

Description of Device Parameters

Proline Teqwave M 500

Total solids measurement via microwave transmission
HART

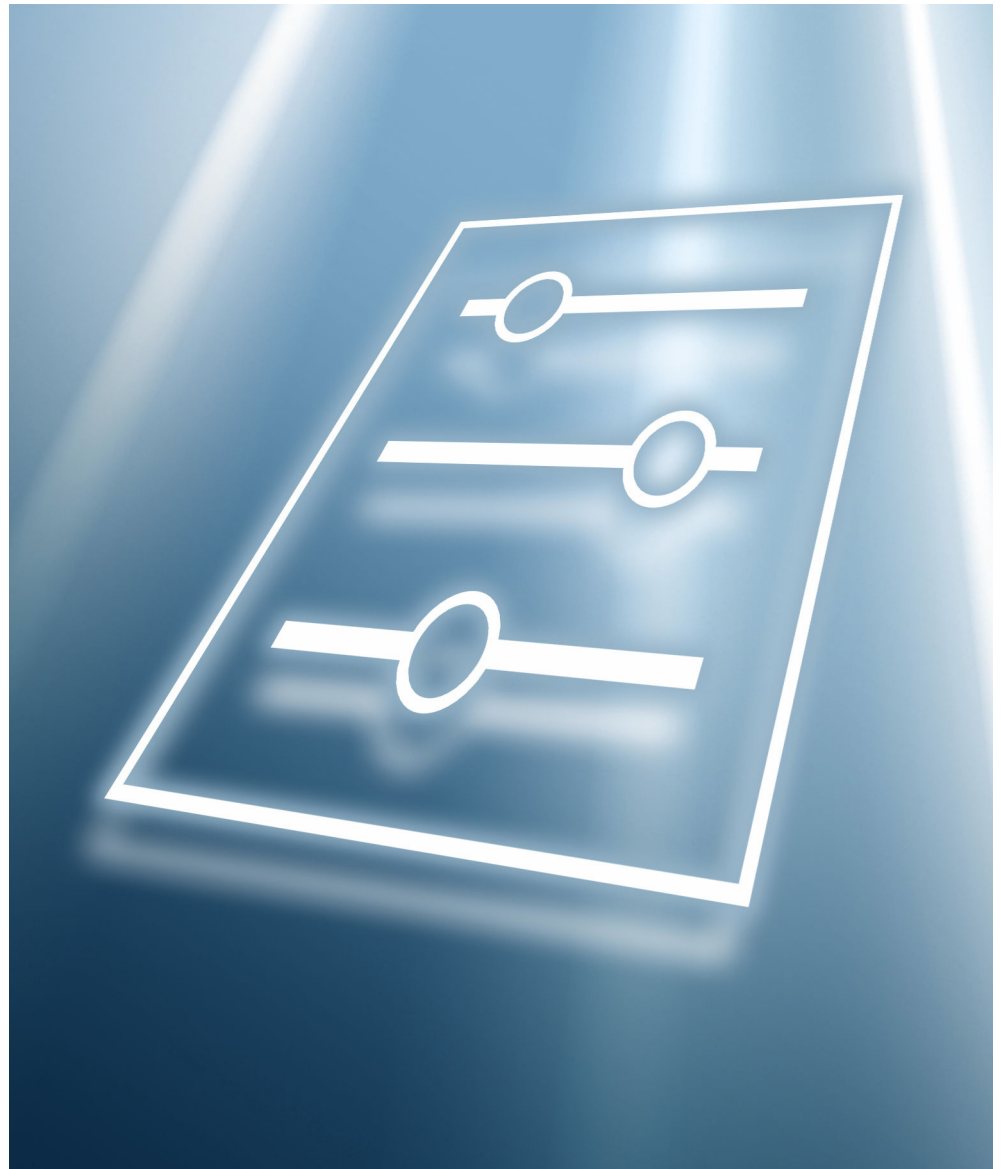


Table of contents

1	About this document	4		
1.1	Document function	4		
1.2	Target group	4		
1.3	Using this document	4		
1.3.1	Information on the document structure	4		
1.3.2	Structure of a parameter description	6		
1.4	Symbols used	6		
1.4.1	Symbols for certain types of information	6		
1.4.2	Symbols in graphics	7		
1.5	Documentation	7		
1.5.1	Standard documentation	7		
1.5.2	Supplementary device-dependent documentation	7		
2	Overview of the Expert operating menu	8		
3	Description of device parameters	11		
3.1	"System" submenu	13		
3.1.1	"Display" submenu	13		
3.1.2	"Configuration backup" submenu	32		
3.1.3	"Diagnostic handling" submenu	35		
3.1.4	"Administration" submenu	40		
3.2	"Sensor" submenu	45		
3.2.1	"Measured values" submenu	45		
3.2.2	"System units" submenu	54		
3.2.3	"Process parameters" submenu	57		
3.2.4	"External compensation" submenu	61		
3.2.5	"Sensor adjustment" submenu	62		
3.2.6	"Factory adjustment" submenu	65		
3.3	"I/O configuration" submenu	66		
3.4	"Input" submenu	68		
3.4.1	"Current input 1 to n" submenu	68		
3.4.2	"Status input 1 to n" submenu	71		
3.5	"Output" submenu	73		
3.5.1	"Current output 1 to n" submenu	74		
3.5.2	"Pulse/frequency/switch output 1 to n" submenu	85		
3.5.3	"Relay output 1 to n" submenu	103		
3.6	"Communication" submenu	109		
3.6.1	"HART input" submenu	110		
3.6.2	"HART output" submenu	115		
3.6.3	"Diagnostic configuration" submenu	131		
3.6.4	"Web server" submenu	135		
3.6.5	"WLAN settings" wizard	139		
3.7	"Application" submenu	146		
3.7.1	"Totalizer 1 to n" submenu	146		
3.8	"Diagnostics" submenu	150		
3.8.1	"Diagnostic list" submenu	153		
3.8.2	"Event logbook" submenu	155		
3.8.3	"Device information" submenu	157		
3.8.4	"Main electronic module + I/O module 1" submenu	161		
3.8.5	"Sensor electronic module (ISEM)" submenu	162		
3.8.6	"I/O module 2" submenu	163		
3.8.7	"I/O module 3" submenu	164		
3.8.8	"I/O module 4" submenu	165		
3.8.9	"Display module" submenu	167		
3.8.10	"Data logging" submenu	168		
3.8.11	"Min/max values" submenu	175		
3.8.12	"Heartbeat Technology" submenu	180		
3.8.13	"Simulation" submenu	180		
4	Country-specific factory settings	189		
4.1	SI units	189		
4.1.1	System units	189		
4.1.2	Output current span	189		
4.2	US units	189		
4.2.1	System units	189		
4.2.2	Output current span	190		
	Index	191		

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 menu.

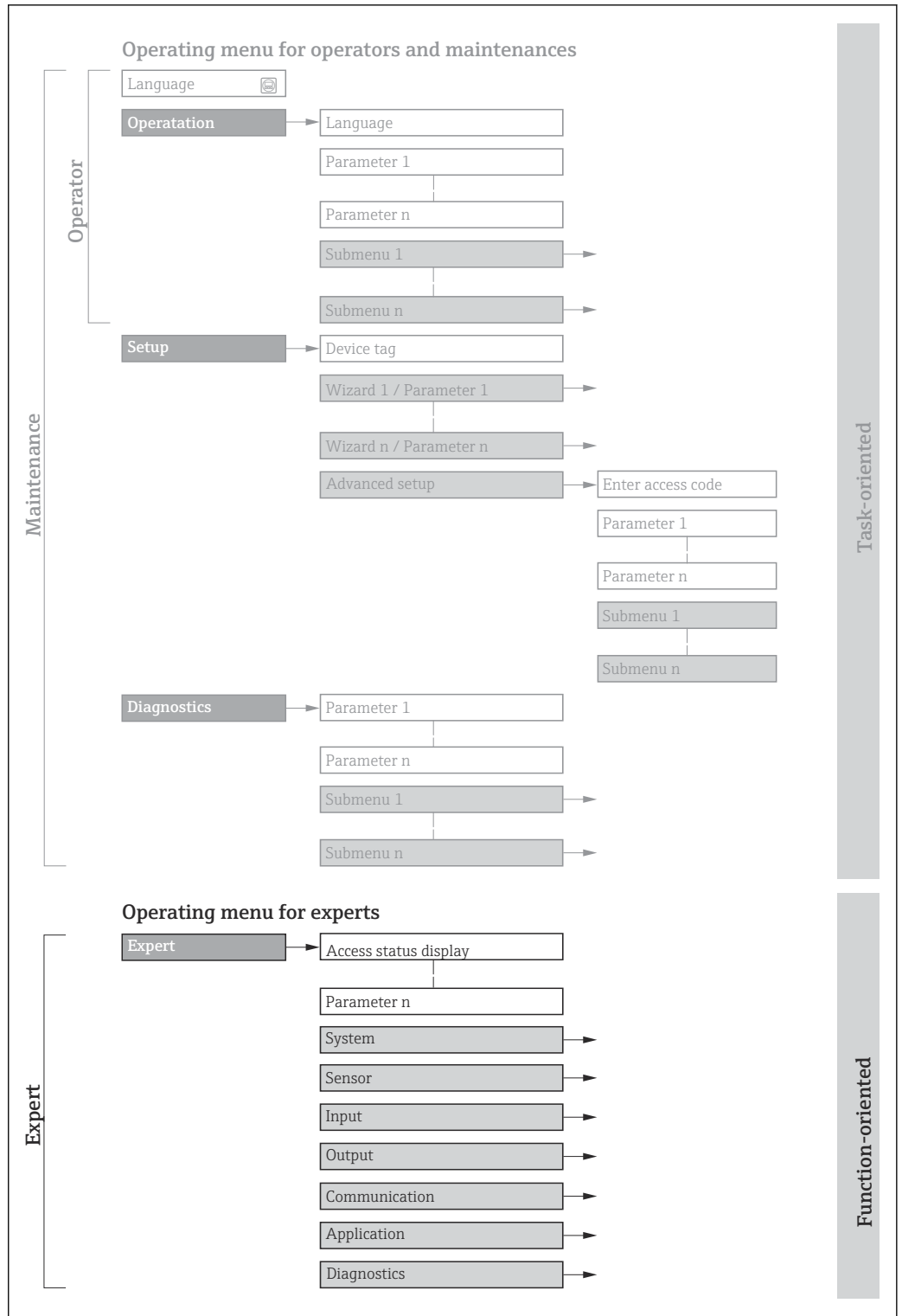
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

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






A0029160-EN

1 Sample graphic for the schematic layout of the operating menu

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








1.3.2 Structure of a parameter description

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

Complete parameter name	Write-protected parameter = 
Navigation	 Navigation path to the parameter via the local display or Web browser  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
Options	List of the individual options for the parameter <ul style="list-style-type: none"> ■ Option 1 ■ Option 2
User entry	Parameter entry range
Display	Display value/data of the parameter
Factory setting	Default setting ex works
Additional information	Additional explanations (e.g. in examples): <ul style="list-style-type: none"> ■ On individual options ■ On display values/data ■ On the input range ■ On the factory setting ■ On the parameter function

1.4 Symbols used

1.4.1 Symbols for certain types of information

Symbol	Meaning
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
 <small>A0028662</small>	Operation via local display
 <small>A0028663</small>	Operation via operating tool
 <small>A0028665</small>	Write-protected parameter

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Technical information

Device	Documentation code
Proline Teqwave MW 500	TI01764D

Operating instructions

Device	Documentation code
Proline Teqwave MW 500 HART	BA02322D

1.5.2 Supplementary device-dependent documentation

Special documentation

Contents	Documentation code
Heartbeat Verification application package (HART)	SD03170D

2 Overview of the Expert operating menu

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

Expert		
Locking status		→ 11
User role		→ 12
Enter access code		→ 13
▶ System		→ 13
▶ Display		→ 13
▶ Configuration backup		→ 32
▶ Diagnostic handling		→ 35
▶ Administration		→ 40
▶ Sensor		→ 45
▶ Measured values		→ 45
▶ System units		→ 54
▶ Process parameters		→ 57
▶ External process variables		→ 61
▶ Sensor adjustment		→ 62
▶ Factory adjustment		→ 65
▶ I/O configuration		→ 66
I/O module 1 to n terminal numbers		→ 66
I/O module 1 to n information		→ 66
I/O module 1 to n type		→ 67
Apply I/O configuration		→ 67
I/O alteration code		→ 68













▶ Input	→ 68
▶ Current input 1 to n	→ 68
▶ Status input 1 to n	→ 71
▶ Output	→ 73
▶ Current output 1 to n	→ 74
▶ Pulse/frequency/switch output 1 to n	→ 85
▶ Relay output 1 to n	→ 103
▶ Communication	→ 109
▶ HART input	→ 110
▶ HART output	→ 115
▶ Web server	→ 135
▶ WLAN settings	→ 139
▶ Application	→ 146
Reset all totalizers	→ 146
▶ Totalizer 1	→ 146
▶ Diagnostics	→ 150
Actual diagnostics	→ 151
Timestamp	→ 151
Previous diagnostics	→ 152
Timestamp	→ 152
Operating time from restart	→ 153
Operating time	→ 153
▶ Diagnostic list	→ 153
▶ Device information	→ 157

▶ Main electronic module + I/O module 1	→ 161
▶ Sensor electronic module (ISEM)	→ 162
▶ I/O module 2	→ 163
▶ I/O module 3	→ 164
▶ I/O module 4	→ 165
▶ Display module	→ 167
▶ Data logging	→ 168
▶ Min/max values	→ 175
▶ Heartbeat Technology	→ 180
▶ Simulation	→ 180

3 Description of device parameters

In the following section, the parameters are listed according to the menu structure of the local display. Specific parameters for the operating tools are included at the appropriate points in the menu structure.

Navigation  Expert

 Expert		
Locking status		→  11
User role		→  12
Enter access code		→  13
▶ System		→  13
▶ Sensor		→  45
▶ I/O configuration		→  66
▶ Input		→  68
▶ Output		→  73
▶ Communication		→  109
▶ Application		→  146
▶ Diagnostics		→  150

Locking status

Navigation  Expert → Locking status

Description Displays the active write protection.

User interface

- Hardware locked
- Temporarily locked

Additional information*Display*

If two or more types of write protection are active, the write protection with the highest priority is shown on the local display. In the operating tool all active types of write protection are displayed.



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

Options

Options	Description
None	The access authorization displayed in the Access status parameter (→ 12) applies . Only appears on local display.
Hardware locked (priority 1)	The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool) .
Temporarily locked	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset, etc.). Once the internal processing has been completed, the parameters can be changed once again.

User role**Navigation**

Expert → User role

Description

Displays the access authorization to the parameters via the local display, Web browser or operating tool.

User interface

- Maintenance
- Service

Factory setting

Maintenance

Additional information*Description*

Access authorization can be modified via the **Enter access code** parameter (→ 13).





If additional write protection is active, this restricts the current access authorization even further.

User interface





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

Enter access code



Navigation	  Expert → Ent. access code
Description	Use this function to enter the user-specific release code to remove parameter write protection.
User entry	Max. 16-digit character string comprising numbers, letters and special characters









3.1 "System" submenu













Navigation   Expert → System

▶ System	
▶ Display	→  13
▶ Configuration backup	→  32
▶ Diagnostic handling	→  35
▶ Administration	→  40

3.1.1 "Display" submenu

Navigation   Expert → System → Display

▶ Display	
Format display	→  14
Value 1 display	→  17
0% bargraph value 1	→  17
100% bargraph value 1	→  18
Decimal places 1	→  18
Value 2 display	→  19
Decimal places 2	→  19
Value 3 display	→  20

0% bargraph value 3	→  20
100% bargraph value 3	→  21
Decimal places 3	→  21
Value 4 display	→  22
Decimal places 4	→  22
Display language	→  23
Display interval	→  29
Display damping	→  29
Header	→  30
Header text	→  30
Separator	→  31
Backlight	→  31

Format display

Navigation   Expert → System → Display → Format display

Prerequisite A local display is provided.

Description Use this function to select how the measured value is shown on the local display.





Selection

- 1 value, max. size
- 1 bargraph + 1 value
- 2 values
- 1 value large + 2 values
- 4 values

Factory setting 1 value, max. size

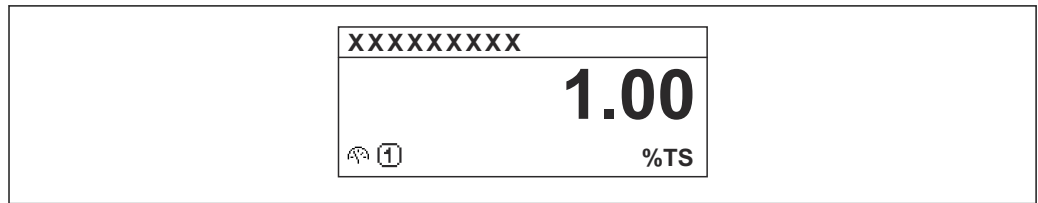
Additional information*Description*

The display format (size, bar graph) and number of simultaneously displayed measured values (1 to 8) can be configured. This setting only applies to normal operation.

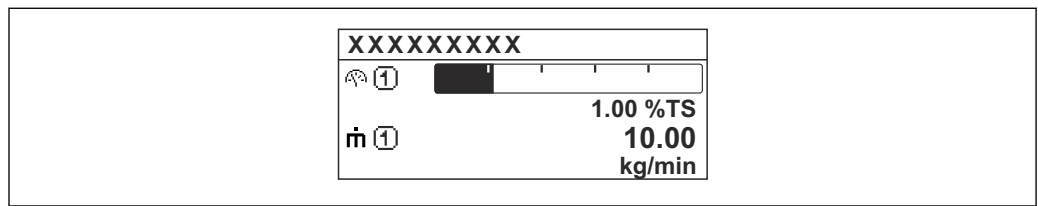
-  ■ The **Value 1 display** parameter (→  17)...**Value 8 display** parameter (→  28) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured using the **Display interval** parameter (→  29).

Possible measured values shown on the local display:

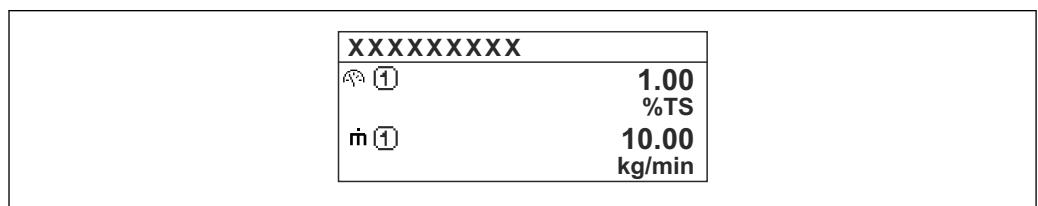
"1 value, max. size" option



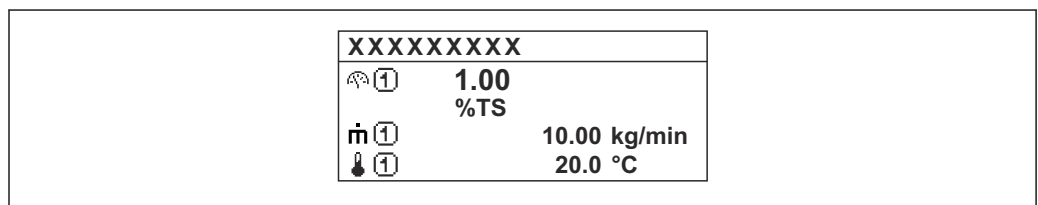
"1 bargraph + 1 value" option



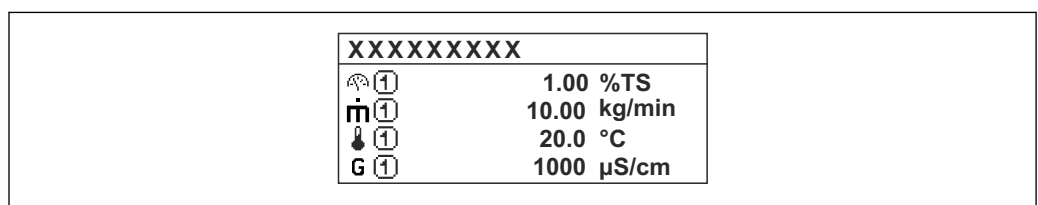
"2 values" option



"1 value large + 2 values" option



"4 values" option



Value 1 display




Navigation	Expert → System → Display → Value 1 display
Prerequisite	<ul style="list-style-type: none"> ▪ A local display is provided. ▪ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→ 49) or the fieldbus.
Description	Use this function to select a measured value that is shown on the local display.
Selection	<ul style="list-style-type: none"> ▪ Total solids ▪ Temperature ▪ Electronics temperature ▪ Conductivity ▪ Corrected conductivity ▪ Load rate * ▪ Totalizer 1 * ▪ Current output 1 * ▪ Current output 2 * ▪ Current output 3 * ▪ Current output 4 *
Factory setting	Total solids
Additional information	<p><i>Description</i></p> <p>If several measured values are displayed one below the other, the measured value selected here will be the first value to be displayed. The value is only displayed during normal operation.</p> <p> The Format display parameter (→ 14) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Dependency</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→ 54).</p>

0% bargraph value 1




Navigation	Expert → System → Display → 0% bargraph 1
Prerequisite	A local display is provided.
Description	Use this function to enter the 0% bar graph value to be shown on the display for the measured value 1.
User entry	Signed floating-point number
Factory setting	0 %TS

* Visibility depends on order options or device settings



Additional information*Description*

 The **Format display** parameter (→  14) is used to specify that the measured value is to be displayed as a bar graph.

User entry

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

100% bargraph value 1**Navigation**

  Expert → System → Display → 100% bargraph 1

Prerequisite

A local display is provided.

Description

Use this function to enter the 100% bar graph value to be shown on the display for the measured value 1.



User entry

Signed floating-point number



Factory setting

Depends on country and nominal diameter



Additional information*Description*

 The **Format display** parameter (→  14) is used to specify that the measured value is to be displayed as a bar graph.

User entry

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Decimal places 1**Navigation**

  Expert → System → Display → Decimal places 1

Prerequisite

A measured value is specified in the **Value 1 display** parameter (→  17).

Description

Use this function to select the number of decimal places for measured value 1.


Selection

- x
- x.x
- x.xx
- x.xxx
- x.xxxx

Factory setting

x.xx

Additional information*Description*

 This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 2 display


Navigation	Expert → System → Display → Value 2 display
Prerequisite	<ul style="list-style-type: none"> ■ A local display is provided. ■ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→ 49) or the fieldbus.
Description	Use this function to select a measured value that is shown on the local display.
Selection	<ul style="list-style-type: none"> ■ None ■ Total solids ■ Temperature ■ Electronics temperature ■ Conductivity ■ Corrected conductivity ■ Load rate * ■ Totalizer 1 * ■ Current output 1 * ■ Current output 2 * ■ Current output 3 * ■ Current output 4 *
Factory setting	None
Additional information	<p><i>Description</i></p> <p>If several measured values are displayed one below the other, the measured value selected here will be the second value to be displayed. The value is only displayed during normal operation.</p> <p> The Format display parameter (→ 14) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Dependency</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→ 54).</p>


Decimal places 2


Navigation	Expert → System → Display → Decimal places 2
Prerequisite	A measured value is specified in the Value 2 display parameter (→ 19).
Description	Use this function to select the number of decimal places for measured value 2.
Selection	<ul style="list-style-type: none"> ■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx

* Visibility depends on order options or device settings

Factory setting x.xx


Additional information *Description*

 This setting does not affect the accuracy of the device for measuring or calculating the value.

Value 3 display

Navigation  Expert → System → Display → Value 3 display

Prerequisite

- A local display is provided.
- The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.



Description Use this function to select a measured value that is shown on the local display.

Selection For the picklist, see **Value 1 display** parameter (→  17)



Factory setting None

Additional information *Description*

If several measured values are displayed one below the other, the measured value selected here will be the third value to be displayed. The value is only displayed during normal operation.


 The **Format display** parameter (→  14) is used to specify how many measured values are displayed simultaneously and how.

Options

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

0% bargraph value 3

Navigation  Expert → System → Display → 0% bargraph 3



Prerequisite A selection was made in the **Value 3 display** parameter (→  20).

Description Use this function to enter the 0% bar graph value to be shown on the display for the measured value 3.



User entry Signed floating-point number

Factory setting 0



Additional information*Description*

 The **Format display** parameter (→  14) is used to specify that the measured value is to be displayed as a bar graph.


User entry

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

100% bargraph value 3**Navigation**

  Expert → System → Display → 100% bargraph 3

Prerequisite

A selection was made in the **Value 3 display** parameter (→  20).

Description

Use this function to enter the 100% bar graph value to be shown on the display for the measured value 3.



User entry

Signed floating-point number



Factory setting

0



Additional information*Description*

 The **Format display** parameter (→  14) is used to specify that the measured value is to be displayed as a bar graph.

User entry

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Decimal places 3**Navigation**

  Expert → System → Display → Decimal places 3

Prerequisite

A measured value is specified in the **Value 3 display** parameter (→  20).

Description

Use this function to select the number of decimal places for measured value 3.


Selection

- x
- x.X
- x.XX
- x.XXX
- x.XXXX









Factory setting

x.XX





Additional information*Description*

 This setting does not affect the accuracy of the device for measuring or calculating the value.


Value 4 display 

Navigation	  Expert → System → Display → Value 4 display
Prerequisite	<ul style="list-style-type: none"> ▪ A local display is provided. ▪ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	Use this function to select a measured value that is shown on the local display.
Selection	For the picklist, see Value 1 display parameter (→  17)
Factory setting	None
Additional information	<p><i>Description</i></p> <p>If several measured values are displayed one below the other, the measured value selected here will be the fourth value to be displayed. The value is only displayed during normal operation.</p> <p> The Format display parameter (→  14) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Options</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→  54).</p>

Decimal places 4 








Navigation	  Expert → System → Display → Decimal places 4
Prerequisite	A measured value is specified in the Value 4 display parameter (→  22).
Description	Use this function to select the number of decimal places for measured value 4.
Selection	<ul style="list-style-type: none"> ▪ x ▪ x.x ▪ x.xx ▪ x.xxx ▪ x.xxxx
Factory setting	x.xx
Additional information	<p><i>Description</i></p> <p> This setting does not affect the accuracy of the device for measuring or calculating the value.</p>








Display language








Navigation	 Expert → System → Display → Display language
Prerequisite	A local display is provided.
Description	Use this function to select the configured language on the local display.
Selection	<ul style="list-style-type: none"> ■ English ■ Deutsch ■ Français ■ Español ■ Italiano ■ Nederlands ■ Portuguesa ■ Polski ■ русский язык (Russian) ■ Svenska ■ Türkçe ■ 中文 (Chinese) ■ 日本語 (Japanese) ■ 한국어 (Korean) ■ čeština (Czech)
Factory setting	English (alternatively, the ordered language is preset in the device)




Value 5 display




Navigation	 Expert → System → Display → Value 5 display
Prerequisite	<ul style="list-style-type: none"> ■ A local display is provided. ■ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	Use this function to select a measured value that is shown on the local display.
Selection	For the picklist, see Value 1 display parameter (→  17)
Factory setting	None
Additional information	<p><i>Description</i></p> <p>If several measured values are displayed one below the other, the measured value selected here will be the fifth value to be displayed. The value is only displayed during normal operation.</p> <p> The Format display parameter (→  14) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Options</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→  54).</p>








0% bargraph value 5		
Navigation	 Expert → System → Display → 0% bargraph 5	
Prerequisite	An option was selected in the Value 5 display parameter (→  23).	
Description	Use this function to enter the 0% bar graph value to be shown on the display for the measured value 5.	
User entry	Signed floating-point number	
Factory setting	0	
Additional information	<p><i>Description</i></p> <p> The Format display parameter (→  14) is used to specify that the measured value is to be displayed as a bar graph.</p> <p><i>User entry</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→  54).</p>	

100% bargraph value 5		
Navigation	 Expert → System → Display → 100% bargraph 5	
Prerequisite	An option was selected in the Value 5 display parameter (→  23).	
Description	Use this function to enter the 100% bar graph value to be shown on the display for the measured value 5.	
User entry	Signed floating-point number	
Factory setting	0	
Additional information	<p><i>Description</i></p> <p> The Format display parameter (→  14) is used to specify that the measured value is to be displayed as a bar graph.</p> <p><i>User entry</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→  54).</p>	



Decimal places 5		
Navigation	 Expert → System → Display → Decimal places 5	
Prerequisite	A measured value is specified in the Value 5 display parameter (→  23).	


