GP01201O/09/EN/01.22-00
71594669
2022-12-30

Valid as of version
01.01.zz (Device firmware)

Description of Device Parameters
T31

4 to 20 mA RTD transmitter

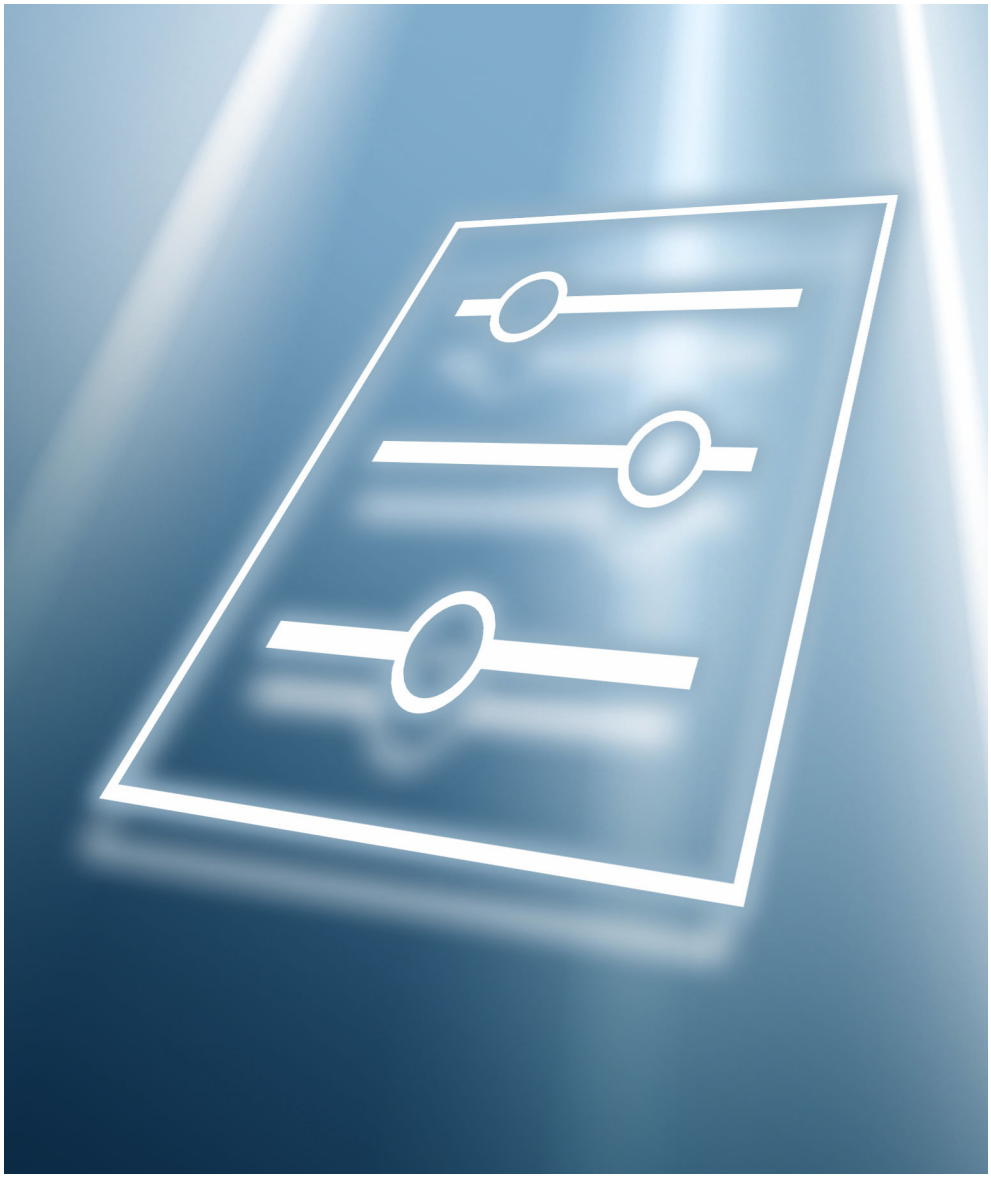

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Table of contents

1 About this document

1.1 Document function

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

It is used to perform tasks that require detailed knowledge of the function of the device:
- Optimal adaptation of the measurement to difficult conditions
- Detailed configuration of the communication interface
- Error diagnostics in difficult cases

1.2 Target group

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

1.3 Using this document

1.3.1 Symbols for certain types of information

Symbol	Meaning
	**Permitted** Procedures, processes or actions that are permitted.
	**Preferred** Procedures, processes or actions that are preferred.
	**Forbidden** Procedures, processes or actions that are forbidden.
	**Tip** Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Notice or individual step to be observed
1., 2., 3...	Series of steps
	Result of a step
	Help in the event of a problem
	Visual inspection
 A0028662	Operation via local display
 A0028663	Operation via operating tool
 A0028665	Write-protected parameter

