example of how to calculate the current totalizer counter when the value exceeds the 7 digit display limit of the operating tool:
- Value of "Totalizer value " parameter: 1,968,457 m^3
- Value of "Totalizer overflow " parameter: 1 × 10^7 m^3 = 10,000,000 m^3
- Current totalizer reading: 11,968,457 m^3

User interface −32 000.0 to 32 000.0

4.2 "System units" submenu

Navigation Application → System units



Volume flow unit

Navigation Application → System units → Volume flow unit

Description Select volume flow unit.

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
- $MMft^3/s$
- $MMft^3/min$
- $MMft^3/h$
- Mft^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)
- 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)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)

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

Volume unit

Navigation Application → System units → Volume unit

Description Select volume unit.

Selection

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

US units
- af
- ft^3
- Mft^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)

Mass flow unit

Navigation Application → System units → Mass flow unit

Description Select mass flow unit.

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

Mass unit

Navigation Application → System units → Mass unit

Description Select mass unit.

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

Density unit

Navigation Application → System units → Density unit

Description Select density unit.

Selection

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

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

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

Temperature unit

Navigation Application → System units → Temperature unit

Prerequisite Temperature measurement is only optionally available for Promag H 10 (5HBB): Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CI (medium temperature measurement)

Description Select temperature unit.

Selection

SI units
- °C
- K

US units
- °F
- °R

Conductivity unit

Navigation Application → System units → Conductiv. unit

Prerequisite Conductivity measurement is switched on in the **Conductivity measurement** parameter (→ 64).

Conductivity measurement is only optionally available: Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CX (conductivity measurement)

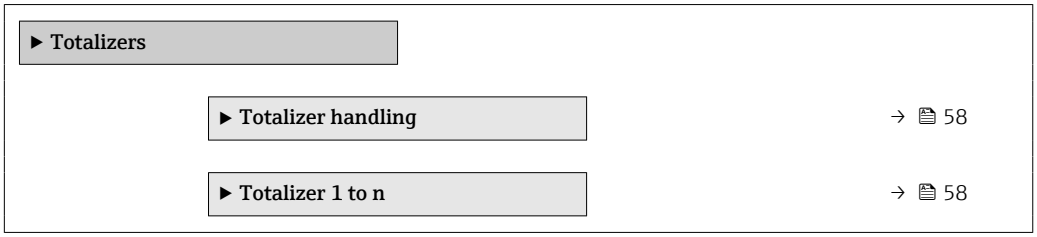
Description Select conductivity unit.

Selection

SI units
- nS/cm
- µS/cm
- µS/m
- µS/mm
- mS/m
- mS/cm
- S/cm
- S/m
- kS/m
- MS/m

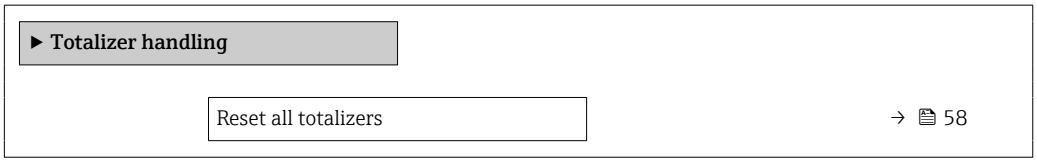
4.3 "Totalizers" submenu

Navigation Application → Totalizers



4.3.1 "Totalizer handling" submenu

Navigation Application → Totalizers → Totalizer



Reset all totalizers

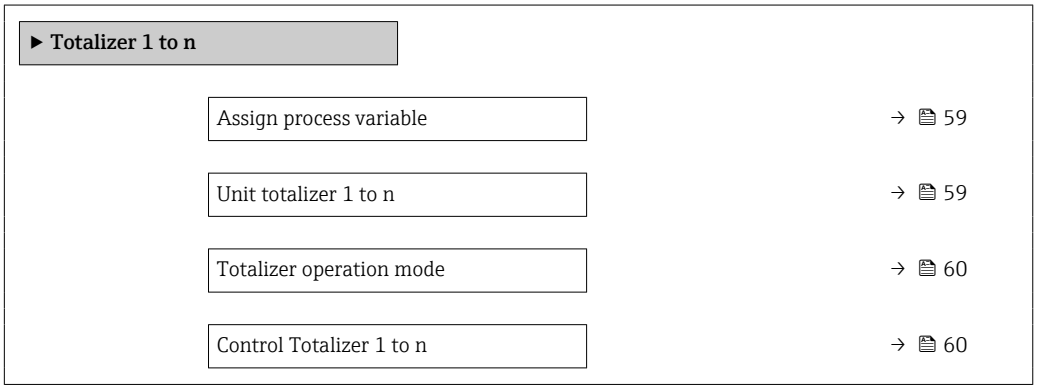
Navigation Application → Totalizers → Totalizer → Reset all tot.

Description Reset all totalizers to "0" and restart the totaling process. All flow quantities thus far totalized are thereby deleted.

Selection
- Cancel
- Reset + totalize

4.3.2 "Totalizer 1 to n" submenu

Navigation Application → Totalizers → Totalizer 1 to n



Preset value 1 to n	→ 61
Failure mode	→ 61

Assign process variable

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

Description Select process variable for totalizer.

Additional information:
If the option selected is changed, the device resets the totalizer to "0".

Selection
- Off
- Volume flow
- Mass flow

Unit totalizer 1 to n

Navigation Application → Totalizers → Totalizer 1 to n → Unit totalizer 1 to n

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Select process variable totalizer unit.

Selection

SI units
- g *
- kg *
- t *

US units
- oz *
- lb *
- STon *

* Visibility depends on order options or device settings

or

SI units
- cm³ *
- dm³ *
- m³ *
- ml *
- l *
- hl *
- Ml Mega *

US units
- af *
- ft³ *
- Mft³ *
- fl oz (us) *
- gal (us) *
- kgal (us) *
- Mgal (us) *
- bbl (us;liq.) *
- bbl (us;beer) *
- bbl (us;oil) *
- bbl (us;tank) *

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

* Visibility depends on order options or device settings

or

Other units
None *

*	Visibility depends on order options or device settings

Additional information

Description

The unit is selected separately for each totalizer. The unit is independent of the option selected in the **System units** submenu (→ 53).

Selection

The selection is dependent on the process variable selected in the **Assign process variable** parameter (→ 13).

Totalizer operation mode

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

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Select totalizer calculation mode.

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

Additional information

Selection

- **Net flow total** option
  The flow values in the forward and reverse flow directions are totalized and netted against each other. Net flow is recorded in the flow direction.
- **Forward flow total** option
  Only the flow in the forward flow direction is totalized.
- **Reverse flow total** option
  Only the flow in the reverse flow direction is totalized (= reverse flow quantity).

Control Totalizer 1 to n

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

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Operate the totalizer.

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

Additional information

Selection
- **Totalize** option
  The totalizer is started or continues running.
- **Reset + hold** option
  The totaling process is stopped and the totalizer is reset to "0".
- **Preset + hold** option
  The totaling process is stopped and the totalizer is set to the start value specified in the "Preset value " parameter.
- **Reset + totalize** option
  The totalizer is reset to "0" and the totaling process is restarted.
- **Hold** option
  Totalizing is stopped.

Preset value 1 to n

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

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Specify start value for totalizer.

User entry Signed floating-point number

Additional information

Description

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 13).

Example

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

Failure mode

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

Prerequisite A process variable has been selected in the **Assign process variable** parameter in the **Totalizer 1 to n** submenu.

Description Specify how the totalizer should behave in the event of a device alarm.

Additional information:
The failsafe mode that applies to any other totalizers or outputs is specified separately in other parameters and is not impacted by this setting.

Selection

- Stop
- Actual value
- Last valid value

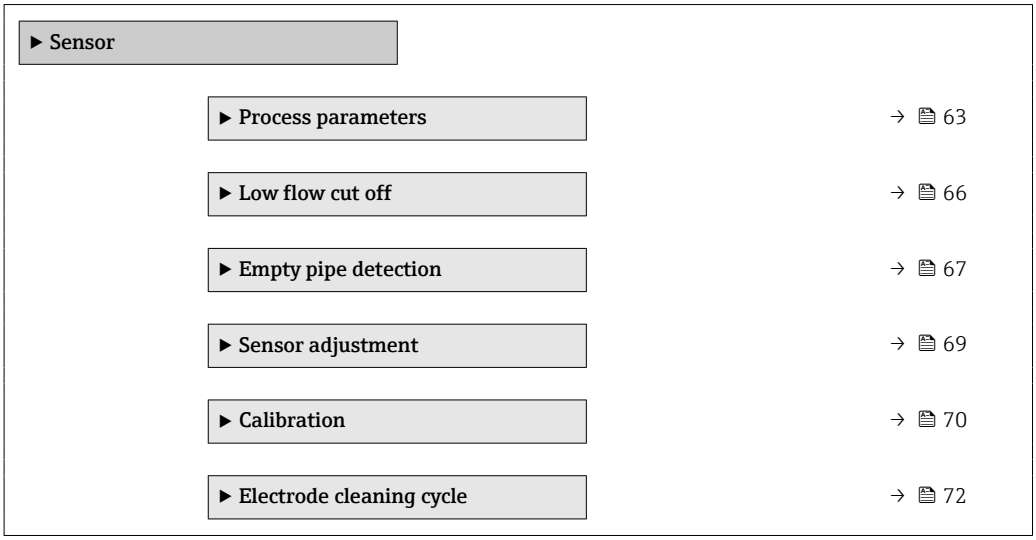
Additional information

Selection

- **Stop** option
  The totalizer is stopped in the event of a device alarm.
- **Actual value** option
  The totalizer continues to totalize based on the current value measured; the device alarm is ignored.
- **Last valid value** option
  The totalizer continues to totalize based on the last valid value measured before the device alarm occurred.

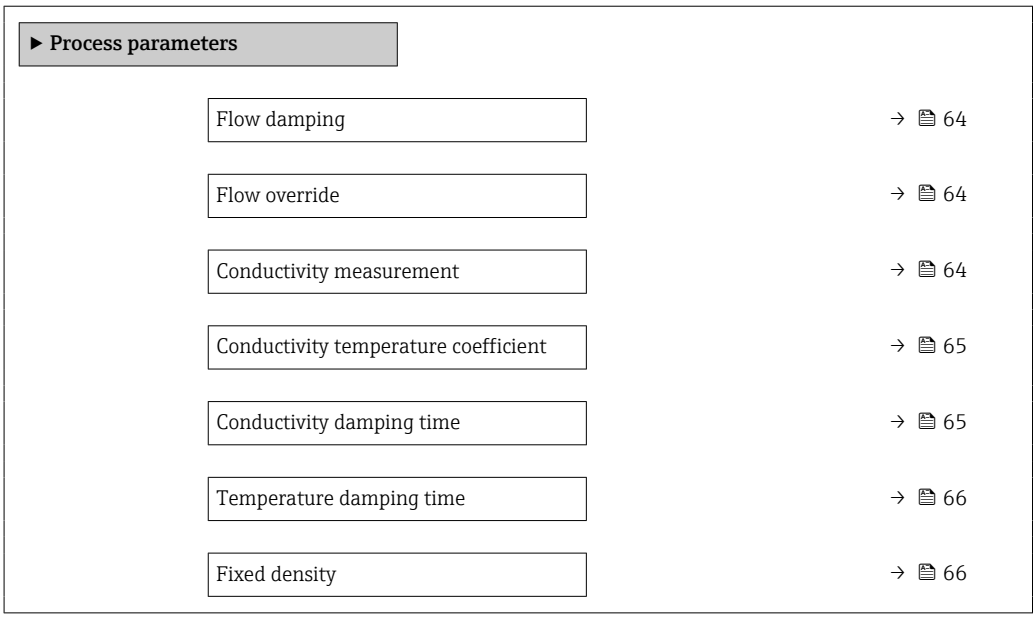
4.4 "Sensor" submenu

Navigation Application → Sensor



4.4.1 "Process parameters" submenu

Navigation Application → Sensor → Process param.



Flow damping

Navigation Application → Sensor → Process param. → Flow damping

Description Enter value for damping of the flow measured value in order to reduce the variability of the flow measured value when exposed to interference.

Additional information:
The depth of the flow filter is determined by this setting. As the filter depth increases, so does the reaction time of the device.
- Value = 0: No damping. Damping of 0 is not recommended, as the measuring signal is then so noisy that it is almost impossible to perform a measurement.
- Value > 0: Damping increases

Optimal damping depends on the measuring period.

Damping impacts the following measuring device variables:
- Outputs
- Low flow cut off
- Totalizers

User entry 0 to 15

Flow override

Navigation Application → Sensor → Process param. → Flow override

Description Stops the measuring process. Can be used for example when cleaning the pipeline.

Selection
- Off
- On

Additional information *Selection*

"On" option
Activates flow override. The diagnostic message "453 Flow override active" is generated.

Additional information:
Output values:
- Temperature: Measurement continues
- Totalizers 1 to 3: No longer totalize

Conductivity measurement

Navigation Application → Sensor → Process param. → Conduct. measur.

Prerequisite Conductivity measurement is only optionally available: Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CX (conductivity measurement)

Description Switch conductivity measurement on or off.

Additional information:
To be able to measure conductivity, the medium must have a minimum conductivity of 5 µS/cm.

Selection
- Off
- On

Conductivity temperature coefficient

Navigation Application → Sensor → Process param. → Cond. temp.coeff

Prerequisite Conductivity measurement is switched on in the **Conductivity measurement** parameter (→ 64).

Conductivity measurement is only optionally available: Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CX (conductivity measurement)

Description Enter the temperature coefficient for conductivity.

User entry Signed floating-point number

Conductivity damping time

Navigation Application → Sensor → Process param. → ConductDampTime

Prerequisite Conductivity measurement is switched on in the **Conductivity measurement** parameter (→ 64).

Conductivity measurement is only optionally available: Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CX (conductivity measurement)

Description Enter time constant for conductivity damping (PT1 element):
- Value = 0: No damping
- Value > 0: Damping increases

Additional information:
Damping is implemented by means of a proportional transmission behavior with first order delay (PT1 element).

User entry 0 to 999.9 s

Temperature damping time

Navigation Application → Sensor → Process param. → TempDampingTime

Prerequisite Temperature measurement is only optionally available for Promag H 10 (5HBB): Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CI (medium temperature measurement)

Description Enter time constant for damping the temperature value.

User entry 0 to 999.9 s

Fixed density

Navigation Application → Sensor → Process param. → Fixed density

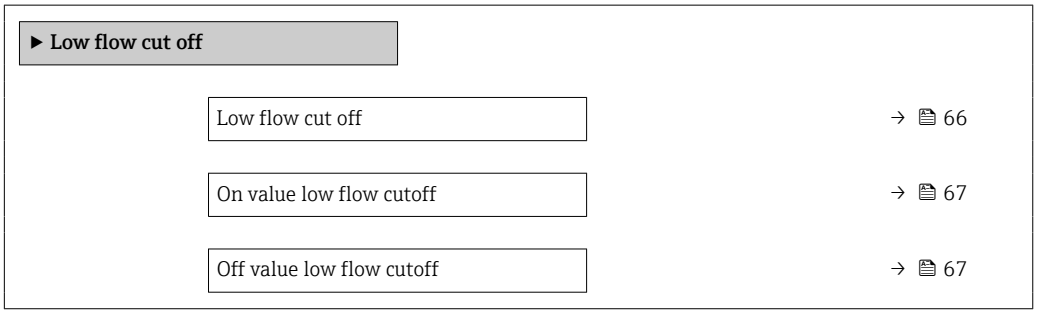
Description Enter a fixed value for the density.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

User entry Positive floating-point number

4.4.2 "Low flow cut off" submenu

Navigation Application → Sensor → Low flow cut off



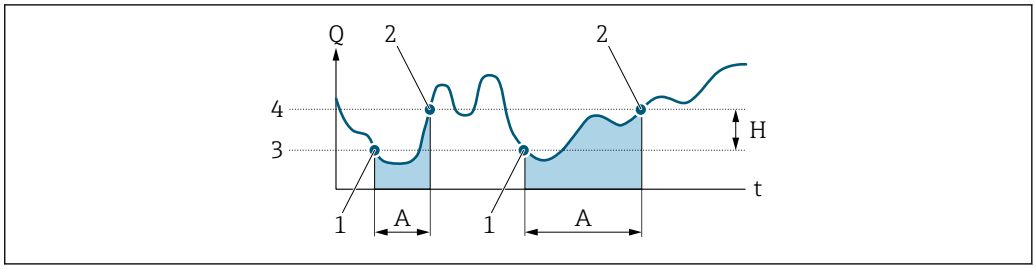
Low flow cut off

Navigation Application → Sensor → Low flow cut off → Low flow cut off

Description Select process variable for low flow cut off to activate low flow cut off.