Description	Use this function to select the number of decimal places for measured value 5.
Selection	<ul style="list-style-type: none"> ■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx ■ x.xxxxx ■ x.xxxxxx
Factory setting	x.xx
Additional information	<p><i>Description</i></p> <p> This setting does not affect the accuracy of the device for measuring or calculating the value.</p>

Value 6 display








Navigation	 Expert → System → Display → Value 6 display
Prerequisite	<ul style="list-style-type: none"> ■ A local display is provided. ■ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	Use this function to select a measured value that is shown on the local display.
Selection	For the picklist, see Value 1 display parameter (→  17)
Factory setting	None
Additional information	<p><i>Description</i></p> <p>If several measured values are displayed one below the other, the measured value selected here will be the sixth value to be displayed. The value is only displayed during normal operation.</p> <p> The Format display parameter (→  14) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Options</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→  54).</p>

Decimal places 6



Navigation	 Expert → System → Display → Decimal places 6
Prerequisite	A measured value is specified in the Value 6 display parameter (→  25).
Description	Use this function to select the number of decimal places for measured value 6.

Selection	<ul style="list-style-type: none"> ■ X ■ X.X ■ X.XX ■ X.XXX ■ X.XXXX ■ X.XXXXX ■ X.XXXXXX
Factory setting	x.xx
Additional information	<p><i>Description</i></p> <p> This setting does not affect the accuracy of the device for measuring or calculating the value.</p>

Value 7 display



Navigation	 Expert → System → Display → Value 7 display
Prerequisite	<ul style="list-style-type: none"> ■ A local display is provided. ■ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	Use this function to select a measured value that is shown on the local display.
Selection	For the picklist, see Value 1 display parameter (→  17)
Factory setting	None
Additional information	<p><i>Description</i></p> <p>If several measured values are displayed one below the other, the measured value selected here will be the seventh value to be displayed. The value is only displayed during normal operation.</p> <p> The Format display parameter (→  14) is used to specify how many measured values are displayed simultaneously and how.</p> <p><i>Options</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→  54).</p>

0% bargraph value 7



Navigation	 Expert → System → Display → 0% bargraph 7
Prerequisite	An option was selected in the Value 7 display parameter (→  26).
Description	Use this function to enter the 0% bar graph value to be shown on the display for the measured value 7.
User entry	Signed floating-point number

Factory setting 0

Additional information *Description*

 The **Format display** parameter (→  14) is used to specify that the measured value is to be displayed as a bar graph.

User entry

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

100% bargraph value 7

Navigation   Expert → System → Display → 100% bargraph 7



Prerequisite An option was selected in the **Value 7 display** parameter (→  26).

Description Use this function to enter the 100% bar graph value to be shown on the display for the measured value 7.


User entry Signed floating-point number

Factory setting 0

Additional information *Description*


 The **Format display** parameter (→  14) is used to specify that the measured value is to be displayed as a bar graph.

User entry

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Decimal places 7

Navigation   Expert → System → Display → Decimal places 7


Prerequisite A measured value is specified in the **Value 7 display** parameter (→  26).

Description Use this function to select the number of decimal places for measured value 7.



Selection

- x
- x.x
- x.xx
- x.xxx
- x.xxxx
- x.xxxxx
- x.xxxxxx

Factory setting x.xx

Additional information	<p><i>Description</i></p> <p> This setting does not affect the accuracy of the device for measuring or calculating the value.</p>
-------------------------------	--



Value 8 display

Navigation	 Expert → System → Display → Value 8 display
Prerequisite	<ul style="list-style-type: none"> ■ A local display is provided. ■ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.



Description Use this function to select a measured value that is shown on the local display.

Selection For the picklist, see **Value 1 display** parameter (→  17)



Factory setting None


Additional information	<p><i>Description</i></p> <p>If several measured values are displayed one below the other, the measured value selected here will be the eighth value to be displayed. The value is only displayed during normal operation.</p> <p> The Format display parameter (→  14) is used to specify how many measured values are displayed simultaneously and how.</p>
-------------------------------	--

Options






 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Decimal places 8



Navigation	 Expert → System → Display → Decimal places 8
Prerequisite	A measured value is specified in the Value 8 display parameter (→  28).
Description	Use this function to select the number of decimal places for measured value 8.
Selection	<ul style="list-style-type: none"> ■ x ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx ■ x.xxxxx ■ x.xxxxxx
Factory setting	x.xx

Additional information	<i>Description</i>  This setting does not affect the accuracy of the device for measuring or calculating the value.
-------------------------------	---

Display interval


Navigation	 Expert → System → Display → Display interval
Prerequisite	A local display is provided.
Description	Use this function to enter the length of time the measured values are displayed if the values alternate on the display.
User entry	1 to 10 s
Factory setting	5 s
Additional information	<i>Description</i> This type of alternating display only occurs automatically if the number of measured values defined exceeds the number of values the selected display format can display simultaneously.  <ul style="list-style-type: none"> ▪ The Value 1 display parameter (→  17)...Value 8 display parameter (→  28) are used to specify which measured values are shown on the local display. ▪ The display format for the measured values displayed is defined in the Format display parameter (→  14).

Display damping

Navigation	 Expert → System → Display → Display damping
Prerequisite	A local display is provided.
Description	Use this function to enter a time constant for the reaction time of the local display to fluctuations in the measured value caused by process conditions.
User entry	0.0 to 999.9 s
Factory setting	0.0 s
Additional information	<i>User entry</i> Use this function to enter a time constant (PT1 element ¹⁾) for display damping: <ul style="list-style-type: none"> ▪ At a low time constant, the display reacts quickly to fluctuating measured variables. ▪ If a high time constant is entered, the display reacts more slowly.  The damping is not active if the value 0 (factory setting) is entered.

1) proportional transmission behavior with first order delay

Header 🔒

Navigation   Expert → System → Display → Header

Prerequisite A local display is provided.

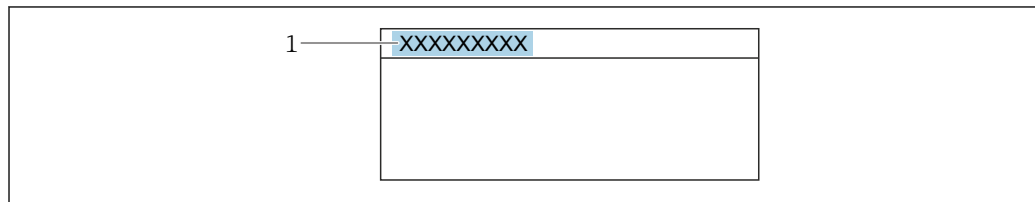
Description Use this function to select the contents of the header of the local display.

Selection

- Device tag
- Free text

Factory setting Device tag



Additional information *Description*
The header text only appears during normal operation.



A0029422

1 Position of the header text on the display

Selection

- Device tag
Is defined in the **Device tag** parameter (→  158).
- Free text
Is defined in the **Header text** parameter (→  30).

Header text 🔒

Navigation   Expert → System → Display → Header text

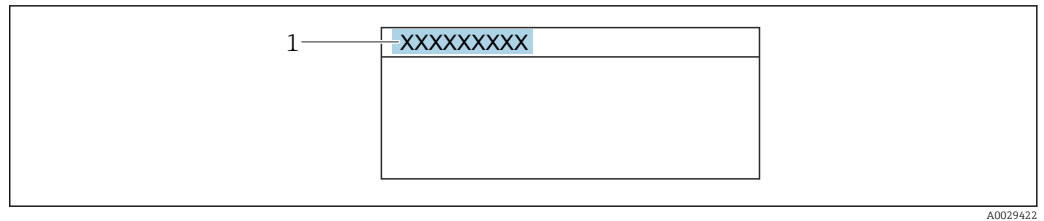
Prerequisite The **Free text** option is selected in the **Header** parameter (→  30).

Description Use this function to enter a customer-specific text for the header of the local display.

User entry Max. 12 characters, such as letters, numbers or special characters (e.g. @, %, /)

Factory setting -----

Additional information *Description*
The header text only appears during normal operation.



A0029422

1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator



Navigation	Expert → System → Display → Separator
Prerequisite	A local display is provided.
Description	Use this function to select the decimal separator.
Selection	<ul style="list-style-type: none"> ▪ . (point) ▪ , (comma)
Factory setting	. (point)

Contrast display

Navigation	Expert → System → Display → Contrast display
Prerequisite	A local display is provided.
Description	Use this function to enter a value to adapt the display contrast to the ambient conditions (e.g. the lighting or viewing angle).
User entry	20 to 80 %
Factory setting	Depends on the display






Backlight

Navigation	Expert → System → Display → Backlight
Prerequisite	One of the following conditions is met: <ul style="list-style-type: none"> ▪ Order code for "Display; operation", option F "4-line, illum.; touch control" ▪ Order code for "Display; operation", option G "4-line, illum.; touch control +WLAN"


Description	Use this function to switch the backlight of the local display on and off.
Selection	<ul style="list-style-type: none"> ▪ Disable ▪ Enable
Factory setting	Enable

3.1.2 "Configuration backup" submenu


Navigation  Expert → System → Config. backup

▶ Configuration backup		
Operating time	→	 32
Last backup	→	 32
Configuration management	→	 33
Backup state	→	 33
Comparison result	→	 34

Operating time

Navigation	 Expert → System → Config. backup → Operating time
Description	Displays the length of time the device has been in operation.
User interface	Days (d), hours (h), minutes (m) and seconds (s)
Additional information	<p><i>Indication</i></p> <p>Maximum number of days: 9 999 (corresponds to approx. 27 years and 5 months)</p>

Last backup

Navigation	 Expert → System → Config. backup → Last backup
Description	Displays the time since a backup copy of the data was last saved to the device memory.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

Configuration management


Navigation	Expert → System → Config. backup → Config. managem.
Description	Use this function to select an action to save the data to the device memory.
Selection	<ul style="list-style-type: none"> ■ Cancel ■ Execute backup ■ Restore * ■ Compare * ■ Clear backup data
Factory setting	Cancel
Additional information	<i>Selection</i>

Options	Description
Cancel	No action is executed and the user exits the parameter.
Execute backup	A backup copy of the current device configuration is saved from the HistoROM backup to the memory of the device. The backup copy includes the transmitter data of the device. The following message appears on local display: Backup active, please wait!
Restore	The last backup copy of the device configuration is restored from the device memory to the device's HistoROM backup. The backup copy includes the transmitter data of the device. The following message appears on local display: Restore active! Do not interrupt power supply!
Compare	The device configuration saved in the device memory is compared with the current device configuration of the HistoROM backup. The following message appears on local display: Comparing files The result can be viewed in Comparison result parameter.
Clear backup data	The backup copy of the device configuration is deleted from the memory of the device. The following message appears on local display: Deleting file

HistoROM

A HistoROM is a "non-volatile" device memory in the form of an EEPROM.

Backup state


Navigation	Expert → System → Config. backup → Backup state
Description	Displays the status of the data backup process.
User interface	<ul style="list-style-type: none"> ■ None ■ Backup in progress ■ Restoring in progress ■ Delete in progress

* Visibility depends on order options or device settings

- Compare in progress
- Restoring failed
- Backup failed

Factory setting None

Comparison result

Navigation  Expert → System → Config. backup → Compar. result

Description Displays the last result of the comparison of the data records in the device memory and in the HistoROM.

User interface ■ Settings identical
 ■ Settings not identical
 ■ No backup available
 ■ Backup settings corrupt
 ■ Check not done
 ■ Dataset incompatible

Factory setting Check not done

Additional information *Description*

 The comparison is started via the **Compare** option in the **Configuration management** parameter (→  33).

Options

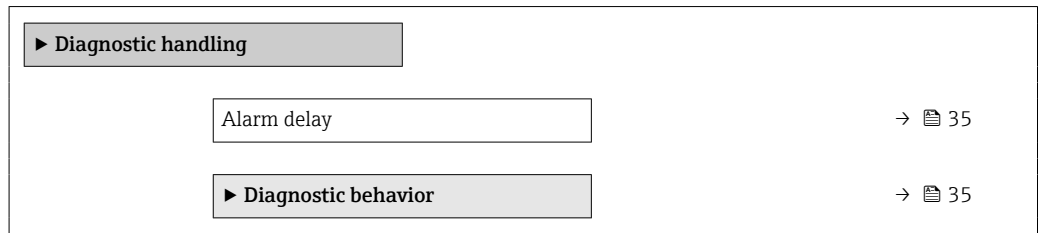
Options	Description
Settings identical	The current device configuration of the HistoROM is not identical to the backup copy in the device memory. If the transformer configuration of another device has been transmitted to the device via HistoROM in Configuration management parameter, the current device configuration of the HistoROM is only partially identical to the backup copy in the device memory: The settings for the transmitter are not identical.
Settings not identical	The current device configuration of the HistoROM is not identical to the backup copy in the device memory.
No backup available	There is no backup copy of the device configuration of the HistoROM in the device memory.
Backup settings corrupt	The current device configuration of the HistoROM is corrupt or not compatible with the backup copy in the device memory.
Check not done	The device configuration of the HistoROM has not yet been compared to the backup copy in the device memory.
Dataset incompatible	The backup copy in the device memory is not compatible with the device.

HistoROM


A HistoROM is a "non-volatile" device memory in the form of an EEPROM.

3.1.3 "Diagnostic handling" submenu


Navigation  Expert → System → Diagn. handling



Alarm delay

Navigation  Expert → System → Diagn. handling → Alarm delay

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

 The diagnostic message is reset without a time delay.

User entry 0 to 60 s


Factory setting 0 s

Additional information *Effect*

This setting affects the following diagnostic messages:



- 832 Electronics temperature too high
- 833 Electronics temperature too low
- 834 Process temperature too high
- 835 Process temperature too low
- 881 Signal to noise ratio too low
- 907 Permittivity out of specification
- 908 Volume fraction out of specification
- 909 Conductivity out of specification


"Diagnostic behavior" submenu

Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the **Diagnostic behavior** submenu (→  35).










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

Options	Description
Alarm	The device stops measurement. The signal outputs and totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.
Warning	The device continues to measure. The signal outputs and totalizers are not affected. A diagnostic message is generated.

Options	Description
Logbook entry only	The device continues to measure. The diagnostic message is only displayed in the Event logbook submenu (→  155) (Event list submenu (→  156)) and is not displayed in alternating sequence with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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



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

► Diagnostic behavior	
Assign behavior of diagnostic no. 441	→  36
Assign behavior of diagnostic no. 442	→  37
Assign behavior of diagnostic no. 443	→  37
Assign behavior of diagnostic no. 444	→  37
Assign behavior of diagnostic no. 302	→  38
Assign behavior of diagnostic no. 832	→  38
Assign behavior of diagnostic no. 833	→  39
Assign behavior of diagnostic no. 834	→  39
Assign behavior of diagnostic no. 835	→  39

Assign behavior of diagnostic no. 441 (Current output 1 to n)



Navigation

  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.441

Description

Use this function to change the diagnostic behavior of the **441 Current output 1 to n** diagnostic message.



Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

 For a detailed description of the options available: →  35

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




Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.442
Prerequisite	The measuring device has a pulse/frequency/switch output.
Description	Use this function to change the diagnostic behavior of the 442 Frequency output 1 to n diagnostic message.
Selection	<ul style="list-style-type: none"> ▪ Off ▪ Alarm ▪ Warning ▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 35

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






Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.443
Prerequisite	The measuring device has a pulse/frequency/switch output.
Description	Use this function to change the diagnostic behavior of the 443 Pulse output 1 to n diagnostic message.
Selection	<ul style="list-style-type: none"> ▪ Off ▪ Alarm ▪ Warning ▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 35

Assign behavior of diagnostic no. 444 (Current input 1 to n)






Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.444
Prerequisite	The device has one current input.
Description	Use this function to change the diagnostic behavior of the 444 Current input 1 to n diagnostic message.

Selection	<ul style="list-style-type: none"> ■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  35

Assign behavior of diagnostic no. 302

Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.302
Description	Use this function to change the diagnostic behavior of the 302 Device verification active diagnostic message.
Selection	<ul style="list-style-type: none"> ■ Off ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  35

Assign behavior of diagnostic no. 832

Navigation	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.832
Description	Use this function to change the diagnostic behavior of the 832 Electronics temperature too high diagnostic message.
Selection	<ul style="list-style-type: none"> ■ Off ■ Alarm ■ Warning ■ Logbook entry only
Factory setting	Warning
Additional information	 For a detailed description of the options available: →  35

Assign behavior of diagnostic no. 833



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.833
Description	Use this function to change the diagnostic behavior of the 833 Electronics temperature too low diagnostic message.
Selection	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 35

Assign behavior of diagnostic no. 834



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.834
Description	Use this function to change the diagnostic behavior of the 834 Process temperature too high diagnostic message.
Selection	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 35

Assign behavior of diagnostic no. 835



Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.835
Description	Use this function to change the diagnostic behavior of the 835 Process temperature too low diagnostic message.
Selection	<ul style="list-style-type: none">▪ Off▪ Alarm▪ Warning▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 35

Assign behavior of diagnostic no. 907


Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.907
Description	Use this function to change the diagnostic behavior of the 907 Permittivity out of specification diagnostic message.
Selection	<ul style="list-style-type: none"> ▪ Off ▪ Alarm ▪ Warning ▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 35

Assign behavior of diagnostic no. 908


Navigation	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no.908
Description	Use this function to change the diagnostic behavior of the 908 Volume fraction out of specification diagnostic message.
Selection	<ul style="list-style-type: none"> ▪ Off ▪ Alarm ▪ Warning ▪ Logbook entry only
Factory setting	Warning
Additional information	For a detailed description of the options available: → 35


3.1.4 "Administration" submenu

Navigation Expert → System → Administration

▶ Administration	
▶ Define access code	→ 41
▶ Reset access code	→ 42
Device reset	→ 43
Transmitter identifier	→ 44

Activate SW option	→ 44
Software option overview	→ 45


"Define access code" wizard



 The **Define access code** wizard (→ 41) is only available when operating via the local display or Web browser.

If operating via the operating tool, the **Define access code** parameter can be found directly in the **Administration** submenu. There is no **Confirm access code** parameter if the device is operated via the operating tool.

Navigation  Expert → System → Administration → Def. access code



▶ Define access code	
Define access code	→ 41
Confirm access code	→ 42

Define access code 


Navigation   Expert → System → Administration → Def. access code → Def. access code

Description Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the device configuration against any inadvertent modifications via the local display, Web browser, FieldCare or DeviceCare (via CDI-RJ45 service interface).

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

Additional information *Description*
 The write protection affects all parameters in the document marked with the  symbol. On the local display, the  symbol in front of a parameter indicates that the parameter is write-protected.

The parameters that cannot be write-accessed are grayed out in the Web browser.

 Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the **Enter access code** parameter (→ 13).

 If you lose the access code, please contact your Endress+Hauser sales organization.

User entry

A message is displayed if the access code is not in the input range.

Factory setting

If the factory setting is not changed or **0** is defined as the access code, the parameters are not write-protected and the device configuration data can be modified. The user is logged on in the **"Maintenance"** role.

Confirm access code


Navigation	Expert → System → Administration → Def. access code → Confirm code
Description	Enter the defined release code a second time to confirm the release code.
User entry	Max. 16-digit character string comprising numbers, letters and special characters

"Reset access code" submenu

Navigation Expert → System → Administration → Reset acc. code

▶ Reset access code	
Operating time	→ 42
Reset access code	→ 42

Operating time


Navigation	Expert → System → Administration → Reset acc. code → Operating time
Description	Displays the length of time the device has been in operation.
User interface	Days (d), hours (h), minutes (m) and seconds (s)
Additional information	<i>Indication</i> Maximum number of days: 9 999 (corresponds to approx. 27 years and 5 months)

Reset access code

Navigation	Expert → System → Administration → Reset acc. code → Reset acc. code
Description	Use this function to enter a reset code to reset the user-specific access codes to the factory setting .
User entry	Character string comprising numbers, letters and special characters
Factory setting	0x00

Additional information

Description

 For a reset code, contact your Endress+Hauser service organization.

User entry

The reset code can only be entered via:

- Web browser
- DeviceCare, FieldCare (via CDI RJ45 interface)
- Fieldbus

Additional parameters in the "Administration" submenu

Device reset 

Navigation

 Expert → System → Administration → 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 *

Factory setting

Cancel



Additional information

Selection

Options	Description
Cancel	No action is executed and the user exits the parameter.
To delivery settings	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	The restart resets every parameter with data stored in volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.
Restore S-DAT backup	Restores the data that is saved on the S-DAT. Additional information: This function can be used to resolve the memory issue "083 Memory content inconsistent" or to restore the S-DAT data when a new S-DAT has been installed.  This option is displayed only in an alarm condition.

* Visibility depends on order options or device settings

Transmitter identifier 

Navigation   Expert → System → Administration → Transm. identif.



Description Select transmitter identifier.

User interface

- Unknown
- 500
- 300

Factory setting 500

Activate SW option 

Navigation   Expert → System → Administration → Activate SW opt.

Description Use this function to enter an activation code to enable an additional, ordered software option.

User entry Max. 10-digit string of numbers.


Factory setting Depends on the software option ordered

Additional information *Description*

If a measuring device was ordered with an additional software option, the activation code is programmed in the device at the factory.

 To activate a software option subsequently, please contact your Endress+Hauser sales organization.

Entering the activation code

 The activation code is linked to the serial number of the measuring device and varies according to the device and software option.


If an incorrect or invalid code is entered, this results in the loss of software options that have already been activated.

- ▶ Before you enter a new activation code, make a note of the current activation code .
- ▶ Enter the new activation code provided by Endress+Hauser when the new software option was ordered.
- ▶ If the code entered is incorrect or invalid, enter the old activation code .
- ▶ Have your Endress+Hauser sales organization check the new activation code remembering to specify the serial number or ask for the code again.


Example for a software option

Order code for "Application package", option **EA** "Extended HistoROM"

Web browser







 Once a software option has been activated, the page must be loaded again in the Web browser.

Software option overview

Navigation	 Expert → System → Administration → SW option overv.
Description	Displays all the software options that are enabled in the device.
User interface	
Additional information	<p><i>Description</i></p> <p>Displays all the options that are available if ordered by the customer.</p> <p><i>"Extended HistoROM" option</i></p> <p>Order code for "Application package", option EA "Extended HistoROM"</p>





3.2 "Sensor" submenu

Navigation  Expert → Sensor

▶ Sensor	
▶ Measured values	→  45
▶ System units	→  54
▶ Process parameters	→  57
▶ External process variables	→  61
▶ Sensor adjustment	→  62
▶ Factory adjustment	→  65







3.2.1 "Measured values" submenu

Navigation  Expert → Sensor → Measured val.


▶ Measured values	
▶ Process variables	→  46
▶ Totalizer	→  47
▶ Input values	→  48
▶ Output values	→  50

"Process variables" submenu

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

► Process variables	
Total solids	→  46
Temperature	→  46
Electronics temperature	→  46
Conductivity	→  47
Corrected conductivity	→  47
Load rate	→  47

Total solids

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

Description Shows total solids (fraction of total weight or concentration per volume unit).

User interface Signed floating-point number


Temperature

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

Description Shows the medium temperature currently measured.

User interface Signed floating-point number

Electronics temperature

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

Description Shows the electronics temperature currently measured.

User interface Signed floating-point number

Conductivity

Navigation	📄📄 Expert → Sensor → Measured val. → Process variab. → Conductivity
Description	Shows the conductivity currently measured.
User interface	Floating-point number

Corrected conductivity

Navigation	📄📄 Expert → Sensor → Measured val. → Process variab. → CorrConductivity
Description	Shows the conductivity measured compensated for temperature.
User interface	Floating-point number

Load rate

Navigation	📄📄 Expert → Sensor → Measured val. → Process variab. → Load rate
Prerequisite	The volume flow of the medium is read in via the Current input 1 to n (→ 📄 49) or the fieldbus.
Description	Shows the total solids flow rate.
User interface	Signed floating-point number

"Totalizer" submenu

Navigation 📄📄 Expert → Sensor → Measured val. → Totalizer

▶ Totalizer

Totalizer 1 value	→ 📄 48
Totalizer 1 overflow	→ 📄 48

Totalizer 1 value


Navigation  Expert → Sensor → Measured val. → Totalizer → Tot. 1 value

Description Displays the current totalizer reading.



User interface Signed floating-point number

Additional information *Description*


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


 In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→  149).

Display

 The unit of the selected process variable is defined in the **Unit totalizer** parameter (→  147) for the totalizer.

Totalizer 1 overflow



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



Description Displays the current totalizer overflow.

User interface Integer with sign

Additional information *Description*

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

Display

 The unit of the selected process variable is defined in the **Unit totalizer** parameter (→  147) for the totalizer.

"Input values" submenu

Navigation  Expert → Sensor → Measured val. → Input values



▶ Current input 1 to n	→ 49
▶ Value status input 1 to n	→ 49

"Current input 1 to n" submenu

Navigation Expert → Sensor → Measured val. → Input values → Current input 1 to n

▶ Current input 1 to n	
Measured values 1 to n	→ 49
Measured current 1 to n	→ 49

Measured values 1 to n

Navigation Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measured val. 1 to n

Description Displays the current input value.

User interface Signed floating-point number

Measured current 1 to n

Navigation Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measur. curr. 1 to n

Description Displays the current value of the current input.


User interface 0 to 22.5 mA

"Value status input 1 to n" submenu

Navigation Expert → Sensor → Measured val. → Input values → Val.stat.inp. 1 to n




▶ Value status input 1 to n	
Value status input	→ 50

Value status input


Navigation	 Expert → Sensor → Measured val. → Input values → Val.stat.inp. 1 to n → Val.stat.inp.
Description	Displays the current input signal level.
User interface	<ul style="list-style-type: none"> ■ High ■ Low



"Output values" submenu

Navigation  Expert → Sensor → Measured val. → Output values


▶ Output values	
▶ Value current output 1 to n	→  50
▶ Pulse/frequency/switch output 1 to n	→  51
▶ Relay output 1 to n	→  53

"Value current output 1 to n" submenu


Navigation  Expert → Sensor → Measured val. → Output values → Current output 1 to n

▶ Value current output 1 to n	
Output current	→  50
Measured current	→  51

Output current

Navigation	 Expert → Sensor → Measured val. → Output values → Current output 1 to n → Output curr.
Description	Displays the current value currently calculated for the current output.
User interface	0 to 22.5 mA


Measured current

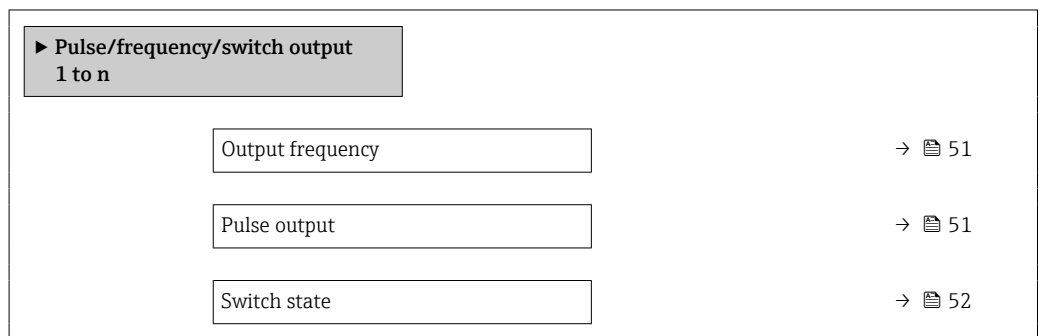
Navigation  Expert → Sensor → Measured val. → Output values → Current output 1 to n → Measur. curr.

Description Displays the actual measured value of the output current.


User interface 0 to 30 mA


"Pulse/frequency/switch output 1 to n" submenu

Navigation  Expert → Sensor → Measured val. → Output values → PFS output 1 to n



Output frequency


Navigation  Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Output freq.


