

Description of Device Parameters

Proline Promag 10

Electromagnetic flowmeter
Modbus RS485

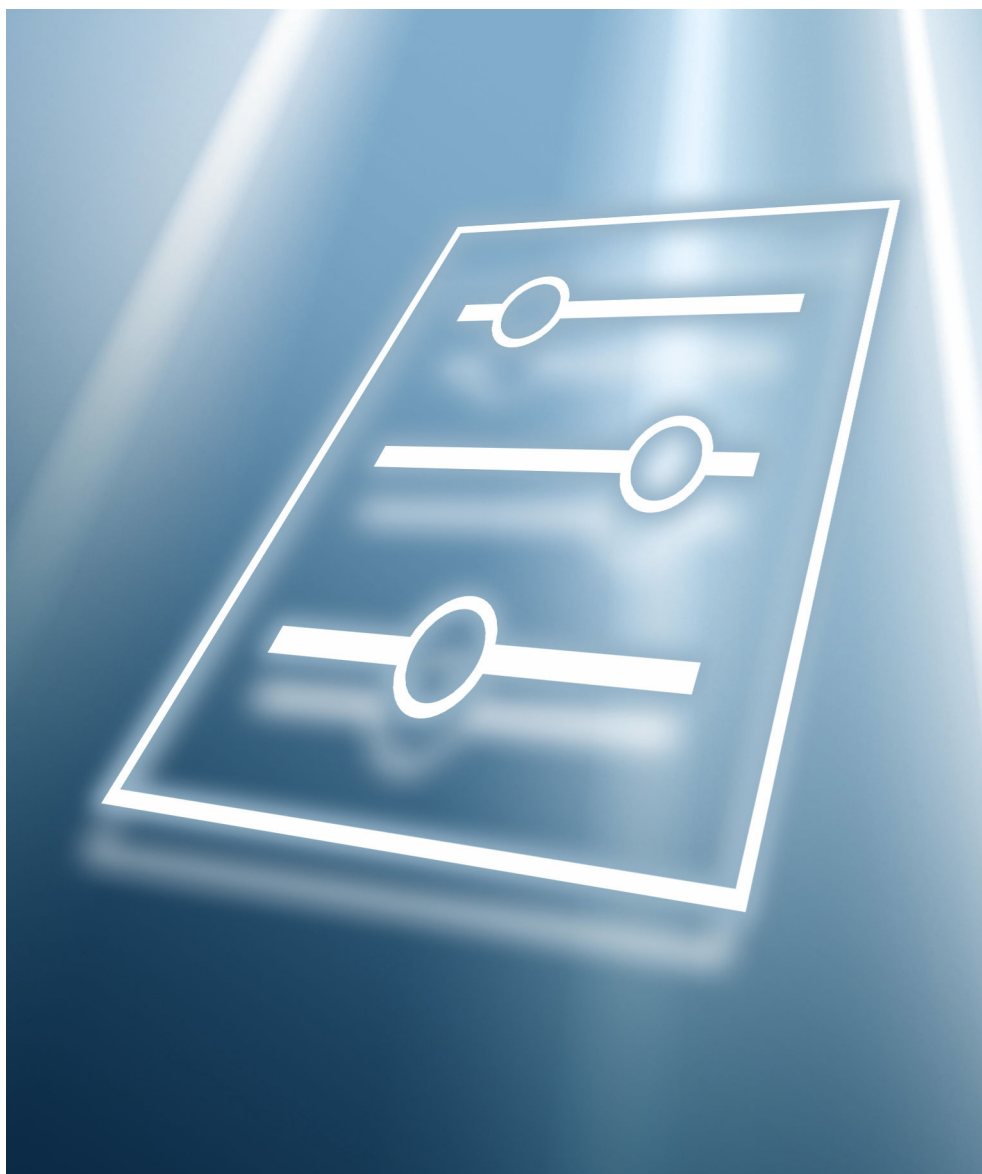


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1 About this document

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
-  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

Device tag

Serial number

Firmware version

Device name

Volume flow unit

Volume unit

Mass flow unit

Mass unit

Density unit

Temperature unit

Conductivity unit

Assign process variable

Unit totalizer 1 to n

Totalizer operation mode

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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 (#11)

Firmware version

Navigation  Guidance → Commissioning → Firmware version

Description Displays the device firmware version installed.

User interface Character string comprising numbers, letters and special characters (#8)

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 (#16)

2.1.2 System units

Navigation  Guidance → Commissioning

Volume flow unit 

Navigation  Guidance → Commissioning → Volume flow unit

Description Select volume flow unit.

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

Volume unit



Navigation

Guidance → Commissioning → Volume unit

Description

Select volume unit.

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ cm ³	■ af	■ gal (imp)
	■ dm ³	■ ft ³	■ Mgal (imp)
	■ m ³	■ Mft ³	■ bbl (imp;beer)
	■ ml	■ fl oz (us)	■ bbl (imp;oil)
	■ l	■ gal (us)	
	■ hl	■ kgal (us)	
	■ Ml Mega	■ Mgal (us)	
		■ bbl (us;oil)	
		■ bbl (us;liq.)	
		■ bbl (us;beer)	
		■ bbl (us;tank)	

Mass flow unit

Navigation Guidance → Commissioning → Mass flow unit

Description Select mass flow unit.