Selection
- Off
- Volume flow
- Mass flow

Additional information Description



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

On value low flow cutoff

Navigation Application → Sensor → Low flow cut off → On value

Description Enter on value to switch on low flow cut off.

Value = 0: No low flow cut off
Value > 0: Low flow cut off is activated

User entry Positive floating-point number

Off value low flow cutoff

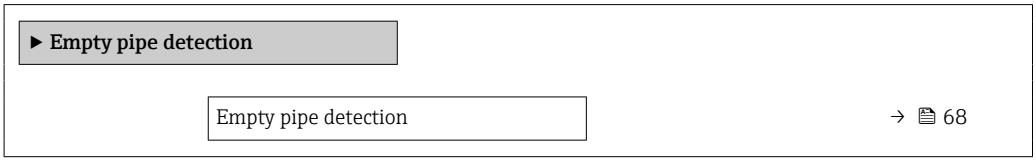
Navigation Application → Sensor → Low flow cut off → Off value

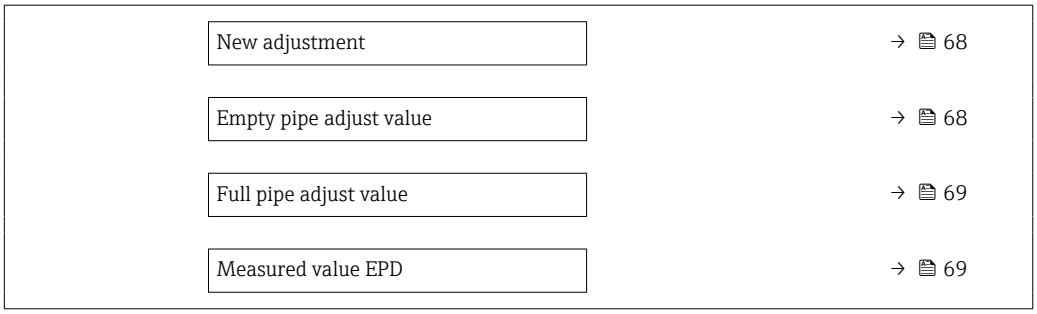
Description Enter off value to switch off low flow cut off. The off value is entered as a positive hysteresis with respect to the on value.

User entry 0 to 100.0 %

4.4.3 "Partially filled pipe detection" submenu

Navigation Application → Sensor → Partial pipe det





Empty pipe detection

Navigation Application → Sensor → Empty pipe det. → Empty pipe det.

Description Switch empty pipe detection on or off. Switch on empty pipe detection to detect a partially filled or empty measuring tube.

Selection
- Off
- On

New adjustment

Navigation Application → Sensor → Empty pipe det. → New adjustment

Description Select empty pipe or full pipe adjustment to perform a new adjustment. To adjust empty pipe detection, perform the empty pipe adjustment first and then the full pipe adjustment.

Additional information:
The measuring device is pre-adjusted at production using water (approx. 300 µS/cm). For liquids that deviate from this conductivity, a new empty pipe and full pipe adjustment must be performed on site.

Selection
- Cancel
- Empty pipe adjust
- Full pipe adjust

Empty pipe adjust value

Navigation Application → Sensor → Empty pipe det. → Empty pipe value

Description Displays adjustment value when the measuring tube is empty.

NOTE
Users logged on in the Service role have write access!

User interface Positive floating-point number

Full pipe adjust value

Navigation Application → Sensor → Empty pipe det. → Full pipe value

Description Displays adjustment value when the measuring tube is full.

NOTE
Users logged on in the Service role have write access!

User interface Positive floating-point number

Measured value EPD

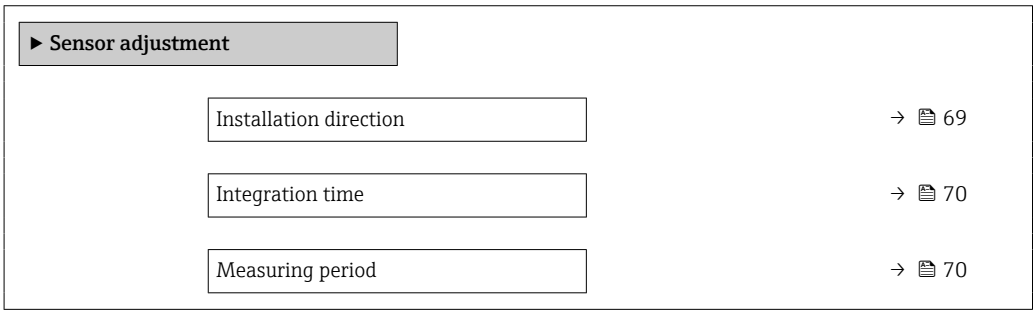
Navigation Application → Sensor → Empty pipe det. → Meas. value EPD

Description Displays the value currently measured for empty pipe detection.

User interface Positive floating-point number

4.4.4 "Sensor adjustment" submenu

Navigation Application → Sensor → Sensor adjustm.



Installation direction

Navigation Application → Sensor → Sensor adjustm. → Install. direct.

Description Select sign of flow direction

Selection
- Forward flow
- Reverse flow

Integration time

Navigation Application → Sensor → Sensor adjustm. → Integration time

Description Displays the duration of an integration cycle.

NOTE
Users logged on in the Service role have write access!

User interface 1 to 65 ms

Measuring period

Navigation Application → Sensor → Sensor adjustm. → Measuring period

Description Displays the duration of a full measuring period.

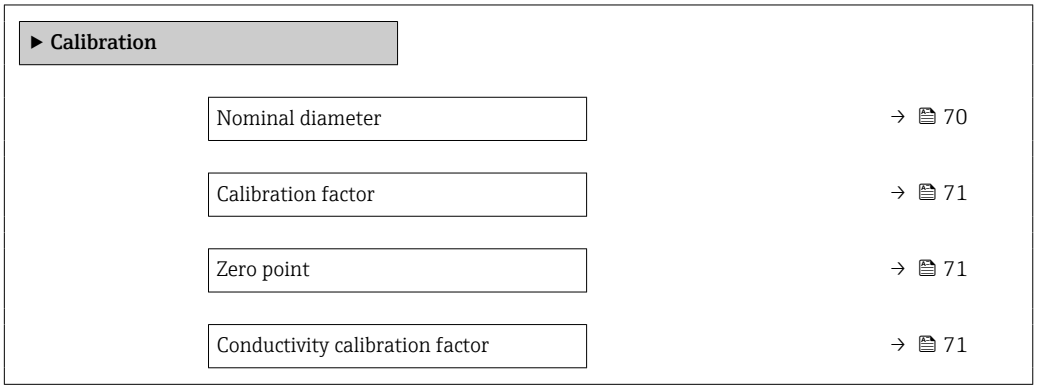
Additional information:
The measuring period is the time span during which the excitation of the magnetic field takes place and a measuring point is created.

NOTE
Users logged on in the Service role have write access!

User interface 0 to 1 000 ms

4.4.5 "Calibration" submenu

Navigation Application → Sensor → Calibration



Nominal diameter

Navigation Application → Sensor → Calibration → Nominal diameter

Description Shows the nominal diameter of the sensor.

User interface Character string comprising numbers, letters and special characters

Calibration factor

Navigation Application → Sensor → Calibration → Cal. factor

Description Displays the current calibration factor for the flow rate measuring sensor.

Additional information:
The factory setting for the calibration factor can be found on the sensor's nameplate.

User interface Positive floating-point number

Zero point

Navigation Application → Sensor → Calibration → Zero point

Description Displays the zero point correction value for the sensor.

NOTE
Users logged on in the Service role have write access!

User interface Signed floating-point number

Conductivity calibration factor

Navigation Application → Sensor → Calibration → Cond. cal. fact.

Prerequisite Conductivity measurement is switched on in the **Conductivity measurement** parameter (→ 64).

Conductivity measurement is only optionally available: Under order code for "Functionality", option D (extended transmitter) and order code for "Sensor option", option CX (conductivity measurement)

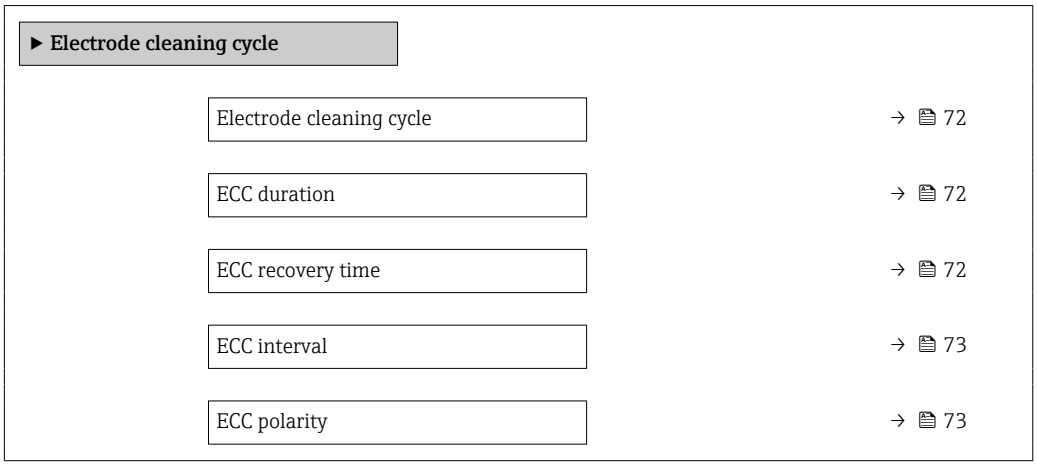
Description Displays calibration factor for conductivity measurement.

NOTE
Users logged on in the Service role have write access!

User interface 0.01 to 10 000

4.4.6 "Electrode cleaning cycle" submenu

Navigation Application → Sensor → Elec. clean cycl



Electrode cleaning cycle

Navigation Application → Sensor → Elec. clean cycl → Elec. clean cycl

Description Switch electrode cleaning on or off.

Selection
- Off
- On

ECC duration

Navigation Application → Sensor → Elec. clean cycl → ECC duration

Description Enter the duration of the cleaning cycle.

User entry 0.01 to 30 s

ECC recovery time

Navigation Application → Sensor → Elec. clean cycl → ECC recov. time

Description Specify a timespan for recovery after a cleaning cycle has completed to prevent interference with the signal outputs. The output signal values will be frozen for the duration of the recovery.

User entry 1 to 600 s

ECC interval

Navigation Application → Sensor → Elec. clean cycl → ECC interval

Description Specify the duration of the interval between one cleaning cycle and the next.

User entry 0.5 to 168 h

ECC polarity

Navigation Application → Sensor → Elec. clean cycl → ECC polarity

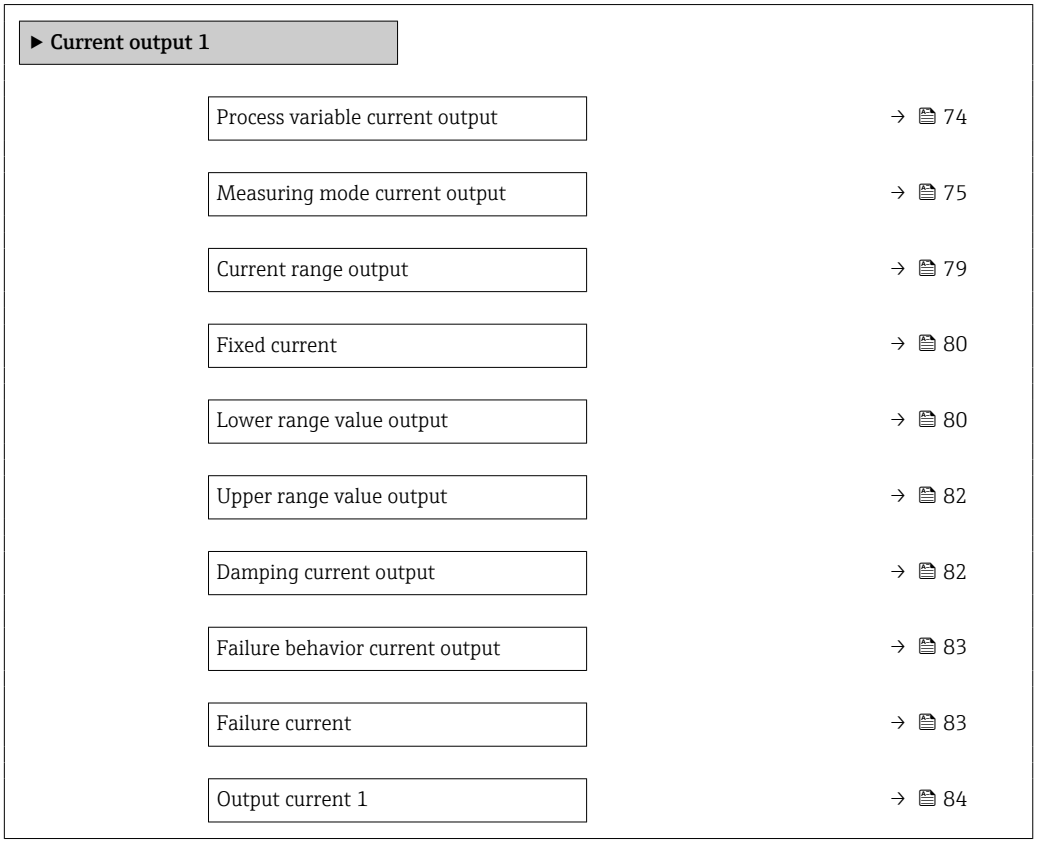
Description Displays the setting for the electrode cleaning polarity.

Additional information:
The polarity depends on the material of the electrodes:
- Platinum: Negative
- Tantalum, Alloy C22, stainless steel: Positive

User interface
- Positive
- Negative

4.5 "Current output" submenu

Navigation Application → Curr.output 1



Process variable current output

Navigation Application → Curr.output 1 → Proc.var. outp

Description Select process variable for current output

Selection
- Off *
- Mass flow
- Conductivity *
- Corrected conductivity *
- Volume flow
- Temperature *
- Noise *
- Coil current shot time *

* Visibility depends on order options or device settings

Measuring mode current output

Navigation Application → Curr.output 1 → Meas.mode outp

Prerequisite A process variable is selected in the **Process variable current output** parameter (→ 20).

Description Select the measuring mode for the output.

Selection
- Forward flow
- Forward/Reverse flow*
- Reverse flow compensation

* Visibility depends on order options or device settings

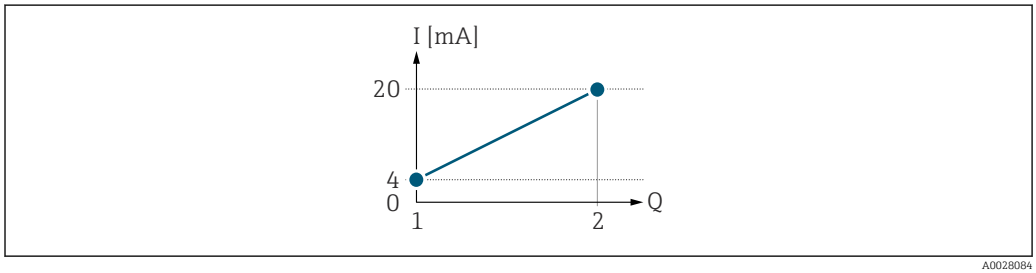
Additional information

Selection

- **Forward flow** option
  The current output signal is proportional to the measured value for the process variable assigned.
  Additional information:
  - The lower limit value ("Lower range value output " parameter) and the upper limit value ("Upper range value output " parameter) of the measured value range do not have to have the same algebraic sign, i.e. the lower limit value can be negative and the upper limit value positive.
  - If the measured value lies outside the scaled measured value range, diagnostic message "441 Current output faulty" is generated.
- **Forward/Reverse flow** option
  The current output outputs the absolute value for the assigned process variable (reflection across the lower limit value of the measured value range).
  Additional information:
  - The lower limit value ("Lower range value output " parameter) and the upper limit value ("Upper range value output " parameter) of the measured value range must have the same algebraic sign.
  - If the absolute value exceeds the upper limit value of the measured value range, diagnostic message "441 Current output faulty" is generated.
  - This setting is generally only used for flow-related process variables.
- **Reverse flow compensation** option
  The current output signal is proportional to the measured value for the process variable assigned.
  Additional information:
  - The lower limit value ("Lower range value output " parameter) and the upper limit value ("Upper range value output " parameter) of the measured value range do not have to have the same algebraic sign, i.e. the lower limit value can be negative and the upper limit value positive.
  - Reverse flow (a measured value below the lower limit value of the measured value range) is stored in a buffer and processed after a maximum delay of 60 s with the next forward flow.
  - When the flow exceeds the maximum value or the reverse flow stored in the buffer cannot be processed within approx. 60 s, diagnostic message "441 Current output faulty" is generated.
  - This option is used e.g. to compensate intermittent reverse flow, which may occur in connection with positive displacement pumps as a result of wear and tear or high viscosity.
  - There is no flow damping with this setting.