Symbol	Meaning	Symbol	Meaning
	Permitted Procedures, processes or actions that are permitted.		**Preferred** Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.		**Tip** Indicates additional information.
	Reference to documentation		Reference to page
	Reference to graphic	1., 2., 3...	Series of steps
	Result of a step		Visual inspection

1.3.2 Information on the document structure

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

Standard mode, which guides the user through all the device parameters that are needed for basic commissioning and contains all the current measured values and parameters for the unique identification of the device:
- Basic setup
- Device information

Expert mode, which guides the user automatically through all the device parameters that are needed for complete commissioning:
- **Diagnostics** menu (→ 15)
- **Application** menu (→ 17)
- **System** menu (→ 25)

1.3.3 Structure of a parameter description

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

Complete parameter name Write-protected parameter =

Navigation
Navigation path to the parameter via the operating tool
The names of the menus, submenus and parameters are abbreviated to the form in which they appear on the display and in the operating tool.

Prerequisite
The parameter is only available under these specific conditions

Description
Description of the parameter function

Selection
List of the individual options for the parameter
- Option 1
- Option 2

User entry
Input range for the parameter

User interface
Display value/data for the parameter

Factory setting
Default setting ex works (if not explicitly selected)

Additional information
Additional explanations (e.g. in examples):
- For individual options
- For display values/data
- For the input range
- For the factory setting
- For the parameter function

1.4 Documentation

The Description of Device Parameters is part of the following documentation:

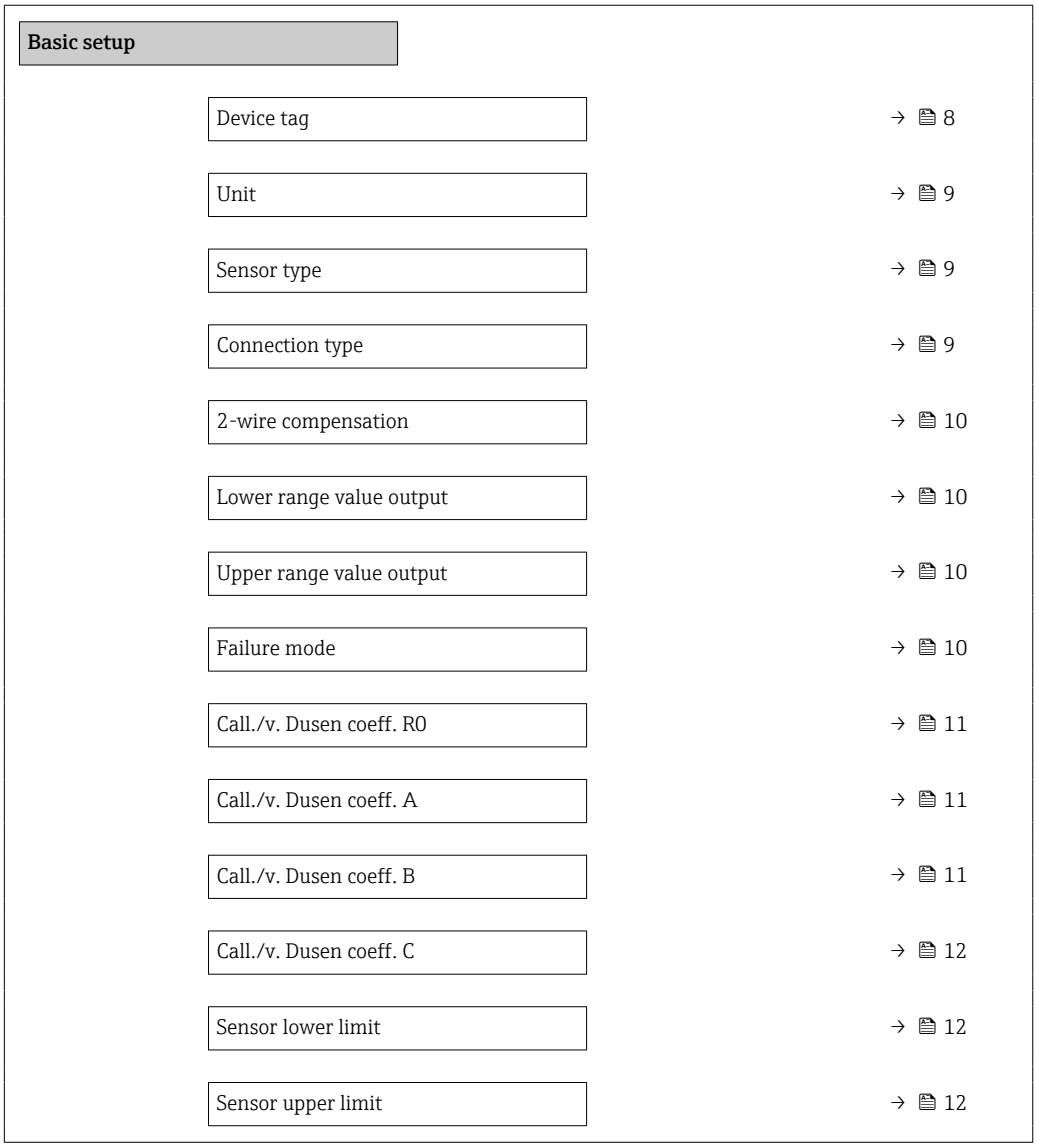
Temperature transmitter T31: **BA02279O**