Selection	<i>SI units</i>	<i>US units</i>
	■ g/s	■ oz/s
	■ g/min	■ oz/min
	■ g/h	■ oz/h
	■ g/d	■ oz/d
	■ kg/s	■ lb/s
	■ kg/min	■ lb/min
	■ kg/h	■ lb/h
	■ kg/d	■ lb/d
	■ t/s	■ STon/s
	■ t/min	■ STon/min
	■ t/h	■ STon/h
	■ t/d	■ STon/d

Mass unit

Navigation Guidance → Commissioning → Mass unit

Description Select mass unit.

Selection	<i>SI units</i>	<i>US units</i>
	■ g	■ oz
	■ kg	■ lb
	■ t	■ STon

Density unit

Navigation   Guidance → Commissioning → Density unit

Description Select density unit.

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ g/cm³ ■ g/m³ ■ kg/l ■ kg/dm³ ■ kg/m³ ■ SD4°C ■ SD15°C ■ SD20°C ■ SG4°C ■ SG15°C ■ SG20°C	■ lb/ft³ ■ lb/gal (us) ■ lb/bbl (us;liq.) ■ lb/bbl (us;beer) ■ lb/bbl (us;oil) ■ lb/bbl (us;tank)	■ 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	<i>SI units</i>	<i>US units</i>
	■ °C ■ K	■ °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	<i>SI units</i>
	■ 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	<i>SI units</i>	<i>US units</i>
	■ g [*]	■ oz [*]
	■ kg [*]	■ lb [*]
	■ t [*]	■ 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 ⓘ ⓘ 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	<i>Selection</i> ■ 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 Measuring conditions

Pressure shock suppression

Navigation  Guidance → Commissioning

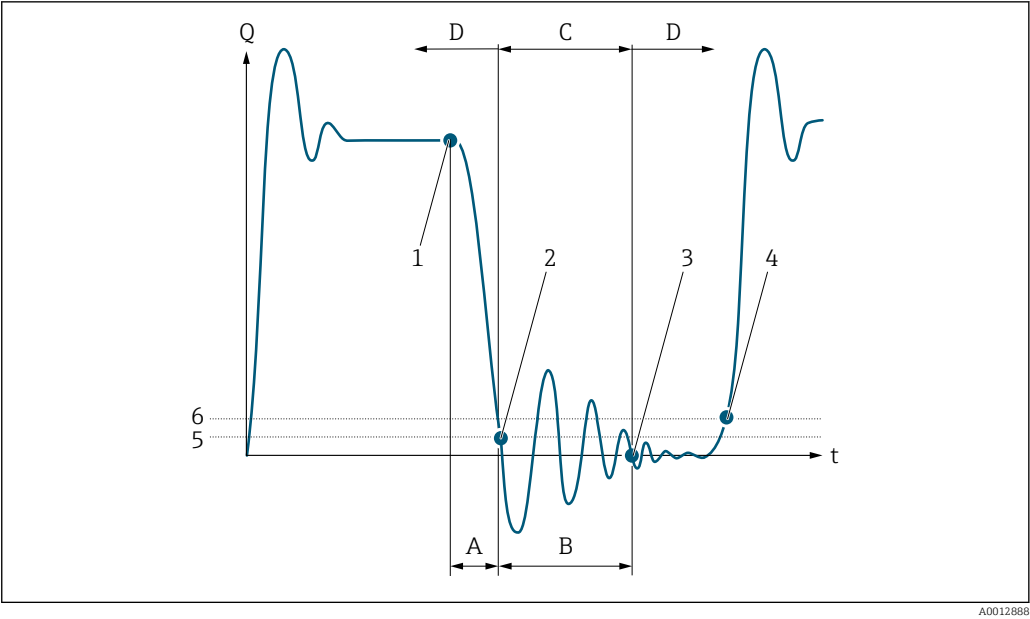
Pressure shock suppression

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 shock 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.

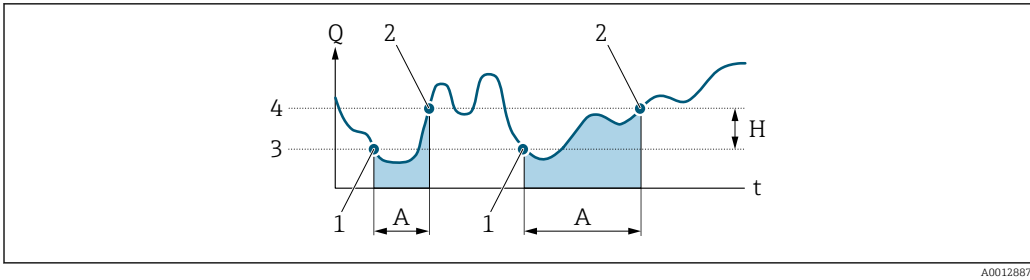


- Q Flow
- t Time
- A After run
- B Pressure shock
- C Pressure shock suppression active as specified by the time entered
- D Pressure shock suppression inactive
- 1 Valve closes
- 2 Flow falls below the on-value of the low flow cut off: pressure shock suppression is activated
- 3 The time entered has 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

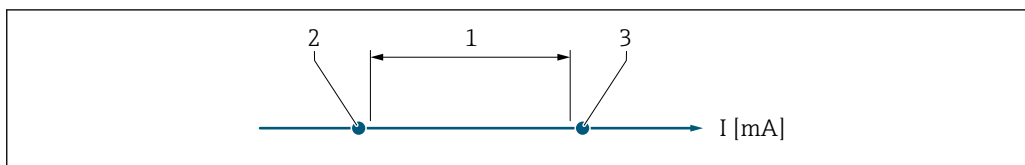
Selection

- **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:



A0034351

- 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 assigned.