1. Examples of the behavior of the current output

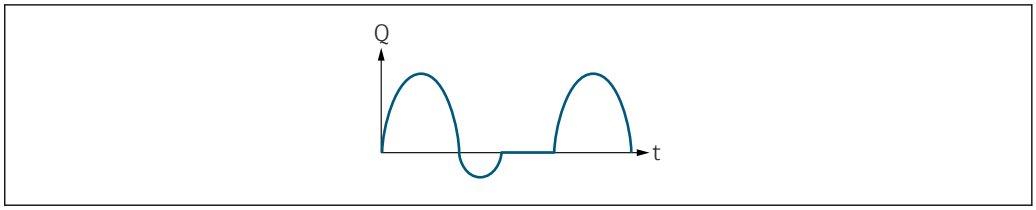
Defined measuring range: lower range value and upper range value with the **same** algebraic sign.



A0028084

I Current
Q Flow
1 Lower range value (value assigned to 0/4 mA current)
2 Upper range value (value assigned to 20 mA current)

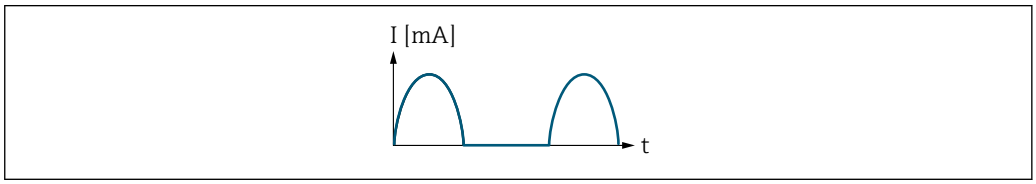
With the following flow response:



A0028091

Q Flow
t Time

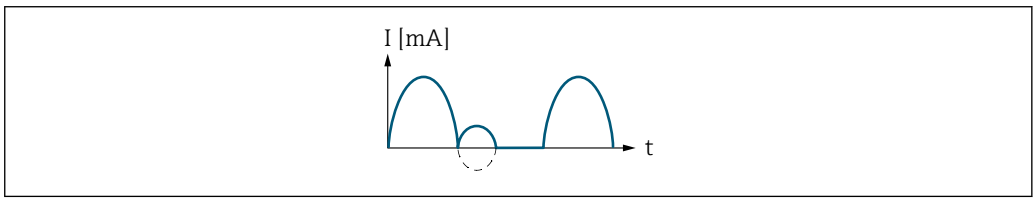
With the **Forward flow** option
The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output:.



A0028092

I Current
t Time

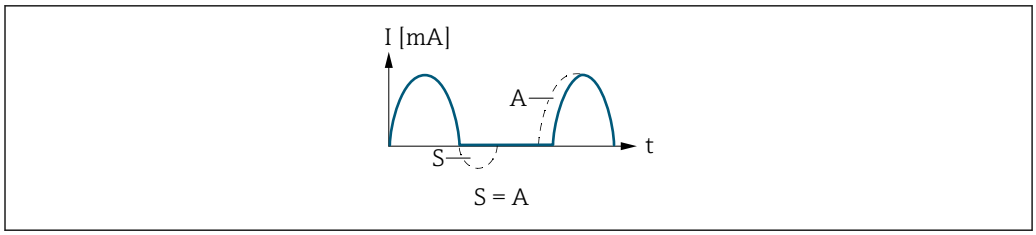
With the **Forward/Reverse flow** option
The current output signal is independent of the direction of flow.



A0028093

I Current
t Time

With the **Reverse flow compensation** option
Flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s.

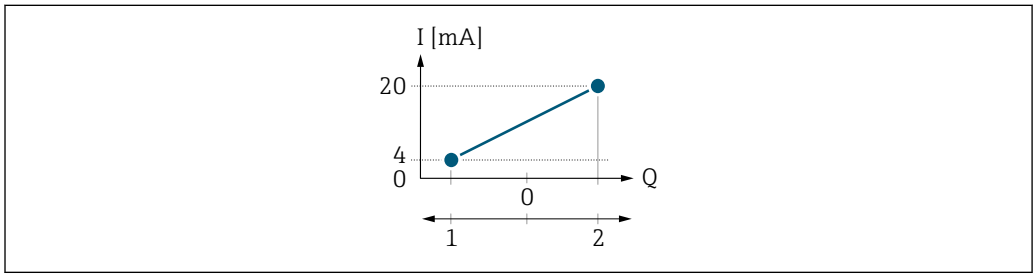


A0028094

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

2. Examples of the behavior of the current output

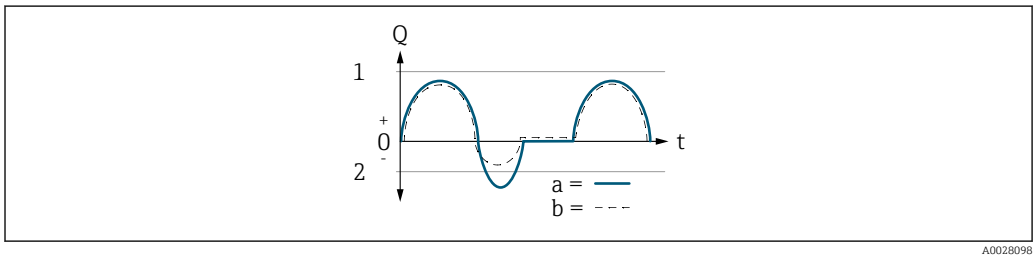
Defined measuring range: lower range value and upper range value with **different** algebraic signs.



A0028095

I Current
Q Flow
1 Lower range value (value assigned to 0/4 mA current)
2 Upper range value (value assigned to 20 mA current)

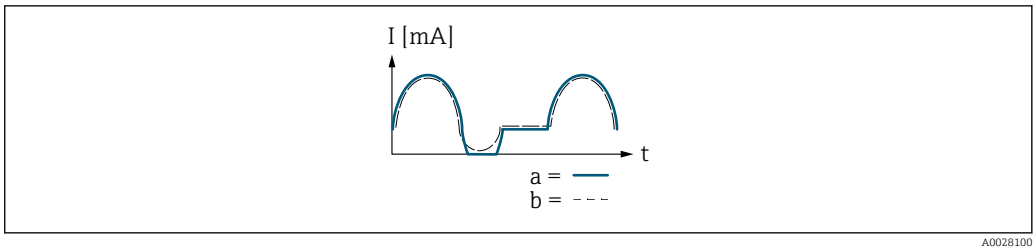
With flow a (—) outside, b (- -) inside the measuring range:



A0028098

Q Flow
t Time
a Lower range value (value assigned to 0/4 mA current)
b Upper range value (value assigned to 20 mA current)

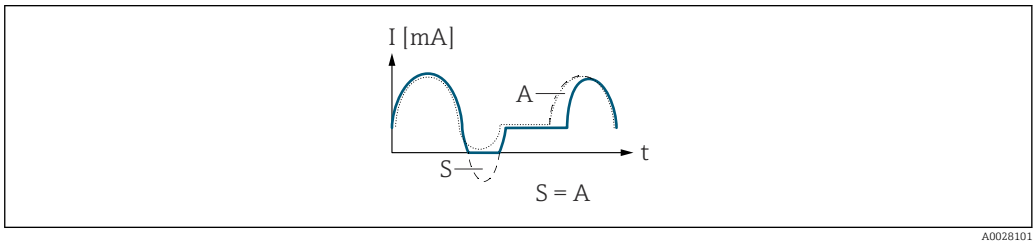
With the **Forward flow** option
- a (—): The flow components outside the scaled measuring range cannot be taken into account for signal output. The diagnostic message ⚠**S441 Current output 1 to n** diagnostic message is displayed.
- b (- -): The current output signal is proportional to the process variable assigned.



I Current
t Time

With the **Forward/Reverse flow** option
This option cannot be selected here since the values for the **20 mA value** parameter (→ 22) and **20 mA value** parameter (→ 22) have different algebraic signs.

With the **Reverse flow compensation** option
Flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s.



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

Current range output

Navigation Application → Curr.output 1 → Curr.range out

Description Select the current range for the measured value output and the upper and lower fault condition signal level.

Additional information:
- The measured value range is specified in the "Lower range value output " parameter and the "Upper range value output " parameter.
- If the measured value lies outside the scaled measured value range, diagnostic message "441 Current output faulty" is generated.
- In the event of a device alarm, the current output adopts the behavior specified in the "Failure behavior current output " parameter.

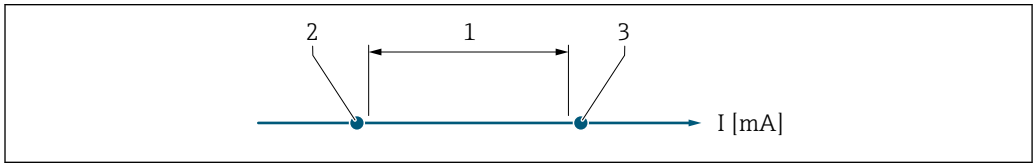
Selection
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- Fixed value

Additional information *Selection*

- **4...20 mA NE (3.8...20.5 mA)** option
  Select this option to set the current range in accordance with NAMUR recommendation NE43.
- **Fixed value** option
  Select this option to set the current output to a current value instead of a range.

The current value is defined in the **Fixed current** parameter (→ 23).

The graphic shows the relationship between the current range for the output of the process value and the lower and upper alarm levels:



1 Current range for process value
2 Lower level for signal on alarm
3 Upper level for signal on alarm

Selection (current range for process value)	Lower level for signal on alarm	Upper level for signal on alarm
4...20 mA NE (3.8...20.5 mA)	< 3.6 mA	> 21.5 mA
4...20 mA US (3.9...20.8 mA)		
4...20 mA (4... 20.5 mA)		

Fixed current

Navigation Application → Curr.output 1 → Fixed current

Prerequisite In the **Current range output** parameter in the **Current output 1** submenu, the **Fixed value** option is selected.

Description Enter the value for the "Fixed value" option.

User entry 3.59 to 21.5 mA

Lower range value output

Navigation Application → Curr.output 1 → Low.range outp

Prerequisite In the **Current range output** parameter, one of the following options is selected:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)

Description

Enter lower range value for the measured value range.

Additional information:
- Depending on the setting selected for the "Measuring mode current output " parameter, the value specified for this parameter and the "Upper range value output " parameter must have the same algebraic sign or not.
- As a rule, the lower range value is scaled to be lower than the upper range value. As a result, the behavior of the current output is proportional to the process variable assigned. If the lower range value is scaled to be higher than the upper range value, then the behavior of the current output will be inversely proportional to the process variable assigend.

User entry

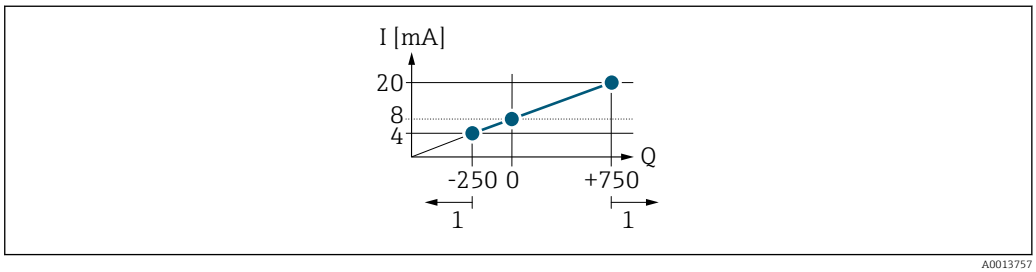
Signed floating-point number

Additional information

Examples of the behavior, depending on the option selected in the **Measuring mode current output** parameter (→ 75).

Example: Measuring mode with "Forward flow" option

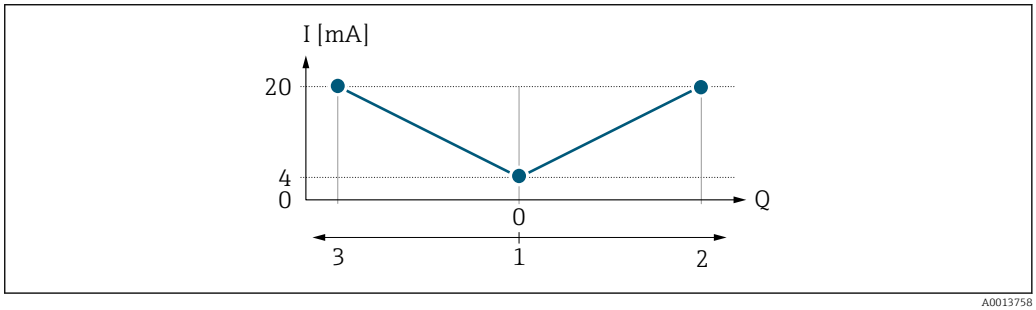
- **Lower range value output** parameter (→ 21) = not equal to zero flow (e.g. −250 m3/h)
- **Upper range value output** parameter (→ 22) = not equal to zero flow (e.g. +750 m3/h)
- Calculated current value = 8 mA at zero flow



Q Flow
I Current
1 Measuring range is exceeded or undershot

The linear operational range of the measuring device is defined by the values entered for the **Lower range value output** parameter (→ 21) and **Upper range value output** parameter (→ 22), and by the selected current range.

Example: Measuring mode with the "Forward/Reverse flow" option



Q Flow
I Current
1 Value assigned to 0/4 mA current
2 Forward flow
3 Reverse flow

The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **Lower range value output** parameter (→ 21) and **Upper range value output** parameter (→ 22) must have the same algebraic sign.

The value for the **Upper range value output** parameter (→ 22) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (→ 22) (e.g. forward flow).

Example: Measuring mode with the "Reverse flow compensation" option

If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s.

Upper range value output

Navigation Application → Curr.output 1 → Upp.range outp

Prerequisite In the **Current range output** parameter, one of the following options is selected:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)

Description Enter upper range value for the measured value range.

User entry Signed floating-point number

Additional information Examples of the behavior, depending on the option selected in the **Measuring mode current output** parameter: **Lower range value output** parameter (→ 21):

Damping current output

Navigation Application → Curr.output 1 → Damp.curr.outp

Prerequisite A process variable is selected in the **Process variable current output** parameter and one of the following options is selected in the **Current range output** parameter:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)

Description Enter time constant (PT1 element) to set the reaction time of the output signal to fluctuations in the measured value caused by process conditions.

Additional information:
- The smaller the time constant the faster the output reacts to fluctuations in the measured value.
- If the time constant is 0, damping is deactivated.

User entry 0.0 to 999.9 s

Failure behavior current output

Navigation Application → Curr.output 1 → Fail.behav.out

Prerequisite A process variable is selected in the **Process variable current output** parameter and one of the following options is selected in the **Current range output** parameter:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)

Description Specify how the output should behave in the event of a device alarm.

Selection
- Min.
- Max.
- Last valid value
- Actual value
- Fixed value

Additional information *Selection*
- **Min.** option
  The current output outputs the lower fault condition signal level for the specified current range.
  Additional information:
  The current range is specified in the "Current range output " parameter.
- **Max.** option
  The current output outputs the upper fault condition signal level for the specified current range.
  Additional information:
  The current range is specified in the "Current range output " parameter.
- **Last valid value** option
  The current output outputs the last valid value measured before the device alarm occurred.
- **Actual value** option
  The current output outputs the flow value currently measured. The device alarm is ignored.
- **Fixed value** option
  The current output outputs the value specified.
  Additional information:
  The value is specified in the "Failure current " parameter.

Failure current

Navigation Application → Curr.output 1 → Fail. current

Prerequisite In the **Failure behavior current output** parameter in the **Current output 1** submenu, the **Fixed value** option is selected.

Description Enter the value for the "Fixed value" option in the "Failure behavior current output " parameter.

User entry 3.59 to 21.5 mA

Output current

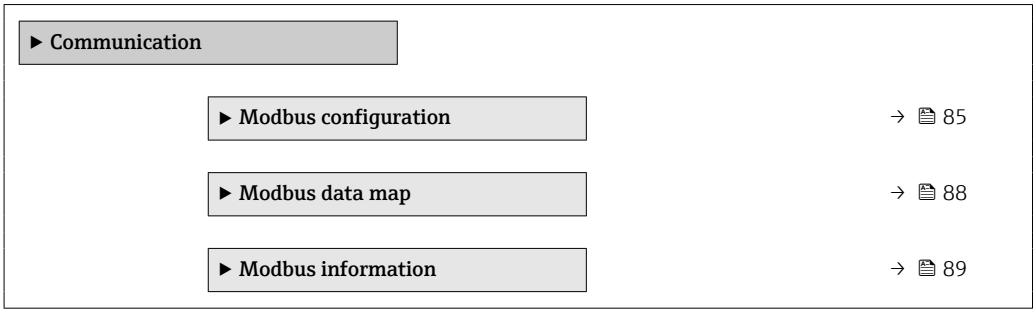
Navigation Application → Curr.output 1 → Output curr. 1

Description Displays the current value currently calculated.