Prerequisite In the **Operating mode** parameter (→  87), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Pulse output

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

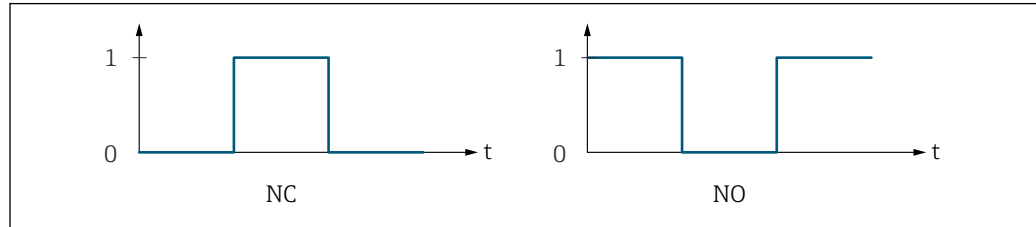
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→  87) parameter.

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

- The pulse output is an open collector output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.



A0028726

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

The output behavior can be reversed via the **Invert output signal** parameter (→ [📄 103](#)) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ [📄 91](#))) can be configured.

Switch state

Navigation [📄](#) [📄](#) Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Switch state

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ [📄 87](#)).

Description Displays the current switch status of the status output.


User interface

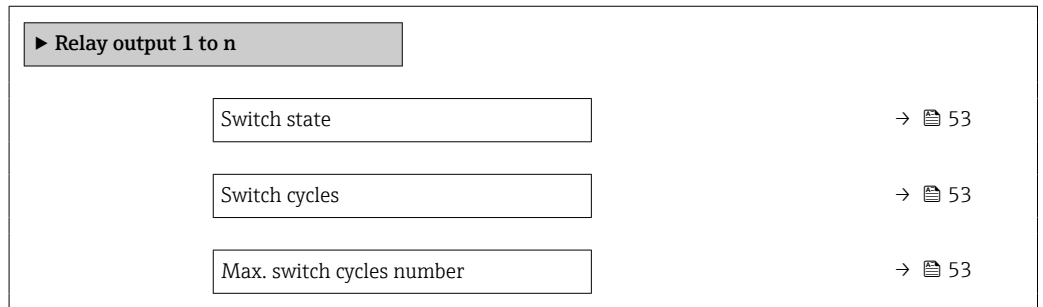
- Open
- Closed

Additional information *User interface*


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

"Relay output 1 to n" submenu

Navigation  Expert → Sensor → Measured val. → Output values → Relay output 1 to n



Switch state

Navigation  Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Switch state

Description Displays the current status of the relay output.


User interface

- Open
- Closed

Additional information *User interface*

- Open
The relay output is not conductive.
- Closed
The relay output is conductive.


Switch cycles

Navigation  Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Switch cycles

Description Displays all the switch cycles performed.

User interface Positive integer

Max. switch cycles number


Navigation  Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Max. cycles no.









Description Displays the maximum number of guaranteed switch cycles.

User interface

Positive integer

3.2.2 "System units" submenu

Navigation  Expert → Sensor → System units

▶ System units	
Total solids unit	→  54
Density unit	→  55
Mass flow unit	→  55
Mass unit	→  55
Volume flow unit	→  56
Temperature unit	→  56
Conductivity unit	→  56
Date/time format	→  57

Total solids unit**Navigation**

 Expert → Sensor → System units → TotalSolidsUnit

Description

Select total solids unit.

Selection*SI units*

- %TS
- ppm
- g/l
- mg/l
- kg/m³
- mg/cm³

US units

- lb/gal (us)
- lb/ft³

Factory setting

Depends on country

Density unit



Navigation Expert → Sensor → System units → Density unit

Description Select density unit.

Selection	<i>SI units</i>	<i>US units</i>
	<ul style="list-style-type: none"> ▪ g/l ▪ mg/l ▪ kg/m³ ▪ mg/cm³ 	<ul style="list-style-type: none"> ▪ lb/gal (us) ▪ lb/ft³

Factory setting Depends on country

Mass flow unit



Navigation Expert → Sensor → System units → Mass flow unit

Prerequisite The volume flow of the medium is read in via the Current input 1 to n (→ 49).

Description Select mass flow unit.

Selection	<i>SI units</i>	<i>US units</i>
	<ul style="list-style-type: none"> ▪ kg/h ▪ kg/d ▪ t/h ▪ t/d 	<ul style="list-style-type: none"> ▪ oz/h ▪ oz/d ▪ lb/h ▪ lb/d ▪ STon/h ▪ STon/d

Factory setting Depends on country

Mass unit




Navigation Expert → Sensor → System units → Mass unit




Prerequisite The volume flow of the medium is read in via the Current input 1 to n (→ 49) or the fieldbus.

Description Select mass unit.



Selection	<i>SI units</i>	<i>US units</i>
	<ul style="list-style-type: none"> ▪ kg ▪ t 	<ul style="list-style-type: none"> ▪ oz ▪ lb ▪ STon

Factory setting Depends on country



Volume flow unit


Navigation	  Expert → Sensor → System units → Volume flow unit
Prerequisite	The volume flow of the medium is read in via the Current input 1 to n (→  49).
Description	Select volume flow unit.
Selection	<i>SI units</i> <ul style="list-style-type: none"> ■ l/h ■ l/s ■ dm³/min ■ m³/h ■ m³/s
Factory setting	l/h

Temperature unit


Navigation	  Expert → Sensor → System units → Temperature unit		
Description	Select temperature unit.		
Selection	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <i>SI units</i> <ul style="list-style-type: none"> ■ °C ■ K </td> <td style="width: 50%; vertical-align: top;"> <i>US units</i> <ul style="list-style-type: none"> ■ °F ■ °R </td> </tr> </table>	<i>SI units</i> <ul style="list-style-type: none"> ■ °C ■ K 	<i>US units</i> <ul style="list-style-type: none"> ■ °F ■ °R
<i>SI units</i> <ul style="list-style-type: none"> ■ °C ■ K 	<i>US units</i> <ul style="list-style-type: none"> ■ °F ■ °R 		
Factory setting	Depends on country		

Conductivity unit


Navigation	  Expert → Sensor → System units → Conductiv. unit
Description	Select conductivity unit.
Selection	<i>SI units</i> <ul style="list-style-type: none"> ■ nS/cm ■ μS/cm ■ μS/m ■ μS/mm ■ mS/m ■ mS/cm ■ S/cm ■ S/m
Factory setting	μS/cm

Date/time format

Navigation	Expert → Sensor → System units → Date/time format
Description	Select date and time format.
Selection	<ul style="list-style-type: none"> ▪ dd.mm.yy hh:mm ▪ dd.mm.yy hh:mm am/pm ▪ mm/dd/yy hh:mm ▪ mm/dd/yy hh:mm am/pm
Factory setting	dd.mm.yy hh:mm

3.2.3 "Process parameters" submenu

Navigation Expert → Sensor → Process param.

▶ Process parameters	
Temperature damping	→ 57
Conductivity damping	→ 58
Total solids override	→ 58
▶ Total solids monitoring	→ 58
▶ Partially filled pipe detection	→ 60

Temperature damping

Navigation	Expert → Sensor → Process param. → Temp. damping
Description	Enter a time constant for damping (PT1 element) of the temperature measured value. Damping reduces the effect of measured value fluctuations.
User entry	0 to 999.9 s
Factory setting	0 s

Conductivity damping

Navigation	Expert → Sensor → Process param. → Conduct. damping
Description	Enter a time constant for damping (PT1 element) of the conductivity measured value. Damping reduces the effect of measured value fluctuations.
User entry	0 to 999.9 s
Factory setting	0 s

Total solids override

Navigation	Expert → Sensor → Process param. → TotalSolOverride
Description	If suppression of the total solids measurement is enabled (On option), zero is output for the measured value. This is suitable for the cleaning processes for the pipeline, for example.
Selection	<ul style="list-style-type: none"> ■ Off ■ On
Factory setting	Off

"Total solids monitoring" submenu

Navigation Expert → Sensor → Process param. → TotSolidsMonitor

▶ Total solids monitoring	
Assign process variable	→ 58
Lower range limit	→ 59
Upper range limit	→ 59
Response time	→ 59



Assign process variable

Navigation	Expert → Sensor → Process param. → TotSolidsMonitor → Assign variable
Description	Select the process variable for total solids monitoring.

Selection ▪ Off
 ▪ Total solids

Factory setting Total solids

Lower range limit



Navigation   Expert → Sensor → Process param. → TotSolidsMonitor → LowerRangeLimit

Description Enter the lower limit value for the measuring range of the total solids.

User entry Signed floating-point number

Factory setting -1 %TS

Upper range limit



Navigation   Expert → Sensor → Process param. → TotSolidsMonitor → UpperRangeLimit

Description Enter the upper limit value for the measuring range of the total solids.

User entry Signed floating-point number

Factory setting 51 %TS

Response time


Navigation   Expert → Sensor → Process param. → TotSolidsMonitor → Response time

Description Enter a delay until the diagnostic message is generated in the event the measuring range is exceeded.


User entry 0 to 100 s


Factory setting 60 s

"Partially filled pipe detection" submenu


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

▶ **Partially filled pipe detection**


Partially filled pipe detection →  60

Response time →  60


Partially filled pipe detection

Navigation	 Expert → Sensor → Process param. → Partial pipe det → Partial pipe det
Description	If activated, a diagnostic message is generated if the antennas are no longer in full contact with the medium.
Selection	<ul style="list-style-type: none"> ■ Off ■ On
Factory setting	Off

Threshold

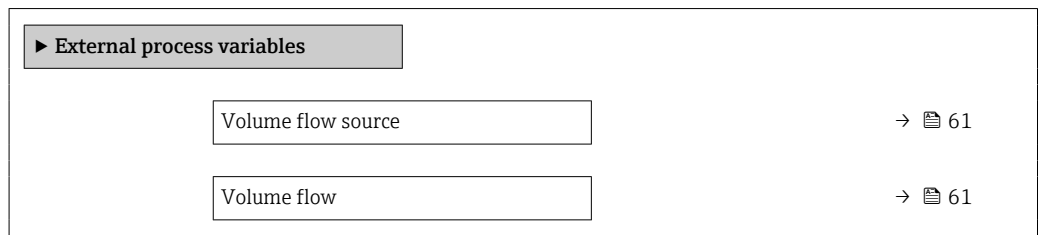
Navigation	 Expert → Sensor → Process param. → Partial pipe det → Threshold
Description	Enter threshold for partially filled pipe detection. If the measured value drops below the threshold, a diagnostic message is generated.
User entry	Decibel as negative floating point number
Factory setting	-6 dB

Response time

Navigation	 Expert → Sensor → Process param. → Partial pipe det → Response time
Description	Enter a delay until the diagnostic message is generated in the event the pipe is detected as partially filled.
User entry	0 to 20.0 s
Factory setting	3 s

3.2.4 "External compensation" submenu

Navigation  Expert → Sensor → External comp.



Volume flow source

Navigation  Expert → Sensor → ExternalProcVar. → VolumeFlowSource


Description Select the input via which the measured value of the volume flow is read in. The volume flow is used to calculate the load rate.

Selection

- Off
- Current input 1 *
- Current input 2 *
- Current input 3 *
- External value

Factory setting Off

Volume flow

Navigation  Expert → Sensor → ExternalProcVar. → Volume flow



Description Shows the volume flow reported by the external measuring device.

User entry Signed floating-point number


* Visibility depends on order options or device settings

3.2.5 "Sensor adjustment" submenu

Navigation  Expert → Sensor → Sensor adjustm.

▶ Sensor adjustment		
Measuring interval		→  62
▶ Process variable adjustment		→  62


Measuring interval











Navigation  Expert → Sensor → Sensor adjustm. → Measur. interval

Description Displays the interval between two measuring periods.

User interface 0 to 10 000 ms

"Process variable adjustment" submenu

Navigation  Expert → Sensor → Sensor adjustm. → Variable adjust

▶ Process variable adjustment		
Temperature offset		→  63
Temperature factor		→  63
Conductivity offset		→  63
Conductivity factor		→  63
Corrected conductivity offset		→  64
Corrected conductivity factor		→  64
Electronics temperature offset		→  64
Electronics temperature factor		→  64
Load rate offset		→  65
Load rate factor		→  65

Temperature offset



Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. offset
Description	Enter the offset by which to shift the zero point for temperature.
User entry	Signed floating-point number
Factory setting	0

Temperature factor



Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. factor
Description	Enter the multiplication factor to apply to the temperature value.
User entry	Positive floating-point number
Factory setting	1

Conductivity offset



Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. offset
Description	Enter the offset by which to shift the zero point for conductivity.
User entry	Signed floating-point number
Factory setting	0

Conductivity factor



Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. factor
Description	Enter the multiplication factor to apply to the conductivity value.
User entry	Positive floating-point number
Factory setting	1

Corrected conductivity offset



Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Corr.cond.offset
Description	Enter the offset by which to shift the zero point for the corrected conductivity.
User entry	Signed floating-point number
Factory setting	0

Corrected conductivity factor



Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Corr.cond.factor
Description	Enter the multiplication factor to apply to the corrected conductivity value.
User entry	Positive floating-point number
Factory setting	1

Electronics temperature offset



Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → ElectrTempOffset
Description	Enter the offset by which to shift the zero point for the electronics temperature.
User entry	Signed floating-point number
Factory setting	0

Electronics temperature factor



Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → ElectrTempFactor
Description	Enter the multiplication factor to apply to the electronics temperature.
User entry	Positive floating-point number
Factory setting	1

Load rate offset

Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Load rate offset
Prerequisite	The volume flow of the medium is read in via the Current input 1 to n (→ 49).
Description	Enter the offset by which to shift the zero point for the load rate.
User entry	Signed floating-point number
Factory setting	0

Load rate factor

Navigation	Expert → Sensor → Sensor adjustm. → Variable adjust → Load rate factor
Prerequisite	The volume flow of the medium is read in via the Current input 1 to n (→ 49).
Description	Enter the multiplication factor to apply to the load rate value.
User entry	Positive floating-point number
Factory setting	1

3.2.6 "Factory adjustment" submenu

Navigation Expert → Sensor → FactoryAdjustm.

► Factory adjustment	
Nominal diameter	→ 65
Date/time	→ 66

Nominal diameter

Navigation	Expert → Sensor → FactoryAdjustm. → Nominal diameter
Description	Shows the nominal diameter of the sensor.
User interface	Character string comprising numbers, letters and special characters

Date/time	
Navigation	Expert → Sensor → FactoryAdjustm. → Date/time
Description	Shows the date and time of the factory adjustment.
User interface	Character string comprising numbers, letters and special characters

3.3 "I/O configuration" submenu

Navigation Expert → I/O config.

▶ I/O configuration	
I/O module 1 to n terminal numbers	→ 66
I/O module 1 to n information	→ 66
I/O module 1 to n type	→ 67
Apply I/O configuration	→ 67
I/O alteration code	→ 68

I/O module 1 to n terminal numbers



Navigation	Expert → I/O config. → I/O 1 to n terminals
Description	Displays the terminal numbers used by the I/O module.
User interface	<ul style="list-style-type: none"> ■ Not used ■ 26-27 (I/O 1) ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)

I/O module 1 to n information



Navigation	Expert → I/O config. → I/O 1 to n info
Description	Displays information about the plugged in I/O module.

User interface	<ul style="list-style-type: none"> ■ Not plugged ■ Invalid ■ Not configurable ■ Configurable ■ HART
Additional information	<p><i>"Not plugged" option</i> The I/O module is not plugged in.</p> <p><i>"Invalid" option</i> The I/O module is not plugged correctly.</p> <p><i>"Not configurable" option</i> The I/O module is not configurable.</p> <p><i>"Configurable" option</i> The I/O module is configurable.</p> <p><i>"Fieldbus" option</i> The I/O module is configured for HART.</p>

I/O module 1 to n type

Navigation	  Expert → I/O config. → I/O 1 to n type
Prerequisite	<p>For the following order code:</p> <ul style="list-style-type: none"> ■ "Output; input 2", option D "Configurable I/O initial setting off" ■ "Output; input 3", option D "Configurable I/O initial setting off" ■ "Output; input 4", option D "Configurable I/O initial setting off"
Description	Use this function to select the I/O module type for the configuration of the I/O module.
Selection	<ul style="list-style-type: none"> ■ Off ■ Current output * ■ Current input * ■ Status input * ■ Pulse/frequency/switch output * ■ Relay output *
Factory setting	Off

Apply I/O configuration

Navigation	  Expert → I/O config. → Apply I/O config
Description	Use this function to activate the newly configured I/O module type.

* Visibility depends on order options or device settings

Selection ■ No
 ■ Yes

Factory setting No

I/O alteration code

Navigation   Expert → I/O config. → I/O alterat.code

Description Use this function to enter the ordered activation code to activate the I/O configuration change.



User entry Positive integer

Factory setting 0

Additional information *Description*
The I/O configuration is changed in the **I/O module type** parameter (→  67).






3.4 "Input" submenu

Navigation   Expert → Input

▶ Input	
▶ Current input 1 to n	→  68
▶ Status input 1 to n	→  71


3.4.1 "Current input 1 to n" submenu

Navigation   Expert → Input → Current input 1 to n


▶ Current input 1 to n	
Terminal number	→  69
Signal mode	→  69
Current span	→  69
0/4 mA value	→  70
20 mA value	→  70

Failure mode	→ 71
Failure value	→ 71


Terminal number

Navigation	 Expert → Input → Current input 1 to n → Terminal no.
Description	Displays the terminal numbers used by the current input module.
User interface	<ul style="list-style-type: none"> ■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)
Additional information	<p><i>"Not used" option</i></p> <p>The current input module does not use any terminal numbers.</p>



Signal mode

Navigation	 Expert → Input → Current input 1 to n → Signal mode
Description	Use this function to select the signal mode for the current input.
Selection	<ul style="list-style-type: none"> ■ Passive ■ Active *
Factory setting	Passive







Current span

Navigation	 Expert → Input → Current input 1 to n → Current span
Description	Use this function to select the current range for the process value output and the upper and lower level for signal on alarm.
Selection	<ul style="list-style-type: none"> ■ 4...20 mA (4...20.5 mA) ■ 4...20 mA NE (3.8...20.5 mA) ■ 4...20 mA US (3.9...20.8 mA) ■ 0...20 mA (0...20.5 mA)





* Visibility depends on order options or device settings

Factory setting	Country-specific: <ul style="list-style-type: none"> ■ 4...20 mA NE (3.8...20.5 mA) ■ 4...20 mA US (3.9...20.8 mA)
Additional information	<i>Examples</i>  Sample values for the current range: Current span parameter (→  75)

0/4 mA value

Navigation	  Expert → Input → Current input 1 to n → 0/4 mA value
Description	Enter 4 mA value.
User entry	Signed floating-point number
Factory setting	0 % TS
Additional information	<i>Current input behavior</i> The current input behaves differently depending on the settings configured in the following parameters: <ul style="list-style-type: none"> ■ Current span (→  69) ■ Failure mode (→  71) <i>Configuration examples</i>  Pay attention to the configuration examples for 4 mA value parameter (→  77).

20 mA value

Navigation	  Expert → Input → Current input 1 to n → 20 mA value
Description	Enter 20 mA value.
User entry	Signed floating-point number
Factory setting	12 %TS
Additional information	<i>Configuration examples</i>  Pay attention to the configuration examples for 4 mA value parameter (→  77).

Failure mode


Navigation	Expert → Input → Current input 1 to n → Failure mode
Description	Use this function to select the input behavior when measuring a current outside the configured Current span parameter (→ 69).
Selection	<ul style="list-style-type: none"> ▪ Alarm ▪ Last valid value ▪ Defined value
Factory setting	Alarm
Additional information	<p><i>Options</i></p> <ul style="list-style-type: none"> ▪ Alarm An error message is set. ▪ Last valid value The last valid measured value is used. ▪ Defined value A user-defined measured value is used (Failure value parameter (→ 71)).



Failure value


Navigation	Expert → Input → Current input 1 to n → Failure value
Prerequisite	In the Failure mode parameter (→ 71), the Defined value option is selected.
Description	Use this function to enter the value that the device uses if it does not receive an input signal from the external device, or if the input signal is invalid.
User entry	Signed floating-point number
Factory setting	0



3.4.2 "Status input 1 to n" submenu

Navigation Expert → Input → Status input 1 to n

▶ Status input 1 to n	
Terminal number	→ 72
Assign status input	→ 72
Value status input	→ 73




Active level	→  73
Response time status input	→  73

Terminal number



Navigation	  Expert → Input → Status input 1 to n → Terminal no.
Description	Displays the terminal numbers used by the status input module.
User interface	<ul style="list-style-type: none"> ■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)
Additional information	<p><i>"Not used" option</i></p> <p>The status input module does not use any terminal numbers.</p>

Assign status input





Navigation	  Expert → Input → Status input 1 to n → Assign stat.inp.
Description	Use this function to select the function for the status input.
Selection	<ul style="list-style-type: none"> ■ Off ■ Reset totalizer 1 ■ Flow override
Factory setting	Off
Additional information	<p><i>Options</i></p> <ul style="list-style-type: none"> ■ Off The status input is switched off. ■ Reset totalizer 1 The totalizer is reset. ■ Flow override The Flow override is activated. <p> Note on the Flow override:</p> <ul style="list-style-type: none"> ■ The Flow override is enabled as long as the level is at the status input (continuous signal). ■ All other assignments react to a change in level (pulse) at the status input.

Value status input

Navigation	  Expert → Input → Status input 1 to n → Val.stat.inp.
Description	Displays the current input signal level.
User interface	<ul style="list-style-type: none"> ▪ High ▪ Low



Active level



Navigation	  Expert → Input → Status input 1 to n → Active level
Description	Use this function to determine the input signal level at which the assigned function is activated.
Selection	<ul style="list-style-type: none"> ▪ High ▪ Low
Factory setting	High

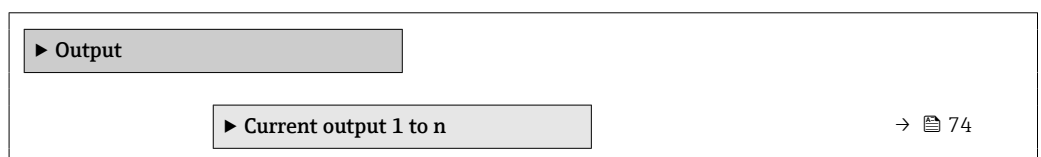
Response time status input



Navigation	  Expert → Input → Status input 1 to n → Response time
Description	Use this function to enter the minimum time period for which the input signal level must be present before the selected function is activated.
User entry	5 to 200 ms
Factory setting	50 ms

3.5 "Output" submenu

Navigation   Expert → Output



▶ Pulse/frequency/switch output 1 to n	→ 85
▶ Relay output 1 to n	→ 103

3.5.1 "Current output 1 to n" submenu

Navigation  Expert → Output → Curr.output 1 to n

▶ Current output 1 to n	
Terminal number	→ 74
Signal mode	→ 75
Process variable current output	→ 75
Current range output	→ 75
Fixed current	→ 76
Lower range value output	→ 77
Upper range value output	→ 78
Measuring mode current output	→ 78
Damping current output	→ 83
Failure behavior current output	→ 83
Failure current	→ 84
Output current	→ 84
Measured current	→ 85

Terminal number

Navigation



 Expert → Output → Curr.output 1 to n → Terminal no.

Description




Displays the terminal numbers used by the current output module.

User interface	<ul style="list-style-type: none"> ■ Not used ■ 26-27 (I/O 1) ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)
Additional information	<p><i>"Not used" option</i></p> <p>The current output module does not use any terminal numbers.</p>



Signal mode

Navigation	  Expert → Output → Curr.output 1 to n → Signal mode
Description	Use this function to select the signal mode for the current output.
Selection	<ul style="list-style-type: none"> ■ Active * ■ Passive *
Factory setting	Active

Process variable current output

Navigation	  Expert → Output → Curr.output 1 to n → Proc.var. outp
Prerequisite	The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	Use this function to select a process variable for the current output.
Selection	<ul style="list-style-type: none"> ■ Off ■ Total solids ■ Temperature ■ Electronics temperature ■ Conductivity ■ Corrected conductivity ■ Load rate *
Factory setting	Total solids

Current range output

Navigation	  Expert → Output → Curr.output 1 to n → Curr.range out
Description	Select current range for process value output and upper/lower level for alarm signal.

* Visibility depends on order options or device settings

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)
- 0...20 mA (0...20.5 mA)
- Fixed value

Factory setting

Depends on country:

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

Additional information*Description*

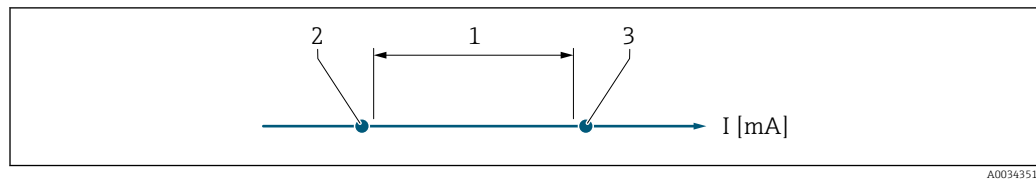
- i** ■ In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 83).
 - The measuring range is specified via the **Lower range value output** parameter (→ 77) and **Upper range value output** parameter (→ 78).

"Fixed current" option

- This option is used for a HART Multidrop network.
- It can only be used for the 4...20 mA HART current output (current output 1).
- The current value is set via the **Fixed current** parameter (→ 76).

Example

Shows the relationship between the current range for the output of the process value and the two signal on alarm levels:



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

Selection

Selection	1	2	3
4...20 mA NE (3.8...20.5 mA)	3.8 to 20.5 mA	< 3.6 mA	> 21.95 mA
4...20 mA US (3.9...20.8 mA)	3.9 to 20.8 mA US	< 3.6 mA	> 21.95 mA
4...20 mA (4...20.5 mA)	4 to 20.5 mA	< 3.6 mA	> 21.95 mA
0...20 mA (0...20.5 mA)	0 to 20.5 mA	0 mA	> 21.95 mA

Fixed current**Navigation**

Expert → Output → Curr.output 1 to n → Fixed current

Prerequisite

The **Fixed current** option is selected in the **Current span** parameter (→ 75).

Description

Use this function to enter a constant current value for the current output.

User entry

0 to 22.5 mA

Factory setting 22.5 mA

Lower range value output



Navigation

Expert → Output → Curr.output 1 to n → Low.range outp

Prerequisite

In **Current span** parameter (→ 75), 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)
- 0...20 mA (0...20.5 mA)

Description

Use this function to enter a value for the start of measuring range.

User entry

Floating point number with sign

Factory setting

0 %TS

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 75). In addition, the value can be greater than or smaller than the value assigned for the 20 mA current in the **Upper range value output** parameter (→ 78).

Dependency



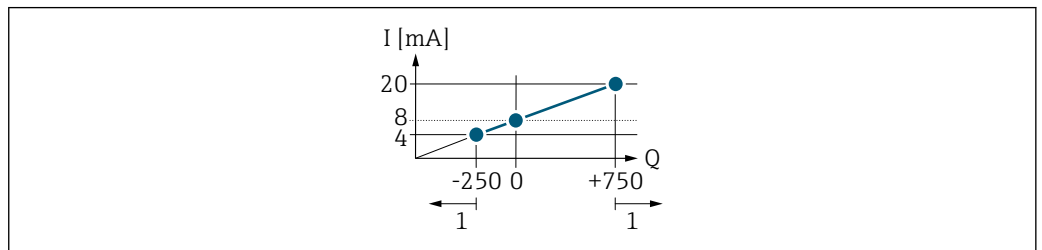
The unit depends on the process variable selected in the **Assign current output** parameter (→ 75).

Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:

- Current span (→ 75)
- Failure mode (→ 83)

Configuration examples



A0013757

Q Flow

I Current

1 Measuring range is exceeded or undershot

Upper range value output


Navigation	Expert → Output → Curr.output 1 to n → Upp.range outp
Prerequisite	In Current span parameter (→ 75), one of the following options is selected: <ul style="list-style-type: none"> ■ 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) ■ 0...20 mA (0...20.5 mA)
Description	Use this function to enter a value for the end of measuring range.
User entry	Floating point number with sign
Factory setting	12 %TS
Additional information	<p><i>Description</i></p> <p>Positive and negative values are permitted depending on the process variable assigned in the Assign current output parameter (→ 75). In addition, the value can be greater than or smaller than the value assigned for the 0/4 mA current in the Lower range value output parameter (→ 77).</p> <p><i>Dependency</i></p> <p> The unit depends on the process variable selected in the Assign current output parameter (→ 75).</p> <p><i>Example</i></p> <p><i>Configuration examples</i></p> <p> Pay attention to the configuration examples for the Lower range value output parameter (→ 77).</p>



Measuring mode current output


Navigation	Expert → Output → Curr.output 1 to n → Output mode
Prerequisite	The following option is selected in the Process variable current output parameter (→ 75): Load rate One of the following options is selected in the Current span parameter (→ 75): <ul style="list-style-type: none"> ■ 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) ■ 0...20 mA (0...20.5 mA)
Description	Use this function to select the measuring mode for the current output.