User entry

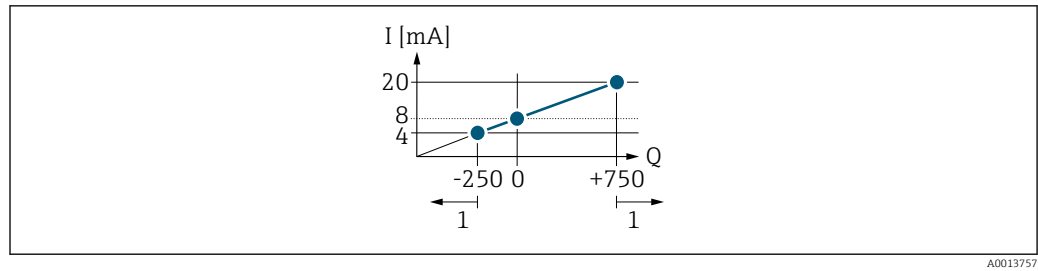
Signed floating-point number

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

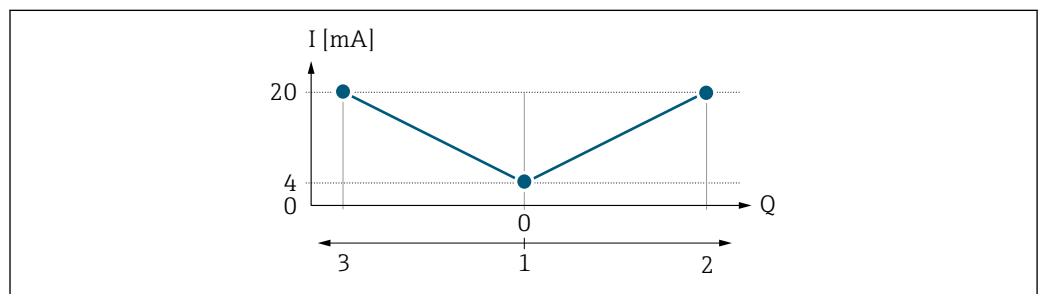


A0013757

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



A0013758

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	<i>Selection</i> ■ 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

Diagnostics		
▶ Active diagnostics	→ 	30
▶ Diagnostic list	→ 	32
▶ Simulation	→ 	35
▶ Heartbeat Technology	→ 	38
▶ Diagnostic settings	→ 	39

3.1 "Actual diagnostics" submenu

Navigation   Diagnostics → Active diagnos.

▶ Active diagnostics		
Actual diagnostics	→ 	30
Timestamp	→ 	30
Previous diagnostics	→ 	30
Timestamp	→ 	31
Operating time from restart	→ 	31
Operating time	→ 	31

Actual diagnostics

Navigation	  Diagnostics → Active diagnos. → Actual diagnostics.
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

► Diagnostic list		
Diagnostics 1	→ 	32
Timestamp	→ 	32
Diagnostics 2	→ 	33
Timestamp	→ 	33
Diagnostics 3	→ 	33
Timestamp	→ 	33
Diagnostics 4	→ 	33
Timestamp	→ 	34
Diagnostics 5	→ 	34
Timestamp	→ 	34

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

► Simulation

Assign simulation process variable

→  35

Process variable value

→  36

Current output 1 simulation

→  36

Current output value

→  36

Device alarm simulation

→  37

Diagnostic event category

→  37

Diagnostic event simulation

→  37

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 output follow this value. In this way, it is possible 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	<i>Description</i> 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

► Diagnostic settings

► Properties

→  39

► Diagnostic configuration

→  39

3.5.1 "Properties" submenu

Navigation   Diagnostics → Diag. settings → Properties

► Properties

Alarm delay

→  39

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.

► Diagnostic configuration

► Sensor

→  40

► Electronics

→  40

► Configuration

→  43

► Process

→  43

"Sensor" submenu

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

► Sensor

Assign behavior of diagnostic no. 043

→  40

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

► Electronics

Assign behavior of diagnostic no. 230

Assign behavior of diagnostic no. 231

Assign behavior of diagnostic no. 302

→  41

→  41

→  41

Assign behavior of diagnostic no. 376	→ 41
Assign behavior of diagnostic no. 377	→ 42

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

► Configuration

Assign behavior of diagnostic no. 441 →  43

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

► Process

Assign behavior of diagnostic no. 832 →  44

Assign behavior of diagnostic no. 833 →  44

Assign behavior of diagnostic no. 834 →  45

Assign behavior of diagnostic no. 835 →  45

Assign behavior of diagnostic no. 842	→  46
Assign behavior of diagnostic no. 937	→  46
Assign behavior of diagnostic no. 938	→  47
Assign behavior of diagnostic no. 961	→  47
Assign behavior of diagnostic no. 962	→  48

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	<i>Selection</i> ■ 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.
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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	<i>Selection</i> ■ 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	<i>Selection</i> ■ 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.
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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	<i>Selection</i> ■ 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	<i>Selection</i> ■ 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.
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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	<i>Selection</i> ■ 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	<i>Selection</i> ■ 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.
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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	<i>Selection</i> ■ 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.
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4 "Application" menu

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

Navigation  Application

Application		
► Measured values	→ 	49
► System units	→ 	53
► Totalizers	→ 	58
► Sensor	→ 	63
► Current output 1	→ 	74
► Communication	→ 	85

4.1 "Measured values" submenu

Navigation  Application → Measured values

► Measured values		
Mass flow	→ 	49
Volume flow	→ 	50
Conductivity	→ 	50
Corrected conductivity	→ 	50
Temperature	→ 	51
► Totalizer	→ 	51