User interface 3.59 to 21.5 mA

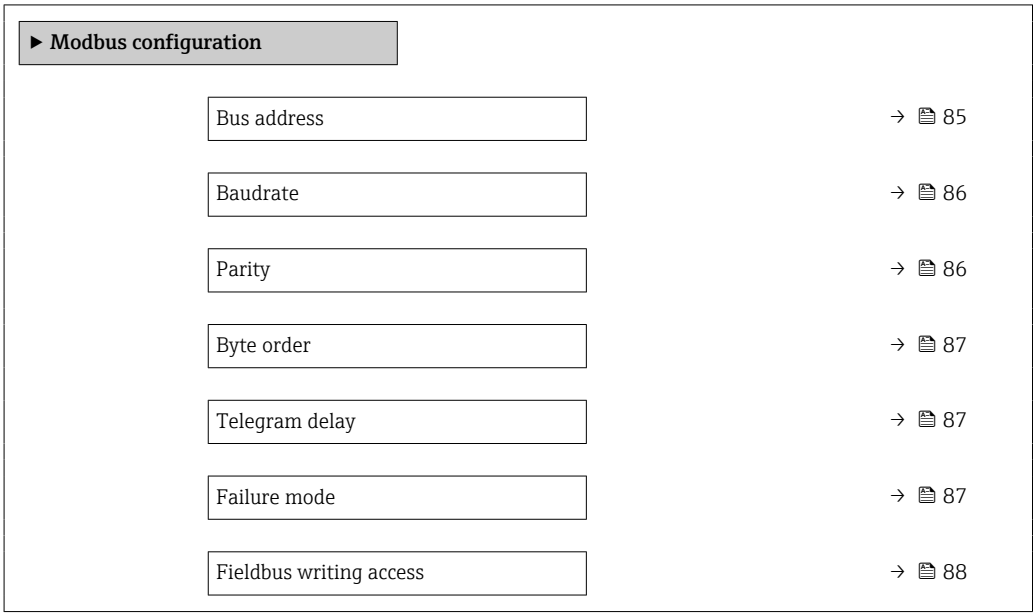
4.6 " Communication" submenu

Navigation Application → Communication



4.6.1 "Modbus configuration" submenu

Navigation Application → Communication → Modbus config.



Bus address

Navigation Application → Communication → Modbus config. → Bus address

Description Enter device address.

User entry 1 to 247

Baudrate

Navigation Application → Communication → Modbus config. → Baudrate

Description Define data transfer speed.

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

Parity

Navigation Application → Communication → Modbus config. → Parity

Description Select parity bits.

Additional information:
"ASCII" picklist option:
- 0 = "Even" option
- 1 = "Odd" option

"RTU" picklist option:
- 0 = "Even" option
- 1 = "Odd" option
- 2 = "No parity bit/1 stop bit" option
- 3 = "No parity bit/2 stop bits" option

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

Byte order

Navigation Application → Communication → Modbus config. → Byte order

Description Select byte transmission sequence. The transmission sequence must be coordinated with the Modbus master.

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

Changing the byte sequence in the host system often requires extensive knowledge and significant programming effort. This parameter can be used to keep the standard settings of the host system, while adjusting the byte sequence on the measuring device by means of trial and error. If it is not possible to achieve correct data exchange in this manner, then it is the host system's settings for the byte sequence that must be modified.

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

Telegram delay

Navigation Application → Communication → Modbus config. → Telegram delay

Description Enter a delay time after which the measuring device replies to the request telegram of the Modbus master. This is to enable communication with slow Modbus RS485 masters.

User entry 0 to 100 ms

Failure mode

Navigation Application → Communication → Modbus config. → Failure mode

Description Select the preferred Modbus communication output mode for the measured value, when a diagnostic event of the category specified in the "Assign diagnostic behavior" parameter occurs.

Selection
- NaN value
- Last valid value

Additional information *Selection*
- **NaN value** option
  The device outputs the NaN value ("Not a number" value).
- **Last valid value** option
  The device displays the last valid measured value before the issue occurred.

Fieldbus writing access

Navigation Application → Communication → Modbus config. → Fieldb.writ.acc.

Description Restrict access to the measuring device via Fieldbus.

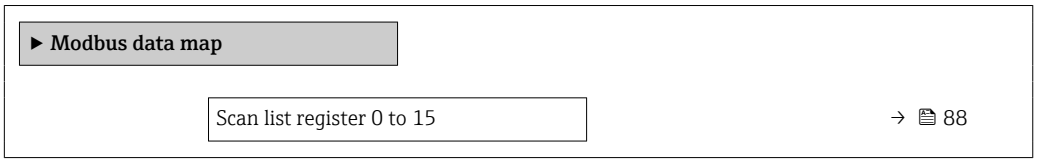
Additional information:
Once read and/or write protection has been enabled, this parameter can only be accessed and reset via local operation. Access via an operating tool is no longer possible.

NOTE
The cyclical transmission of measured values to the higher-order system is not impacted by these restrictions and always guaranteed!

Selection
- Read + write
- Read only

4.6.2 "Modbus data map" submenu

Navigation Application → Communication → Modbus data map



Scan list register 0 to 15

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

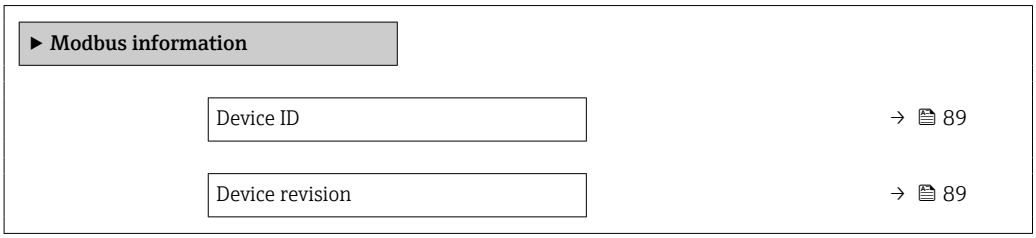
Description Enter the scan list register.

Additional information:
By entering the register address (1-based), it is possible to group up to 16 device parameters, which thereby are assigned to the scan list registers 0 to 15. The data corresponding to the device parameters assigned is read out via the register addresses 5051 to 5081.

User entry 0 to 65 535

4.6.3 "Modbus information" submenu

Navigation Application → Communication → Modbus info



Device ID

Navigation Application → Communication → Modbus info → Device ID

Description Displays the device ID to identify the measuring device.

User interface 0 to 65 535

Device revision

Navigation Application → Communication → Modbus info → Device revision

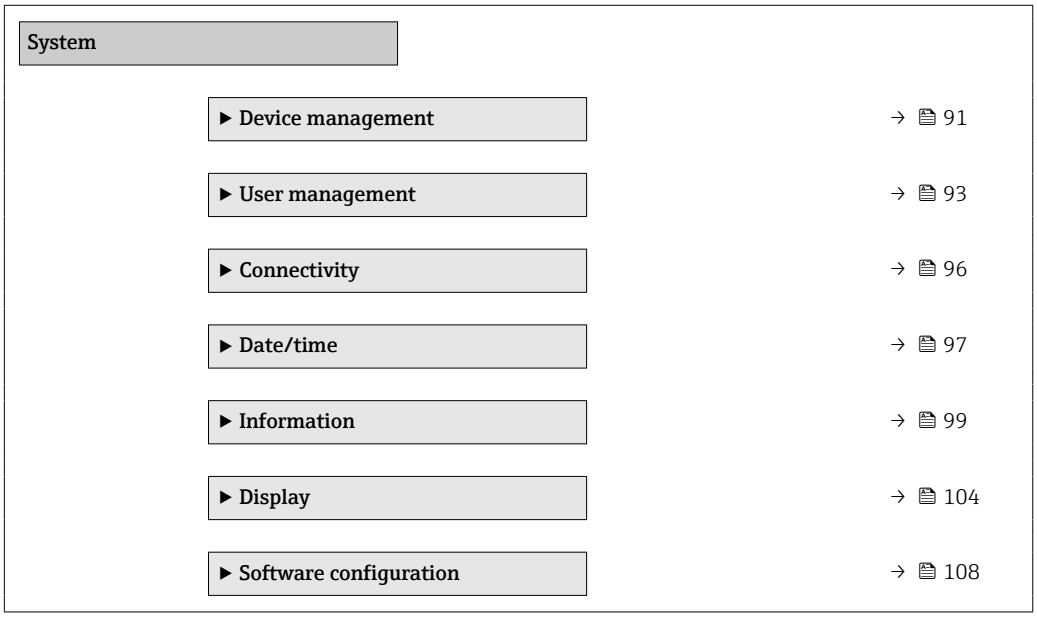
Description Displays device revision.

User interface 0 to 65 535

5 "System" menu

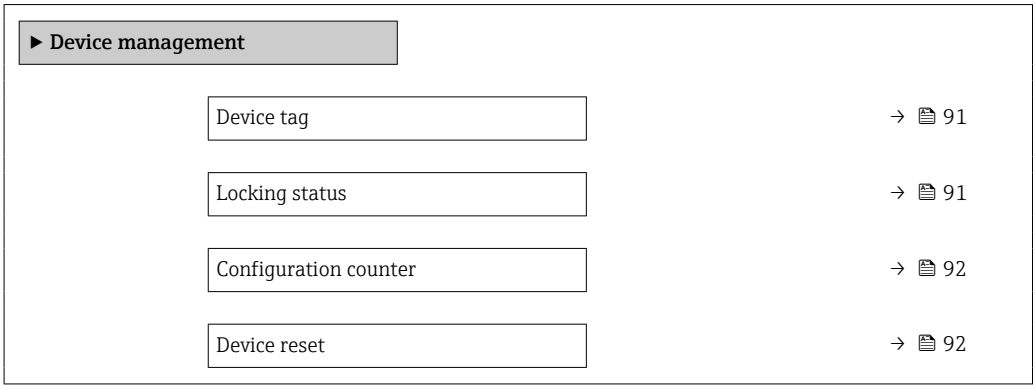
Overall device management and security settings – management of system settings and adaption to operational requirements.

Navigation System



5.1 "Device management" submenu

Navigation System → Device manag.



Device tag

Navigation System → Device manag. → Device tag

Description Enter a unique designation for the measuring point to be able to easily identify it within the plant.

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

Locking status

Navigation System → Device manag. → Locking status

Description Indicates the write protection with the highest priority that is currently active.

User interface
- Hardware locked
- Temporarily locked

Additional information *User interface*
- **Hardware locked** option
  The DIP switch for the hardware lock is enabled. As a result write access to the parameters is locked.
- **Temporarily locked** option
  Due to internal procedures that are currently in progress (e.g. data upload/download, reset, etc.), write access to the parameters is temporarily locked.The parameters can be modified again, once the internal procedures are complete.

Configuration counter

Navigation System → Device manag. → Config. counter

Description Displays the counter for changes to the device parameters.

Additional information:
- If the value for a static parameter is changed when optimizing or configuring the parameter, the counter is incremented by 1. This is to enable tracking different parameter versions.
- When multiple parameters are changed simultaneously, e.g. when loading parameters into the device from an external source such as FieldCare, the counter may display a higher value. The counter cannot be reset, nor is it reset to a default value on performing a device reset.
- Once the counter has reached the value 65535, it restarts at 0.

User interface 0 to 65 535

Device reset

Navigation System → Device manag. → Device reset

Description Reset the device configuration - either entirely or in part - to a defined state.

Selection
- Cancel
- To delivery settings
- Restart device
- Restore S-DAT backup *
- Create T-DAT backup
- Restore T-DAT backup *

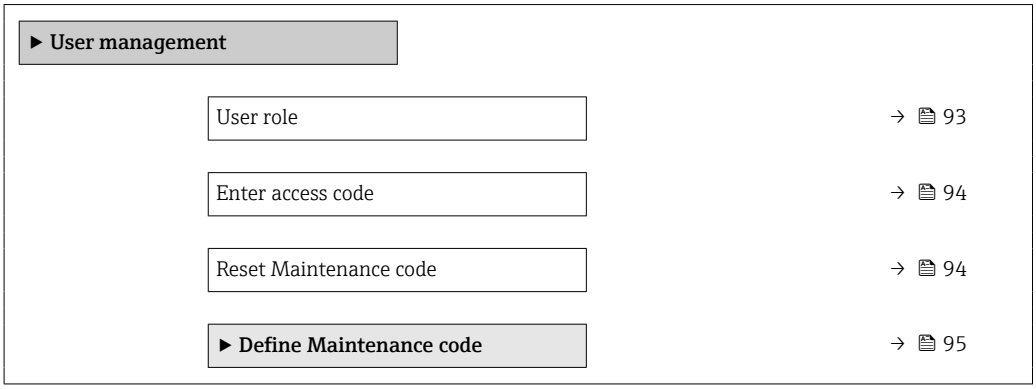
Additional information *Selection*

- **To delivery settings** option
  Every parameter for which a customer-specific default setting was ordered is reset to the customer-specific value. All other parameters are reset to the factory setting.
- **Restart device** option
  The restart resets every parameter with data stored in volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.
- **Restore S-DAT backup** option
  Restore the data that is saved on the S-DAT. The data record is restored from the electronics memory to the S-DAT.
- **Create T-DAT backup** option
  Create T-DAT backup.

* Visibility depends on order options or device settings

5.2 "User management" submenu

Navigation System → User manag.



User role

Navigation System → User manag. → User role

Description Displays the role the user is currently logged on in. The role determines the user's access rights for the parameters.

Additional information:
- Until a Maintenance code has been set in the "Define Maintenance code" parameter, all users are automatically logged on in the Maintenance role. Once the Maintenance code has been set, all users are automatically logged on in the Operator role.
- The access rights can be changed via the "Enter access code" parameter.

User interface
- Operator
- Maintenance
- Service
- Production
- Development

Additional information *User interface*

- **Operator** option
  Provides only read access to parameters.
- **Maintenance** option
  Provides read and write access to parameters.
  Additional information:
  For some parameters, the user must be logged on in the Service role to obtain write access.
- **Service** option
  Provides read and write access to Service parameters.

Enter access code

Navigation System → User manag. → Ent. access code

Description For users logged on in the Operator role, enter the Maintenance code to change the access status to Maintenance and disable write protection of parameters. For users logged on in the Maintenance role, enter the Service code to change the access status to Service and enable read and write access to Service parameters.

User entry 0 to 9 999

Reset Maintenance code

Navigation System → User manag. → Reset Maint code

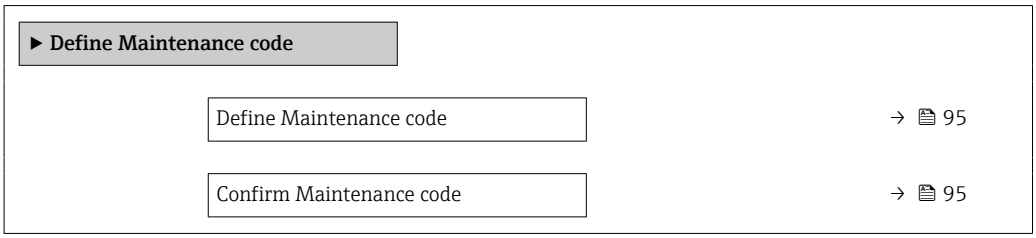
Description Enter the code provided by Endress+Hauser Technical Support to reset the Maintenance code.

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

5.2.1 "Define access code" wizard

Complete this wizard to specify an access code for the Maintenance role.

Navigation System → User manag. → Def. access code



Define Maintenance code

Navigation System → User manag. → Def. Maint. code → Def. Maint. code

Description Specify an access code that is required to obtain the access rights for the Maintenance role.

User entry 0 to 9 999

Confirm Maintenance code

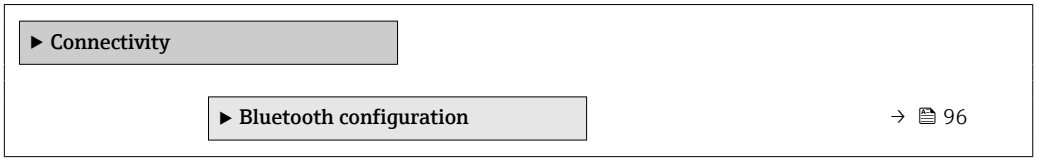
Navigation System → User manag. → Def. Maint. code → Conf. Maint code

Description Confirm the access code entered for the Maintenance role.