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

Factory setting Forward flow

Additional information *Description*

 The process variable that is assigned to the current output via the **Assign current output** parameter (→  75) is displayed below the parameter.

"Forward flow" option

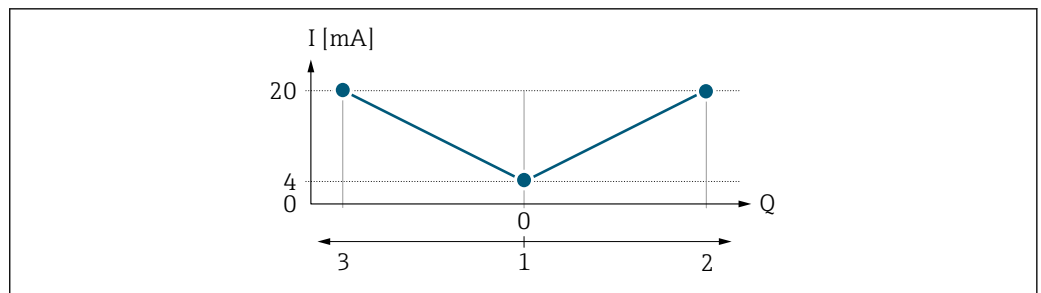
The current output signal is proportional to the process variable assigned. The measuring range is defined by the values that are assigned to the **Lower range value output** parameter (→  77) and the **Upper range value output** parameter (→  78).

The flow components outside the scaled measuring range are taken into account for signal output as follows:

Both values are defined such that they are not equal to zero flow e.g.:





- Start of measuring range = -50 kg/h
- End of measuring range = 100 kg/h

"Forward/Reverse flow" option



A0013758

- I* Current
Q Flow
 1 Start of measuring range output (0/4 mA)
 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 (→  77) and **Upper range value output** parameter (→  78) must have the same sign.
- The value for the **Upper range value output** parameter (→  78) (e.g. reverse flow) corresponds to the mirrored value for the **Upper range value output** parameter (→  78) (e.g. forward flow).

"Reverse flow compensation" option

The **Reverse flow compensation** option is primarily used to compensate for intermittent reverse flow that can arise with displacement pumps due to wear or high-viscosity medium. The reverse flow is recorded in a buffer memory and offset against the next forward flow.

In the event of prolonged and undesired reverse flow, flow values can accumulate in the buffer memory. Due to the configuration of the current output, these values are not factored in, however, i.e. there is no compensation for the reverse flow.

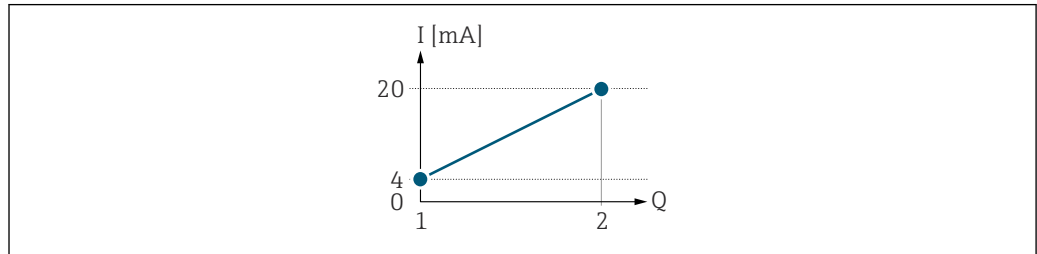
* Visibility depends on order options or device settings

If this option is set, the measuring device does not smoothen the flow signal. The flow signal is not attenuated.

Examples of how the current output behaves

Example 1

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

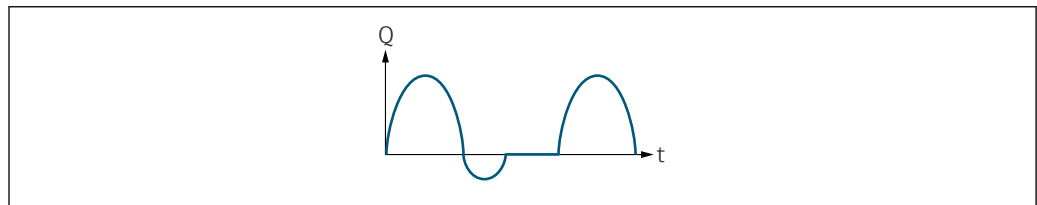


A0028084

2 Measuring range

- I Current
- Q Flow
- 1 Lower range value (Start of measuring range output)
- 2 Upper range value (end of measuring range output)

With the following flow response:



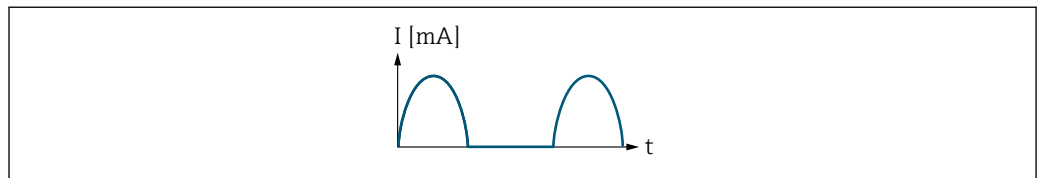
A0028091

3 Flow response

- Q Flow
- t Time

With **Forward flow** option

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

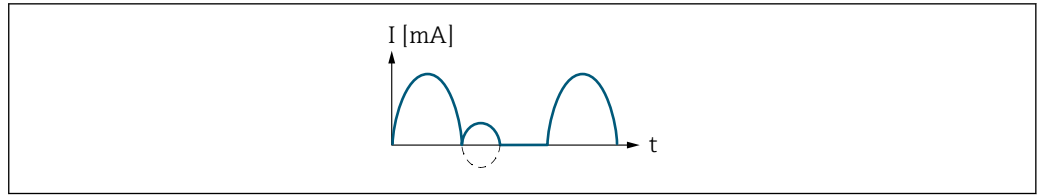


A0028092

- I Current
- t Time

With **Forward/Reverse flow** option

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

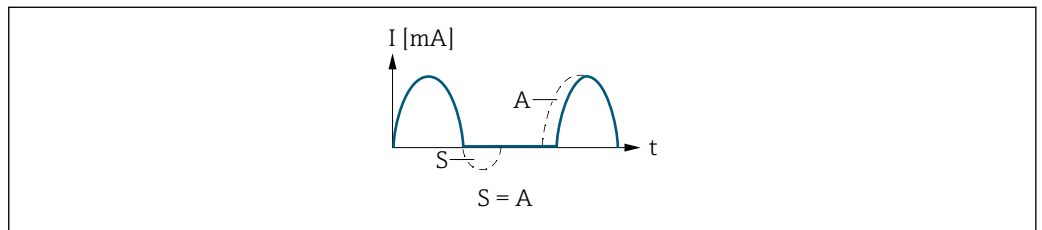


A0028093

I Current
 t Time

With Reverse flow compensation option

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

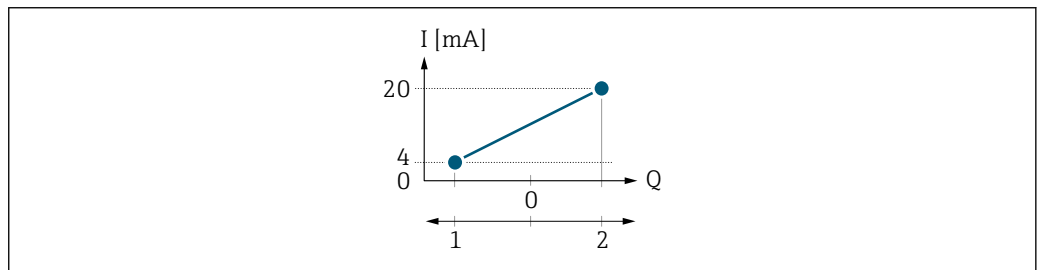


A0028094

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

Example 2

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

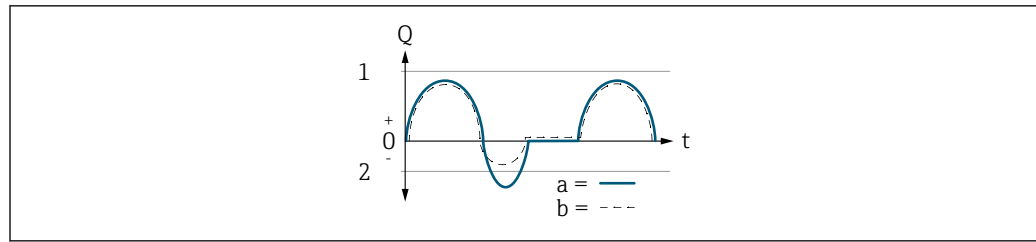


A0028095

4 Measuring range

I Current
 Q Flow
 1 Lower range value (Start of measuring range output)
 2 Upper range value (end of measuring range output)

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

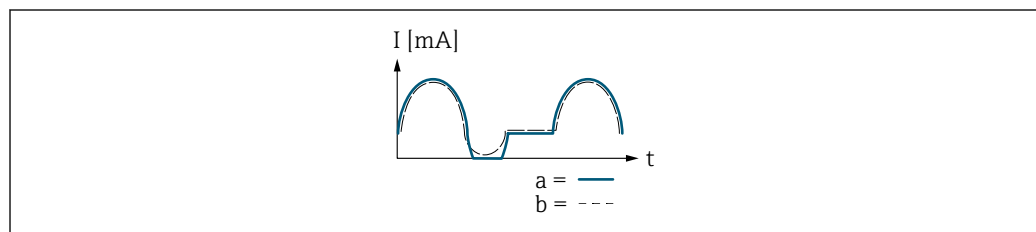


A0028098

- Q Flow
 t Time
 1 Lower range value (Start of measuring range output)
 2 Upper range value (end of measuring range output)

With **Forward flow** option

- a (-): The flow components outside the scaled measuring range cannot be taken into account for signal output.
- b (- -): The current output signal is proportional to the process variable assigned.



A0028100

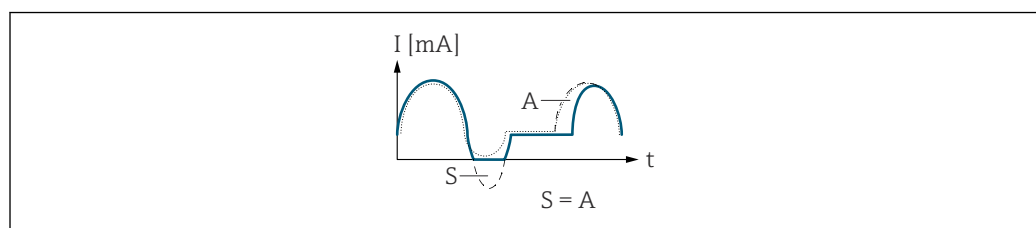
- I Current
 t Time

With **Forward/Reverse flow** option

This option cannot be selected here since the values for the **Lower range value output** parameter (\rightarrow 77) and **Upper range value output** parameter (\rightarrow 78) have different signs.

With **Reverse flow compensation** option

Flow components outside the measuring span 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

Damping current output



Navigation	Expert → Output → Curr.output 1 to n → Damp.curr.outp
Prerequisite	A process variable is selected in the Assign current output parameter (→ 75) and one of the following options is selected in the Current span parameter (→ 75): <ul style="list-style-type: none"> ▪ 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) ▪ 0...20 mA (0...20.5 mA)
Description	Use this function to enter a time constant for the reaction time of the current output signal to fluctuations in the measured value caused by process conditions.
User entry	0.0 to 999.9 s
Factory setting	1.0 s
Additional information	<p><i>User entry</i></p> <p>Use this function to enter a time constant (PT1 element ²⁾) for current output damping:</p> <ul style="list-style-type: none"> ▪ If a low time constant is entered, the current output reacts quickly to fluctuating measured variables. ▪ If a high time constant is entered, the current output reacts more slowly. <p> Damping is switched off if 0 is entered (factory setting).</p>

Failure behavior current output


Navigation	Expert → Output → Curr.output 1 to n → Failure behav.
Prerequisite	A process variable is selected in the Assign current output parameter (→ 75) and one of the following options is selected in the Current span parameter (→ 75): <ul style="list-style-type: none"> ▪ 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) ▪ 0...20 mA (0...20.5 mA)
Description	Use this function to select the value of the current output in the event of a device alarm.
Selection	<ul style="list-style-type: none"> ▪ Min. ▪ Max. ▪ Last valid value ▪ Actual value ▪ Fixed value
Factory setting	Max.



2) proportional transmission behavior with first order delay

Additional information*Description*

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



"Min." option

The current output adopts the value of the lower level for signal on alarm.

 The signal on alarm level is defined via the **Current span** parameter (→  75).

"Max." option

The current output adopts the value of the upper level for signal on alarm.

 The signal on alarm level is defined via the **Current span** parameter (→  75).

"Last valid value" option



The current output adopts the last measured value that was valid before the device alarm occurred.

"Actual value" option


The current output adopts the measured value on the basis of the current flow measurement; the device alarm is ignored.

"Defined value" option


The current output adopts a defined measured value.

 The measured value is defined via the **Failure current** parameter (→  84).

Failure current**Navigation**

 Expert → Output → Curr.output 1 to n → Fail. current

Prerequisite

The **Defined value** option is selected in the **Failure mode** parameter (→  83).

Description

Use this function to enter a fixed value that the current output adopts in the event of a device alarm.


User entry

0 to 22.5 mA

Factory setting

22.5 mA

Output current**Navigation**

 Expert → Output → Curr.output 1 to n → Output curr.

Description

Displays the current value currently calculated for the current output.

User interface

3.59 to 22.5 mA


















Measured current

Navigation	🏠🏠 Expert → Output → Curr.output 1 to n → Measur. curr.
Description	Displays the actual measured value of the output current.
User interface	0 to 30 mA

3.5.2 "Pulse/frequency/switch output 1 to n" submenu

Navigation 🏠🏠 Expert → Output → PFS output 1 to n

▶ Pulse/frequency/switch output 1 to n		
Terminal number		→ 📖 86
Signal mode		→ 📖 87
Operating mode		→ 📖 87
Assign pulse output		→ 📖 88
Pulse scaling		→ 📖 89
Pulse width		→ 📖 89
Measuring mode		→ 📖 90
Failure mode		→ 📖 91
Pulse output		→ 📖 91
Assign frequency output		→ 📖 92
Minimum frequency value		→ 📖 92
Maximum frequency value		→ 📖 93
Measuring value at minimum frequency		→ 📖 93
Measuring value at maximum frequency		→ 📖 93
Measuring mode		→ 📖 94

Damping output	→  94
Response time	→  95
Failure mode	→  95
Failure frequency	→  96
Output frequency	→  96
Switch output function	→  96
Assign diagnostic behavior	→  97
Assign limit	→  98
Switch-on value	→  100
Switch-off value	→  100
Assign flow direction check	→  101
Assign status	→  101
Switch-on delay	→  101
Switch-off delay	→  102
Failure mode	→  102
Switch state	→  102
Invert output signal	→  103

Terminal number

Navigation

  Expert → Output → PFS output 1 to n → Terminal no.

Description

Displays the terminal numbers used by the pulse/frequency/switch output module.

User interface

- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4)

Additional information

"Not used" option

The pulse/frequency/switch output module does not use any terminal numbers.

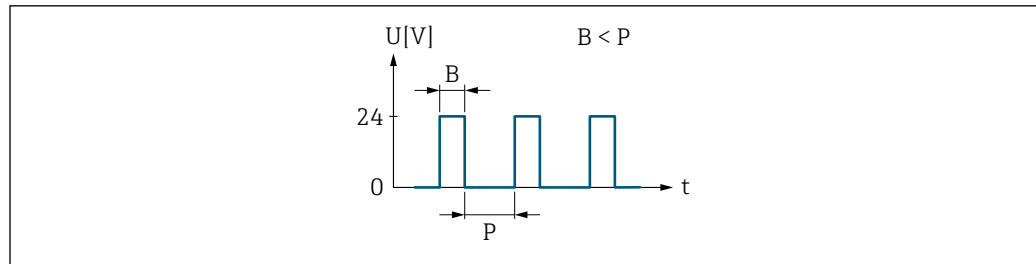
Signal mode


Navigation	Expert → Output → PFS output 1 to n → Signal mode
Description	Use this function to select the signal mode for the pulse/frequency/switch output.
Selection	<ul style="list-style-type: none"> ■ Passive ■ Active * ■ Passive NE
Factory setting	Passive

Operating mode


Navigation	Expert → Output → PFS output 1 to n → Operating mode
Prerequisite	If the Pulse option is selected, the Load rate option must be selected in the Assign pulse output parameter (→ 88).
Description	Use this function to select the operating mode of the output as a pulse, frequency or switch output.
Selection	<ul style="list-style-type: none"> ■ Pulse ■ Frequency ■ Switch
Factory setting	Pulse
Additional information	<p><i>"Pulse" option</i></p> <p>Example</p> <ul style="list-style-type: none"> ■ Flow rate approx. 100 g/s ■ Pulse value 0.1 g ■ Pulse width 0.05 ms ■ Pulse rate 1 000 Impuls/s

* Visibility depends on order options or device settings



A0026883

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

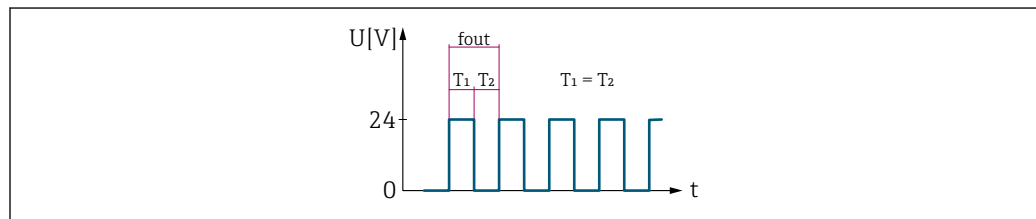
B Pulse width entered

P Pauses between the individual pulses

"Frequency" option

Example

- Flow rate approx. 100 g/s
- Max. frequency 10 kHz
- Flow rate at max. frequency 1000 g/s
- Output frequency approx. 1000 Hz



A0026886

6 Flow-proportional frequency output

Assign pulse output



Navigation

Expert → Output → PFS output 1 to n → Assign pulse

Prerequisite

The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→ 49) or the fieldbus.

Prerequisite

The **Pulse** option is selected in **Operating mode** parameter (→ 87).

Description

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

Selection

- Off
- Load rate *

Factory setting

Off

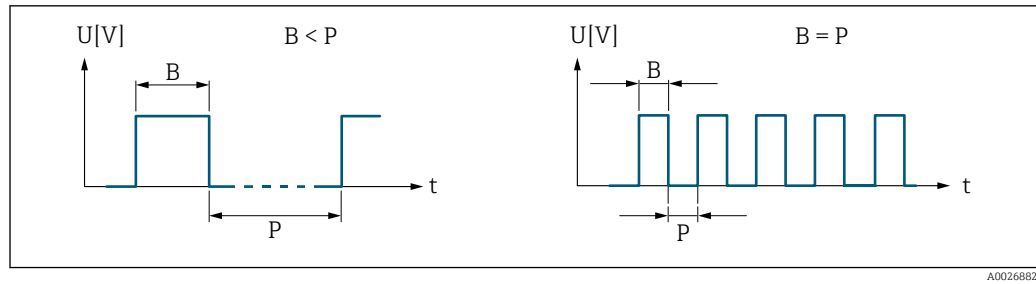
* Visibility depends on order options or device settings

Pulse scaling


Navigation	Expert → Output → PFS output 1 to n → Pulse scaling
Prerequisite	The Pulse option is selected in the Operating mode parameter (→ 87) and a process variable is selected in the Assign pulse output parameter (→ 88).
Description	Use this function to enter the value for the measured value that a pulse is equivalent to.
User entry	Positive floating point number
Factory setting	Depends on country and nominal diameter
Additional information	<p><i>User entry</i></p> <p>Weighting of the pulse output with a quantity.</p> <p>The lower the pulse value, the</p> <ul style="list-style-type: none"> ▪ better the resolution. ▪ the higher the frequency of the pulse response.

Pulse width


Navigation	Expert → Output → PFS output 1 to n → Pulse width
Prerequisite	The Pulse option is selected in the Operating mode parameter (→ 87) and a process variable is selected in the Assign pulse output parameter (→ 88).
Description	Use this function to enter the duration of the output pulse.
User entry	0.05 to 2 000 ms
Factory setting	100 ms
Additional information	<p><i>Description</i></p> <ul style="list-style-type: none"> ▪ Define how long a pulse is (duration). ▪ The maximum pulse rate is defined by $f_{\max} = 1 / (2 \times \text{pulse width})$. ▪ The interval between two pulses lasts at least as long as the set pulse width. ▪ The maximum flow is defined by $Q_{\max} = f_{\max} \times \text{pulse value}$. ▪ If the flow exceeds these limit values, the measuring device displays the 443 Pulse output 1 to n diagnostic message.



B Pulse width entered
P Pauses between the individual pulses

Example

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

Measuring mode



Navigation

Expert → Output → PFS output 1 to n → Measuring mode

Description

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

Selection

- Forward flow
- Forward/Reverse flow
- Reverse flow
- Reverse flow compensation

Factory setting

Forward flow

Additional information






Options




- Forward flow
Positive flow is output, negative flow is not output.
- Forward/Reverse flow
Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
- Reverse flow
Negative flow is output, positive flow is not output.
- Reverse flow compensation
The flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s.

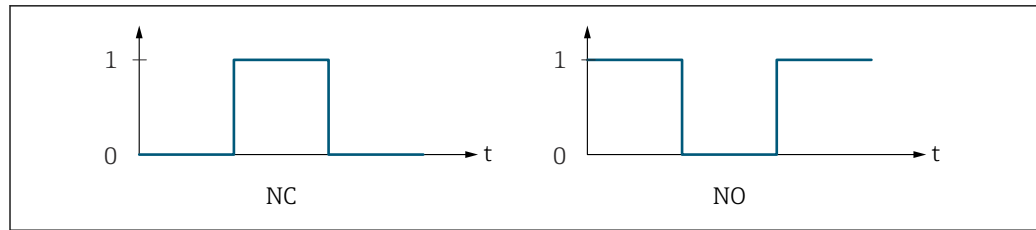
For a detailed description of the options available, see the **Measuring mode** parameter (→ 78)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 78)

Failure mode 	
Navigation	  Expert → Output → PFS output 1 to n → Failure mode
Prerequisite	The Pulse option is selected in the Operating mode parameter (→  87) and a process variable is selected in the Assign pulse output parameter (→  88).
Description	Use this function to select the failure mode of the pulse output in the event of a device alarm.
Selection	<ul style="list-style-type: none"> ▪ Actual value ▪ No pulses
Factory setting	No pulses
Additional information	<p><i>Description</i></p> <p>The dictates of safety render it advisable to ensure that the pulse output shows a predefined behavior in the event of a device alarm.</p> <p><i>Options</i></p> <ul style="list-style-type: none"> ▪ Actual value In the event of a device alarm, the pulse output continues on the basis of the current flow measurement. The fault is ignored. ▪ No pulses In the event of a device alarm, the pulse output is "switched off". <p>NOTICE! A device alarm indicates a serious fault with the measuring device. The measurement quality may possibly be influenced and may no longer be guaranteed. The Actual value option is only recommended if it is ensured that all possible alarm conditions do not influence the measurement quality.</p>

Pulse output	
Navigation	  Expert → Output → PFS output 1 to n → Pulse output
Prerequisite	The Pulse option is selected in the Operating mode parameter (→  87) parameter.
Description	Displays the pulse frequency currently output.
User interface	Positive floating-point number
Additional information	<p><i>Description</i></p> <ul style="list-style-type: none"> ▪ The pulse output is an open collector output. ▪ This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.



A0028726

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

The output behavior can be reversed via the **Invert output signal** parameter (→ 103) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 91)) can be configured.

Assign frequency output

**Navigation**

Expert → Output → PFS output 1 to n → Assign freq.

Prerequisite

- The **Frequency** option is selected in **Operating mode** parameter (→ 87).
- The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→ 49) or the fieldbus.

Description

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

Selection

- Off
- Total solids
- Temperature
- Electronics temperature
- Conductivity
- Corrected conductivity
- Load rate*

Factory setting

Off

Minimum frequency value

**Navigation**

Expert → Output → PFS output 1 to n → Min. freq. value

Prerequisite

The **Frequency** option is selected in the **Operating mode** parameter (→ 87) and a process variable is selected in the **Assign frequency output** parameter (→ 92).

Description

Use this function to enter the minimum frequency.



User entry



0.0 to 10 000.0 Hz

* Visibility depends on order options or device settings

Factory setting 0.0 Hz

Maximum frequency value

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



Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→  87) and a process variable is selected in the **Assign frequency output** parameter (→  92).



Description Use this function to enter the end value frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 10 000.0 Hz

Measuring value at minimum frequency

Navigation   Expert → Output → PFS output 1 to n → Val. at min.freq

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→  87) and a process variable is selected in the **Assign frequency output** parameter (→  92).

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

User entry Signed floating-point number



Factory setting Depends on country and nominal diameter



Additional information *Dependency*



The entry depends on the process variable selected in the **Assign frequency output** parameter (→  92).

Measuring value at maximum frequency



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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→  87) and a process variable is selected in the **Assign frequency output** parameter (→  92).







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

User entry Signed floating-point number



Factory setting Depends on country and nominal diameter


Additional information	<p><i>Description</i></p> <p>Use this function to enter the maximum measured value at the maximum frequency. The selected process variable is output as a proportional frequency.</p> <p><i>Dependency</i></p> <p> The entry depends on the process variable selected in the Assign frequency output parameter (→  92).</p>
-------------------------------	--

Measuring mode




Navigation	  Expert → Output → PFS output 1 to n → Measuring mode
Description	Use this function to select the measuring mode for the frequency output.
Selection	<ul style="list-style-type: none"> ▪ Forward flow ▪ Forward/Reverse flow ▪ Reverse flow compensation
Factory setting	Forward flow
Additional information	<p><i>Options</i></p> <p> For a detailed description of the options available, see the Measuring mode parameter (→  78)</p> <p><i>Examples</i></p> <p> For a detailed description of the configuration examples, see the Measuring mode parameter (→  78)</p>

Damping output




Navigation	  Expert → Output → PFS output 1 to n → Damping out.
Description	Use this function to enter a time constant for the reaction time of the output signal to fluctuations in the measured value.
User entry	0 to 999.9 s
Factory setting	0.0 s

Additional information	<p><i>User entry</i></p> <p>Use this function to enter a time constant (PT1 element³⁾) for frequency output damping:</p> <ul style="list-style-type: none"> ▪ If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables. ▪ On the other hand, the current output reacts more slowly if a high time constant is entered. <p> Damping is switched off if 0 is entered (factory setting).</p> <p>The frequency output is subject to separate damping that is independent of all preceding time constants.</p>
-------------------------------	---


Response time

Navigation	 Expert → Output → PFS output 1 to n → Response time
Prerequisite	The Frequency option is selected in the Operating mode parameter (→  87) and an option is selected in the Assign frequency output parameter (→  92).
Description	Shows how quickly the output reaches 63% of a measured value change.
User interface	Positive floating-point number
Factory setting	0 s






Failure mode

Navigation	 Expert → Output → PFS output 1 to n → Failure mode
Prerequisite	The Frequency option is selected in the Operating mode parameter (→  87) and a process variable is selected in the Assign frequency output parameter (→  92).
Description	Use this function to select the failure mode of the frequency output in the event of a device alarm.
Selection	<ul style="list-style-type: none"> ▪ Actual value ▪ Defined value ▪ 0 Hz
Factory setting	0 Hz




3) proportional transmission behavior with first order delay

Additional information	<p><i>Options</i></p> <ul style="list-style-type: none"> ■ Actual value In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored. ■ Defined value In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure frequency (→  96) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm. ■ 0 Hz In the event of a device alarm, the frequency output is "switched off". <p>NOTICE! A device alarm indicates a serious fault with the measuring device. The measurement quality may possibly be influenced and may no longer be guaranteed. The Actual value option is only recommended if it is ensured that all possible alarm conditions do not influence the measurement quality.</p>
-------------------------------	---




Failure frequency

Navigation	  Expert → Output → PFS output 1 to n → Failure freq.
Prerequisite	In the Operating mode parameter (→  87), the Frequency option is selected, in the Assign frequency output parameter (→  92) a process variable is selected, and in the Failure mode parameter (→  95), the Defined value option is selected.
Description	Enter frequency output value in alarm condition.
User entry	0.0 to 12 500.0 Hz
Factory setting	0.0 Hz

Output frequency





Navigation	  Expert → Output → PFS output 1 to n → Output freq.
Prerequisite	In the Operating mode parameter (→  87), the Frequency option is selected.
Description	Displays the actual value of the output frequency which is currently measured.
User interface	0.0 to 12 500.0 Hz







Switch output function

Navigation	  Expert → Output → PFS output 1 to n → Switch out funct
Prerequisite	The Switch option is selected in the Operating mode parameter (→  87).