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

Totalizer value 1 to n →  51

Totalizer overflow 1 to n →  52

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 m³ - Value of "Totalizer overflow" parameter: 1 × 10 ⁷ m³ = 10,000,000 m³ - Current totalizer reading: 11,968,457 m³ 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 m³ - Value of "Totalizer overflow " parameter: $1 \times 10^7 \text{ m}^3 = 10,000,000 \text{ m}^3$ - Current totalizer reading: 11,968,457 m³
User interface	-32 000.0 to 32 000.0

4.2 "System units" submenu

Navigation  Application → System units

► System units		
Volume flow unit	→ 	53
Volume unit	→ 	54
Mass flow unit	→ 	55
Mass unit	→ 	55
Density unit	→ 	56
Temperature unit	→ 	56
Conductivity unit	→ 	56

Volume flow unit



Navigation  Application → System units → Volume flow unit

Description Select volume flow unit.

Selection

SI units

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

US units

- af/s
- af/min
- af/h
- af/d
- ft³/s
- ft³/min
- ft³/h
- ft³/d
- MMft³/s
- MMft³/min
- MMft³/h
- Mft³/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	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ cm³ ■ dm³ ■ m³ ■ ml ■ l ■ hl ■ Ml Mega	■ af ■ ft³ ■ Mft³ ■ fl oz (us) ■ gal (us) ■ kgal (us) ■ Mgal (us) ■ bbl (us;oil) ■ bbl (us;liq.) ■ bbl (us;beer) ■ bbl (us;tank)	■ 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	<i>SI units</i>	<i>US units</i>
	■ g/s ■ g/min ■ g/h ■ g/d ■ kg/s ■ kg/min ■ kg/h ■ kg/d ■ t/s ■ t/min ■ t/h ■ t/d	■ 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	<i>SI units</i>	<i>US units</i>
	■ g ■ kg ■ t	■ oz ■ lb ■ STon

Density unit

Navigation   Application → System units → Density unit

Description Select density unit.

Selection	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ g/cm ³	■ lb/ft ³	■ lb/gal (imp)
	■ g/m ³	■ lb/gal (us)	■ lb/bbl (imp;beer)
	■ kg/l	■ lb/bbl (us;liq.)	■ lb/bbl (imp;oil)
	■ kg/dm ³	■ lb/bbl (us;beer)	
	■ kg/m ³	■ lb/bbl (us;oil)	
	■ SD4°C	■ lb/bbl (us;tank)	
	■ SD15°C		
	■ SD20°C		
	■ SG4°C		
	■ SG15°C		
	■ SG20°C		

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	<i>SI units</i>	<i>US units</i>
	■ °C	■ °F
	■ K	■ °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
- μ S/cm
- μ S/m
- μ S/mm
- mS/m
- mS/cm
- S/cm
- S/m
- kS/m
- MS/m

4.3 "Totalizers" submenu

Navigation  Application → Totalizers

► Totalizers

► Totalizer handling

→  58

► Totalizer 1 to n

→  58

4.3.1 "Totalizer handling" submenu

Navigation  Application → Totalizers → Totalizer

► Totalizer handling

Reset all totalizers

→  58

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

► Totalizer 1 to n

Assign process variable

→  59

Unit totalizer 1 to n

→  59

Totalizer operation mode

→  60

Control Totalizer 1 to n

→  60

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 | US units |
|-------------------|---------------------|
| ■ g [*] | ■ oz [*] |
| ■ kg [*] | ■ lb [*] |
| ■ t [*] | ■ STon [*] |

* Visibility depends on order options or device settings

or

- | SI units | US units | Imperial units |
|--------------------------------|---------------------------------|-------------------------------|
| ■ cm ³ [*] | ■ af [*] | ■ gal (imp) [*] |
| ■ dm ³ [*] | ■ ft ³ [*] | ■ Mgal (imp) [*] |
| ■ m ³ [*] | ■ Mft ³ [*] | ■ bbl (imp;beer) [*] |
| ■ ml [*] | ■ fl oz (us) [*] | ■ bbl (imp;oil) [*] |
| ■ l [*] | ■ gal (us) [*] | |
| ■ hl [*] | ■ kgal (us) [*] | |
| ■ Ml Mega [*] | ■ Mgal (us) [*] | |
| | ■ bbl (us;liq.) [*] | |
| | ■ bbl (us;beer) [*] | |
| | ■ bbl (us;oil) [*] | |
| | ■ bbl (us;tank) [*] | |

* 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	<i>Selection</i> ■ 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	<i>Description</i> The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→  13). <i>Example</i> 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

► Sensor		
► Process parameters	→ 	63
► Low flow cut off	→ 	66
► Empty pipe detection	→ 	67
► Sensor adjustment	→ 	69
► Calibration	→ 	70
► Electrode cleaning cycle	→ 	72

4.4.1 "Process parameters" submenu

Navigation  Application → Sensor → Process param.