User entry 0 to 9 999

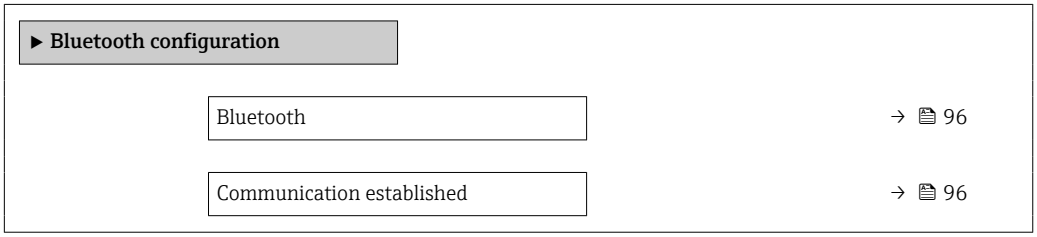
5.3 "Connectivity" submenu

Navigation System → Connectivity



5.3.1 "Bluetooth configuration" submenu

Navigation System → Connectivity → Bluetooth conf.



Bluetooth

Navigation System → Connectivity → Bluetooth conf. → Bluetooth

Description Enable or disable Bluetooth.

Selection
- Enable
- Disable
- Not available *

Communication established

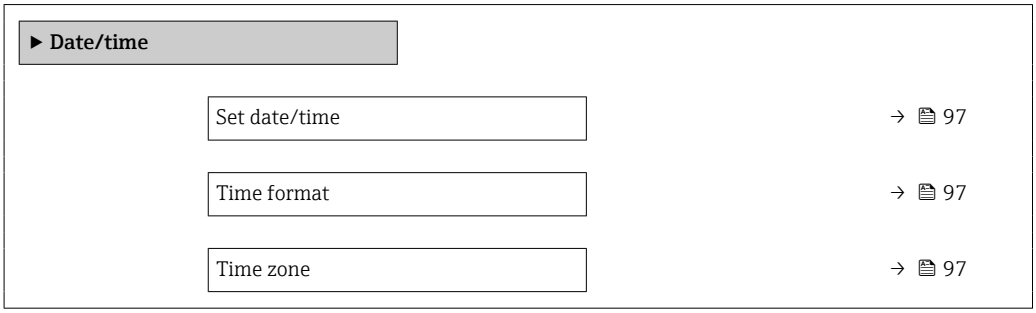
Navigation System → Connectivity → Bluetooth conf. → Communi. establ.

User interface
- No
- Yes

* Visibility depends on order options or device settings

5.4 " Date / Time" submenu

Navigation System → Date / Time



Set date/time

Navigation System → Date/time → Set date/time

Description Set the date and local time. Every time the date or time is changed, a logbook entry is created.

User entry Date and time

Time format

Navigation System → Date/time → Time format

Description Select time format.

Selection
- 24 h
- 12 h AM/PM

Time zone

Navigation System → Date/time → Time zone

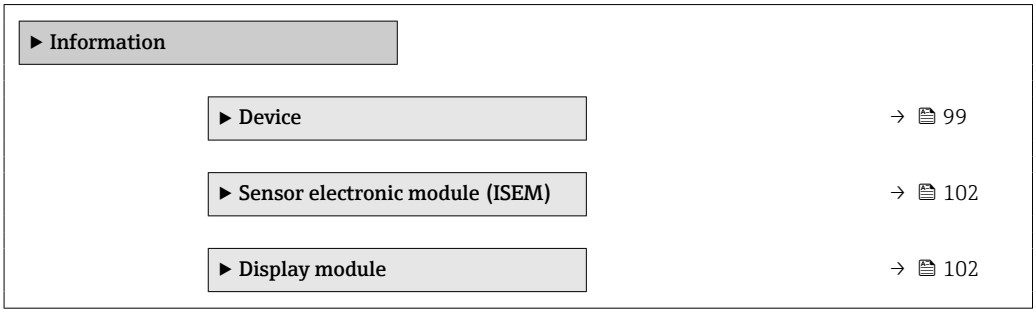
Description Select the time zone. Every time the time zone is changed, a logbook entry is created.

Selection

Other units
- UTC-12:00
- UTC-11:00
- UTC-10:00
- UTC-09:30
- UTC-09:00
- UTC-08:00
- UTC-07:00
- UTC-06:00
- UTC-05:00
- UTC-04:00
- UTC-03:30
- UTC-03:00
- UTC-02:00
- UTC-01:00
- UTC 00:00
- UTC+01:00
- UTC+02:00
- UTC+03:00
- UTC+03:30
- UTC+04:00
- UTC+04:30
- UTC+05:00
- UTC+05:30
- UTC+05:45
- UTC+06:00
- UTC+06:30
- UTC+07:00
- UTC+08:00
- UTC+08:45
- UTC+09:00
- UTC+09:30
- UTC+10:00
- UTC+10:30
- UTC+11:00
- UTC+12:00
- UTC+12:45
- UTC+13:00
- UTC+14:00

5.5 "Information" submenu

Navigation System → Information



5.5.1 "Device" submenu

Navigation System → Information → Device

Device name

Navigation System → Information → Device → Device name

Description Displays the name of the transmitter.

Additional information:
The name can also be found on the transmitter's nameplate.

User interface Character string comprising numbers, letters and special characters

Device tag

Navigation System → Information → Device → Device tag

Description Displays the name for the measuring point.

User interface Character string comprising numbers, letters and special characters

Serial number

Navigation System → Information → Device → Serial number

Description Displays the serial number of the measuring device. The serial number can be used to identify the measuring device and to retrieve further information on the measuring device, such as the related documentation, via the Device Viewer or Operations app.

Additional information:
The serial number can also be found on the nameplate of the sensor and transmitter.

User interface Character string comprising numbers, letters and special characters

Order code

Navigation System → Information → Device → Order code

Description Displays the device order code.

Additional information:
The order code can be used for instance to order a replacement or spare device or to verify that the device features specified on the order form match the shipping note.

User interface Character string comprising numbers, letters and special characters

Firmware version

Navigation System → Information → Device → Firmware version

Description Displays the device firmware version installed.

User interface Character string comprising numbers, letters and special characters

Extended order code 1

Navigation System → Information → Device → Ext. order cd. 1

Description Displays the first, second and/or third part of the extended order code. Due to character length restrictions, the extended order code is split into a maximum of 3 parameters. The extended order code indicates for each feature in the product structure the selected option, thereby uniquely identifying the device model.

Additional information:
The extended order code can also be found on the nameplate.

User interface Character string comprising numbers, letters and special characters

Extended order code 2

Navigation System → Information → Device → Ext. order cd. 2

Description Displays the first, second and/or third part of the extended order code. Due to character length restrictions, the extended order code is split into a maximum of 3 parameters. The extended order code indicates for each feature in the product structure the selected option, thereby uniquely identifying the device model.

Additional information:
The extended order code can also be found on the nameplate.

User interface Character string comprising numbers, letters and special characters

Extended order code 3

Navigation System → Information → Device → Ext. order cd. 3

Description Displays the first, second and/or third part of the extended order code. Due to character length restrictions, the extended order code is split into a maximum of 3 parameters. The extended order code indicates for each feature in the product structure the selected option, thereby uniquely identifying the device model.

Additional information:
The extended order code can also be found on the nameplate.

User interface Character string comprising numbers, letters and special characters

ENP version

Navigation System → Information → Device → ENP version

Description Displays the version of the electronic nameplate (ENP).

User interface Character string comprising numbers, letters and special characters

Manufacturer

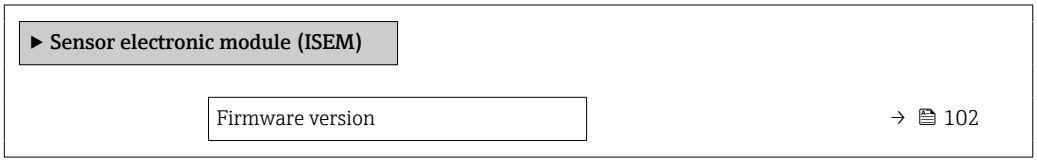
Navigation System → Information → Device → Manufacturer

Description Displays the manufacturer.

User interface Character string comprising numbers, letters and special characters

5.5.2 "Sensor electronic module (ISEM)" submenu

Navigation System → Information → Sens. electronic



Firmware version

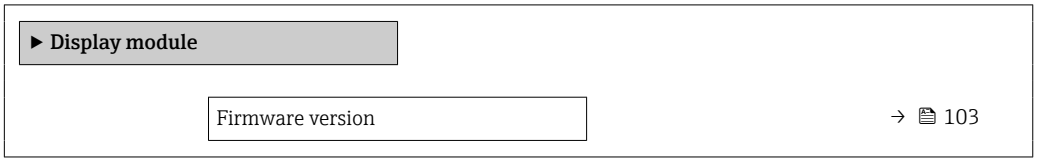
Navigation System → Information → Sens. electronic → Firmware version

Description Displays the firmware version of the module.

User interface Positive integer

5.5.3 "Display module" submenu

Navigation System → Information → Display module



Firmware version

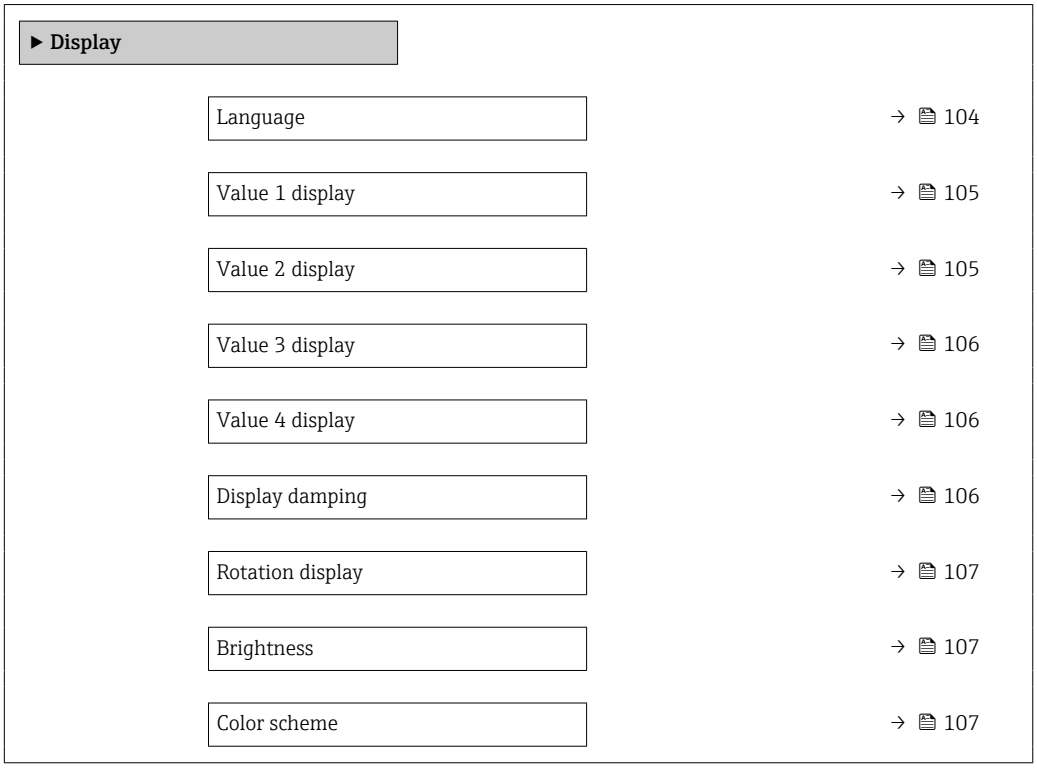
Navigation System → Information → Display module → Firmware version

Description Displays the firmware version of the module.

User interface Positive integer

5.6 "Display" submenu

Navigation System → Display



Language

Navigation System → Display → Language

Description Set display language.

Selection
- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- العَرَبيّة (Arabic) *
- Bahasa Indonesia

* Visibility depends on order options or device settings

- ภาษาไทย (Thai) *
- tiếng Việt (Vietnamese)
- čeština (Czech)

Value 1 display

Navigation System → Display → Value 1 display

Description Select the measured value that is displayed first on the local display.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

Selection
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Value 2 display

Navigation System → Display → Value 2 display

Description Select the measured value that is shown second on the local display.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

Selection
- None
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *
- Totalizer 1
- Totalizer 2
- Totalizer 3

* Visibility depends on order options or device settings

Value 3 display

Navigation System → Display → Value 3 display

Description Select the measured value that is shown third on the local display.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

Selection
- None
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Value 4 display

Navigation System → Display → Value 4 display

Description Select the measured value that is shown fourth on the local display.

Additional information:
The applicable unit of measure is specified in the "System units" submenu.

Selection
- None
- Volume flow
- Mass flow
- Conductivity *
- Corrected conductivity *
- Temperature *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Display damping

Navigation System → Display → Display damping

Description Enter time constant (PT1 element) to set reaction time of the display to fluctuations in the measured value.

Additional information:
- The smaller the time constant the faster the display reacts to fluctuations in the measured value.
- If the time constant is set to 0, damping is deactivated.

* Visibility depends on order options or device settings

User entry 0.0 to 999.9 s

Rotation display

Navigation System → Display → Rotation display

Description Select rotation angle of the display text to optimize local display readability.

Selection
- Auto
- 0 degree
- 90 degree
- 180 degree
- 270 degree

Brightness

Navigation System → Display → Brightness

Description Adjust brightness.

User entry 0 to 100 %

Color scheme

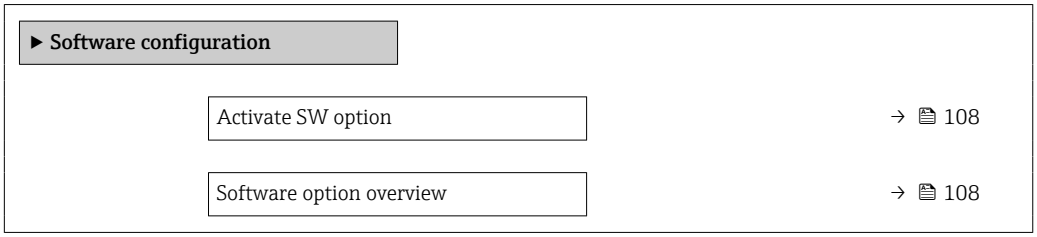
Navigation System → Display → Color scheme

Description Select preferred color scheme.

Selection
- Light
- Dark

5.7 "Software configuration" submenu

Navigation System → Software config.



Activate SW option

Navigation System → Software config. → Activate SW opt.

Description Enter application package code or code of the functionality ordered separately to activate it.

Additional information:
- If a measuring device was ordered with an add-on software option, the activation code is programmed into the measuring device ex factory.
- After entering the activation code: Check whether the new software option is displayed in the "Software option overview" parameter and therefore active.

NOTE
If an an invalid code is entered the software options that have already been activated are invalidated!
Before entering a new activation code: Create a record of the existing activation code.

User entry Positive integer

Software option overview

Navigation System → Software config. → SW option overv.

Description Displays all software options included in the order ex factory or ordered at a later date that have been enabled via the operating interface.

Additional information:
If a new software option is not displayed after entering the activation code, the code entered was inaccurate or invalid. In this case, contact the appropriate Endress+Hauser sales organization to activate the software option.