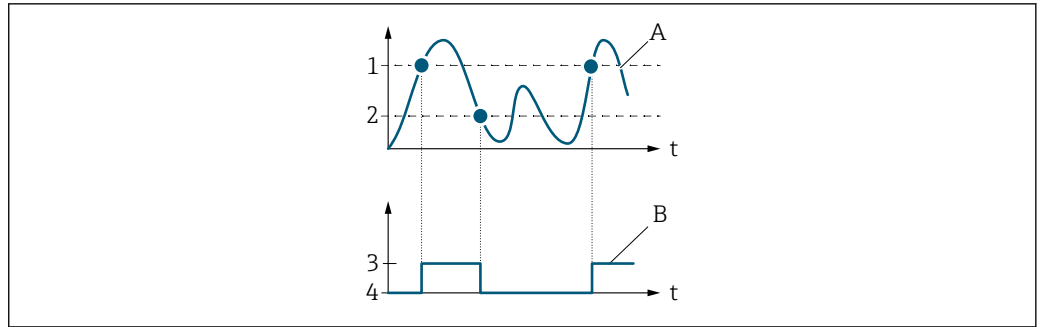
Description	Use this function to select a function for the switch output.
Selection	<ul style="list-style-type: none"> ■ Off ■ On ■ Diagnostic behavior ■ Limit ■ Flow direction check ■ Status
Factory setting	Off
Additional information	<ul style="list-style-type: none"> ■ Off The switch output is permanently switched off (open, non-conductive). ■ On The switch output is permanently switched on (closed, conductive). ■ Diagnostic behavior The switch output is switched on (closed, conductive), if there is a pending diagnostic event of the assigned behavioral category. ■ Limit The switch output is switched on (closed, conductive), if a limit value specified for the process variable is reached. ■ Flow direction check The switch output is switched on (closed, conductive), when the flow direction changes (forward or reverse flow). ■ Status The switch output is switched on (closed/conductive) to display the device status for the selected detection method, e.g. empty pipe detection.

Assign diagnostic behavior

Navigation	  Expert → Output → PFS output 1 to n → Assign diag. beh
Prerequisite	<ul style="list-style-type: none"> ■ In the Operating mode parameter (→  87), the Switch option is selected. ■ In the Switch output function parameter (→  96), the Diagnostic behavior option is selected.
Description	Use this function to select the diagnostic event category that is displayed for the switch output.
Selection	<ul style="list-style-type: none"> ■ Alarm ■ Alarm or warning ■ Warning
Factory setting	Alarm

Additional information	<i>Description</i>
	 If no diagnostic event is pending, the switch output is closed and conductive.
	<i>Selection</i>
	<ul style="list-style-type: none"> ■ Alarm The switch output signals only diagnostic events in the alarm category. ■ Alarm or warning The switch output signals diagnostic events in the alarm and warning category. ■ Warning The switch output signals only diagnostic events in the warning category.
<hr/>	
Assign limit	
Navigation	 Expert → Output → PFS output 1 to n → Assign limit
Prerequisite	<ul style="list-style-type: none"> ■ The Switch option is selected in Operating mode parameter (→  87). ■ The Limit option is selected in Switch output function parameter (→  96). ■ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	Use this function to select a process variable for the limit function.
Selection	<ul style="list-style-type: none"> ■ Off ■ Total solids ■ Temperature ■ Electronics temperature ■ Conductivity ■ Corrected conductivity ■ Load rate * ■ Totalizer 1 *
Factory setting	Temperature
Additional information	<i>Description</i>
	Behavior of status output when Switch-on value > Switch-off value: <ul style="list-style-type: none"> ■ Process variable > Switch-on value: transistor is conductive ■ Process variable < Switch-off value: transistor is non-conductive

* Visibility depends on order options or device settings

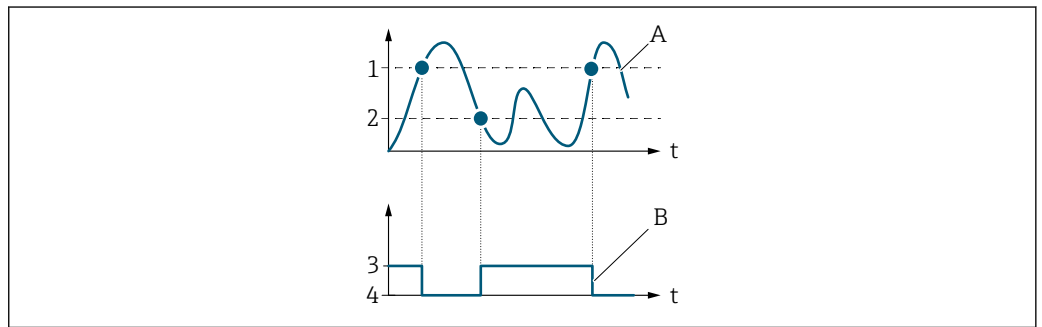


A0026891

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

Behavior of status output when Switch-on value < Switch-off value:

- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive

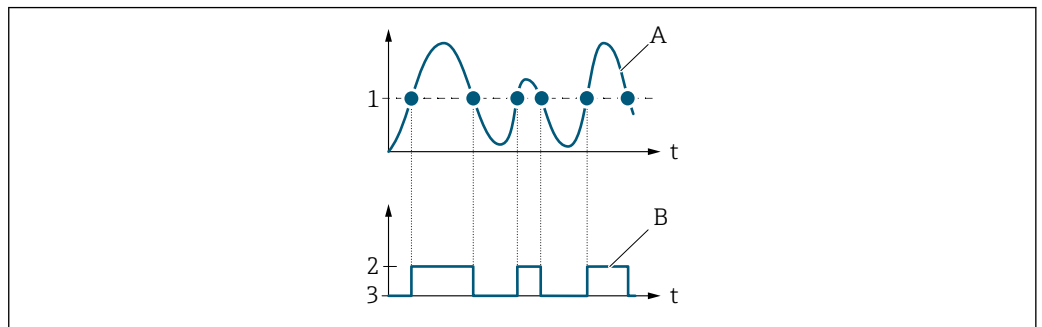


A0026892

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

Behavior of status output when Switch-on value = Switch-off value:







- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive









A0026893

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

Switch-on value 

Navigation	 Expert → Output → PFS output 1 to n → Switch-on value
Prerequisite	<ul style="list-style-type: none">▪ The Switch option is selected in the Operating mode parameter (→  87).▪ The Limit option is selected in the Switch output function parameter (→  96).
Description	Use this function to enter the measured value for the switch-on point.
User entry	Floating point number with sign
Factory setting	0 °C
Additional information	<p><i>Description</i></p> <p>Use this function to enter the limit value for the switch-on value (process variable > switch-on value = closed, conductive).</p> <p> When using a hysteresis: Switch-on value > Switch-off value.</p> <p><i>Dependency</i></p> <p> The unit depends on the process variable selected in the Assign limit parameter (→  98).</p>

Switch-off value 

Navigation	 Expert → Output → PFS output 1 to n → Switch-off value
Prerequisite	<ul style="list-style-type: none">▪ The Switch option is selected in the Operating mode parameter (→  87).▪ The Limit option is selected in the Switch output function parameter (→  96).
Description	Use this function to enter the measured value for the switch-off point.
User entry	Floating point number with sign
Factory setting	0 °C
Additional information	<p><i>Description</i></p> <p>Use this function to enter the limit value for the switch-off value (process variable < switch-off value = open, non-conductive).</p> <p> When using a hysteresis: Switch-on value > Switch-off value.</p> <p><i>Dependency</i></p> <p> The unit depends on the process variable selected in the Assign limit parameter (→  98).</p>

Assign flow direction check


Navigation	Expert → Output → PFS output 1 to n → Assign dir.check
Prerequisite	<ul style="list-style-type: none"> ▪ The Switch option is selected in the Operating mode parameter (→ 87). ▪ The Flow direction check option is selected in the Switch output function parameter (→ 96).
Description	Use this function to select a process variable for monitoring the flow direction.
Selection	
Factory setting	Off

Assign status


Navigation	Expert → Output → PFS output 1 to n → Assign status
Prerequisite	<ul style="list-style-type: none"> ▪ The Switch option is selected in Operating mode parameter (→ 87). ▪ The Status option is selected in Switch output function parameter (→ 96).
Description	Select the device function whose status you want to display.
Selection	<ul style="list-style-type: none"> ▪ Off ▪ Partially filled pipe detection
Factory setting	Partially filled pipe detection
Additional information	<p><i>Options</i></p> <p>When the switch-on point for the selected device function is reached, the output is switched on (closed, conductive). Otherwise, the output is non-conductive.</p>

Switch-on delay


Navigation	Expert → Output → PFS output 1 to n → Switch-on delay
Prerequisite	<ul style="list-style-type: none"> ▪ The Switch option is selected in the Operating mode parameter (→ 87). ▪ The Limit option is selected in the Switch output function parameter (→ 96).
Description	Use this function to enter a delay time for switching on the switch output.
User entry	0.0 to 100.0 s
Factory setting	0.0 s

Switch-off delay



Navigation	Expert → Output → PFS output 1 to n → Switch-off delay
Prerequisite	<ul style="list-style-type: none"> ▪ The Switch option is selected in the Operating mode parameter (→ 87). ▪ The Limit option is selected in the Switch output function parameter (→ 96).
Description	Use this function to enter a delay time for switching off the switch output.
User entry	0.0 to 100.0 s
Factory setting	0.0 s

Failure mode



Navigation	Expert → Output → PFS output 1 to n → Failure mode
Description	Use this function to select a failsafe mode for the switch output in the event of a device alarm.
Selection	<ul style="list-style-type: none"> ▪ Actual status ▪ Open ▪ Closed
Factory setting	Open
Additional information	<p><i>Options</i></p> <ul style="list-style-type: none"> ▪ Actual status In the event of a device alarm, faults are ignored and the current behavior of the input value is output by the switch output. The Actual status option behaves in the same way as the current input value. ▪ Open In the event of a device alarm, the switch output's transistor is set to non-conductive. ▪ Closed In the event of a device alarm, the switch output's transistor is set to conductive.

Switch state

Navigation	Expert → Output → PFS output 1 to n → Switch state
Prerequisite	The Switch option is selected in the Operating mode parameter (→ 87).
Description	Displays the current switch status of the status output.
User interface	<ul style="list-style-type: none"> ▪ Open ▪ Closed

Additional information *User interface*

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

Invert output signal



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

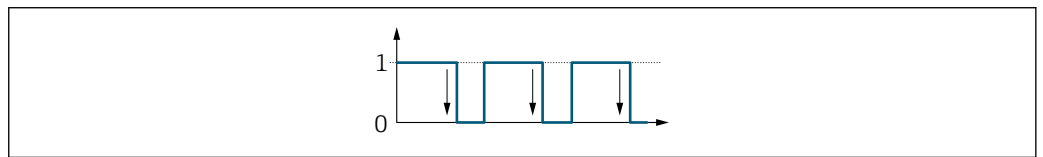
Description Use this function to select whether to invert the output signal.

Selection

- No
- Yes

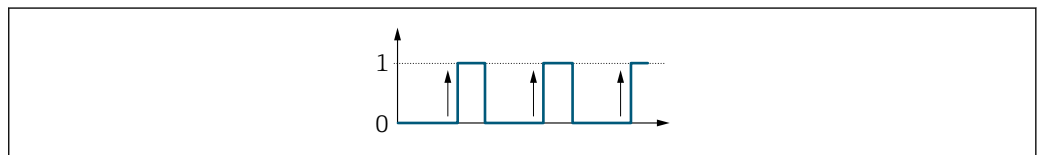
Factory setting No

Additional information *Selection*
No option (passive - negative)



A0026693

Yes option (passive - positive)













A0026692

3.5.3 "Relay output 1 to n" submenu



Navigation Expert → Output → Relay output 1 to n

▶ **Relay output 1 to n**



Terminal number	→ 104
Relay output function	→ 104
Assign flow direction check	→ 105

Assign limit	→  105
Assign diagnostic behavior	→  106
Assign status	→  106
Switch-off value	→  107
Switch-off delay	→  107
Switch-on value	→  107
Switch-on delay	→  108
Failure mode	→  108
Switch state	→  109
Powerless relay status	→  109

Terminal number




Navigation	  Expert → Output → Relay output 1 to n → Terminal no.
Description	Displays the terminal numbers used by the relay output module.
User interface	<ul style="list-style-type: none"> ■ Not used ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)
Additional information	<p><i>"Not used" option</i></p> <p>The relay output module does not use any terminal numbers.</p>

Relay output function





Navigation	  Expert → Output → Relay output 1 to n → Relay outp.func.
Description	Use this function to select an output function for the relay output.
Selection	<ul style="list-style-type: none"> ■ Closed ■ Open ■ Diagnostic behavior ■ Limit ■ Flow direction check ■ Status

Factory setting	Closed
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ Closed The relay output is permanently switched on (closed, conductive). ■ Open The relay output is permanently switched off (open, non-conductive). ■ Diagnostic behavior Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level. ■ Limit Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level. ■ Flow direction check Indicates the flow direction (forward or reverse flow). ■ Digital Output Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.

Assign flow direction check

Navigation	  Expert → Output → Relay output 1 to n → Assign dir.check
Prerequisite	The Flow direction check option is selected in the Relay output function parameter (→  104).
Description	Use this function to select a process variable for monitoring the flow direction.
Selection	
Factory setting	Off



Assign limit


Navigation	  Expert → Output → Relay output 1 to n → Assign limit
Prerequisite	<ul style="list-style-type: none"> ■ The Limit option is selected in Relay output function parameter (→  104). ■ The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	Use this function to select a process variable for the limit value function.
Selection	<ul style="list-style-type: none"> ■ Off ■ Total solids ■ Temperature ■ Electronics temperature ■ Conductivity

- Corrected conductivity
- Load rate *
- Totalizer 1 *

Factory setting Temperature

Assign diagnostic behavior

Navigation   Expert → Output → Relay output 1 to n → Assign diag. beh

Prerequisite In the **Relay output function** parameter (→  104), the **Diagnostic behavior** option is selected.


Description Use this function to select the category of the diagnostic events that are displayed for the relay output.

Selection

- Alarm
- Alarm or warning
- Warning

Factory setting Alarm



Additional information *Description*


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

Selection

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

Assign status

Navigation   Expert → Output → Relay output 1 to n → Assign status

Prerequisite In the **Relay output function** parameter (→  104), the **Digital Output** option is selected.

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

Selection

- Off
- Partially filled pipe detection

Factory setting Off

* Visibility depends on order options or device settings

Switch-off value


Navigation	Expert → Output → Relay output 1 to n → Switch-off value
Prerequisite	The Limit option is selected in the Relay output function parameter (→ 104).
Description	Use this function to enter the measured value for the switch-off point.
User entry	Floating point number with sign
Factory setting	0 °C
Additional information	<p><i>Description</i></p> <p>Use this function to enter the limit value for the switch-off value (process variable < switch-off value = open, non-conductive).</p> <p> When using a hysteresis: Switch-on value > Switch-off value.</p> <p><i>Dependency</i></p> <p> The unit is dependent on the process variable selected in the Assign limit parameter (→ 105).</p>

Switch-off delay


Navigation	Expert → Output → Relay output 1 to n → Switch-off delay
Prerequisite	In the Relay output function parameter (→ 104), the Limit option is selected.
Description	Use this function to enter a delay time for switching off the switch output.
User entry	0.0 to 100.0 s
Factory setting	0.0 s

Switch-on value




Navigation	Expert → Output → Relay output 1 to n → Switch-on value
Prerequisite	The Limit option is selected in the Relay output function parameter (→ 104).
Description	Use this function to enter the measured value for the switch-on point.
User entry	Floating point number with sign
Factory setting	0 °C

Additional information*Description*


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

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


Dependency

 The unit is dependent on the process variable selected in the **Assign limit** parameter (→  105).

Switch-on delay**Navigation**

 Expert → Output → Relay output 1 to n → Switch-on delay

Prerequisite

In the **Relay output function** parameter (→  104), the **Limit** option is selected.

Description

Use this function to enter a delay time for switching on the switch output.

User entry

0.0 to 100.0 s

Factory setting

0.0 s

Failure mode**Navigation**

 Expert → Output → Relay output 1 to n → Failure mode

Description

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

Selection

- Actual status
- Open
- Closed


Factory setting

Open

Additional information*Selection*


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

Switch state

Navigation	 Expert → Output → Relay output 1 to n → Switch state
Description	Displays the current status of the relay output.
User interface	<ul style="list-style-type: none"> ▪ Open ▪ Closed
Additional information	<i>User interface</i> <ul style="list-style-type: none"> ▪ Open The relay output is not conductive. ▪ Closed The relay output is conductive.





Powerless relay status




Navigation	 Expert → Output → Relay output 1 to n → Powerless relay
Description	Use this function to select the quiescent state for the relay output.
Selection	<ul style="list-style-type: none"> ▪ Open ▪ Closed
Factory setting	Open
Additional information	<i>Selection</i> <ul style="list-style-type: none"> ▪ Open The relay output is not conductive. ▪ Closed The relay output is conductive.



3.6 "Communication" submenu

Navigation  Expert → Communication


▶ Communication	
▶ HART input	→  110
▶ HART output	→  115
▶ Diagnostic configuration	→  131
▶ Web server	→  135










3.6.1 "HART input" submenu

Navigation  Expert → Communication → HART input

▶ HART input	
▶ Configuration	→  110
▶ Input	→  114

"Configuration" submenu

Navigation  Expert → Communication → HART input → Configuration

▶ Configuration	
Capture mode	→  110
Device ID	→  111
Device type	→  111
Manufacturer ID	→  112
Burst command	→  112
Slot number	→  113
Timeout	→  113
Failure mode	→  113
Failure value	→  114

Capture mode

Navigation

 Expert → Communication → HART input → Configuration → Capture mode

Description











Use this function to select the capture mode via burst or master communication.

Selection




- Off
- Burst network
- Master network

Factory setting



Off


Additional information	<p><i>"Burst network" option</i></p> <p>The device records data transmitted via burst in the network.</p> <p><i>"Master network" option</i></p> <p>In this case, the device must be located in a HART network in which a HART master (control) queries the measured values of the up to 64 network participants. The device reacts only to the responses of a specific device in the network. Device ID, device type, manufacturer ID and the HART commands used by the master must be defined.</p>
<hr/>	
Device ID	
Navigation	  Expert → Communication → HART input → Configuration → Device ID
Prerequisite	The Master network option is selected in the Capture mode parameter (→  110).
Description	Use this function to enter the device ID of the HART slave device whose data are to be recorded.
User entry	<p>6-digit value:</p> <ul style="list-style-type: none"> ■ Via local operation: enter as hexadecimal or decimal number ■ Via operating tool: enter as decimal number
Factory setting	0
Additional information	 In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.
<hr/>	
Device type	
Navigation	  Expert → Communication → HART input → Configuration → Device type
Prerequisite	In the Capture mode parameter (→  110), the Master network option is selected.
Description	Use this function to enter the device type of the HART slave device whose data are to be recorded.
User entry	2-digit hexadecimal number
Factory setting	0x00
Additional information	 In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.




Manufacturer ID 

Navigation	 Expert → Communication → HART input → Configuration → Manufacturer ID
Prerequisite	The Master network option is selected in the Capture mode parameter (→  110).
Description	Use this function to enter the manufacturer ID of the HART slave device whose data are to be recorded.
User entry	2-digit value: <ul style="list-style-type: none"> ▪ Via local operation: enter as hexadecimal or decimal number ▪ Via operating tool: enter as decimal number
Factory setting	0
Additional information	 In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.


Burst command 





Navigation	 Expert → Communication → HART input → Configuration → Burst command
Prerequisite	The Burst network option or the Master network option are selected in the Capture mode parameter (→  110).
Description	Use this function to select the burst command to be recorded.
Selection	<ul style="list-style-type: none"> ▪ Command 1 ▪ Command 3 ▪ Command 9 ▪ Command 33
Factory setting	Command 1
Additional information	<i>Selection</i> <ul style="list-style-type: none"> ▪ Command 1 Use this function to capture the primary variable. ▪ Command 3 Use this function to capture the dynamic HART variables and the current. ▪ Command 9 Use this function to capture the dynamic HART variables including the associated status. ▪ Command 33 Use this function to capture the dynamic HART variables including the associated unit.

Slot number 




Navigation	  Expert → Communication → HART input → Configuration → Slot number
Prerequisite	The Burst network option or the Master network option is selected in the Capture mode parameter (→  110).
Description	Use this function to enter the position of the process variable to be recorded in the burst command.
User entry	1 to 8
Factory setting	1
Additional information	<i>User entry</i>


Slot	Command			
	1	3	9	33
1	PV	PV	HART variable (slot 1)	HART variable (slot 1)
2	–	SV	HART variable (slot 2)	HART variable (slot 2)
3	–	TV	HART variable (slot 3)	HART variable (slot 3)
4	–	QV	HART variable (slot 4)	HART variable (slot 4)

Timeout 





Navigation	  Expert → Communication → HART input → Configuration → Timeout
Prerequisite	The Burst network option or the Master network option is selected in the Capture mode parameter (→  110).
Description	Use this function to enter the maximum permitted interval between two HART frames.
User entry	1 to 120 s
Factory setting	5 s
Additional information	<i>Description</i>  If the interval is exceeded, the measuring device displays the F882 Input signal diagnostic message.

Failure mode 

Navigation	  Expert → Communication → HART input → Configuration → Failure mode
Prerequisite	In the Capture mode parameter (→  110), the Burst network option or Master network option is selected.

Description	Use this function to select the device behavior if no data are recorded within the maximum permitted interval.
Selection	<ul style="list-style-type: none"> ▪ Alarm ▪ Last valid value ▪ Defined value
Factory setting	Alarm
Additional information	<p><i>Options</i></p> <ul style="list-style-type: none"> ▪ Alarm An error message is set. ▪ Last valid value The last valid measured value is used. ▪ Defined value A user-defined measured value is used: (Failure value parameter (→  114)).



Failure value

Navigation	  Expert → Communication → HART input → Configuration → Failure value
Prerequisite	<p>The following conditions are met:</p> <ul style="list-style-type: none"> ▪ In the Capture mode parameter (→  110), the Burst network option or Master network option is selected. ▪ In the Failure mode parameter (→  113), the Defined value option is selected.
Description	Use this function to enter the measured value to be used if no data are recorded within the maximum permitted interval.
User entry	Signed floating-point number
Factory setting	0



"Input" submenu

Navigation   Expert → Communication → HART input → Input



▶ Input

Value	→  115
Status	→  115



Value





Navigation	  Expert → Communication → HART input → Input → Value
Description	Displays the value of the device variable recorded by the HART input.
User interface	Signed floating-point number

Status



Navigation	  Expert → Communication → HART input → Input → Status
Description	Displays the value of the device variable recorded by the HART input in accordance with the HART specification.
User interface	<ul style="list-style-type: none"> ■ Manual/Fixed ■ Good ■ Poor accuracy ■ Bad



3.6.2 "HART output" submenu




Navigation   Expert → Communication → HART output



▶ HART output	
▶ Configuration	→  115
▶ Burst configuration	→  117
▶ Information	→  124
▶ Output	→  127

"Configuration" submenu

Navigation   Expert → Communication → HART output → Configuration

▶ Configuration	
HART short tag	→  116
Device tag	→  116

HART address	→  116
No. of preambles	→  117
Fieldbus writing access	→  117

HART short tag
**Navigation**
  Expert → Communication → HART output → Configuration → HART short tag
Description

Use this function to enter a brief description for the measuring point. This can be edited and displayed via HART protocol or using the local display.

User entry

Max. 8 characters: A to Z, 0 to 9 and certain special characters (e.g. punctuation marks, @, %).

Factory setting

TEQWAVEM

Device tag
**Navigation**
  Expert → Communication → HART output → Configuration → Device tag
Description

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

User entry

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

Factory setting

Teqwave M

HART address
**Navigation**
  Expert → Communication → HART output → Configuration → HART address
Description

Use this function to enter the address via which the data exchange takes place via HART protocol.

User entry


0 to 63

Factory setting

0

Additional information

Description

For addressing in a HART Multidrop network, the **Fixed current** option must be set in the **Current span** parameter (→  75) (current output 1).

No. of preambles



Navigation	Expert → Communication → HART output → Configuration → No. of preambles
Description	Use this function to enter the number of preambles in the HART protocol.
User entry	2 to 20
Factory setting	5
Additional information	<i>User entry</i> As every modem component can "swallow" a byte, 2-byte preambles at least must be defined.

Fieldbus writing access









Navigation	Expert → Communication → HART output → Configuration → Fieldb.writ.acc.
Description	Use this function to restrict access to the measuring device via fieldbus (HART interface).
Selection	<ul style="list-style-type: none"> ■ Read + write ■ Read only
Factory setting	Read + write
Additional information	<i>Description</i> If read and/or write protection is enabled, the parameter can only be controlled and reset via local operation. Access is no longer possible via operating tools. <i>Selection</i> <ul style="list-style-type: none"> ■ Read + write The parameters are readable and writable. ■ Read only The parameters are only readable.

"Burst configuration 1 to n" submenu

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n



▶ **Burst configuration 1 to n**

Burst mode 1 to n	→ 118
Burst command 1 to n	→ 119

Burst variable 0	→  119
Burst variable 1	→  120
Burst variable 2	→  120
Burst variable 3	→  121
Burst variable 4	→  121
Burst variable 5	→  121
Burst variable 6	→  121
Burst variable 7	→  122
Burst trigger mode	→  122
Burst trigger level	→  123
Min. update period	→  123
Max. update period	→  123

Burst mode 1 to n

Navigation

  Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst mode 1 to n

Description

Use this function to select whether to activate the HART burst mode for burst message X.

Selection

- Off
- On







Factory setting




Off

Additional information

Options

- Off
The measuring device transmits data only when requested by the HART master.
- On
The measuring device transmits data regularly without being requested.

Burst command 1 to n 	
Navigation	  Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst command 1 to n
Description	Use this function to select the HART command that is sent to the HART master.
Selection	<ul style="list-style-type: none"> ■ Command 1 ■ Command 2 ■ Command 3 ■ Command 9 ■ Command 33 ■ Command 48
Factory setting	Command 2
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ Command 1 Read out the primary variable. ■ Command 2 Read out the current and the main measured value as a percentage. ■ Command 3 Read out the dynamic HART variables and the current. ■ Command 9 Read out the dynamic HART variables including the related status. ■ Command 33 Read out the dynamic HART variables including the related unit. ■ Command 48 Read out the complete device diagnostics. <p><i>"Command 33" option</i></p> <p>The HART device variables are defined via Command 107.</p> <p><i>Commands</i></p> <ul style="list-style-type: none">  ■ Information about the defined details of the command: HART specifications ■ The measured variables (HART device variables) are assigned to the dynamic variables in the Output submenu (→  73).
Burst variable 0 	

Navigation	  Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 0
Prerequisite	The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	For HART command 9 and 33: select the HART device variable or the process variable.
Selection	<ul style="list-style-type: none"> ■ Conductivity ■ Corrected conductivity ■ Temperature ■ Electronics temperature

- Total solids
- Load rate^{*}
- Totalizer 1
- Percent of range
- Measured current
- Current input 1^{*}
- Current input 2^{*}
- Current input 3^{*}
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)
- HART input
- Not used

Factory setting

Total solids

Additional information*Options*If a burst message is not configured, the **Not used** option is set.**Burst variable 1****Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n
→ Burst variable 1

Description

For HART command 9 and 33: select the HART device variable or the process variable.