► Process parameters		
Flow damping	→ 	64
Flow override	→ 	64
Conductivity measurement	→ 	64
Conductivity temperature coefficient	→ 	65
Conductivity damping time	→ 	65
Temperature damping time	→ 	66
Fixed density	→ 	66

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	<i>Selection</i> "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

Low flow cut off

On value low flow cutoff

Off value low flow cutoff

→  66

→  67

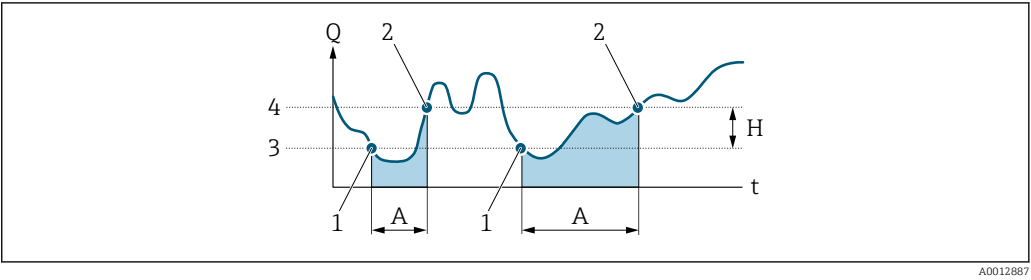
→  67

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



- 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

Empty pipe detection

→ 68

New adjustment	→  68
Empty pipe adjust value	→  68
Full pipe adjust value	→  69
Measured value EPD	→  69

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.

► Sensor adjustment

Installation direction

→  69

Integration time

→  70

Measuring period

→  70

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

► Calibration

Nominal diameter

→  70

Calibration factor

→  71

Zero point

→  71

Conductivity calibration factor

→  71

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 (#20)

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		
Electrode cleaning cycle	→ 	72
ECC duration	→ 	72
ECC recovery time	→ 	72
ECC interval	→ 	73
ECC polarity	→ 	73

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

► Current output 1		
Process variable current output	→ 	74
Measuring mode current output	→ 	75
Current range output	→ 	79
Fixed current	→ 	80
Lower range value output	→ 	80
Upper range value output	→ 	82
Damping current output	→ 	82
Failure behavior current output	→ 	83
Failure current	→ 	83
Output current 1	→ 	84

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

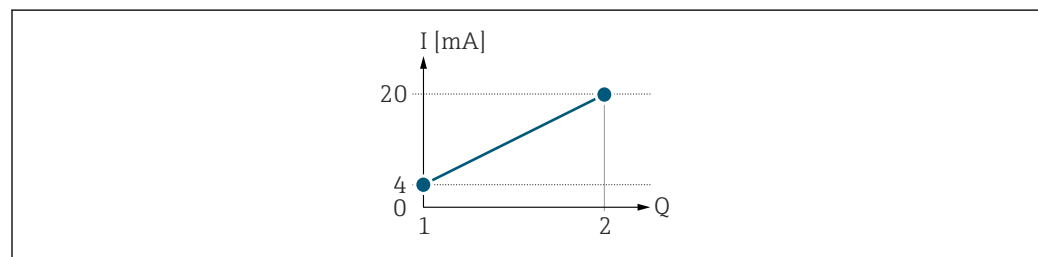
The current output signal is proportional to the measured value for the process variable assigned.

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

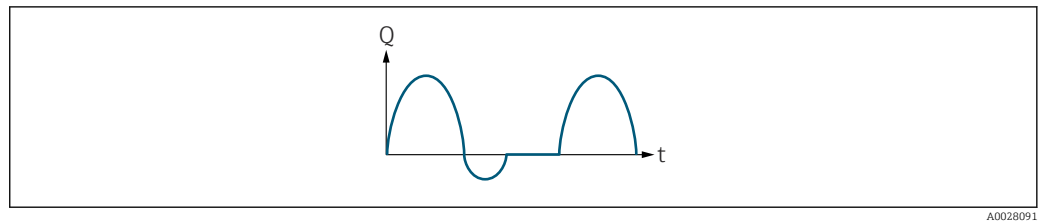
I Current

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:

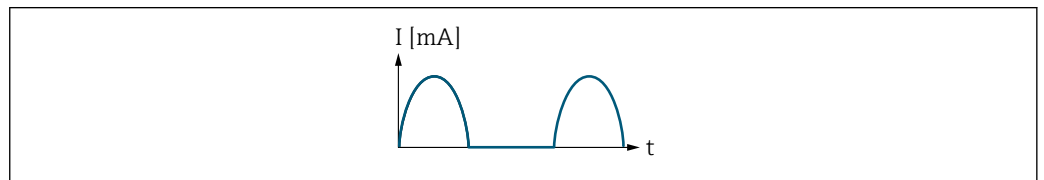


Q Flow
 t Time

A0028091

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..