User interface
- Heartbeat Verification
- Heartbeat Monitoring

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	**Selection** List of the individual options for the parameter ▪ Option 1 ▪ **Option 2** ▪ **Option 3** (+) ▪ Factory setting highlighted in bold ▪ (+) = Factory setting depends on country, order options or device settings **Input** 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:

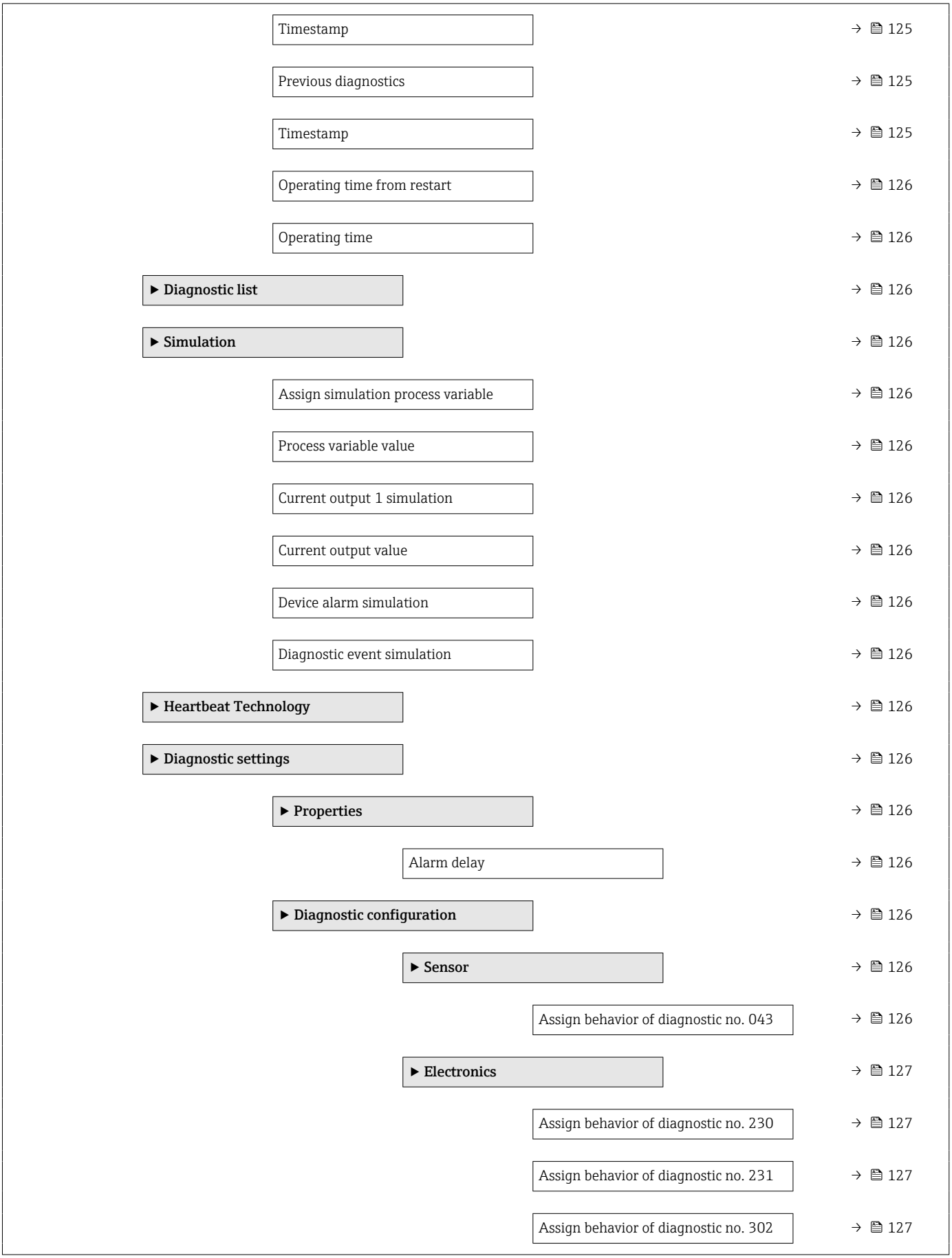
- "3" → "Read" access
- "4" → "Write" access

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 operating menu

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

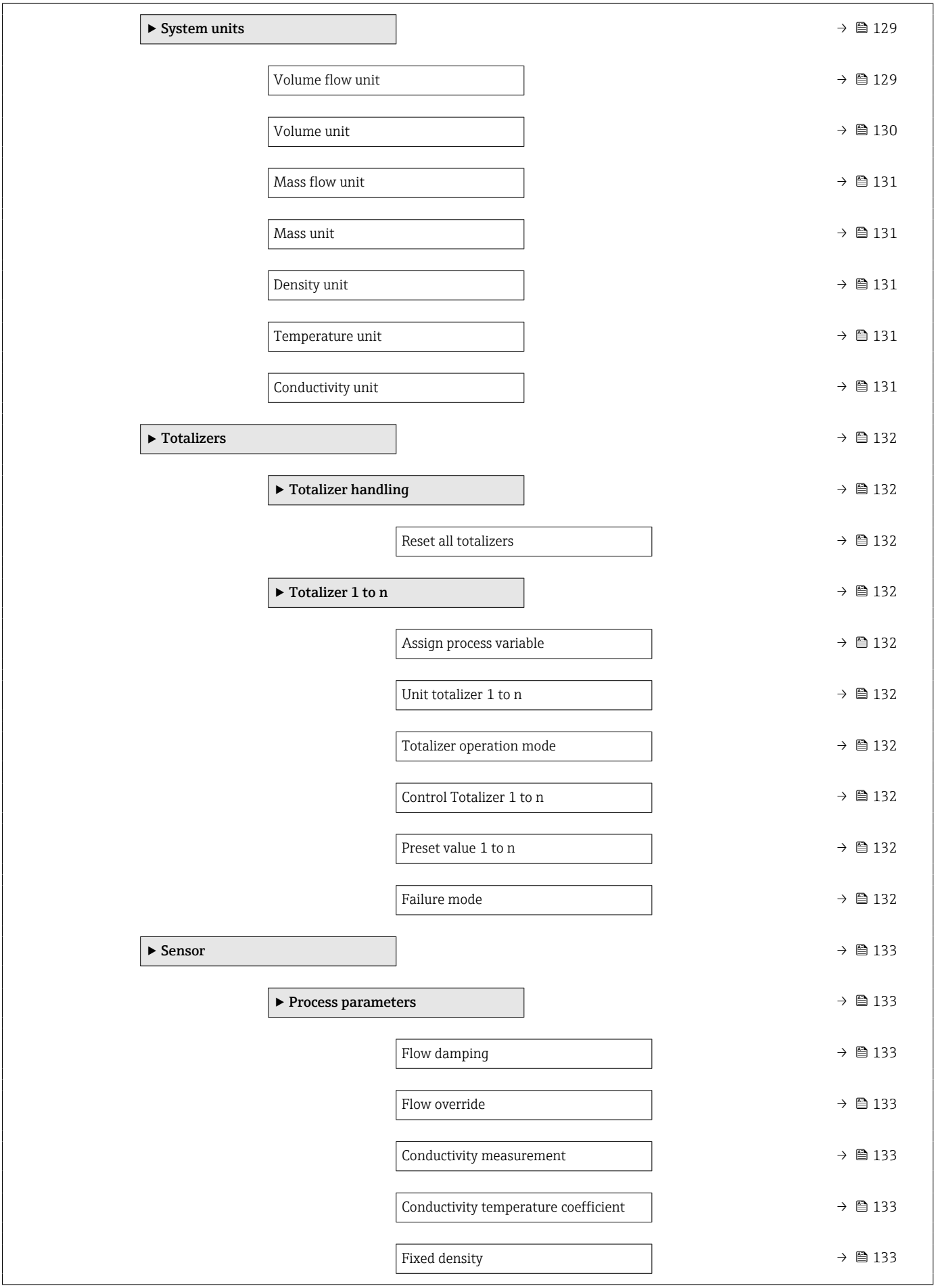
Low flow cut off	→ 123
On value low flow cutoff	→ 123
Off value low flow cutoff	→ 123
Pressure shock suppression	→ 123
Empty pipe detection	→ 123
Empty pipe adjust value	→ 123
Full pipe adjust value	→ 123
Process variable current output	→ 123
Current range output	→ 124
Lower range value output	→ 124
Upper range value output	→ 124
Damping current output	→ 124
Fixed current	→ 124
Failure behavior current output	→ 124
Failure current	→ 124
Value 1 display	→ 124
Value 2 display	→ 124
Value 3 display	→ 124
Value 4 display	→ 124
Display damping	→ 124
Time format	→ 125
Time zone	→ 125
Diagnostics	→ 125
▶ **Active diagnostics**	→ 125
Actual diagnostics	→ 125


Timestamp → 125
Previous diagnostics → 125
Timestamp → 125
Operating time from restart → 126
Operating time → 126
▶ Diagnostic list → 126
▶ Simulation → 126
Assign simulation process variable → 126
Process variable value → 126
Current output 1 simulation → 126
Current output value → 126
Device alarm simulation → 126
Diagnostic event simulation → 126
▶ Heartbeat Technology → 126
▶ Diagnostic settings → 126
▶ Properties → 126
Alarm delay → 126
▶ Diagnostic configuration → 126
▶ Sensor → 126
Assign behavior of diagnostic no. 043 → 126
▶ Electronics → 127
Assign behavior of diagnostic no. 230 → 127
Assign behavior of diagnostic no. 231 → 127
Assign behavior of diagnostic no. 302 → 127

- Assign behavior of diagnostic no. 376 → 127
- Assign behavior of diagnostic no. 377 → 127
- ▶ **Configuration** → 127
  - Assign behavior of diagnostic no. 441 → 127
  - ▶ **Process** → 127
    - Assign behavior of diagnostic no. 832 → 127
    - Assign behavior of diagnostic no. 833 → 127
    - Assign behavior of diagnostic no. 834 → 127
    - Assign behavior of diagnostic no. 835 → 127
    - Assign behavior of diagnostic no. 842 → 127
    - Assign behavior of diagnostic no. 937 → 128
    - Assign behavior of diagnostic no. 938 → 128
    - Assign behavior of diagnostic no. 961 → 128
    - Assign behavior of diagnostic no. 962 → 128

Application → 128

- ▶ **Measured values** → 128
  - Mass flow → 128
  - Volume flow → 128
  - Conductivity → 128
  - Corrected conductivity → 128
  - Temperature → 128
  - ▶ **Totalizer** → 128
    - Totalizer value 1 to n → 128
    - Totalizer overflow 1 to n → 128


▶ System units → 129
Volume flow unit → 129
Volume unit → 130
Mass flow unit → 131
Mass unit → 131
Density unit → 131
Temperature unit → 131
Conductivity unit → 131
▶ Totalizers → 132
▶ Totalizer handling → 132
Reset all totalizers → 132
▶ Totalizer 1 to n → 132
Assign process variable → 132
Unit totalizer 1 to n → 132
Totalizer operation mode → 132
Control Totalizer 1 to n → 132
Preset value 1 to n → 132
Failure mode → 132
▶ Sensor → 133
▶ Process parameters → 133
Flow damping → 133
Flow override → 133
Conductivity measurement → 133
Conductivity temperature coefficient → 133
Fixed density → 133

▶ **Low flow cut off**	→ 133
Low flow cut off	→ 133
On value low flow cutoff	→ 133
Off value low flow cutoff	→ 133
▶ **Empty pipe detection**	→ 133
Empty pipe detection	→ 133
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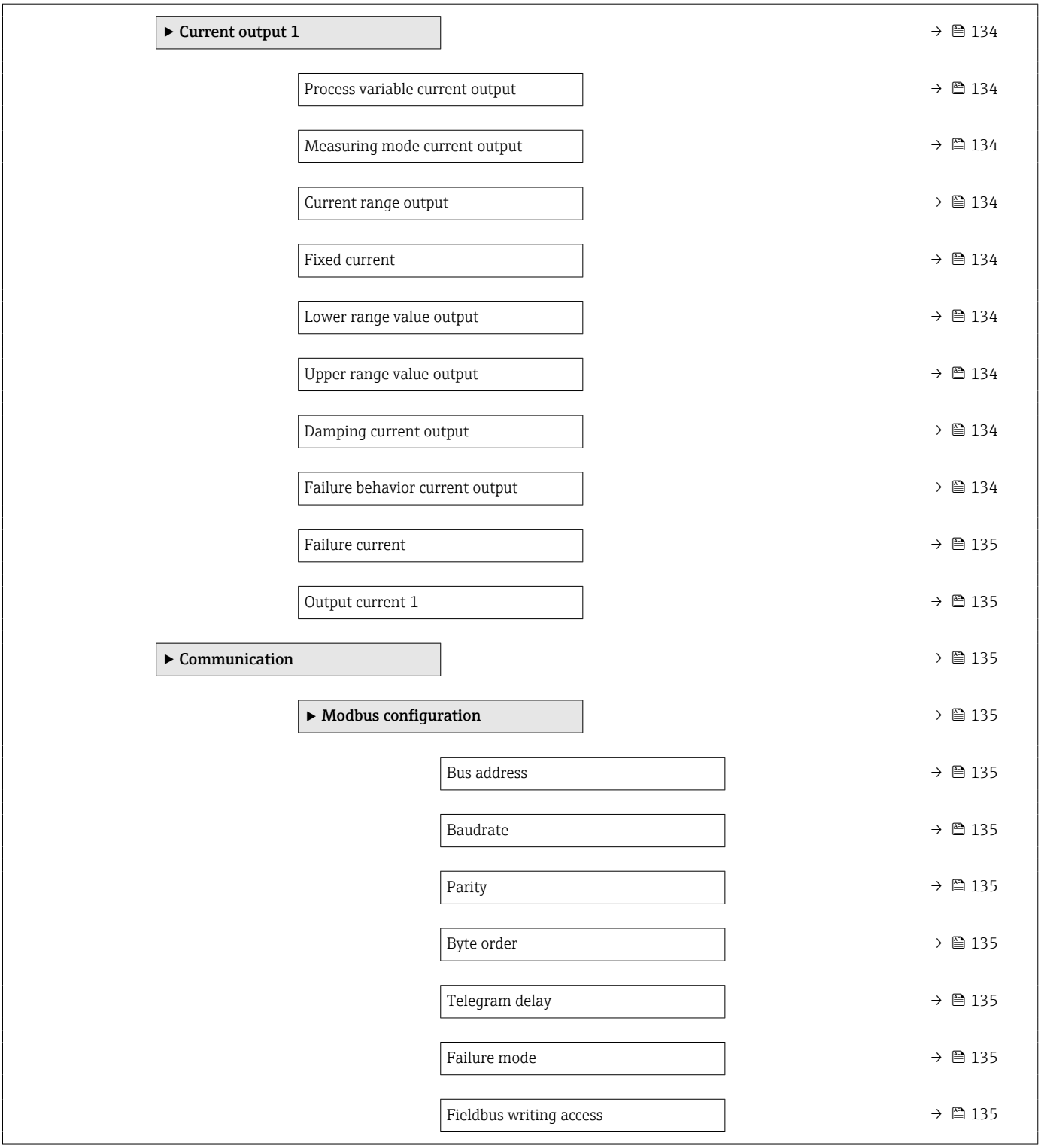
Empty pipe adjust value	→ 133
Full pipe adjust value	→ 133
Measured value EPD	→ 133
▶ **Sensor adjustment**	→ 133
Installation direction	→ 133
Integration time	→ 133
Measuring period	→ 133
▶ **Calibration**	→ 134
Nominal diameter	→ 134
Calibration factor	→ 134
Zero point	→ 134
Conductivity calibration factor	→ 134
▶ **Electrode cleaning cycle**	→ 134
Electrode cleaning cycle	→ 134
ECC duration	→ 134
ECC recovery time	→ 134
ECC interval	→ 134
ECC polarity	→ 134