SelectionSee the **Burst variable 0** parameter (→ 119).**Factory setting**

Not used

Burst variable 2**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n
→ Burst variable 2

Description

For HART command 9 and 33: select the HART device variable or the process variable.

SelectionSee the **Burst variable 0** parameter (→ 119).**Factory setting**

Not used

* Visibility depends on order options or device settings

Burst variable 3



Navigation	Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 3
Description	For HART command 9 and 33: select the HART device variable or the process variable.
Selection	See the Burst variable 0 parameter (→ 119).
Factory setting	Not used

Burst variable 4



Navigation	Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 4
Description	For HART command 9: select the HART device variable or the process variable.
Selection	See the Burst variable 0 parameter (→ 119).
Factory setting	Not used

Burst variable 5



Navigation	Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 5
Description	For HART command 9: select the HART device variable or the process variable.
Selection	See the Burst variable 0 parameter (→ 119).
Factory setting	Not used

Burst variable 6



Navigation	Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 6
Description	For HART command 9: select the HART device variable or the process variable.
Selection	See the Burst variable 0 parameter (→ 119).
Factory setting	Not used

Burst variable 7











Navigation	Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 7
Description	For HART command 9: select the HART device variable or the process variable.
Selection	See the Burst variable 0 parameter (→ 119).
Factory setting	Not used

Burst trigger mode














Navigation	Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Trigger mode
Description	Use this function to select the event that triggers burst message X.
Selection	<ul style="list-style-type: none"> ■ Continuous ■ Window * ■ Rising * ■ Falling * ■ On change
Factory setting	Continuous
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ Continuous The message is sent continuously, at least at intervals corresponding to the time frame specified in the Burst min period parameter (→ 123). ■ Window The message is sent if the specified measured value has changed by the value in the Burst trigger level parameter (→ 123). ■ Rising The message is sent if the specified measured value exceeds the value in the Burst trigger level parameter (→ 123). ■ Falling The message is sent if the specified measured value drops below the value in the Burst trigger level parameter (→ 123). ■ On change The message is sent if a measured value changes in the burst message.

* Visibility depends on order options or device settings



Burst trigger level		
Navigation	  Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Trigger level	
Description	For entering the burst trigger value.	
User entry	Signed floating-point number	
Additional information	<p><i>Description</i></p> <p>Together with the option selected in the Burst trigger mode parameter (→  122) the burst trigger value determines the time of burst message X.</p>	
Min. update period		
Navigation	  Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Min. upd. per.	
Description	Use this function to enter the minimum time span between two burst commands of burst message X.	
User entry	Positive integer	
Factory setting	1 000 ms	
Max. update period		
Navigation	  Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Max. upd. per.	
Description	Use this function to enter the maximum time span between two burst commands of burst message X.	
User entry	Positive integer	
Factory setting	2 000 ms	

"Information" submenu



Navigation  Expert → Communication → HART output → Information

▶ Information	
Device revision	→  124
Device ID	→  125
Device type	→  125
Manufacturer ID	→  125
HART revision	→  125
HART descriptor	→  126
HART message	→  126
Hardware revision	→  126
Software revision	→  126
HART date code	→  127



Device revision

Navigation	 Expert → Communication → HART output → Information → Device revision
Description	Displays the device revision with which the device is registered with the HART Communication Foundation.
User interface	2-digit hexadecimal number
Factory setting	1
Additional information	<p><i>Description</i></p> <p> The device revision is needed to assign the appropriate device description file (DD) to the device.</p>


Device ID

Navigation	 Expert → Communication → HART output → Information → Device ID
Description	Use this function to view the device ID for identifying the measuring device in a HART network.
User interface	6-digit hexadecimal number
Additional information	<p><i>Description</i></p> <p> In addition to the device type and manufacturer ID, the device ID is part of the unique ID. Each HART device is uniquely identified by the unique device ID.</p>


Device type

Navigation	 Expert → Communication → HART output → Information → Device type
Description	Displays the device type used to register the measuring device with the HART Communication Foundation
User interface	Hexadecimal number
Factory setting	11B3
Additional information	<p><i>Description</i></p> <p> The device type is specified by the manufacturer. It is needed to assign the appropriate device description file (DD) to the device.</p>

Manufacturer ID

Navigation	 Expert → Communication → HART output → Information → Manufacturer ID
Description	Use this function to view the manufacturer ID with which the measuring device is registered with the HART Communication Foundation.
User interface	2-digit hexadecimal number
Factory setting	0x11 (for Endress+Hauser)


HART revision

Navigation	 Expert → Communication → HART output → Information → HART revision
Description	Use this function to display the HART protocol revision of the measuring device.

User interface 5 to 7

Factory setting 7

HART descriptor



Navigation   Expert → Communication → HART output → Information → HART descriptor

Description Use this function to enter a description for the measuring point. This can be edited and displayed via HART protocol or using the local display.

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

Factory setting TEQWAVE M300 500

HART message



Navigation   Expert → Communication → HART output → Information → HART message

Description Use this function to enter a HART message which is sent via the HART protocol when requested by the master.

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

Factory setting TEQWAVE M300 500

Hardware revision



Navigation   Expert → Communication → HART output → Information → Hardware rev.

Description Displays the hardware revision of the measuring device.

User interface 0 to 255

Factory setting 1

Software revision

Navigation   Expert → Communication → HART output → Information → Software rev.

Description Displays the software revision of the measuring device.

User interface 0 to 255

Factory setting 1

HART date code



Navigation Expert → Communication → HART output → Information → HART date code

Description Use this function to enter the date information for individual use.

User entry Date entry format: yyyy-mm-dd

Factory setting 2009-07-20

Additional information *Example*
Device installation date

"Output" submenu

Navigation Expert → Communication → HART output → Output

► Output	
Assign PV	→ 128
Primary variable (PV)	→ 128
Assign SV	→ 128
Secondary variable (SV)	→ 129
Assign TV	→ 129
Tertiary variable (TV)	→ 130
Assign QV	→ 130
Quaternary variable (QV)	→ 131

Assign PV



Navigation	Expert → Communication → HART output → Output → Assign PV
Prerequisite	The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→ 49) or the fieldbus.
Description	Use this function to select a measured variable (HART device variable) for the primary dynamic variable (PV).
Selection	<ul style="list-style-type: none"> ▪ Off ▪ Total solids ▪ Temperature ▪ Electronics temperature ▪ Conductivity ▪ Corrected conductivity ▪ Load rate*
Factory setting	Total solids

Primary variable (PV)

Navigation	Expert → Communication → HART output → Output → Primary var (PV)
Description	Displays the current measured value of the primary dynamic variable (PV).
User interface	Floating point number with sign
Additional information	<p><i>Display</i></p> <p>The measured value displayed depends on the process variable selected in the Assign PV parameter (→ 128).</p> <p><i>Dependency</i></p> <p> The unit of the displayed measured value is taken from the System units submenu (→ 54).</p>

Assign SV




Navigation	Expert → Communication → HART output → Output → Assign SV
Prerequisite	The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→ 49) or the fieldbus.
Description	Use this function to select a measured variable (HART device variable) for the secondary dynamic variable (SV).

* Visibility depends on order options or device settings

- Selection**
- Conductivity
 - Corrected conductivity
 - Temperature
 - Electronics temperature
 - Total solids
 - Load rate *
 - Volume flow *
 - Totalizer 1 *
 - Current input 1 *
 - Current input 2 *
 - Current input 3 *
 - HART input

Factory setting Temperature

Secondary variable (SV)



Navigation  Expert → Communication → HART output → Output → Second.var(SV)

Description Displays the current measured value of the secondary dynamic variable (SV).

User interface Floating point number with sign


Additional information *Display*
 The measured value displayed depends on the process variable selected in the **Assign SV** parameter (→  128).


Dependency

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Assign TV



Navigation  Expert → Communication → HART output → Output → Assign TV

Prerequisite The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.

Description Use this function to select a measured variable (HART device variable) for the tertiary (third) dynamic variable (TV).


- Selection**
- Conductivity
 - Corrected conductivity
 - Temperature
 - Electronics temperature
 - Total solids
 - Load rate *

* Visibility depends on order options or device settings

- Volume flow *
- Totalizer 1 *
- Current input 1 *
- Current input 2 *
- Current input 3 *
- HART input

Factory setting Electronics temperature

Tertiary variable (TV)



Navigation  Expert → Communication → HART output → Output → Tertiary var(TV)

Description Displays the current measured value of the tertiary dynamic variable (TV).

User interface Floating point number with sign


Additional information *Display*
The measured value displayed depends on the process variable selected in the **Assign TV** parameter (→  129).

Dependency

 The unit of the displayed measured value is taken from the **System units** submenu (→  54).

Assign QV

Navigation  Expert → Communication → HART output → Output → Assign QV

Prerequisite The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.

Description Use this function to select a measured variable (HART device variable) for the quaternary (fourth) dynamic variable (QV).

Selection ■ Conductivity
 ■ Corrected conductivity
 ■ Temperature
 ■ Electronics temperature
 ■ Total solids
 ■ Load rate *
 ■ Volume flow *
 ■ Totalizer 1 *
 ■ Current input 1 *
 ■ Current input 2 *
 ■ Current input 3 *
 ■ HART input

* Visibility depends on order options or device settings

Factory setting Conductivity

Quaternary variable (QV)

Navigation Expert → Communication → HART output → Output → Quaterna.var(QV)

Description Displays the current measured value of the quaternary dynamic variable (QV).

User interface Floating point number with sign

Additional information *Display*
 The measured value displayed depends on the process variable selected in the **Assign QV** parameter (→ 130).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

3.6.3 "Diagnostic configuration" submenu

For a list of all the diagnostic events, see the Operating Instructions for the device → 7

Assign a category to the particular diagnostic event:

Category	Meaning
Failure (F)	A device error has occurred. The measured value is no longer valid.
Function check (C)	The device is in the service mode (e.g. during a simulation).
Out of specification (S)	The device is being operated: <ul style="list-style-type: none"> ▪ Outside its technical specification limits (e.g. outside the process temperature range) ▪ Outside of the configuration carried out by the user (e.g. maximum flow in parameter 20 mA value)
Maintenance required (M)	Maintenance is required. The measured value remains valid.
No effect (N)	Has no effect on the condensed status ¹⁾ .

1) Condensed status according to NAMUR recommendation NE 107

Navigation Expert → Communication → Diag. config.







▶ **Diagnostic configuration**

Event category 441

→ 132




Event category 442

→ 132

Event category 443	→  133
Event category 444	→  133
Event category 832	→  134
Event category 833	→  134
Event category 834	→  134
Event category 835	→  135


Event category 441 (Current output 1 to n)



Navigation	 Expert → Communication → Diag. config. → Event category 441
Description	Use this function to select a category for the 441 Current output 1 to n diagnostic message.
Selection	<ul style="list-style-type: none"> ■ Failure (F) ■ Function check (C) ■ Out of specification (S) ■ Maintenance required (M) ■ No effect (N)
Factory setting	Out of specification (S)
Additional information	 For a detailed description of the event categories available for selection: →  131

Event category 442 (Frequency output 1 to n)




Navigation	 Expert → Communication → Diag. config. → Event category 442
Prerequisite	The pulse/frequency/switch output is available.
Description	Use this function to select a category for the 442 Frequency output 1 to n diagnostic message.
Selection	<ul style="list-style-type: none"> ■ Failure (F) ■ Function check (C) ■ Out of specification (S) ■ Maintenance required (M) ■ No effect (N)
Factory setting	Out of specification (S)

Additional information  For a detailed description of the event categories available for selection: →  131

Event category 443 (Pulse output 1 to n)



Navigation  Expert → Communication → Diag. config. → Event category 443

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select a category for the **443 Pulse output 1 to n** diagnostic message.

Selection

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information  For a detailed description of the event categories available for selection: →  131

Event category 444 (Current input 1 to n)



Navigation  Expert → Communication → Diag. config. → Event category 444

Prerequisite The current input is available.


Description Use this function to select a category for the **444 Current input 1 to n** diagnostic message.

Selection

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information *Selection*

 For a detailed description of the event categories available for selection: →  131

Event category 832 (Electronics temperature too high)



Navigation	Expert → Communication → Diag. config. → Event category 832
Description	Use this function to select a category for the 832 Electronics temperature too high diagnostic message.
Selection	<ul style="list-style-type: none">■ Failure (F)■ Function check (C)■ Out of specification (S)■ Maintenance required (M)■ No effect (N)
Factory setting	Out of specification (S)
Additional information	<i>Selection</i> For a detailed description of the event categories available for selection: → 131

Event category 833 (Electronics temperature too low)





Navigation	Expert → Communication → Diag. config. → Event category 833
Description	Use this option to select a category for the 833 Electronics temperature too low diagnostic message.
Selection	<ul style="list-style-type: none">■ Failure (F)■ Function check (C)■ Out of specification (S)■ Maintenance required (M)■ No effect (N)
Factory setting	Out of specification (S)
Additional information	<i>Selection</i> For a detailed description of the event categories available for selection: → 131

Event category 834 (Process temperature too high)






Navigation	Expert → Communication → Diag. config. → Event category 834
Description	Use this option to select a category for the 834 Process temperature too high diagnostic message.


Selection	<ul style="list-style-type: none"> ■ Failure (F) ■ Function check (C) ■ Out of specification (S) ■ Maintenance required (M) ■ No effect (N)
Factory setting	Out of specification (S)
Additional information	<i>Selection</i>  For a detailed description of the event categories available for selection: →  131






Event category 835 (Process temperature too low)



Navigation	 Expert → Communication → Diag. config. → Event category 835
Description	Use this option to select a category for the 835 Process temperature too low diagnostic message.
Selection	<ul style="list-style-type: none"> ■ Failure (F) ■ Function check (C) ■ Out of specification (S) ■ Maintenance required (M) ■ No effect (N)
Factory setting	Out of specification (S)
Additional information	<i>Selection</i>  For a detailed description of the event categories available for selection: →  131

3.6.4 "Web server" submenu

Navigation  Expert → Communication → Web server



▶ Web server	
Web server language	→  136
MAC address	→  136
DHCP client	→  137
IP address	→  137
Subnet mask	→  137

Default gateway	→ ⓘ 138
Web server functionality	→ ⓘ 138
Login page	→ ⓘ 138












Web server language



Navigation	  Expert → Communication → Web server → Webserv.language
Description	Use this function to select the language configured for the Web server.
Selection	<ul style="list-style-type: none"> ■ English ■ Deutsch ■ Français ■ Español ■ Italiano ■ Nederlands ■ Portuguesa ■ Polski ■ русский язык (Russian) ■ Svenska ■ Türkçe ■ 中文 (Chinese) ■ 日本語 (Japanese) ■ 한국어 (Korean) ■ čeština (Czech)
Factory setting	English



MAC address


Navigation	  Expert → Communication → Web server → MAC Address
Description	Displays the MAC ⁴⁾ address of the measuring device.
User interface	Unique 12-digit character string comprising letters and numbers
Factory setting	Each measuring device is given an individual address.
Additional information	<p><i>Example</i></p> <p>For the display format 00:07:05:10:01:5F</p>




4) Media Access Control


DHCP client	
Navigation	  Expert → Communication → Web server → DHCP client
Description	Use this function to activate and deactivate the DHCP client functionality.
Selection	<ul style="list-style-type: none"> ▪ Off ▪ On
Factory setting	On
Additional information	<p><i>Effect</i></p> <p>If the DHCP client functionality of the web server is selected, the IP address (→  137), Subnet mask (→  137) and Default gateway (→  138) are set automatically.</p> <ul style="list-style-type: none"> ▪  Identification is via the MAC address of the measuring device. ▪ The IP address (→  137) in the IP address parameter (→  137) is ignored as long as the DHCP client parameter (→  137) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→  137) in the parameter of the same name is only used if the DHCP client parameter (→  137) is inactive.




IP address	
Navigation	  Expert → Communication → Web server → IP address
Description	Display or enter the IP address of the Web server integrated in the measuring device.
User entry	4 octet: 0 to 255 (in the particular octet)
Factory setting	192.168.1.212

Subnet mask	
Navigation	  Expert → Communication → Web server → Subnet mask
Description	Display or enter the subnet mask.
User entry	4 octet: 0 to 255 (in the particular octet)
Factory setting	255.255.255.0

Default gateway



Navigation	  Expert → Communication → Web server → Default gateway
Description	Display or enter the Default gateway (→  138).
User entry	4 octet: 0 to 255 (in the particular octet)
Factory setting	0.0.0.0



Web server functionality


Navigation	  Expert → Communication → Web server → Webserver funct.
Description	Use this function to switch the Web server on and off.
Selection	<ul style="list-style-type: none"> ■ Off ■ HTML Off ■ On
Factory setting	On
Additional information	<p><i>Description</i></p> <p> Once disabled, the Web server functionality can only be enabled again via the local display, the FieldCare operating tool or the DeviceCare operating tool.</p>

Selection

Option	Description
Off	<ul style="list-style-type: none"> ■ The Web server is completely disabled. ■ Port 80 is locked.
HTML Off	The HTML version of the Web server is not available.
On	<ul style="list-style-type: none"> ■ The complete Web server functionality is available. ■ JavaScript is used. ■ The password is transferred in an encrypted state. ■ Any change to the password is also transferred in an encrypted state.


Login page


Navigation	  Expert → Communication → Web server → Login page
Description	Use this function to select the format of the login page.
Selection	<ul style="list-style-type: none"> ■ Without header ■ With header

Factory setting

With header


3.6.5 "WLAN settings" wizard

Navigation  Expert → Communication → WLAN settings

▶ WLAN settings	
WLAN	→ 140
WLAN mode	→ 140
SSID name	→ 140
Network security	→ 141
Security identification	→ 141
User name	→ 141
WLAN password	→ 142
WLAN IP address	→ 142
WLAN MAC address	→ 142
WLAN subnet mask	→ 143
WLAN MAC address	→ 142
WLAN passphrase	→ 143
WLAN MAC address	→ 142
Assign SSID name	→ 143
SSID name	→ 144
2.4 GHz WLAN channel	→ 144
Select antenna	→ 144
Connection state	→ 144
Received signal strength	→ 145

WLAN IP address	→ ⓘ 142
Gateway IP address	→ ⓘ 145
IP address domain name server	→ ⓘ 145

WLAN ⓘ

Navigation  Expert → Communication → WLAN settings → WLAN

Description Use this function to enable and disable the WLAN connection.

Selection

- Disable
- Enable

Factory setting Enable

WLAN mode ⓘ

Navigation  Expert → Communication → WLAN settings → WLAN mode


Description Use this function to select the WLAN mode.

Selection

- WLAN access point
- WLAN Client

Factory setting WLAN access point

SSID name ⓘ

Navigation  Expert → Communication → WLAN settings → SSID name

Prerequisite The client is activated.

Description Use this function to enter the user-defined SSID name (max. 32 characters) of the WLAN network.

User entry –

Factory setting –

Network security


Navigation	Expert → Communication → WLAN settings → Network security
Description	Use this function to select the type of security for the WLAN interface.
Selection	<ul style="list-style-type: none"> ■ Unsecured ■ WPA2-PSK ■ EAP-PEAP with MSCHAPv2 * ■ EAP-PEAP MSCHAPv2 no server authentic. * ■ EAP-TLS *
Factory setting	WPA2-PSK
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ Unsecured Access the WLAN connection without identification. ■ WPA2-PSK Access the WLAN connection with a network key. ■ EAP-PEAP with MSCHAPv2 Access the WLAN connection with a password-based authentication protocol. ■ EAP-PEAP MSCHAPv2 no server authentic. Access the WLAN connection with a password-based protocol without server authentication. ■ EAP-TLS Access the WLAN connection with a certificate-based, two-way authentication of the client and network.

Security identification

Navigation	Expert → Communication → WLAN settings → Sec. identific.
Description	Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).
User interface	<ul style="list-style-type: none"> ■ Trusted issuer certificate ■ Device certificate ■ Device private key

User name


Navigation	Expert → Communication → WLAN settings → User name
Description	Use this function to enter the username of the WLAN network.
User entry	–

* Visibility depends on order options or device settings

Factory setting –

WLAN password

Navigation   Expert → Communication → WLAN settings → WLAN password

Description Use this function to enter the WLAN password for the WLAN network.

User entry –

Factory setting –

WLAN IP address



Navigation   Expert → Communication → WLAN settings → WLAN IP address

Description Use this function to enter the IP address of the measuring device's WLAN connection.

User entry 4 octet: 0 to 255 (in the particular octet)

Factory setting 192.168.1.212

WLAN MAC address

Navigation   Expert → Communication → WLAN settings → WLAN MAC address

Description Displays the MAC ⁵⁾ address of the measuring device.

User interface Unique 12-digit character string comprising letters and numbers

Factory setting Each measuring device is given an individual address.

Additional information *Example*
For the display format
00:07:05:10:01:5F

5) Media Access Control

WLAN subnet mask



Navigation	Expert → Communication → WLAN settings → WLAN subnet mask Expert → Communication → WLAN settings → WLAN subnet mask Expert → Communication → WLAN settings → WLAN subnet mask
Description	Use this function to enter the subnet mask.
User entry	4 octet: 0 to 255 (in the particular octet)
Factory setting	255.255.255.0

WLAN passphrase



Navigation	Expert → Communication → WLAN settings → WLAN passphrase
Prerequisite	The WPA2-PSK option is selected in the Security type parameter (→ 141).
Description	Use this function to enter the network key.
User entry	8 to 32-digit character string comprising numbers, letters and special characters (without spaces)
Factory setting	Serial number of the measuring device (e.g. L100A802000)





Assign SSID name






Navigation	Expert → Communication → WLAN settings → Assign SSID name
Description	Use this function to select which name is used for the SSID ⁶⁾ .
Selection	<ul style="list-style-type: none"> ▪ Device tag ▪ User-defined
Factory setting	User-defined
Additional information	<i>Selection</i> <ul style="list-style-type: none"> ▪ Device tag The device tag name is used as the SSID. ▪ User-defined A user-defined name is used as the SSID.

6) Service Set Identifier



SSID name 

Navigation	  Expert → Communication → WLAN settings → SSID name
Prerequisite	<ul style="list-style-type: none"> ▪ The User-defined option is selected in the Assign SSID name parameter (→  143). ▪ The WLAN access point option is selected in the WLAN mode parameter (→  140).
Description	Use this function to enter a user-defined SSID name.
User entry	Max. 32-digit character string comprising numbers, letters and special characters
Factory setting	


2.4 GHz WLAN channel 

Navigation	  Expert → Communication → WLAN settings → WLAN channel
Description	Use this function to enter the 2.4 GHz WLAN channel.
User entry	1 to 11
Factory setting	6
Additional information	<p><i>Description</i></p> <p> ▪ It is only necessary to enter a 2.4 GHz WLAN channel if multiple WLAN devices are in use.</p> <p>▪ If just one measuring device is in use, it is recommended to keep the factory setting.</p>

Select antenna 

Navigation	  Expert → Communication → WLAN settings → Select antenna
Description	Use this function to select whether the external or internal antenna is used for reception.
Selection	<ul style="list-style-type: none"> ▪ External antenna ▪ Internal antenna
Factory setting	Internal antenna

Connection state

Navigation	 Expert → Communication → WLAN settings → Connection state
Description	The connection status is displayed.

User interface ▪ Connected
 ▪ Not connected

Factory setting Not connected

Received signal strength

Navigation  Expert → Communication → WLAN settings → Rec.sig.strength

Description Displays the signal strength received.

User interface ▪ Low
 ▪ Medium
 ▪ High

Factory setting High

Gateway IP address

Navigation  Expert → Communication → WLAN settings → Gateway IP addr.

Description Use this function to enter the IP address of the gateway.

User interface Character string comprising numbers, letters and special characters

Factory setting 192.168.1.212

IP address domain name server

Navigation  Expert → Communication → WLAN settings → IP address DNS



Description Use this function to enter the IP address of the domain name server.

User interface Character string comprising numbers, letters and special characters


Factory setting 192.168.1.212

3.7 "Application" submenu

Navigation  Expert → Application

▶ Application	
Reset all totalizers	→  146
▶ Totalizer 1	→  146

Reset all totalizers

Navigation  Expert → Application → Reset all tot.

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

Selection


- Cancel
- Reset + totalize





Factory setting Cancel



Additional information *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
Reset + totalize	Resets the totalizer to 0 and restarts the totaling process. The previously aggregated load quantity is thus deleted.






3.7.1 "Totalizer 1 to n" submenu

Navigation  Expert → Application → Totalizer 1 to n





▶ Totalizer 1	
Assign process variable 1	→  147
Process variable unit 1	→  147
Totalizer 1 operation mode	→  148
Totalizer 1 control	→  148

Preset value 1	→  149
Totalizer 1 failure behavior	→  149

Assign process variable 1

Navigation	  Expert → Application → Totalizer 1 → AssignVariab. 1
Prerequisite	The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
Description	Use this function to select a process variable for the Totalizer 1 to n.
Selection	<ul style="list-style-type: none"> ■ Off ■ Load rate *
Factory setting	Off
Additional information	<p><i>Description</i></p> <p> If the option selected is changed, the device resets the totalizer to 0.</p> <p><i>Options</i></p> <p>If the Off option is selected, only the Assign process variable parameter (→  147) is still displayed in the Totalizer 1 to n submenu. All other parameters in the submenu are hidden.</p>

Process variable unit 1

Navigation	  Expert → Application → Totalizer 1 → VariableUnit 1		
Prerequisite	A process variable is selected in the Assign process variable parameter (→  147) of the Totalizer 1 to n submenu.		
Description	Use this function to select the process variable unit for the Totalizer 1 to n (→  146).		
Selection	<table style="width: 100%; border: none;"> <tr> <td style="vertical-align: top; width: 50%;"> <p><i>SI units</i></p> <ul style="list-style-type: none"> ■ kg ■ t </td> <td style="vertical-align: top; width: 50%;"> <p><i>US units</i></p> <ul style="list-style-type: none"> ■ oz ■ lb ■ STon </td> </tr> </table> <p style="text-align: center; margin-top: 10px;">or</p>	<p><i>SI units</i></p> <ul style="list-style-type: none"> ■ kg ■ t 	<p><i>US units</i></p> <ul style="list-style-type: none"> ■ oz ■ lb ■ STon
<p><i>SI units</i></p> <ul style="list-style-type: none"> ■ kg ■ t 	<p><i>US units</i></p> <ul style="list-style-type: none"> ■ oz ■ lb ■ STon 		

* Visibility depends on order options or device settings

Other units



None *

* Visibility depends on order options or device settings


Factory setting


Depends on country


Additional information*Description*

 The unit is selected separately for the totalizer and is independent of the option selected in the **System units** submenu (→  54).

Options

The selection is dependent on the process variable selected in the **Assign process variable** parameter (→  147).

Totalizer 1 operation mode**Navigation** Expert → Application → Totalizer 1 → Operat. mode 1**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→  147) of the **Totalizer 1 to n** submenu.

Description

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

Selection


- Net
- Forward
- Reverse


Factory setting

Net

Additional information*Selection*

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

Totalizer 1 control**Navigation** Expert → Application → Totalizer 1 → Tot. 1 control**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→  147) of the **Totalizer 1 to n** submenu.

Description

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

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


Factory setting Totalize


Additional information *Selection*

Options	Description
Totalize	The totalizer is started or continues running.
Reset + hold	The totaling process is stopped and the totalizer is reset to 0.
Preset + hold ¹⁾	The totaling process is stopped and the totalizer is set to its defined start value from the Preset value parameter.
Reset + totalize	The totalizer is reset to 0 and the totaling process is restarted.
Preset + totalize ¹⁾	The totalizer is set to the defined start value in the Preset value parameter and the totaling process is restarted.
Hold	Totalizing is stopped.

1) Visible depending on the order options or device settings

Preset value 1

Navigation  Expert → Application → Totalizer 1 → Preset value 1



Prerequisite A process variable is selected in the **Assign process variable** parameter (→  147) of the **Totalizer 1 to n** submenu.

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


User entry Signed floating-point number


Factory setting 0 kg

Additional information *User entry*

 The unit of the selected process variable is defined in the **Unit totalizer** parameter (→  147) for the totalizer.

Totalizer 1 failure behavior

Navigation  Expert → Application → Totalizer 1 → FailureBehav. 1

Prerequisite A process variable is selected in the **Assign process variable** parameter (→  147) of the **Totalizer 1 to n** submenu.