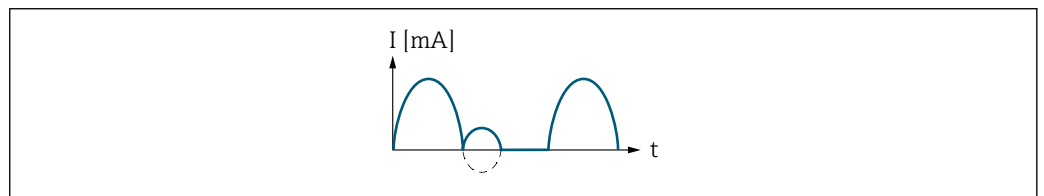


I Current
 t Time

A0028092

With the **Forward/Reverse flow** option

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

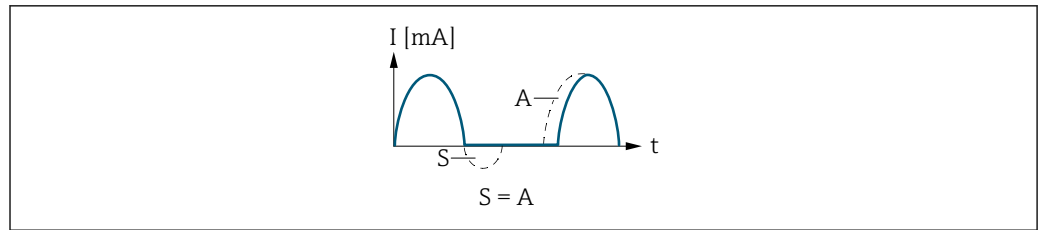


I Current
 t Time

A0028093

With the **Reverse flow compensation** option

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

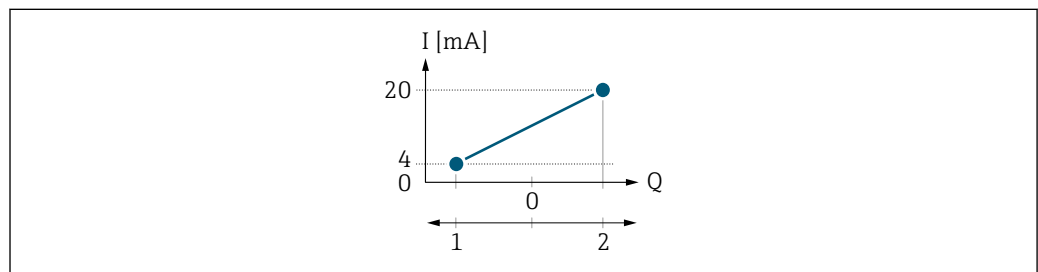


A0028094

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

2. Examples of the behavior of the current output

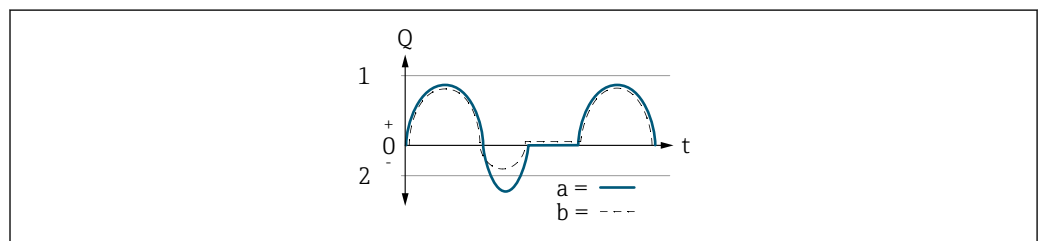
Defined measuring range: lower range value and upper range value with **different** algebraic signs.



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:

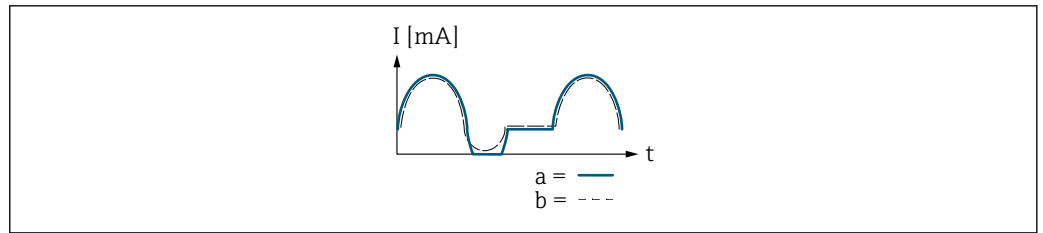


A0028096

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 Δ **S441 Current output 1 to n** diagnostic message is displayed.
- b (---): The current output signal is proportional to the process variable assigned.



A0028100

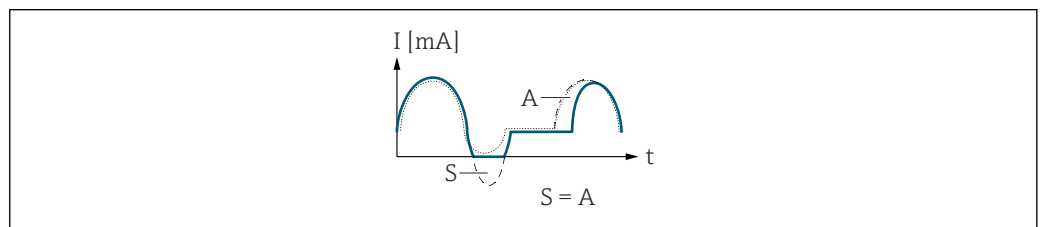
I Current
t Time

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.



A0028101

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

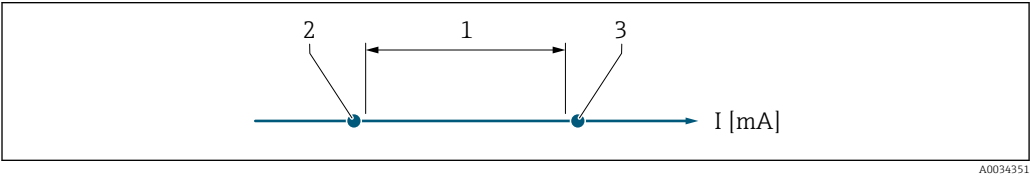
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- Fixed value

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 assigned.