▶ Current output 1
→ 134
Process variable current output
→ 134
Measuring mode current output
→ 134
Current range output
→ 134
Fixed current
→ 134
Lower range value output
→ 134
Upper range value output
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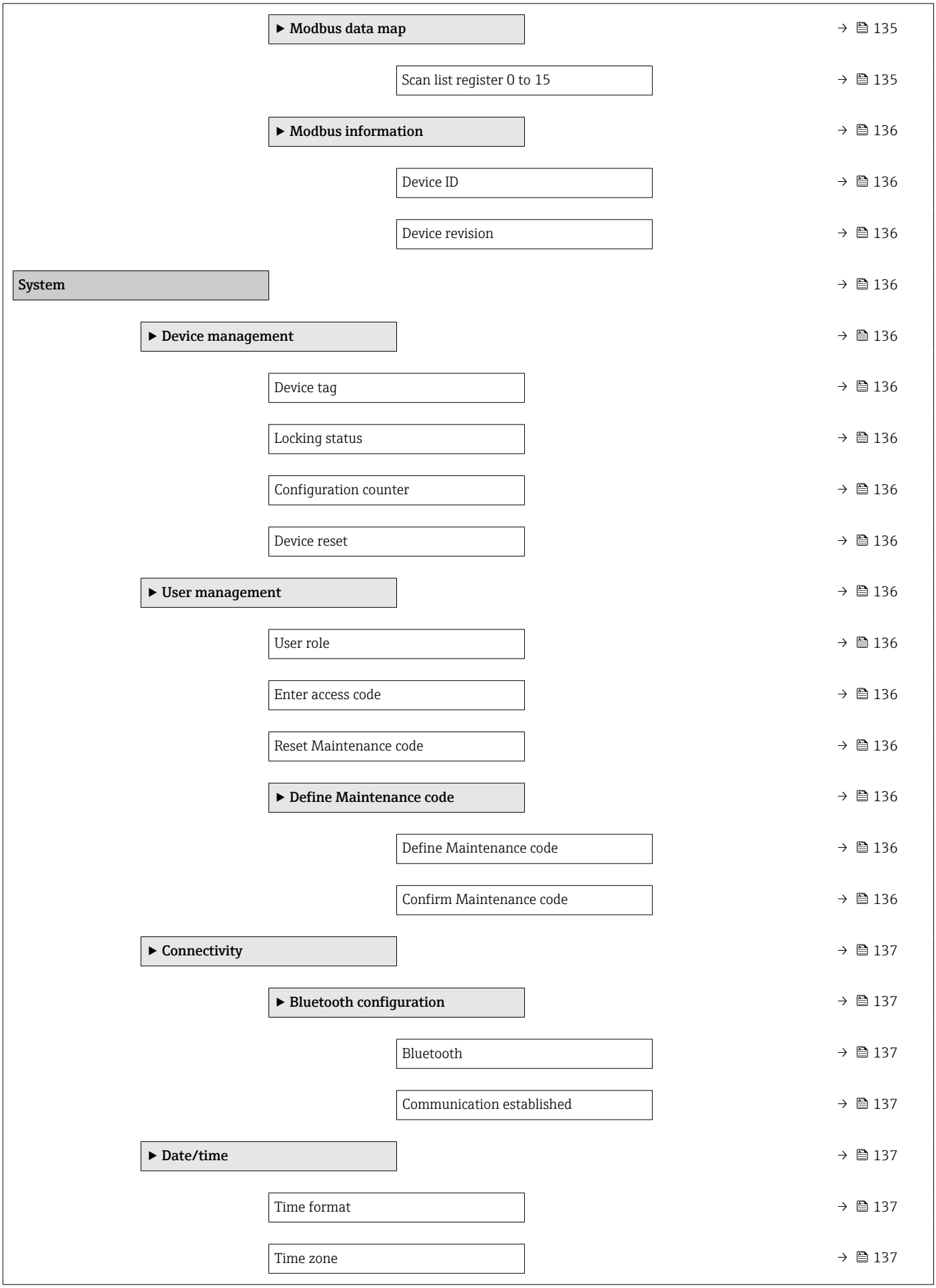
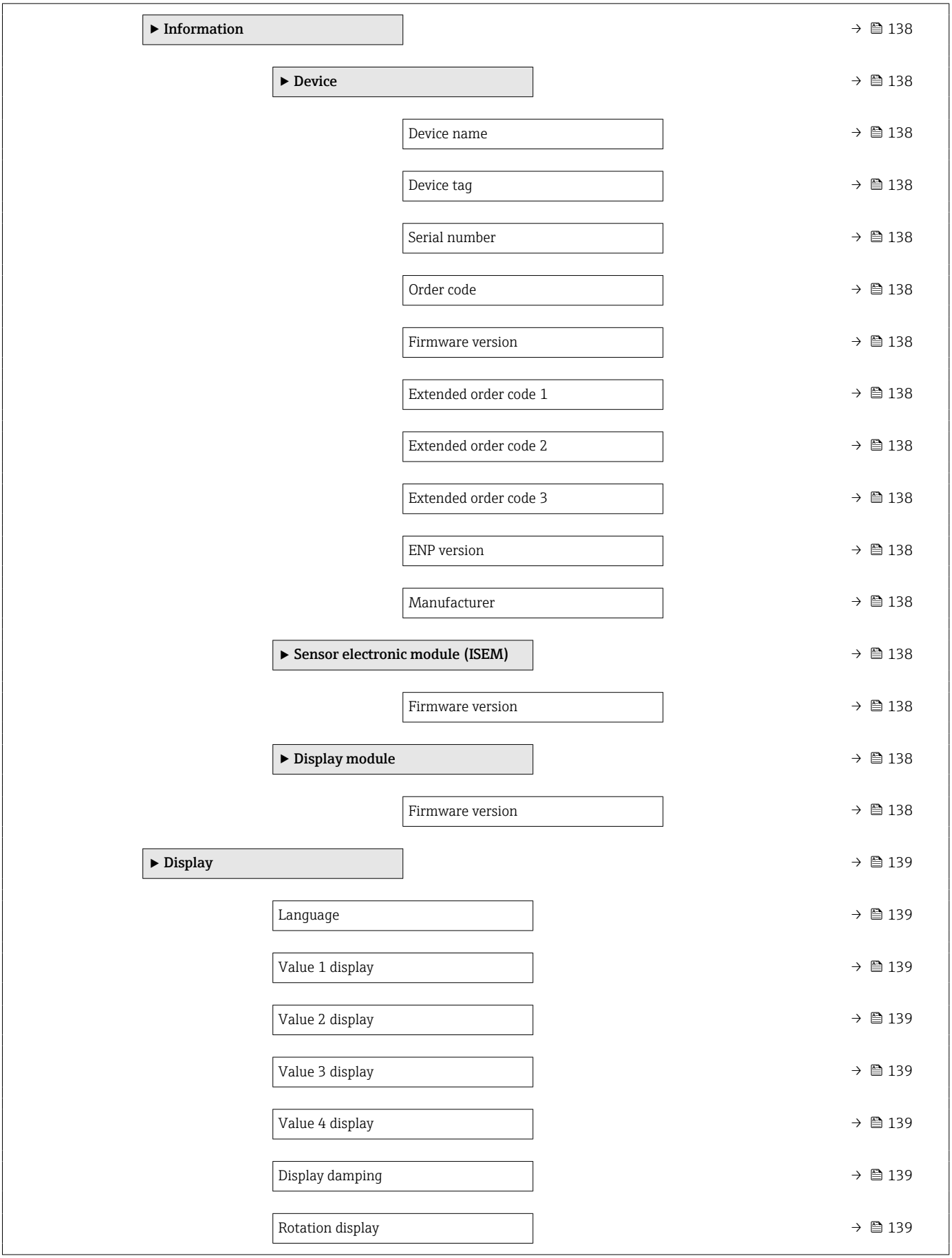
Damping current output
→ 134
Failure behavior current output
→ 134
Failure current
→ 135
Output current 1
→ 135
▶ Communication
→ 135
▶ Modbus configuration
→ 135
Bus address
→ 135
Baudrate
→ 135
Parity
→ 135
Byte order
→ 135
Telegram delay
→ 135
Failure mode
→ 135
Fieldbus writing access
→ 135


▶ Modbus data map → 135
Scan list register 0 to 15 → 135
▶ Modbus information → 136
Device ID → 136
Device revision → 136
System → 136
▶ Device management → 136
Device tag → 136
Locking status → 136
Configuration counter → 136
Device reset → 136
▶ User management → 136
User role → 136
Enter access code → 136
Reset Maintenance code → 136
▶ Define Maintenance code → 136
Define Maintenance code → 136
Confirm Maintenance code → 136
▶ Connectivity → 137
▶ Bluetooth configuration → 137
Bluetooth → 137
Communication established → 137
▶ Date/time → 137
Time format → 137
Time zone → 137


▶ Information → 138
▶ Device → 138
Device name → 138
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Serial number → 138
Order code → 138
Firmware version → 138
Extended order code 1 → 138
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▶ Sensor electronic module (ISEM) → 138
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▶ Display → 139
Language → 139
Value 1 display → 139
Value 2 display → 139
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Display damping → 139
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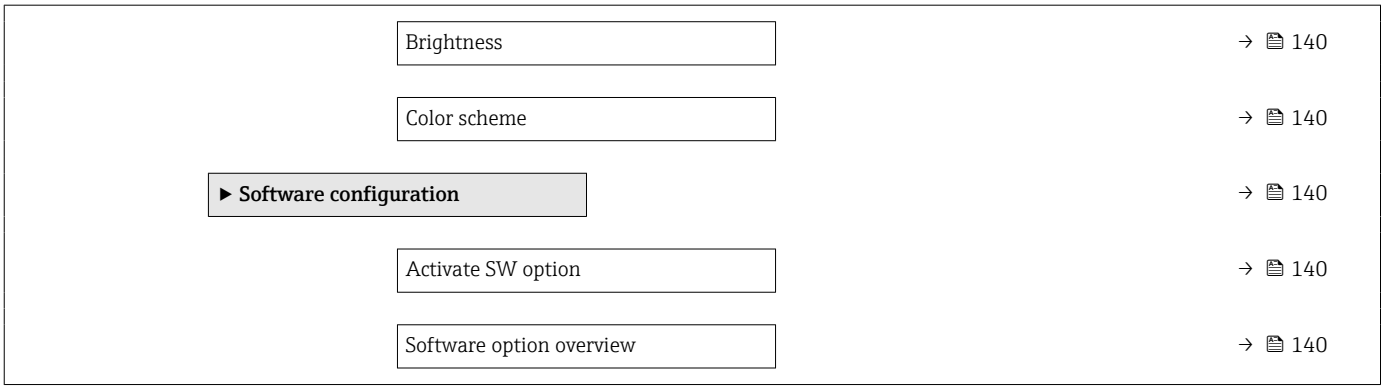

6.3 Register information

6.3.1 "Guidance" menu

"Commissioning" wizard

Navigation: Guidance → Commissioning					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Device tag	29243 to 29258	String	Read / Write	Character string comprising numbers, letters and special characters (32)	8
Serial number	7003 to 7008	String	Read	Character string comprising numbers, letters and special characters	8
Firmware version	7277 to 7280	String	Read	Character string comprising numbers, letters and special characters	8
Device name	7263 to 7270	String	Read	Character string comprising numbers, letters and special characters	8

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

Navigation: Guidance → Commissioning					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
				71 = gal/d (imp) 72 = Mgal/s (imp) 73 = Mgal/min (imp) 74 = Mgal/h (imp) 75 = Mgal/d (imp) 76 = bbl/s (imp;beer) 77 = bbl/min (imp;beer) 78 = bbl/h (imp;beer) 79 = bbl/d (imp;beer) 80 = bbl/s (imp;oil) 81 = bbl/min (imp;oil) 82 = bbl/h (imp;oil) 83 = bbl/d (imp;oil) 88 = kgal/s (us) 89 = kgal/min (us) 90 = kgal/h (us) 91 = kgal/d (us) 92 = MMft³/s 93 = MMft³/min 94 = MMft³/h 96 = Mft³/d	
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) 22 = kgal (us) 23 = Mft³	10

Navigation: Guidance → Commissioning					
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	11
Mass unit	2102	Integer	Read / Write	50 = g 51 = kg 52 = t 53 = oz 54 = lb 55 = STon	11
Density unit	2107	Integer	Read / Write	0 = g/cm³ 2 = kg/dm³ 3 = kg/l 4 = kg/m³ 5 = SD4°C 6 = SD15°C 7 = SD20°C 8 = SG4°C 9 = SG15°C 10 = SG20°C 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) 21 = g/m³	12
Temperature unit	2109	Integer	Read / Write	0 = °C 1 = K 2 = °F 3 = °R	12
Conductivity unit	2121	Integer	Read / Write	1 = MS/m 2 = kS/m 3 = S/m 4 = S/cm 5 = mS/m 6 = mS/cm 7 = µS/m 8 = µS/cm 9 = µS/mm 10 = nS/cm	12

Navigation: Guidance → Commissioning					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign process variable	2601	Integer	Read / Write	0 = Off 1 = Volume flow 11 = Mass flow	13
Unit totalizer 1 to n	1: 4604 2: 4605 3: 4606	Integer	Read / Write	0 = cm^3 * 1 = dm^3 * 2 = m^3 * 3 = ml * 4 = l * 5 = hl * 6 = Ml Mega * 8 = af * 9 = ft^3 * 10 = fl oz (us) * 11 = gal (us) * 12 = Mgal (us) * 13 = bbl (us;liq.) * 14 = bbl (us;beer) * 15 = bbl (us;oil) * 16 = bbl (us;tank) * 17 = gal (imp) * 18 = Mgal (imp) * 19 = bbl (imp;beer) * 20 = bbl (imp;oil) * 22 = kgal (us) * 23 = Mft^3 * 50 = g * 51 = kg * 52 = t * 53 = oz * 54 = lb * 55 = STon * 251 = None *	13
Totalizer operation mode	2605	Integer	Read / Write	0 = Net flow total 1 = Forward flow total 2 = Reverse flow total	14
Failure mode	2606	Integer	Read / Write	0 = Stop 1 = Actual value 2 = Last valid value	15
Flow damping	2274	Integer	Read / Write	0 to 15	15
Low flow cut off	5101	Integer	Read / Write	0 = Off 1 = Volume flow 11 = Mass flow	17
On value low flow cutoff	5138 to 5139	Float	Read / Write	Positive floating-point number	18
Off value low flow cutoff	5104 to 5105	Float	Read / Write	0 to 100.0 %	18
Pressure shock suppression	5140 to 5141	Float	Read / Write	0 to 100 s	16
Empty pipe detection	5106	Integer	Read / Write	0 = Off 1 = On	19
Empty pipe adjust value	2181 to 2182	Float	Read	Positive floating-point number	19
Full pipe adjust value	2832 to 2833	Float	Read	Positive floating-point number	19
Process variable current output	5927	Integer	Read / Write	0 = Off * 1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 40 = Noise * 41 = Coil current shot time *	20

Navigation: Guidance → Commissioning					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Current range output	5923	Integer	Read / Write	0 = 4...20 mA (4... 20.5 mA) 1 = 4...20 mA US (3.9...20.8 mA) 2 = 4...20 mA NE (3.8...20.5 mA) 4 = Fixed value	20
Lower range value output	6195 to 6196	Float	Read / Write	Signed floating-point number	21
Upper range value output	5915 to 5916	Float	Read / Write	Signed floating-point number	22
Damping current output	5903 to 5904	Float	Read / Write	0.0 to 999.9 s	23
Fixed current	5987 to 5988	Float	Read / Write	3.59 to 21.5 mA	23
Failure behavior current output	5911	Integer	Read / Write	0 = Min. 1 = Max. 4 = Actual value 5 = Last valid value 6 = Fixed value	23
Failure current	5979 to 5980	Float	Read / Write	3.59 to 21.5 mA	24
Value 1 display	34918	Integer	Read / Write	1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3	25
Value 2 display	34919	Integer	Read / Write	1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 251 = None	25
Value 3 display	34922	Integer	Read / Write	1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 251 = None	26
Value 4 display	34923	Integer	Read / Write	1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 251 = None	26
Display damping	27602 to 27603	Float	Read / Write	0.0 to 999.9 s	26

Navigation: Guidance → Commissioning					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Time format	2150	Integer	Read / Write	12 = 12 h AM/PM 24 = 24 h	27
Time zone	27339	Integer	Read / Write	0 = UTC 00:00 1 = UTC+01:00 2 = UTC+02:00 3 = UTC+03:00 4 = UTC+04:00 5 = UTC+05:00 6 = UTC+06:00 7 = UTC+07:00 8 = UTC+08:00 9 = UTC+09:00 10 = UTC+10:00 11 = UTC+11:00 12 = UTC+12:00 13 = UTC+13:00 14 = UTC+14:00 35 = UTC+03:30 45 = UTC+04:30 55 = UTC+05:30 57 = UTC+05:45 65 = UTC+06:30 87 = UTC+08:45 95 = UTC+09:30 105 = UTC+10:30 127 = UTC+12:45 135 = UTC-03:30 195 = UTC-09:30 201 = UTC-01:00 202 = UTC-02:00 203 = UTC-03:00 204 = UTC-04:00 205 = UTC-05:00 206 = UTC-06:00 207 = UTC-07:00 208 = UTC-08:00 209 = UTC-09:00 210 = UTC-10:00 211 = UTC-11:00 212 = UTC-12:00	27

* Visibility depends on order options or device settings
* Visibility depends on order options or device settings
* Visibility depends on order options or device settings

6.3.2 "Diagnostics" menu

"Active diagnostics" submenu

Navigation: Diagnostics → Active diagnostics					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Actual diagnostics	2732	Integer	Read	Positive integer	30
Timestamp	29726	String	Read	Days (d), hours (h), minutes (m), seconds (s)	30
Previous diagnostics	2734	Integer	Read	Positive integer	30
Timestamp	29715	String	Read	Days (d), hours (h), minutes (m), seconds (s)	31

Navigation: Diagnostics → Active diagnostics					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Operating time from restart	2624	String	Read	Days (d), hours (h), minutes (m), seconds (s)	31
Operating time	2631	String	Read	Days (d), hours (h), minutes (m), seconds (s)	31

"Diagnostic list" submenu

"Simulation" submenu

Navigation: Diagnostics → Simulation					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign simulation process variable	6813	Integer	Read / Write	0 = Off 1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow	35
Process variable value	6814 to 6815	Float	Read / Write	Signed floating-point number	36
Current output 1 simulation	5939	Integer	Read / Write	0 = Off 1 = On	36
Current output value	5995 to 5996	Float	Read / Write	3.59 to 21.5 mA	36
Device alarm simulation	6812	Integer	Read / Write	0 = Off 1 = On	37
Diagnostic event simulation	4259	Integer	Read / Write	0 = Off	37

* Visibility depends on order options or device settings

"Heartbeat Technology" submenu

"Diagnostic settings" submenu

"Properties" submenu

Navigation: Diagnostics → Diagnostic settings → Properties					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Alarm delay	6808 to 6809	Float	Read / Write	0 to 60 s	39

"Diagnostic configuration" submenu

"Sensor" submenu

Navigation: Diagnostics → Diagnostic settings → Diagnostic configuration → Sensor					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign behavior of diagnostic no. 043	9666	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	40