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

Selection

- Hold
- Continue
- Last valid value + continue

Factory setting

Hold

Additional information*Description*

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

Selection

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

3.8 "Diagnostics" submenu







Navigation

Expert → Diagnostics


▶ Diagnostics		
Actual diagnostics		→ 151
Previous diagnostics		→ 152
Operating time from restart		→ 153
Operating time		→ 153
▶ Diagnostic list		→ 153
▶ Event logbook		→ 155
▶ Device information		→ 157
▶ Main electronic module + I/O module 1		→ 161
▶ Sensor electronic module (ISEM)		→ 162
▶ I/O module 2		→ 163
▶ I/O module 3		→ 164

▶ I/O module 4	→ 📄 165
▶ Display module	→ 📄 167
▶ Data logging	→ 📄 168
▶ Min/max values	→ 📄 175
▶ Heartbeat Technology	→ 📄 180
▶ Simulation	→ 📄 180


Actual diagnostics

Navigation	  Expert → Diagnostics → Actual diagnos.
Prerequisite	A diagnostic event has occurred.
Description	Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.
User interface	Symbol for diagnostic behavior, diagnostic code and short message.
Additional information	<p><i>Display</i></p> <p> Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→ 📄 153).</p> <p> Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.</p> <p><i>Example</i></p> <p>For the display format:  F271 Main electronics failure</p>

Timestamp

Navigation	 Expert → Diagnostics → Timestamp
Description	Displays the operating time when the current diagnostic message occurred.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

Additional information*Display*



 The diagnostic message can be viewed via the **Actual diagnostics** parameter (→  151).

Example

For the display format:
24d12h13m00s

Previous diagnostics

Navigation

  Expert → Diagnostics → Prev.diagnostics

Prerequisite

Two diagnostic events have already occurred.


Description

Displays the diagnostic message that occurred before the current message.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information*Display*


 Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.

Example

For the display format:
⊗F271 Main electronics failure

Timestamp

Navigation

 Expert → Diagnostics → Timestamp

Description

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

User interface

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


Additional information*Display*

 The diagnostic message can be viewed via the **Previous diagnostics** parameter (→  152).


Example

For the display format:
24d12h13m00s

Operating time from restart






Navigation	 Expert → Diagnostics → Time fr. restart
Description	Use this function to display the time the device has been in operation since the last device restart.
User interface	Days (d), hours (h), minutes (m) and seconds (s)

Operating time


Navigation	 Expert → Diagnostics → Operating time
Description	Displays the length of time the device has been in operation.
User interface	Days (d), hours (h), minutes (m) and seconds (s)
Additional information	<i>Indication</i> Maximum number of days: 9 999 (corresponds to approx. 27 years and 5 months)

3.8.1 "Diagnostic list" submenu

Navigation  Expert → Diagnostics → Diagnostic list



▶ Diagnostic list	
Diagnostics 1	→  153
Diagnostics 2	→  154
Diagnostics 3	→  154
Diagnostics 4	→  155
Diagnostics 5	→  155

Diagnostics 1

Navigation	 Expert → Diagnostics → Diagnostic list → Diagnostics 1
Description	Displays the current diagnostics message with the highest priority.



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

Additional information *Display*



 Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.

Examples

For the display format:

-  F271 Main electronics failure
-  F276 I/O module failure



Diagnostics 2

Navigation   Expert → Diagnostics → Diagnostic list → Diagnostics 2

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



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

Additional information *Display*



 Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.

Examples

For the display format:

-  F271 Main electronics failure
-  F276 I/O module failure



Diagnostics 3

Navigation   Expert → Diagnostics → Diagnostic list → Diagnostics 3

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



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

Additional information *Display*






 Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.

Examples






For the display format:

-  F271 Main electronics failure
-  F276 I/O module failure

Diagnostics 4

Navigation	 Expert → Diagnostics → Diagnostic list → Diagnostics 4
Description	Displays the current diagnostics message with the fourth-highest priority.
User interface	Symbol for diagnostic behavior, diagnostic code and short message.
Additional information	<p><i>Display</i></p> <p> Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.</p> <p><i>Examples</i></p> <p>For the display format:</p> <ul style="list-style-type: none"> ■  F271 Main electronics failure ■  F276 I/O module failure

Diagnostics 5

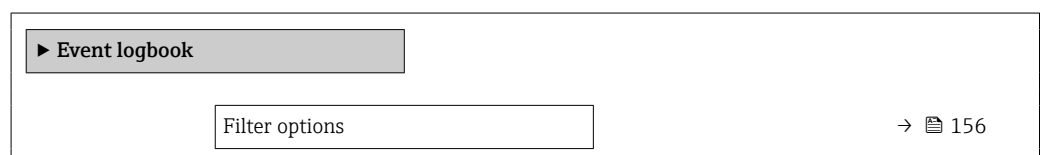
Navigation	 Expert → Diagnostics → Diagnostic list → Diagnostics 5
Description	Displays the current diagnostics message with the fifth-highest priority.
User interface	Symbol for diagnostic behavior, diagnostic code and short message.
Additional information	<p><i>Display</i></p> <p> Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.</p> <p><i>Examples</i></p> <p>For the display format:</p> <ul style="list-style-type: none"> ■  F271 Main electronics failure ■  F276 I/O module failure

3.8.2 "Event logbook" submenu

Viewing event messages

Event messages are displayed in chronological order. The event history includes both diagnostic events and information events. The symbol in front of the timestamp indicates whether the event has started or ended.

Navigation  Expert → Diagnostics → Event logbook



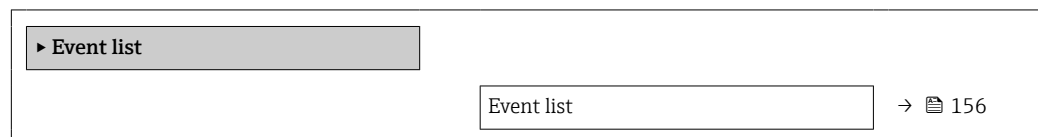
Filter options


Navigation	Expert → Diagnostics → Event logbook → Filter options
Description	Use this function to select the category whose event messages are displayed in the event list of the local display.
Selection	<ul style="list-style-type: none"> ■ All ■ Failure (F) ■ Function check (C) ■ Out of specification (S) ■ Maintenance required (M) ■ Information (I)
Factory setting	All
Additional information	<p><i>Description</i></p> <p> The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107:</p> <ul style="list-style-type: none"> ■ F = Failure ■ C = Function Check ■ S = Out of Specification ■ M = Maintenance Required

"Event list" submenu

- The **Event list** submenu is only displayed if operating via the local display.
- If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module.
- If operating via the Web browser, the event messages can be found directly in the **Event logbook** submenu.

Navigation Expert → Diagnostics → Event logbook → Event list



Event list

Navigation	Expert → Diagnostics → Event logbook → Event list
Description	Displays the history of event messages of the category selected in the Filter options parameter (→ 156).

User interface

- For a "Category I" event message
Information event, short message, symbol for event recording and operating time when error occurred
- For a "Category F, C, S, M" event message (status signal)
Diagnostics code, short message, symbol for event recording and operating time when error occurred

Additional information

Description

A maximum of 20 event messages are displayed in chronological order.

If the **Extended HistoROM** application package (order option) is enabled in the device, the event list can contain up to 100 entries .

The following symbols indicate whether an event has occurred or has ended:

- ☺: Occurrence of the event
- ☹: End of the event

Examples

For the display format:

- I1091 Configuration modified
☺ 24d12h13m00s
- ☹F271 Main electronics failure
☺ 01d04h12min30s









HistoROM

A HistoROM is a "non-volatile" device memory in the form of an EEPROM.

3.8.3 "Device information" submenu


Navigation   Expert → Diagnostics → Device info

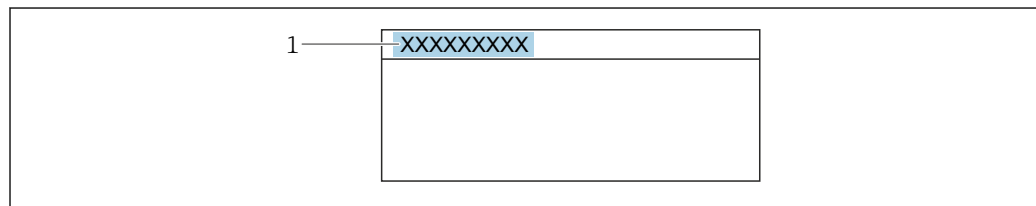
▶ **Device information**

Device tag	→  158
Serial number	→  158
Firmware version	→  159
Device name	→  159
Order code	→  159
Extended order code 1	→  159
Extended order code 2	→  160
Extended order code 3	→  160

Configuration counter	→ 160
ENP version	→ 160

Device tag

Navigation	 Expert → Diagnostics → Device info → Device tag
Description	Displays a unique name for the measuring point so it can be identified quickly within the plant. It is displayed in the header.
User interface	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).
Factory setting	Teqwave M
Additional information	<i>User interface</i>






A0029422


1 Position of the header text on the display

The number of characters displayed depends on the characters used.

Serial number

Navigation	 Expert → Diagnostics → Device info → Serial number
Description	Displays the serial number of the measuring device.  The number can be found on the nameplate of the sensor and transmitter.
User interface	Max. 11-digit character string comprising letters and numbers.
Additional information	<i>Description</i>  Uses of the serial number <ul style="list-style-type: none"> ▪ To identify the measuring device quickly, e.g. when contacting Endress+Hauser. ▪ To obtain specific information on the measuring device using the Device Viewer: www.endress.com/deviceviewer

Firmware version

Navigation  Expert → Diagnostics → Device info → Firmware version

Description Displays the device firmware version installed.

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


Additional information *Display*



The Firmware version is also located:

- On the title page of the Operating instructions
- On the transmitter nameplate

Device name

Navigation  Expert → Diagnostics → Device info → Device name

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

User interface Character string comprising numbers, letters and special characters

Order code



Navigation  Expert → Diagnostics → Device info → Order code

Description Displays the device order code.

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

Additional information *Description*


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




Uses of the order code

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

Extended order code 1



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

Description Displays the first part of the extended order code.

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

User interface

Character string

Additional information*Description*

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

Extended order code 2

**Navigation**

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

Description

Displays the second part of the extended order code.

User interface

Character string

Additional information

For additional information, see **Extended order code 1** parameter (→ 159)

Extended order code 3

**Navigation**

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

Description

Displays the third part of the extended order code.

User interface

Character string

Additional information

For additional information, see **Extended order code 1** parameter (→ 159)

Configuration counter

Navigation

Expert → Diagnostics → Device info → Config. counter

Description

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

User interface

0 to 65 535

ENP version

Navigation



Expert → Diagnostics → Device info → ENP version




Description

Displays the version of the electronic nameplate.



User interface	Character string
Factory setting	2.02.00
Additional information	<p><i>Description</i></p> <p>This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.</p>

3.8.4 "Main electronic module + I/O module 1" submenu



Navigation   Expert → Diagnostics → Main elec.+I/O1

▶ Main electronic module + I/O module 1	
Firmware version	→  161
Build no. software	→  161
Bootloader revision	→  162



Firmware version

Navigation	  Expert → Diagnostics → Main elec.+I/O1 → Firmware version
Description	Use this function to display the software revision of the module.
User interface	Positive integer



Build no. software




Navigation	  Expert → Diagnostics → Main elec.+I/O1 → Build no. softw.
Description	Use this function to display the software build number of the module.
User interface	Positive integer

Bootloader revision



Navigation	  Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev.
Description	Use this function to display the bootloader revision of the software.
User interface	Positive integer

3.8.5 "Sensor electronic module (ISEM)" submenu



Navigation   Expert → Diagnostics → Sens. electronic

▶ Sensor electronic module (ISEM)	
Firmware version	→  162
Build no. software	→  162
Bootloader revision	→  163



Firmware version

Navigation	  Expert → Diagnostics → Sens. electronic → Firmware version
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. software





Navigation	  Expert → Diagnostics → Sens. electronic → Build no. softw.
Description	Use this function to display the software build number of the module.
User interface	Positive integer

Bootloader revision



Navigation	  Expert → Diagnostics → Sens. electronic → Bootloader rev.
Description	Use this function to display the bootloader revision of the software.
User interface	Positive integer

3.8.6 "I/O module 2" submenu



Navigation   Expert → Diagnostics → I/O module 2

▶ I/O module 2	
I/O module 2 terminal numbers	→  163
Firmware version	→  163
Build no. software	→  164
Bootloader revision	→  164


I/O module 2 terminal numbers

Navigation	  Expert → Diagnostics → I/O module 2 → I/O 2 terminals
Description	Displays the terminal numbers used by the I/O module.
User interface	<ul style="list-style-type: none"> ■ Not used ■ 26-27 (I/O 1) ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)


Firmware version

Navigation	  Expert → Diagnostics → I/O module 2 → Firmware version
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. software





Navigation	 Expert → Diagnostics → I/O module 2 → Build no. softw.
Description	Use this function to display the software build number of the module.
User interface	Positive integer

Bootloader revision


Navigation	 Expert → Diagnostics → I/O module 2 → Bootloader rev.
Description	Use this function to display the bootloader revision of the software.
User interface	Positive integer

3.8.7 "I/O module 3" submenu



Navigation  Expert → Diagnostics → I/O module 3

▶ I/O module 3	
I/O module 3 terminal numbers	→  164
Firmware version	→  165
Build no. software	→  165
Bootloader revision	→  165



I/O module 3 terminal numbers

Navigation	 Expert → Diagnostics → I/O module 3 → I/O 3 terminals
Description	Displays the terminal numbers used by the I/O module.
User interface	<ul style="list-style-type: none"> ■ Not used ■ 26-27 (I/O 1) ■ 24-25 (I/O 2) ■ 22-23 (I/O 3) ■ 20-21 (I/O 4)



Firmware version

Navigation	  Expert → Diagnostics → I/O module 3 → Firmware version
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. software





Navigation	  Expert → Diagnostics → I/O module 3 → Build no. softw.
Description	Use this function to display the software build number of the module.
User interface	Positive integer

Bootloader revision


Navigation	  Expert → Diagnostics → I/O module 3 → Bootloader rev.
Description	Use this function to display the bootloader revision of the software.
User interface	Positive integer

3.8.8 "I/O module 4" submenu


Navigation   Expert → Diagnostics → I/O module 4

► I/O module 4	
I/O module 4 terminal numbers	→  166
Firmware version	→  166
Build no. software	→  166
Bootloader revision	→  166


I/O module 4 terminal numbers

Navigation	 Expert → Diagnostics → I/O module 4 → I/O 4 terminals
Description	Displays the terminal numbers used by the I/O module.
User interface	<ul style="list-style-type: none">■ Not used■ 26-27 (I/O 1)■ 24-25 (I/O 2)■ 22-23 (I/O 3)■ 20-21 (I/O 4)*


Firmware version

Navigation	 Expert → Diagnostics → I/O module 4 → Firmware version
Description	Use this function to display the software revision of the module.
User interface	Positive integer

Build no. software


Navigation	 Expert → Diagnostics → I/O module 4 → Build no. softw.
Description	Use this function to display the software build number of the module.
User interface	Positive integer

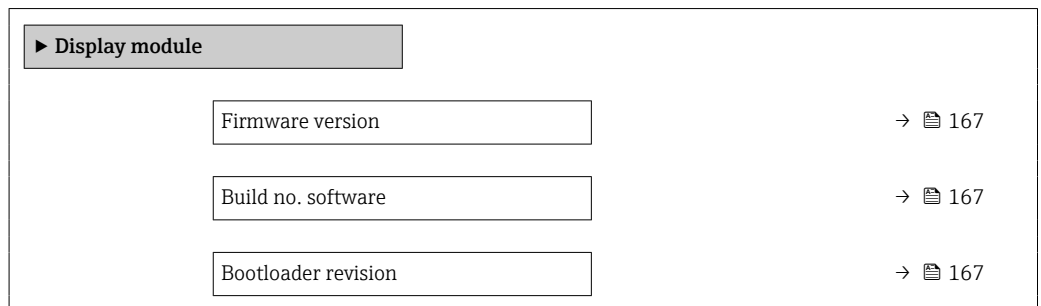
Bootloader revision

Navigation	 Expert → Diagnostics → I/O module 4 → Bootloader rev.
Description	Use this function to display the bootloader revision of the software.
User interface	Positive integer

* Visibility depends on order options or device settings

3.8.9 "Display module" submenu

Navigation  Expert → Diagnostics → Display module



Firmware version

Navigation  Expert → Diagnostics → Display module → Firmware version

Description Use this function to display the software revision of the module.

User interface Positive integer


Build no. software

Navigation  Expert → Diagnostics → Display module → Build no. softw.

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision












Navigation  Expert → Diagnostics → Display module → Bootloader rev.

Description Use this function to display the bootloader revision of the software.


User interface Positive integer

3.8.10 "Data logging" submenu


Navigation  Expert → Diagnostics → Data logging



► Data logging	
Assign channel 1	→  168
Assign channel 2	→  169
Assign channel 3	→  169
Assign channel 4	→  170
Logging interval	→  170
Clear logging data	→  171
Data logging	→  171
Logging delay	→  172
Data logging control	→  172
Data logging status	→  172
Entire logging duration	→  173

Assign channel 1

Navigation  Expert → Diagnostics → Data logging → Assign chan. 1

Prerequisite

- The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
- The **Extended HistoROM** application package is available.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  45).

Description Use this function to assign a process variable to the data logging channel.

Selection

- Off
- Total solids
- Temperature
- Electronics temperature
- Conductivity
- Corrected conductivity

- Load rate *
- Current output 1 *
- Current output 2 *
- Current output 3 *
- Current output 4 *


Factory setting Off

Additional information *Description*



A total of 1000 measured values can be logged. This means:

- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used


Once the maximum number of data points is reached, the oldest data points in the data log are cyclically overwritten in such a way that the last 1000, 500, 333 or 250 measured values are always in the log (ring memory principle).



 The log contents are cleared if the option selected is changed.

Assign channel 2


Navigation   Expert → Diagnostics → Data logging → Assign chan. 2

Prerequisite

- The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
- The **Extended HistoROM** application package is available.



 The software options currently enabled are displayed in the **Software option overview** parameter (→  45).

Description Use this function to assign a process variable to the logging channel.


Selection For the picklist, see **Assign channel 1** parameter (→  168)


Factory setting Off

Assign channel 3

Navigation   Expert → Diagnostics → Data logging → Assign chan. 3


Prerequisite

- The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
- The **Extended HistoROM** application package is available.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  45).



* Visibility depends on order options or device settings

Description Use this function to assign a process variable to the logging channel.


Selection For the picklist, see **Assign channel 1** parameter (→  168)



Factory setting Off

Assign channel 4


Navigation   Expert → Diagnostics → Data logging → Assign chan. 4

Prerequisite

- The **Load rate** option is only available if the volume flow of the medium is read in via the Current input 1 to n (→  49) or the fieldbus.
- The **Extended HistoROM** application package is available.



 The software options currently enabled are displayed in the **Software option overview** parameter (→  45).

Description Use this function to assign a process variable to the logging channel.



Selection For the picklist, see **Assign channel 1** parameter (→  168)

Factory setting Off

Logging interval

Navigation   Expert → Diagnostics → Data logging → Logging interval

Prerequisite The **Extended HistoROM** application package is available.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  45).

Description Use this function to enter the logging interval T_{\log} for data logging.

User entry 0.1 to 3 600.0 s


Factory setting 1.0 s

Additional information *Description*

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time T_{\log} :

- If 1 logging channel is used: $T_{\log} = 1000 \times t_{\log}$
- If 2 logging channels are used: $T_{\log} = 500 \times t_{\log}$
- If 3 logging channels are used: $T_{\log} = 333 \times t_{\log}$
- If 4 logging channels are used: $T_{\log} = 250 \times t_{\log}$

Once this time elapses, the oldest data points in the data log are cyclically overwritten such that a time of T_{log} always remains in the memory (ring memory principle).

 The log contents are cleared if the length of the logging interval is changed.



Example

If 1 logging channel is used:

- $T_{\text{log}} = 1000 \times 1 \text{ s} = 1\,000 \text{ s} \approx 15 \text{ min}$
- $T_{\text{log}} = 1000 \times 10 \text{ s} = 10\,000 \text{ s} \approx 3 \text{ h}$
- $T_{\text{log}} = 1000 \times 80 \text{ s} = 80\,000 \text{ s} \approx 1 \text{ d}$
- $T_{\text{log}} = 1000 \times 3\,600 \text{ s} = 3\,600\,000 \text{ s} \approx 41 \text{ d}$



Clear logging data

Navigation

  Expert → Diagnostics → Data logging → Clear logging

Prerequisite

The **Extended HistorOM** application package is available.

 The software options currently enabled are displayed in the **Software option overview** parameter (→  45).

Description

Use this function to clear the entire logging data.

Selection

- Cancel
- Clear data

Factory setting

Cancel



Additional information

Selection

- Cancel
The data is not cleared. All the data is retained.
- Clear data
The logging data is cleared. The logging process starts from the beginning.

Data logging

Navigation

  Expert → Diagnostics → Data logging → Data logging

Description

Use this function to select the data logging method.

Selection

- Overwriting
- Not overwriting






Factory setting





Overwriting




Additional information

Selection

- Overwriting
The device memory applies the FIFO principle.
- Not overwriting
Data logging is canceled if the measured value memory is full (single shot).



Logging delay		
Navigation	  Expert → Diagnostics → Data logging → Logging delay	
Prerequisite	In the Data logging parameter (→  171), the Not overwriting option is selected.	
Description	Use this function to enter the time delay for measured value logging.	
User entry	0 to 999 h	
Factory setting	0 h	
Additional information	<p><i>Description</i></p> <p>Once data logging has been started with the Data logging control parameter (→  172), the device does not save any data for the duration of the delay time entered.</p>	

Data logging control		
Navigation	  Expert → Diagnostics → Data logging → Data log.control	
Prerequisite	In the Data logging parameter (→  171), the Not overwriting option is selected.	
Description	Use this function to start and stop measured value logging.	
Selection	<ul style="list-style-type: none"> ■ None ■ Delete + start ■ Stop 	
Factory setting	None	
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ■ None Initial measured value logging status. ■ Delete + start All the measured values recorded for all the channels are deleted and measured value logging starts again. ■ Stop Measured value logging is stopped. 	


Data logging status		
Navigation	  Expert → Diagnostics → Data logging → Data log. status	
Prerequisite	In the Data logging parameter (→  171), the Not overwriting option is selected.	
Description	Displays the measured value logging status.	

User interface	<ul style="list-style-type: none"> ■ Done ■ Delay active ■ Active ■ Stopped
Factory setting	Done
Additional information	<i>Selection</i> <ul style="list-style-type: none"> ■ Done Measured value logging has been performed and completed successfully. ■ Delay active Measured value logging has been started but the logging interval has not yet elapsed. ■ Active The logging interval has elapsed and measured value logging is active. ■ Stopped Measured value logging is stopped.

Entire logging duration




Navigation	 Expert → Diagnostics → Data logging → Logging duration
Prerequisite	In the Data logging parameter (→  171), the Not overwriting option is selected.
Description	Displays the total logging duration.
User interface	Positive floating-point number
Factory setting	0 s

"Display channel 1" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 1



Display channel 1

Navigation	 Expert → Diagnostics → Data logging → Displ.channel 1
Prerequisite	<p>The Extended HistorOM application package is available.</p> <p> The software options currently enabled are displayed in the Software option overview parameter (→  45).</p>

Description Displays the measured value trend for the logging channel in the form of a chart.

Additional information *Description*


- x-axis: depending on the number of channels selected displays 250 to 1000 measured values of a process variable.
- y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.

"Display channel 2" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 2




Display channel 2

Navigation  Expert → Diagnostics → Data logging → Displ.channel 2

Prerequisite A process variable is specified in the **Assign channel 2** parameter.


Description See the **Display channel 1** parameter →  173

"Display channel 3" submenu

Navigation  Expert → Diagnostics → Data logging → Displ.channel 3




Display channel 3

Navigation  Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite A process variable is specified in the **Assign channel 3** parameter.

Description See the **Display channel 1** parameter →  173

"Display channel 4" submenu


Navigation  Expert → Diagnostics → Data logging → Displ.channel 4

▶ Display channel 4

Display channel 4

→  175

Display channel 4

Navigation  Expert → Diagnostics → Data logging → Displ.channel 4

Prerequisite A process variable is specified in the **Assign channel 4** parameter.


Description See the **Display channel 1** parameter →  173

3.8.11 "Min/max values" submenu


Navigation  Expert → Diagnostics → Min/max val.

▶ Min/max values


▶ Electronics temperature

→  175


▶ Main electronics temperature

→  176


▶ Sensor electronics temperature (ISEM)

→  177


▶ Medium temperature

→  178


▶ Total solids

→  178

▶ Conductivity


→  179

"Electronics temperature" submenu


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

▶ Electronics temperature



Minimum value

→  176



Maximum value

→  176



Minimum value



Navigation	  Expert → Diagnostics → Min/max val. → Electronics temp → Minimum value
Description	Shows the lowest electronics temperature measured to date.
User interface	Positive floating-point number

Maximum value





Navigation	  Expert → Diagnostics → Min/max val. → Electronics temp → Maximum value
Description	Shows the highest electronics temperature measured to date.
User interface	Positive floating-point number

"Main electronics temperature" submenu




Navigation   Expert → Diagnostics → Min/max val. → Main elect.temp.

▶ Main electronics temperature	
Minimum value	→  176
Maximum value	→  177


Minimum value



Navigation	  Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value
Description	Displays the lowest previously measured temperature value of the electronics module in the transmitter.
User interface	Signed floating-point number
Additional information	<p><i>Dependency</i></p> <p> The unit is taken from the Temperature unit parameter (→  56)</p>

Maximum value


Navigation	 Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value
Description	Displays the highest previously measured temperature value of the electronics module in the transmitter.
User interface	Signed floating-point number
Additional information	<i>Dependency</i>  The unit is taken from the Temperature unit parameter (→  56)

"Sensor electronics temperature (ISEM)" submenu


Navigation  Expert → Diagnostics → Min/max val. → Sensor elec.temp

<p>▶ Sensor electronics temperature (ISEM)</p>	
<p>Minimum value</p>	→  177
<p>Maximum value</p>	→  177


Minimum value



Navigation	 Expert → Diagnostics → Min/max val. → Sensor elec.temp → Minimum value
Description	Shows the lowest temperature measured to date for the sensor electronic module.
User interface	Signed floating-point number

Maximum value


Navigation	 Expert → Diagnostics → Min/max val. → Sensor elec.temp → Maximum value
Description	Shows the highest temperature measured to date for the sensor electronic module.
User interface	Signed floating-point number

"Medium temperature" submenu

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

▶ Medium temperature	
Minimum value	→  178
Maximum value	→  178


Minimum value

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

Description Shows the lowest medium temperature measured to date.

User interface Positive floating-point number

Maximum value



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

Description Shows the highest medium temperature measured to date.



User interface Positive floating-point number

"Total solids" submenu



Navigation  Expert → Diagnostics → Min/max val. → Total solids

▶ Total solids	
Maximum value	→  179
Minimum value	→  179

Maximum value

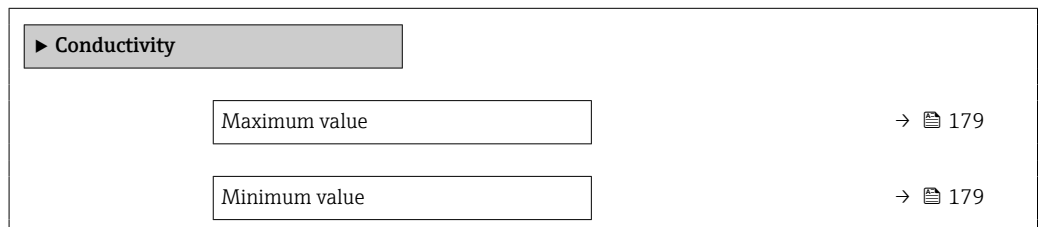
Navigation	  Expert → Diagnostics → Min/max val. → Total solids → Maximum value
Description	Shows the highest total solids value measured to date.
User interface	Positive floating-point number

Minimum value



Navigation	  Expert → Diagnostics → Min/max val. → Total solids → Minimum value
Description	Shows the lowest total solids value measured to date.
User interface	Positive floating-point number

"Conductivity" submenu



Navigation   Expert → Diagnostics → Min/max val. → Conductivity



Maximum value

Navigation	  Expert → Diagnostics → Min/max val. → Conductivity → Maximum value
Description	Shows the highest conductivity measured to date.
User interface	Positive floating-point number



Minimum value



Navigation	  Expert → Diagnostics → Min/max val. → Conductivity → Minimum value
Description	Shows the lowest conductivity measured to date.