User entry

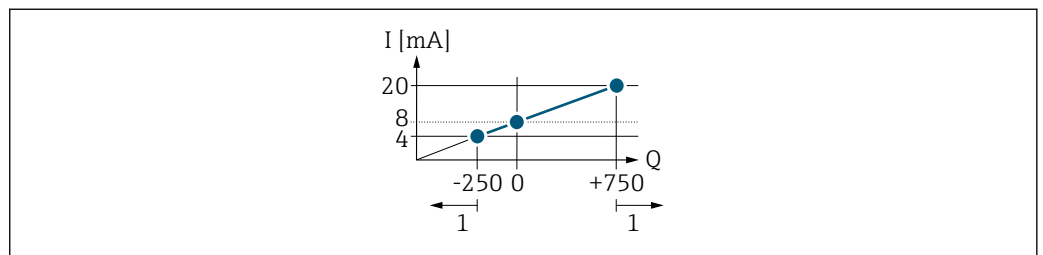
Signed floating-point number

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

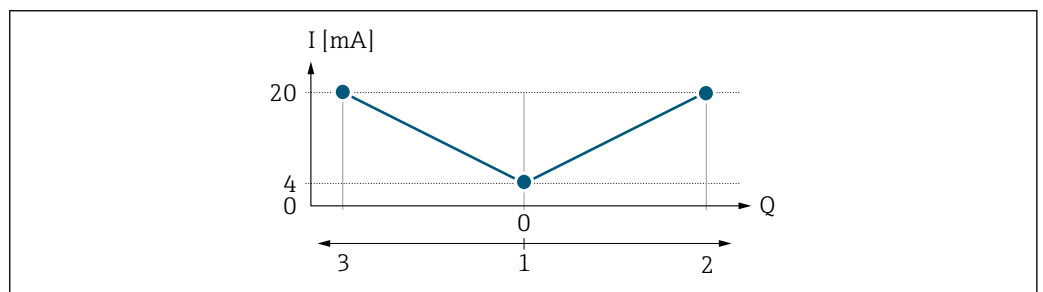


A0013757

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



A0013758

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	<i>Selection</i> ■ 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

► Communication	
► Modbus configuration	→  85
► Modbus data map	→  88
► Modbus information	→  89

4.6.1 "Modbus configuration" submenu

Navigation  Application → Communication → Modbus config.

► Modbus configuration	
Bus address	→  85
Baudrate	→  86
Parity	→  86
Byte order	→  87
Telegram delay	→  87
Failure mode	→  87
Fieldbus writing access	→  88

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

► Modbus data map

Scan list register 0 to 15

→  88

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

► Modbus information

Device ID

→  89

Device revision

→  89

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

System		
▶ Device management	→ 	91
▶ User management	→ 	94
▶ Connectivity	→ 	97
▶ Date/time	→ 	98
▶ Information	→ 	100
▶ Display	→ 	105
▶ Software configuration	→ 	109

5.1 "Device management" submenu

Navigation  System → Device manag.

► Device management

Device tag

→  91

Locking status

→  91

Configuration counter

→  92

Device reset

→  92

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	<i>Selection</i> ■ 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. ■ Delete powerfail data option Deletes the powerfail data segment in the T-DAT or (if applicable) the T-DAT partition of the S-DAT. Additional information: This function resolves the following memory content error: "283 Memory content inconsistent" with Service ID 225 and Service ID 721.

* Visibility depends on order options or device settings

- **Delete T-DAT** option

Deletes the T-DAT or (if applicable) the T-DAT partition of the S-DAT. On performing this delete operation, all parameters on the T-DAT are reset to the default values.

Additional information:

This function can be used to resolve any memory content issue on the T-DAT.

NOTE

The powerfail data and device delivery settings will no longer be available on performing this delete operation!

- **Delete flash file system** option

Deletes the flash file system.

Additional information:

This function resolves the following memory content error: "387 HistoROM data faulty" with Service ID 648.

NOTE

The menu structure set up for the SmartBlue app and the files used to perform a firmware restore in the event the firmware is corrupted will no longer be available on performing this delete operation!

- **Reset faulty parameters** option

Resets all faulty parameters to default values when the following memory content error occurs: "283 Memory content inconsistent" with Service ID 367.

Additional information:

Only faulty parameters are reset. All parameters that are reset are logged in the logbook.

- **Delete delivery settings** option

Deletes the delivery settings on the T-DAT or (if applicable) T-DAT partition of the S-DAT.

Additional information:

This function resolves the following memory content error: "311 Sensor electronics (ISEM) faulty" with Service ID 226.

NOTE

The device delivery settings will no longer be available on performing this delete operation!

- **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.

5.2 "User management" submenu

Navigation  System → User manag.

► User management	
User role	→  94
Enter access code	→  95
Reset Maintenance code	→  95
► Define Maintenance code	→  96

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 9999

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

Define Maintenance code

→  96

Confirm Maintenance code

→  96

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

► Connectivity

► Bluetooth configuration →  97

5.3.1 "Bluetooth configuration" submenu

Navigation  System → Connectivity → Bluetooth conf.

► Bluetooth configuration

Bluetooth →  97

Communication established →  97

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

► Date/time

Set date/time

→  98

Time format

→  98

Time zone

→  98

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

► Information

► Device

→  100

► Sensor electronic module (ISEM)

→  103

► Display module

→  103

5.5.1 "Device" submenu

Navigation  System → Information → Device

► Device

Device name

→  100

Device tag

→  101

Serial number

→  101

Order code

→  101

Firmware version

→  101

Extended order code 1

→  102

Extended order code 2

→  102

Extended order code 3

→  102

ENP version

→  102

Manufacturer

→  103

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 (#16)

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 (#32)

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 (#11)

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 (#20)

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 (#8)

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 (#20)

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 (#20)

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 (#20)

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 (#16)

Manufacturer

Navigation  System → Information → Device → Manufacturer

Description Displays the manufacturer.

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

5.5.2 "Sensor electronic module (ISEM)" submenu

Navigation  System → Information → Sens. electronic

► Sensor electronic module (ISEM)

Firmware version

→  103

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

► Display module

Firmware version

→  104

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

► Display		
Language	→ 	105
Value 1 display	→ 	106
Value 2 display	→ 	106
Value 3 display	→ 	107
Value 4 display	→ 	107
Display damping	→ 	107
Rotation display	→ 	108
Brightness	→ 	108
Color scheme	→ 	108

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)
 - العربية (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.