"Electronics" submenu

Navigation: Diagnostics → Diagnostic settings → Diagnostic configuration → Electronics					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign behavior of diagnostic no. 230	27632	Integer	Read / Write	1 = Logbook entry only 2 = Warning 3 = Alarm	41
Assign behavior of diagnostic no. 231	28535	Integer	Read / Write	1 = Logbook entry only 2 = Warning 3 = Alarm	41
Assign behavior of diagnostic no. 302	6484	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning	41
Assign behavior of diagnostic no. 376	6442	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	41
Assign behavior of diagnostic no. 377	5183	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	42

"Configuration" submenu

Navigation: Diagnostics → Diagnostic settings → Diagnostic configuration → Configuration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign behavior of diagnostic no. 441	4742	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	43

"Process" submenu

Navigation: Diagnostics → Diagnostic settings → Diagnostic configuration → Process					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign behavior of diagnostic no. 832	6440	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	44
Assign behavior of diagnostic no. 833	6439	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	44
Assign behavior of diagnostic no. 834	6438	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	45
Assign behavior of diagnostic no. 835	6437	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	45
Assign behavior of diagnostic no. 842	9661	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	46

Navigation: Diagnostics → Diagnostic settings → Diagnostic configuration → Process					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign behavior of diagnostic no. 937	26404	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	46
Assign behavior of diagnostic no. 938	5837	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	47
Assign behavior of diagnostic no. 961	28459	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	47
Assign behavior of diagnostic no. 962	6441	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	48

6.3.3 "Application" menu

"Measured values" submenu

Navigation: Application → Measured values					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Mass flow	2007 to 2008	Float	Read	Signed floating-point number	49
Volume flow	2009 to 2010	Float	Read	Signed floating-point number	50
Conductivity	2099 to 2100	Float	Read	Positive floating-point number	50
Corrected conductivity	37423 to 37424	Float	Read	Positive floating-point number	50
Temperature	2017 to 2018	Float	Read	Positive floating-point number	51

"Totalizer" submenu

Navigation: Application → Measured values → Totalizer					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Totalizer value 1 to n	1: 2610 to 2611 2: 2810 to 2811 3: 3010 to 3011	Float	Read	Signed floating-point number	51
Totalizer overflow 1 to n	1: 2612 to 2613 2: 2812 to 2813 3: 3012 to 3013	Float	Read	−32 000.0 to 32 000.0	52

"System units" submenu

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

Navigation: Application → System units					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
				69 = gal/min (imp) 70 = gal/h (imp) 71 = gal/d (imp) 72 = Mgal/s (imp) 73 = Mgal/min (imp) 74 = Mgal/h (imp) 75 = Mgal/d (imp) 76 = bbl/s (imp;beer) 77 = bbl/min (imp;beer) 78 = bbl/h (imp;beer) 79 = bbl/d (imp;beer) 80 = bbl/s (imp;oil) 81 = bbl/min (imp;oil) 82 = bbl/h (imp;oil) 83 = bbl/d (imp;oil) 88 = kgal/s (us) 89 = kgal/min (us) 90 = kgal/h (us) 91 = kgal/d (us) 92 = MMft³/s 93 = MMft³/min 94 = MMft³/h 96 = Mft³/d	
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) 22 = kgal (us) 23 = Mft³	54

Navigation: Application → 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	55
Mass unit	2102	Integer	Read / Write	50 = g 51 = kg 52 = t 53 = oz 54 = lb 55 = STon	55
Density unit	2107	Integer	Read / Write	0 = g/cm³ 2 = kg/dm³ 3 = kg/l 4 = kg/m³ 5 = SD4°C 6 = SD15°C 7 = SD20°C 8 = SG4°C 9 = SG15°C 10 = SG20°C 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) 21 = g/m³	56
Temperature unit	2109	Integer	Read / Write	0 = °C 1 = K 2 = °F 3 = °R	56
Conductivity unit	2121	Integer	Read / Write	1 = MS/m 2 = kS/m 3 = S/m 4 = S/cm 5 = mS/m 6 = mS/cm 7 = µS/m 8 = µS/cm 9 = µS/mm 10 = nS/cm	56

"Totalizers" submenu

"Totalizer handling" submenu

Navigation: Application → Totalizers → Totalizer handling					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Reset all totalizers	2609	Integer	Read / Write	0 = Cancel 1 = Reset + totalize	58

"Totalizer 1 to n" submenu

Navigation: Application → Totalizers → Totalizer 1 to n					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Assign process variable	1: 2601 2: 2801 3: 3001	Integer	Read / Write	0 = Off 1 = Volume flow 11 = Mass flow	59
Unit totalizer 1 to n	1: 4604 2: 4605 3: 4606	Integer	Read / Write	0 = cm^3 * 1 = dm^3 * 2 = m^3 * 3 = ml * 4 = l * 5 = hl * 6 = Ml Mega * 8 = af * 9 = ft^3 * 10 = fl oz (us) * 11 = gal (us) * 12 = Mgal (us) * 13 = bbl (us;liq.) * 14 = bbl (us;beer) * 15 = bbl (us;oil) * 16 = bbl (us;tank) * 17 = gal (imp) * 18 = Mgal (imp) * 19 = bbl (imp;beer) * 20 = bbl (imp;oil) * 22 = kgal (us) * 23 = Mft^3 * 50 = g * 51 = kg * 52 = t * 53 = oz * 54 = lb * 55 = STon * 251 = None *	59
Totalizer operation mode	1: 2605 2: 2805 3: 3005	Integer	Read / Write	0 = Net flow total 1 = Forward flow total 2 = Reverse flow total	60
Control Totalizer 1 to n	1: 2608 2: 2808 3: 3008	Integer	Read / Write	0 = Totalize 1 = Reset + totalize 2 = Preset + hold 3 = Reset + hold 5 = Hold	60
Preset value 1 to n	1: 2590 to 2591 2: 2592 to 2593 3: 2594 to 2595	Float	Read / Write	Signed floating-point number	61
Failure mode	1: 2606 2: 2806 3: 3006	Integer	Read / Write	0 = Stop 1 = Actual value 2 = Last valid value	61

* Visibility depends on order options or device settings

"Sensor" submenu

"Process parameters" submenu

Navigation: Application → Sensor → Process parameters					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Flow damping	2274	Integer	Read / Write	0 to 15	64
Flow override	5503	Integer	Read / Write	0 = Off 1 = On	64
Conductivity measurement	2268	Integer	Read / Write	0 = Off 1 = On	64
Conductivity temperature coefficient	2886 to 2887	Float	Read / Write	Signed floating-point number	65
Fixed density	2830 to 2831	Float	Read / Write	Positive floating-point number	66

"Low flow cut off" submenu

Navigation: Application → Sensor → Low flow cut off					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Low flow cut off	5101	Integer	Read / Write	0 = Off 1 = Volume flow 11 = Mass flow	66
On value low flow cutoff	5138 to 5139	Float	Read / Write	Positive floating-point number	67
Off value low flow cutoff	5104 to 5105	Float	Read / Write	0 to 100.0 %	67

"Empty pipe detection" submenu

Navigation: Application → Sensor → Empty pipe detection					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Empty pipe detection	5106	Integer	Read / Write	0 = Off 1 = On	68
New adjustment	2335	Integer	Read / Write	0 = Cancel 1 = Empty pipe adjust 2 = Full pipe adjust	68
Empty pipe adjust value	2181 to 2182	Float	Read	Positive floating-point number	68
Full pipe adjust value	2832 to 2833	Float	Read	Positive floating-point number	69
Measured value EPD	2298 to 2299	Float	Read	Positive floating-point number	69

"Sensor adjustment" submenu

Navigation: Application → Sensor → Sensor adjustment					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Installation direction	5501	Integer	Read / Write	0 = Forward flow 1 = Reverse flow	69
Integration time	2260 to 2261	Float	Read	1 to 65 ms	70
Measuring period	2852 to 2853	Float	Read	0 to 1000 ms	70

"Calibration" submenu

Navigation: Application → Sensor → Calibration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Nominal diameter	2048 to 2057	String	Read	Character string comprising numbers, letters and special characters	70
Calibration factor	2313 to 2314	Float	Read	Positive floating-point number	71
Zero point	2870 to 2871	Float	Read	Signed floating-point number	71
Conductivity calibration factor	19806 to 19807	Float	Read	0.01 to 10 000	71

"Electrode cleaning cycle" submenu

Navigation: Application → Sensor → Electrode cleaning cycle					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Electrode cleaning cycle	2280	Integer	Read / Write	0 = Off 1 = On	72
ECC duration	2330 to 2331	Float	Read / Write	0.01 to 30 s	72
ECC recovery time	2332 to 2333	Float	Read / Write	1 to 600 s	72
ECC interval	2328 to 2329	Float	Read / Write	0.5 to 168 h	73
ECC polarity	2334	Integer	Read	0 = Positive 1 = Negative	73

"Current output 1" submenu

Navigation: Application → Current output 1					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Process variable current output	5927	Integer	Read / Write	0 = Off * 1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 40 = Noise * 41 = Coil current shot time *	74
Measuring mode current output	5899	Integer	Read / Write	0 = Forward flow 2 = Reverse flow compensation 13 = Forward/Reverse flow *	75
Current range output	5923	Integer	Read / Write	0 = 4...20 mA (4... 20.5 mA) 1 = 4...20 mA US (3.9...20.8 mA) 2 = 4...20 mA NE (3.8...20.5 mA) 4 = Fixed value	79
Fixed current	5987 to 5988	Float	Read / Write	3.59 to 21.5 mA	80
Lower range value output	6195 to 6196	Float	Read / Write	Signed floating-point number	80
Upper range value output	5915 to 5916	Float	Read / Write	Signed floating-point number	82
Damping current output	5903 to 5904	Float	Read / Write	0.0 to 999.9 s	82
Failure behavior current output	5911	Integer	Read / Write	0 = Min. 1 = Max. 4 = Actual value 5 = Last valid value 6 = Fixed value	83

Navigation: Application → Current output 1					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Failure current	5979 to 5980	Float	Read / Write	3.59 to 21.5 mA	83
Output current 1	5931 to 5932	Float	Read	3.59 to 21.5 mA	84

* Visibility depends on order options or device settings

"Communication" submenu

"Modbus configuration" submenu

Navigation: Application → Communication → Modbus configuration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Bus address	4910	Integer	Read / Write	1 to 247	85
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	86
Parity	4914	Integer	Read / Write	0 = Even 1 = Odd 2 = None / 2 stop bits 3 = None / 1 stop bit	86
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	87
Telegram delay	4916 to 4917	Float	Read / Write	0 to 100 ms	87
Failure mode	4920	Integer	Read / Write	1 = Last valid value 255 = NaN value	87
Fieldbus writing access	6807	Integer	Read / Write	0 = Read + write 1 = Read only	88

"Modbus data map" submenu

Navigation: Application → Communication → Modbus data map					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Scan list register 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	0 to 65 535	88

"Modbus information" submenu

Navigation: Application → Communication → Modbus information					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Device ID	2547	Integer	Read	0 to 65 535	89
Device revision	4481	Integer	Read	0 to 65 535	89

6.3.4 "System" menu

"Device management" submenu

Navigation: System → Device management					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Device tag	29243 to 29258	String	Read / Write	Character string comprising numbers, letters and special characters (32)	91
Locking status	4918	Integer	Read	256 = Hardware locked 512 = Temporarily locked	91
Configuration counter	4818	Integer	Read	0 to 65 535	92
Device reset	6817	Integer	Read / Write	0 = Cancel 1 = Restart device 2 = To delivery settings 25 = Restore S-DAT backup * 35 = Restore T-DAT backup * 36 = Create T-DAT backup	92

* Visibility depends on order options or device settings

"User management" submenu

Navigation: System → User management					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
User role	2178	Integer	Read	0 = Operator 1 = Maintenance 2 = Service 3 = Production 4 = Development	93
Enter access code	2177	Integer	Read / Write	0 to 9 999	94
Reset Maintenance code	8880 to 8895	String	Read / Write	Character string comprising numbers, letters and special characters (32)	94

"Define Maintenance code" wizard

Navigation: System → User management → Define Maintenance code					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Define Maintenance code	29482	Integer	Read / Write	0 to 9 999	95
Confirm Maintenance code	29481	Integer	Read / Write	0 to 9 999	95

"Connectivity" submenu

"Bluetooth configuration" submenu

Navigation: System → Connectivity → Bluetooth configuration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Bluetooth	27662	Integer	Read / Write	0 = Disable 1 = Enable 4 = Not available *	96
Communication established	27927	Integer	Read	0 = Yes 1 = No	96

* Visibility depends on order options or device settings

"Date/time" submenu

Navigation: System → Date/time					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Time format	2150	Integer	Read / Write	12 = 12 h AM/PM 24 = 24 h	97
Time zone	27339	Integer	Read / Write	0 = UTC 00:00 1 = UTC+01:00 2 = UTC+02:00 3 = UTC+03:00 4 = UTC+04:00 5 = UTC+05:00 6 = UTC+06:00 7 = UTC+07:00 8 = UTC+08:00 9 = UTC+09:00 10 = UTC+10:00 11 = UTC+11:00 12 = UTC+12:00 13 = UTC+13:00 14 = UTC+14:00 35 = UTC+03:30 45 = UTC+04:30 55 = UTC+05:30 57 = UTC+05:45 65 = UTC+06:30 87 = UTC+08:45 95 = UTC+09:30 105 = UTC+10:30 127 = UTC+12:45 135 = UTC-03:30 195 = UTC-09:30 201 = UTC-01:00 202 = UTC-02:00 203 = UTC-03:00 204 = UTC-04:00 205 = UTC-05:00 206 = UTC-06:00 207 = UTC-07:00 208 = UTC-08:00 209 = UTC-09:00 210 = UTC-10:00 211 = UTC-11:00 212 = UTC-12:00	97

"Information" submenu

"Device" submenu

Navigation: System → Information → Device					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Device name	7263 to 7270	String	Read	Character string comprising numbers, letters and special characters	99
Device tag	2026 to 2041	String	Read	Character string comprising numbers, letters and special characters	100
Serial number	7003 to 7008	String	Read	Character string comprising numbers, letters and special characters	100
Order code	2058 to 2067	String	Read	Character string comprising numbers, letters and special characters	100
Firmware version	7277 to 7280	String	Read	Character string comprising numbers, letters and special characters	100
Extended order code 1	2212 to 2221	String	Read	Character string comprising numbers, letters and special characters	101
Extended order code 2	2222 to 2231	String	Read	Character string comprising numbers, letters and special characters	101
Extended order code 3	2232 to 2241	String	Read	Character string comprising numbers, letters and special characters	101
ENP version	4003 to 4010	String	Read	Character string comprising numbers, letters and special characters	101
Manufacturer	8001 to 8016	String	Read	Character string comprising numbers, letters and special characters	102

"Sensor electronic module (ISEM)" submenu

Navigation: System → Information → Sensor electronic module (ISEM)					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Firmware version	7039	Integer	Read	Positive integer	102

"Display module" submenu

Navigation: System → Information → Display module					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Firmware version	7039	Integer	Read	Positive integer	103

"Display" submenu

Navigation: System → Display					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Language	35001	Integer	Read / Write	0 = English 1 = Deutsch 2 = Français 3 = Español 4 = Italiano 5 = Nederlands 8 = Svenska 10 = Bahasa Indonesia 11 = 日本語 (Japanese) 12 = Portuguesa 13 = Polski 14 = русский язык (Russian) 15 = čeština (Czech) 16 = 中文 (Chinese) 17 = ภาษาไทย (Thai) * 18 = Türkçe 19 = tiếng Việt (Vietnamese) 20 = 한국어 (Korean) 21 = العَرَبيّة (Arabic) *	104
Value 1 display	34918	Integer	Read / Write	1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3	105
Value 2 display	34919	Integer	Read / Write	1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 251 = None	105
Value 3 display	34922	Integer	Read / Write	1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 251 = None	106
Value 4 display	34923	Integer	Read / Write	1 = Volume flow 4 = Conductivity * 7 = Temperature * 9 = Corrected conductivity * 11 = Mass flow 16 = Totalizer 1 17 = Totalizer 2 18 = Totalizer 3 251 = None	106
Display damping	27602 to 27603	Float	Read / Write	0.0 to 999.9 s	106
Rotation display	36770	Integer	Read / Write	0 = 0 degree 8 = Auto 9 = 90 degree 18 = 180 degree 27 = 270 degree	107

Navigation: System → Display					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Brightness	36768 to 36769	Float	Read / Write	0 to 100 %	107
Color scheme	30228	Integer	Read / Write	11 = Light 12 = Dark	107

* Visibility depends on order options or device settings

"Software configuration" submenu

Navigation: System → Software configuration					
Parameter	**Register**	**Data type**	**Access**	**Selection / User entry / User interface**	**→**
Activate SW option	2795	Integer	Read / Write	Positive integer	108
Software option overview	2902	Integer	Read	16384 = Heartbeat Monitoring 32768 = Heartbeat Verification	108

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