User interface

Positive floating-point number














3.8.12 "Heartbeat Technology" submenu

 For detailed information on the parameter descriptions of the **Heartbeat Verification** application package, see the Special Documentation for the device →  7

Navigation   Expert → Diagnostics → Heartbeat Techn.



3.8.13 "Simulation" submenu

Navigation   Expert → Diagnostics → Simulation



▶ Simulation	
Assign simulation process variable	→  181
Process variable value	→  181
Current input 1 to n simulation	→  182
Value current input 1 to n	→  182
Status input 1 to n simulation	→  182
Input signal level 1 to n	→  183
Current output 1 to n simulation	→  183
Current output value	→  184
Frequency output 1 to n simulation	→  184
Frequency output 1 to n value	→  184
Pulse output simulation 1 to n	→  185
Pulse value 1 to n	→  185
Switch output simulation 1 to n	→  186
Switch state 1 to n	→  186
Relay output 1 to n simulation	→  187
Switch state 1 to n	→  187

Device alarm simulation	→ 188
Diagnostic event category	→ 188
Diagnostic event simulation	→ 188




Assign simulation process variable



Navigation	  Expert → Diagnostics → Simulation → Assign proc.var.
Prerequisite	The Load rate option is only available if the volume flow of the medium is read in via the Current input 1 to n (→ 49) or the fieldbus.
Description	Select a process variable for the simulation process that is activated.
Selection	<ul style="list-style-type: none"> ■ Off ■ Load rate * ■ Total solids ■ Temperature ■ Electronics temperature ■ Conductivity ■ Corrected conductivity
Factory setting	Off



Process variable value

Navigation	  Expert → Diagnostics → Simulation → Proc. var. value
Description	Enter the simulation value for the selected process variable.
User entry	Signed floating-point number
Factory setting	0

* Visibility depends on order options or device settings

Current input 1 to n simulation		
Navigation	 Expert → Diagnostics → Simulation → Curr.inp 1 to n sim.	
Description	Option for switching simulation of the current input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.  The desired simulation value is defined in the Value current input 1 to n parameter.	
Selection	<ul style="list-style-type: none"> ▪ Off ▪ On 	
Factory setting	Off	
Additional information	<i>Selection</i> <ul style="list-style-type: none"> ▪ Off Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ▪ On Current simulation is active. 	

Value current input 1 to n		
Navigation	 Expert → Diagnostics → Simulation → Value curr.inp 1 to n	
Prerequisite	In the Current input 1 to n simulation parameter, the On option is selected.	
Description	Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.	
User entry	0 to 22.5 mA	

Status input 1 to n simulation		
Navigation	 Expert → Diagnostics → Simulation → Status inp 1 to n sim	
Description	Use this function to switch simulation of the status input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.	
Selection	<ul style="list-style-type: none"> ▪ Off ▪ On 	
Factory setting	Off	

Additional information*Description*

The desired simulation value is defined in the **Input signal level** parameter (→ 183).

Selection

- Off
Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
Simulation for the status input is active.

Input signal level 1 to n**Navigation**

Expert → Diagnostics → Simulation → Signal level 1 to n

Prerequisite

In the **Status input simulation** parameter (→ 182), the **On** option is selected.

Description

Use this function to select the signal level for the simulation of the status input. In this way, users can verify the correct configuration of the status input and the correct function of upstream feed-in units.

Selection

- High
- Low

Current output 1 to n simulation**Navigation**

Expert → Diagnostics → Simulation → Curr.outp 1 to n sim.

Description

Use this function to switch simulation of the current output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Factory setting

Off

Additional information*Description*

The desired simulation value is defined in the **Value current output 1 to n** parameter.

Selection

- Off
Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
Current simulation is active.

Current output value


Navigation	Expert → Diagnostics → Simulation → Curr.outp val.
Prerequisite	In the Current output 1 to n simulation parameter, the On option is selected.
Description	Use this function to enter a current value for the simulation. In this way, users can verify the correct adjustment of the current output and the correct function of downstream switching units.
User entry	3.59 to 22.5 mA
Additional information	<i>Dependency</i> The input range is dependent on the option selected in the Current span parameter (→ 75).

Frequency output 1 to n simulation


Navigation	Expert → Diagnostics → Simulation → Freq.outp 1 to n sim.
Prerequisite	In the Operating mode parameter (→ 87), the Frequency option is selected.
Description	Use this function to switch simulation of the frequency output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	<ul style="list-style-type: none"> ■ Off ■ On
Factory setting	Off
Additional information	<i>Description</i> The desired simulation value is defined in the Frequency value 1 to n parameter. <i>Selection</i> <ul style="list-style-type: none"> ■ Off Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ On Frequency simulation is active.

Frequency output 1 to n value


Navigation	Expert → Diagnostics → Simulation → Freq.outp 1 to n val.
Prerequisite	In the Frequency simulation 1 to n parameter, the On option is selected.

Description	Use this function to enter a frequency value for the simulation. In this way, users can verify the correct adjustment of the frequency output and the correct function of downstream switching units.
User entry	0.0 to 12 500.0 Hz

Pulse output simulation 1 to n


Navigation	Expert → Diagnostics → Simulation → Puls.outp.sim. 1 to n
Prerequisite	In the Operating mode parameter (→ 87), the Pulse option is selected.
Description	Use this function to switch simulation of the pulse output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	<ul style="list-style-type: none"> ■ Off ■ Fixed value ■ Down-counting value
Factory setting	Off
Additional information	<p><i>Description</i></p> <p> The desired simulation value is defined in the Pulse value 1 to n parameter.</p> <p><i>Selection</i></p> <ul style="list-style-type: none"> ■ Off Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ■ Fixed value Pulses are continuously output with the pulse width specified in the Pulse width parameter (→ 89). ■ Down-counting value The pulses specified in the Pulse value parameter (→ 185) are output.

Pulse value 1 to n


Navigation	Expert → Diagnostics → Simulation → Pulse value 1 to n
Prerequisite	In the Pulse output simulation 1 to n parameter, the Down-counting value option is selected.
Description	Use this function to enter a pulse value for the simulation. In this way, users can verify the correct adjustment of the pulse output and the correct function of downstream switching units.
User entry	0 to 65 535

Switch output simulation 1 to n


Navigation	Expert → Diagnostics → Simulation → Switch sim. 1 to n
Prerequisite	In the Operating mode parameter (→ 87), the Switch option is selected.
Description	Use this function to switch simulation of the switch output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	<ul style="list-style-type: none"> ▪ Off ▪ On
Factory setting	Off
Additional information	<p><i>Description</i></p> <p> The desired simulation value is defined in the Switch state 1 to n parameter.</p> <p><i>Selection</i></p> <ul style="list-style-type: none"> ▪ Off Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ▪ On Switch simulation is active.

Switch state 1 to n













Navigation	Expert → Diagnostics → Simulation → Switch state 1 to n
Description	Use this function to select a switch value for the simulation. In this way, users can verify the correct adjustment of the switch output and the correct function of downstream switching units.
Selection	<ul style="list-style-type: none"> ▪ Open ▪ Closed
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ▪ Open Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ▪ Closed Switch simulation is active.

Relay output 1 to n simulation


Navigation	Expert → Diagnostics → Simulation → Relay out. 1 to n sim
Description	Use this function to switch simulation of the relay output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
Selection	<ul style="list-style-type: none"> ▪ Off ▪ On
Factory setting	Off
Additional information	<p><i>Description</i></p> <p> The desired simulation value is defined in the Switch state 1 to n parameter.</p> <p><i>Selection</i></p> <ul style="list-style-type: none"> ▪ Off Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ▪ On Relay simulation is active.

Switch state 1 to n


Navigation	Expert → Diagnostics → Simulation → Switch state 1 to n
Prerequisite	The On option is selected in the Switch output simulation 1 to n parameter parameter.
Description	Use this function to select a relay value for the simulation. In this way, users can verify the correct adjustment of the relay output and the correct function of downstream switching units.
Selection	<ul style="list-style-type: none"> ▪ Open ▪ Closed
Additional information	<p><i>Selection</i></p> <ul style="list-style-type: none"> ▪ Open Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated. ▪ Closed Relay simulation is active.

Device alarm simulation 	
Navigation	  Expert → Diagnostics → Simulation → Dev. alarm sim.
Description	Use this function to switch the device alarm on and off.
Selection	<ul style="list-style-type: none"> ■ Off ■ On
Factory setting	Off
Additional information	<p><i>Description</i></p> <p>The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.</p>
Diagnostic event category 	
Navigation	 Expert → Diagnostics → Simulation → Event category
Description	Use this function to select the category of the diagnostic events that are displayed for the simulation in the Diagnostic event simulation parameter (→  188).
Selection	<ul style="list-style-type: none"> ■ Sensor ■ Electronics ■ Configuration ■ Process
Factory setting	Process
Diagnostic event simulation 	
Navigation	  Expert → Diagnostics → Simulation → Diagnostic event
Description	Use this function to select a diagnostic event for the simulation process that is activated.
Selection	<ul style="list-style-type: none"> ■ Off ■ Diagnostic event picklist (depends on the category selected)
Factory setting	Off
Additional information	<p><i>Description</i></p> <p> For the simulation, you can choose from the diagnostic events of the category selected in the Diagnostic event category parameter (→  188).</p>



4 Country-specific factory settings

4.1 SI units

 The country-specific factory setting in SI units is made for all countries except the USA and Canada.

4.1.1 System units

Process variable	Unit
Total solids	%TS
Density	g/l
Mass flow	kg/h
Mass	kg
Volume	l/h
Temperature	°C
Conductivity	µS/cm
Load rate	kg/h

 For further information on system units, see: **System units** submenu (→  54)

4.1.2 Output current span

Output	Current range
Current output 1 to n	4 to 20 mA NAMUR

 For further information on the current ranges, see: **Current range output** parameter (→  75)



4.2 US units

 The country-specific factory setting in US units is made for the USA and Canada.

4.2.1 System units

Process variable	Unit
Total solids	%TS
Density	lb/ft ³
Mass flow	lb/h
Mass	lb
Volume	l/h
Temperature	°F

Process variable	Unit
Conductivity	$\mu\text{S/cm}$
Load rate	lb/h

 For further information on system units, see: **System units** submenu ([→](#)  54)

4.2.2 Output current span

Output	Current range
Current output 1 to n	4 to 20 mA US

 For further information on the current ranges, see: **Current range output** parameter ([→](#)  75)

Index

0 ... 9

0/4 mA value (Parameter)	70
0% bargraph value 1 (Parameter)	17
0% bargraph value 3 (Parameter)	20
0% bargraph value 5 (Parameter)	24
0% bargraph value 7 (Parameter)	26
2.4 GHz WLAN channel (Parameter)	144
20 mA value (Parameter)	70
100% bargraph value 1 (Parameter)	18
100% bargraph value 3 (Parameter)	21
100% bargraph value 5 (Parameter)	24
100% bargraph value 7 (Parameter)	27

A

Activate SW option (Parameter)	44
Active level (Parameter)	73
Actual diagnostics (Parameter)	151
Administration (Submenu)	40
Alarm delay (Parameter)	35
Application (Submenu)	146
Apply I/O configuration (Parameter)	67
Assign behavior of diagnostic no. 302 (Parameter) ...	38
Assign behavior of diagnostic no. 441 (Parameter) ...	36
Assign behavior of diagnostic no. 442 (Parameter) ...	37
Assign behavior of diagnostic no. 443 (Parameter) ...	37
Assign behavior of diagnostic no. 444 (Parameter) ...	37
Assign behavior of diagnostic no. 832 (Parameter) ...	38
Assign behavior of diagnostic no. 833 (Parameter) ...	39
Assign behavior of diagnostic no. 834 (Parameter) ...	39
Assign behavior of diagnostic no. 835 (Parameter) ...	39
Assign behavior of diagnostic no. 907 (Parameter) ...	40
Assign behavior of diagnostic no. 908 (Parameter) ...	40
Assign channel 1 (Parameter)	168
Assign channel 2 (Parameter)	169
Assign channel 3 (Parameter)	169
Assign channel 4 (Parameter)	170
Assign diagnostic behavior (Parameter)	97, 106
Assign flow direction check (Parameter)	101, 105
Assign frequency output (Parameter)	92
Assign limit (Parameter)	98, 105
Assign process variable (Parameter)	58
Assign process variable 1 (Parameter)	147
Assign pulse output (Parameter)	88
Assign PV (Parameter)	128
Assign QV (Parameter)	130
Assign simulation process variable (Parameter) ...	181
Assign SSID name (Parameter)	143
Assign status (Parameter)	101, 106
Assign status input (Parameter)	72
Assign SV (Parameter)	128
Assign TV (Parameter)	129

B

Backlight (Parameter)	31
Backup state (Parameter)	33

Bootloader revision (Parameter)	162, 163, 164, 165, 166, 167
Build no. software (Parameter)	161, 162, 164, 165, 166, 167
Burst command (Parameter)	112
Burst command 1 to n (Parameter)	119
Burst configuration 1 to n (Submenu)	117
Burst mode 1 to n (Parameter)	118
Burst trigger level (Parameter)	123
Burst trigger mode (Parameter)	122
Burst variable 0 (Parameter)	119
Burst variable 1 (Parameter)	120
Burst variable 2 (Parameter)	120
Burst variable 3 (Parameter)	121
Burst variable 4 (Parameter)	121
Burst variable 5 (Parameter)	121
Burst variable 6 (Parameter)	121
Burst variable 7 (Parameter)	122

C

Capture mode (Parameter)	110
Clear logging data (Parameter)	171
Communication (Submenu)	109
Comparison result (Parameter)	34
Conductivity (Parameter)	47
Conductivity (Submenu)	179
Conductivity damping (Parameter)	58
Conductivity factor (Parameter)	63
Conductivity offset (Parameter)	63
Conductivity unit (Parameter)	56
Configuration (Submenu)	110, 115
Configuration backup (Submenu)	32
Configuration counter (Parameter)	160
Configuration management (Parameter)	33
Confirm access code (Parameter)	42
Connection state (Parameter)	144
Contrast display (Parameter)	31
Corrected conductivity (Parameter)	47
Corrected conductivity factor (Parameter)	64
Corrected conductivity offset (Parameter)	64
Current input 1 to n (Submenu)	49, 68
Current input 1 to n simulation (Parameter)	182
Current output 1 to n (Submenu)	74
Current output 1 to n simulation (Parameter)	183
Current output value (Parameter)	184
Current range output (Parameter)	75
Current span (Parameter)	69

D

Damping current output (Parameter)	83
Damping output (Parameter)	94
Data logging (Parameter)	171
Data logging (Submenu)	168
Data logging control (Parameter)	172
Data logging status (Parameter)	172
Date/time (Parameter)	66

Date/time format (Parameter)	57
Decimal places 1 (Parameter)	18
Decimal places 2 (Parameter)	19
Decimal places 3 (Parameter)	21
Decimal places 4 (Parameter)	22
Decimal places 5 (Parameter)	24
Decimal places 6 (Parameter)	25
Decimal places 7 (Parameter)	27
Decimal places 8 (Parameter)	28
Default gateway (Parameter)	138
Define access code (Parameter)	41
Define access code (Wizard)	41
Density unit (Parameter)	55
Device alarm simulation (Parameter)	188
Device ID (Parameter)	111, 125
Device information (Submenu)	157
Device name (Parameter)	159
Device reset (Parameter)	43
Device revision (Parameter)	124
Device tag (Parameter)	116, 158
Device type (Parameter)	111, 125
DHCP client (Parameter)	137
Diagnostic behavior (Submenu)	35
Diagnostic configuration (Submenu)	131
Diagnostic event category (Parameter)	188
Diagnostic event simulation (Parameter)	188
Diagnostic handling (Submenu)	35
Diagnostic list (Submenu)	153
Diagnostics (Submenu)	150
Diagnostics 1 (Parameter)	153
Diagnostics 2 (Parameter)	154
Diagnostics 3 (Parameter)	154
Diagnostics 4 (Parameter)	155
Diagnostics 5 (Parameter)	155
Direct access	
0% bargraph value 5	24
0% bargraph value 7	26
2.4 GHz WLAN channel	144
100% bargraph value 5	24
100% bargraph value 7	27
Assign SSID name	143
Connection state	144
Decimal places 5	24
Decimal places 6	25
Decimal places 7	27
Decimal places 8	28
Gateway IP address	145
IP address domain name server	145
Network security	141
Received signal strength	145
Relay output 1 to n simulation	187
Security identification	141
Select antenna	144
SSID name	140, 144
Switch state 1 to n	187
Timestamp	151, 152
User name	141
Value 5 display	23
Value 6 display	25
Value 7 display	26
Value 8 display	28
WLAN	140
WLAN IP address	142
WLAN MAC address	142
WLAN mode	140
WLAN passphrase	143
WLAN password	142
WLAN subnet mask	143
Display (Submenu)	13
Display channel 1 (Submenu)	173
Display channel 2 (Submenu)	174
Display channel 3 (Submenu)	174
Display channel 4 (Submenu)	175
Display damping (Parameter)	29
Display interval (Parameter)	29
Display language (Parameter)	23
Display module (Submenu)	167
Document	
Design	4
Explanation of the structure of a parameter	
description	6
Function	4
Symbols used	6
Target group	4
Using the document	4
Document function	4
E	
Electronics temperature (Parameter)	46
Electronics temperature (Submenu)	175
Electronics temperature factor (Parameter)	64
Electronics temperature offset (Parameter)	64
ENP version (Parameter)	160
Enter access code (Parameter)	13
Entire logging duration (Parameter)	173
Event category 441 (Parameter)	132
Event category 442 (Parameter)	132
Event category 443 (Parameter)	133
Event category 444 (Parameter)	133
Event category 832 (Parameter)	134
Event category 833 (Parameter)	134
Event category 834 (Parameter)	134
Event category 835 (Parameter)	135
Event list (Submenu)	156
Event logbook (Submenu)	155
Expert (Menu)	11
Extended order code 1 (Parameter)	159
Extended order code 2 (Parameter)	160
Extended order code 3 (Parameter)	160
External compensation (Submenu)	61
F	
Factory adjustment (Submenu)	65
Factory settings	189
SI units	189
US units	189
Failure behavior current output (Parameter)	83
Failure current (Parameter)	84

Failure frequency (Parameter) 96
 Failure mode (Parameter) 71, 91, 95, 102, 108, 113
 Failure value (Parameter) 71, 114
 Fieldbus writing access (Parameter) 117
 Filter options (Parameter) 156
 Firmware version (Parameter)
 159, 161, 162, 163, 165, 166, 167
 Fixed current (Parameter) 76
 Format display (Parameter) 14
 Frequency output 1 to n simulation (Parameter) 184
 Frequency output 1 to n value (Parameter) 184
 Function
 see Parameter
G
 Gateway IP address (Parameter) 145
H
 Hardware revision (Parameter) 126
 HART address (Parameter) 116
 HART date code (Parameter) 127
 HART descriptor (Parameter) 126
 HART input (Submenu) 110
 HART message (Parameter) 126
 HART output (Submenu) 115
 HART revision (Parameter) 125
 HART short tag (Parameter) 116
 Header (Parameter) 30
 Header text (Parameter) 30
 Heartbeat Technology (Submenu) 180
I
 I/O alteration code (Parameter) 68
 I/O configuration (Submenu) 66
 I/O module 1 to n information (Parameter) 66
 I/O module 1 to n terminal numbers (Parameter) 66
 I/O module 1 to n type (Parameter) 67
 I/O module 2 (Submenu) 163
 I/O module 2 terminal numbers (Parameter)
 163, 164, 166
 I/O module 3 (Submenu) 164
 I/O module 3 terminal numbers (Parameter)
 163, 164, 166
 I/O module 4 (Submenu) 165
 I/O module 4 terminal numbers (Parameter)
 163, 164, 166
 Information (Submenu) 124
 Input (Submenu) 68, 114
 Input signal level 1 to n (Parameter) 183
 Input values (Submenu) 48
 Invert output signal (Parameter) 103
 IP address (Parameter) 137
 IP address domain name server (Parameter) 145
L
 Last backup (Parameter) 32
 Load rate (Parameter) 47
 Load rate factor (Parameter) 65
 Load rate offset (Parameter) 65
 Locking status (Parameter) 11

Logging delay (Parameter) 172
 Logging interval (Parameter) 170
 Login page (Parameter) 138
 Lower range limit (Parameter) 59
 Lower range value output (Parameter) 77

M

MAC address (Parameter) 136
 Main electronic module + I/O module 1 (Submenu) . 161
 Main electronics temperature (Submenu) 176
 Manufacturer ID (Parameter) 112, 125
 Mass flow unit (Parameter) 55
 Mass unit (Parameter) 55
 Max. switch cycles number (Parameter) 53
 Max. update period (Parameter) 123
 Maximum frequency value (Parameter) 93
 Maximum value (Parameter) 176, 177, 178, 179
 Measured current (Parameter) 51, 85
 Measured current 1 to n (Parameter) 49
 Measured values (Submenu) 45
 Measured values 1 to n (Parameter) 49
 Measuring interval (Parameter) 62
 Measuring mode (Parameter) 90, 94
 Measuring mode current output (Parameter) 78
 Measuring value at maximum frequency (Parameter) 93
 Measuring value at minimum frequency (Parameter) 93
 Medium temperature (Submenu) 178
 Menu
 Expert 11
 Min. update period (Parameter) 123
 Min/max values (Submenu) 175
 Minimum frequency value (Parameter) 92
 Minimum value (Parameter) 176, 177, 178, 179

N

Network security (Parameter) 141
 No. of preambles (Parameter) 117
 Nominal diameter (Parameter) 65

O

Operating mode (Parameter) 87
 Operating time (Parameter) 32, 42, 153
 Operating time from restart (Parameter) 153
 Order code (Parameter) 159
 Output (Submenu) 73, 127
 Output current (Parameter) 50, 84
 Output frequency (Parameter) 51, 96
 Output values (Submenu) 50

P

Parameter
 Structure of description 6
 Partially filled pipe detection (Parameter) 60
 Partially filled pipe detection (Submenu) 60
 Powerless relay status (Parameter) 109
 Preset value 1 (Parameter) 149
 Previous diagnostics (Parameter) 152
 Primary variable (PV) (Parameter) 128
 Process parameters (Submenu) 57
 Process variable adjustment (Submenu) 62

Process variable current output (Parameter) 75
 Process variable unit 1 (Parameter) 147
 Process variable value (Parameter) 181
 Process variables (Submenu) 46
 Pulse output (Parameter) 51, 91
 Pulse output simulation 1 to n (Parameter) 185
 Pulse scaling (Parameter) 89
 Pulse value 1 to n (Parameter) 185
 Pulse width (Parameter) 89
 Pulse/frequency/switch output 1 to n (Submenu) 51, 85

Q

Quaternary variable (QV) (Parameter) 131

R

Received signal strength (Parameter) 145
 Relay output 1 to n (Submenu) 53, 103
 Relay output 1 to n simulation (Parameter) 187
 Relay output function (Parameter) 104
 Reset access code (Parameter) 42
 Reset access code (Submenu) 42
 Reset all totalizers (Parameter) 146
 Response time (Parameter) 59, 60, 95
 Response time status input (Parameter) 73

S

Secondary variable (SV) (Parameter) 129
 Security identification (Parameter) 141
 Select antenna (Parameter) 144
 Sensor (Submenu) 45
 Sensor adjustment (Submenu) 62
 Sensor electronic module (ISEM) (Submenu) 162
 Sensor electronics temperature (ISEM) (Submenu) . . 177
 Separator (Parameter) 31
 Serial number (Parameter) 158
 Signal mode (Parameter) 69, 75, 87
 Simulation (Submenu) 180
 Slot number (Parameter) 113
 Software option overview (Parameter) 45
 Software revision (Parameter) 126
 SSID name (Parameter) 140, 144
 Status (Parameter) 115
 Status input 1 to n (Submenu) 71
 Status input 1 to n simulation (Parameter) 182
 Submenu
 Administration 40
 Application 146
 Burst configuration 1 to n 117
 Communication 109
 Conductivity 179
 Configuration 110, 115
 Configuration backup 32
 Current input 1 to n 49, 68
 Current output 1 to n 74
 Data logging 168
 Device information 157
 Diagnostic behavior 35
 Diagnostic configuration 131
 Diagnostic handling 35

Diagnostic list 153
 Diagnostics 150
 Display 13
 Display channel 1 173
 Display channel 2 174
 Display channel 3 174
 Display channel 4 175
 Display module 167
 Electronics temperature 175
 Event list 156
 Event logbook 155
 External compensation 61
 Factory adjustment 65
 HART input 110
 HART output 115
 Heartbeat Technology 180
 I/O configuration 66
 I/O module 2 163
 I/O module 3 164
 I/O module 4 165
 Information 124
 Input 68, 114
 Input values 48
 Main electronic module + I/O module 1 161
 Main electronics temperature 176
 Measured values 45
 Medium temperature 178
 Min/max values 175
 Output 73, 127
 Output values 50
 Partially filled pipe detection 60
 Process parameters 57
 Process variable adjustment 62
 Process variables 46
 Pulse/frequency/switch output 1 to n 51, 85
 Relay output 1 to n 53, 103
 Reset access code 42
 Sensor 45
 Sensor adjustment 62
 Sensor electronic module (ISEM) 162
 Sensor electronics temperature (ISEM) 177
 Simulation 180
 Status input 1 to n 71
 System 13
 System units 54
 Total solids 178
 Total solids monitoring 58
 Totalizer 47
 Totalizer 1 to n 146
 Value current output 1 to n 50
 Value status input 1 to n 49
 Web server 135
 Subnet mask (Parameter) 137
 Switch cycles (Parameter) 53
 Switch output function (Parameter) 96
 Switch output simulation 1 to n (Parameter) 186
 Switch state (Parameter) 52, 53, 102, 109
 Switch state 1 to n (Parameter) 186, 187
 Switch-off delay (Parameter) 102, 107

Switch-off value (Parameter)	100, 107
Switch-on delay (Parameter)	101, 108
Switch-on value (Parameter)	100, 107
System (Submenu)	13
System units (Submenu)	54

T

Target group	4
Temperature (Parameter)	46
Temperature damping (Parameter)	57
Temperature factor (Parameter)	63
Temperature offset (Parameter)	63
Temperature unit (Parameter)	56
Terminal number (Parameter)	69, 72, 74, 86, 104
Tertiary variable (TV) (Parameter)	130
Threshold (Parameter)	60
Timeout (Parameter)	113
Timestamp (Parameter)	151, 152
Total solids (Parameter)	46
Total solids (Submenu)	178
Total solids monitoring (Submenu)	58
Total solids override (Parameter)	58
Total solids unit (Parameter)	54
Totalizer (Submenu)	47
Totalizer 1 control (Parameter)	148
Totalizer 1 failure behavior (Parameter)	149
Totalizer 1 operation mode (Parameter)	148
Totalizer 1 overflow (Parameter)	48
Totalizer 1 to n (Submenu)	146
Totalizer 1 value (Parameter)	48
Transmitter identifier (Parameter)	44

U

Upper range limit (Parameter)	59
Upper range value output (Parameter)	78
User name (Parameter)	141
User role (Parameter)	12

V

Value (Parameter)	115
Value 1 display (Parameter)	17
Value 2 display (Parameter)	19
Value 3 display (Parameter)	20
Value 4 display (Parameter)	22
Value 5 display (Parameter)	23
Value 6 display (Parameter)	25
Value 7 display (Parameter)	26
Value 8 display (Parameter)	28
Value current input 1 to n (Parameter)	182
Value current output 1 to n (Submenu)	50
Value status input (Parameter)	50, 73
Value status input 1 to n (Submenu)	49
Volume flow unit (Parameter)	56

W

Web server (Submenu)	135
Web server functionality (Parameter)	138
Web server language (Parameter)	136
Wizard	
Define access code	41

WLAN settings	139
WLAN (Parameter)	140
WLAN IP address (Parameter)	142
WLAN MAC address (Parameter)	142
WLAN mode (Parameter)	140
WLAN passphrase (Parameter)	143
WLAN password (Parameter)	142
WLAN settings (Wizard)	139
WLAN subnet mask (Parameter)	143



71637084

www.addresses.endress.com