► Software configuration		
Activate SW option	→	 109
Software option overview	→	 109

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 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.

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► Commissioning	→ 120
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Unit totalizer 1 to n	→ 124
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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 (#11)	8
Firmware version	7277 to 7280	String	Read	Character string comprising numbers, letters and special characters (#8)	8
Device name	7263 to 7270	String	Read	Character string comprising numbers, letters and special characters (#16)	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 = MMft ³ /s 93 = MMft ³ /min 94 = MMft ³ /h 96 = Mft ³ /d	
Volume unit	2104	Integer	Read / Write	0 = cm ³ 1 = dm ³ 2 = m ³ 3 = ml 4 = l 5 = hl 6 = Ml Mega 8 = af 9 = ft ³ 10 = fl oz (us) 11 = gal (us) 12 = Mgal (us) 13 = bbl (us;liq.) 14 = bbl (us;beer) 15 = bbl (us;oil) 16 = bbl (us;tank) 17 = gal (imp) 18 = Mgal (imp) 19 = bbl (imp;beer) 20 = bbl (imp;oil) 22 = kgal (us) 23 = Mft ³	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/cm ³ 2 = kg/dm ³ 3 = kg/l 4 = kg/m ³ 5 = SD4°C 6 = SD15°C 7 = SD20°C 8 = SG4°C 9 = SG15°C 10 = SG20°C 11 = lb/ft ³ 12 = lb/gal (us) 13 = lb/bbl (us;liq.) 14 = lb/bbl (us;beer) 15 = lb/bbl (us;oil) 16 = lb/bbl (us;tank) 17 = lb/gal (imp) 18 = lb/bbl (imp;beer) 19 = lb/bbl (imp;oil) 21 = g/m ³	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 = MMft ³ /s 93 = MMft ³ /min 94 = MMft ³ /h 96 = Mft ³ /d	
Volume unit	2104	Integer	Read / Write	0 = cm ³ 1 = dm ³ 2 = m ³ 3 = ml 4 = l 5 = hl 6 = Ml Mega 8 = af 9 = ft ³ 10 = fl oz (us) 11 = gal (us) 12 = Mgal (us) 13 = bbl (us;liq.) 14 = bbl (us;beer) 15 = bbl (us;oil) 16 = bbl (us;tank) 17 = gal (imp) 18 = Mgal (imp) 19 = bbl (imp;beer) 20 = bbl (imp;oil) 22 = kgal (us) 23 = Mft ³	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/cm ³ 2 = kg/dm ³ 3 = kg/l 4 = kg/m ³ 5 = SD4°C 6 = SD15°C 7 = SD20°C 8 = SG4°C 9 = SG15°C 10 = SG20°C 11 = lb/ft ³ 12 = lb/gal (us) 13 = lb/bbl (us;liq.) 14 = lb/bbl (us;beer) 15 = lb/bbl (us;oil) 16 = lb/bbl (us;tank) 17 = lb/gal (imp) 18 = lb/bbl (imp;beer) 19 = lb/bbl (imp;oil) 21 = g/m ³	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 1 000 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 (#20)	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 5 = Delete powerfail data 21 = Delete T-DAT 22 = Reset faulty parameters 23 = Delete delivery settings 24 = Delete flash file system 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	94
Enter access code	2177	Integer	Read / Write	0 to 9999	95
Reset Maintenance code	8880 to 8895	String	Read / Write	Character string comprising numbers, letters and special characters (#32)	95

"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 9999	96
Confirm Maintenance code	29481	Integer	Read / Write	0 to 9999	96

"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 *	97
Communication established	27927	Integer	Read	0 = Yes 1 = No	97

* 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	98
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	98

"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 (#16)	100
Device tag	2026 to 2041	String	Read	Character string comprising numbers, letters and special characters (#32)	101
Serial number	7003 to 7008	String	Read	Character string comprising numbers, letters and special characters (#11)	101
Order code	2058 to 2067	String	Read	Character string comprising numbers, letters and special characters (#20)	101
Firmware version	7277 to 7280	String	Read	Character string comprising numbers, letters and special characters (#8)	101
Extended order code 1	2212 to 2221	String	Read	Character string comprising numbers, letters and special characters (#20)	102
Extended order code 2	2222 to 2231	String	Read	Character string comprising numbers, letters and special characters (#20)	102
Extended order code 3	2232 to 2241	String	Read	Character string comprising numbers, letters and special characters (#20)	102
ENP version	4003 to 4010	String	Read	Character string comprising numbers, letters and special characters (#16)	102
Manufacturer	8001 to 8016	String	Read	Character string comprising numbers, letters and special characters (#32)	103

"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	103

"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	104

"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 = العربية (Arabic) *	105
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	106
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	106
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	107
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	107
Display damping	27602 to 27603	Float	Read / Write	0.0 to 999.9 s	107
Rotation display	36770	Integer	Read / Write	0 = 0 degree 8 = Auto 9 = 90 degree 18 = 180 degree 27 = 270 degree	108

Navigation: System → Display					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Brightness	36768 to 36769	Float	Read / Write	0 to 100 %	108
Color scheme	30228	Integer	Read / Write	11 = Light 12 = Dark	108

* 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	109
Software option overview	2902	Integer	Read	1 = Extended HistoROM 16384 = Heartbeat Monitoring 32768 = Heartbeat Verification	109

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