2 Overview of the operating menu

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

3 "Basic setup" menu

Navigation Basic setup



Device tag

Navigation Basic setup → Device tag

Description Displays the name for the measuring point.

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

Unit

Navigation Basic setup → Unit

Description Selection of the unit for all measured values.

Selection

SI units
- °C
- K

Custom-specific units
°F

Sensor type

Navigation Basic setup → Sensor type

Description Use this function to select the sensor type for the sensor input.

Info:

Please observe the terminal assignment when connecting the sensor.

Selection
- Pt100 IEC60751, a=0.00385 (1)
- Pt1000 IEC60751, a=0.00385 (4)
- Pt100 JIS C1604, a=0.003916 (5)
- Pt100 GOST 6651-94, a=0.00391 (9)
- RTD Platinium (Callendar/van Dusen)

Factory setting Pt100 IEC60751, a=0.00385 (1)

Connection type

Navigation Basic setup → Connection type

Description Use this function to select the connection type for the sensor.

Selection
- 2- wire
- 3- wire
- 4- wire

Factory setting 4- wire

2-wire compensation

Navigation Basic setup → 2-wire compensation

Description Use this function to specify the resistance value for two-wire compensation in RTDs.

User entry 0.0 to 30.0 Ohm

Factory setting 0 Ohm

Lower range value output

Navigation Basic setup → Lower range value output

Description Use this function to assign a measured value to the current value 4 mA.

Info:

The set point that can be set depends on the sensor type used in the Sensor type parameter.

User entry −50 000.0 to 50 000.0

Factory setting 0.0

Upper range value output

Navigation Basic setup → Upper range value output

Description Use this function to assign a measured value to the current value 20 mA.

Info:

The set point that can be set depends on the sensor type used in the Sensor type parameter.

User entry −50 000.0 to 50 000.0

Factory setting 100

Failure mode

Navigation Basic setup → Failure mode

Description Use this function to select the signal on alarm level of the current output in the event of an error.

Selection
- Max.
- Min.

Factory setting Min.

Call./v. Dusen coeff. R0

Navigation Basic setup → Call./v. Dusen coeff. R0

Description Use this function to set the R0 value for sensor linearization with the Callendar/Van Dusen polynomial.

User entry 10.0 to 4 000.0 Ohm

Factory setting 100 Ohm

Call./v. Dusen coeff. A

Navigation Basic setup → Call./v. Dusen coeff. A

Description Use this function to set the coefficients for sensor linearization with the Callendar/Van Dusen polynomial.

User entry 3.0E-03 to 4.0E-03

Factory setting 3.9083E-03

Call./v. Dusen coeff. B

Navigation Basic setup → Call./v. Dusen coeff. B

Description Use this function to set the coefficients for sensor linearization with the Callendar/Van Dusen polynomial.

User entry −2.0E-06 to 2.0E-06

Factory setting −5.775E-07

Call./v. Dusen coeff. C

Navigation Basic setup → Call./v. Dusen coeff. C

Description Use this function to set the coefficients for sensor linearization with the Callendar/Van Dusen polynomial.

User entry −1.0E-09 to 1.0E-09

Factory setting −4.183E-12

Sensor lower limit

Navigation Basic setup → Sensor lower limit

Prerequisite The RTD platinum (Callendar/Van Dusen) option is enabled in the Sensor type parameter

Description Use this function to set the lower calculation limit for special sensor linearization.

User entry Depends on the **sensor type** selected

Factory setting Depends on the **sensor type** selected

Sensor upper limit

Navigation Basic setup → Sensor upper limit

Prerequisite The RTD platinum (Callendar/Van Dusen) option is enabled in the Sensor type parameter

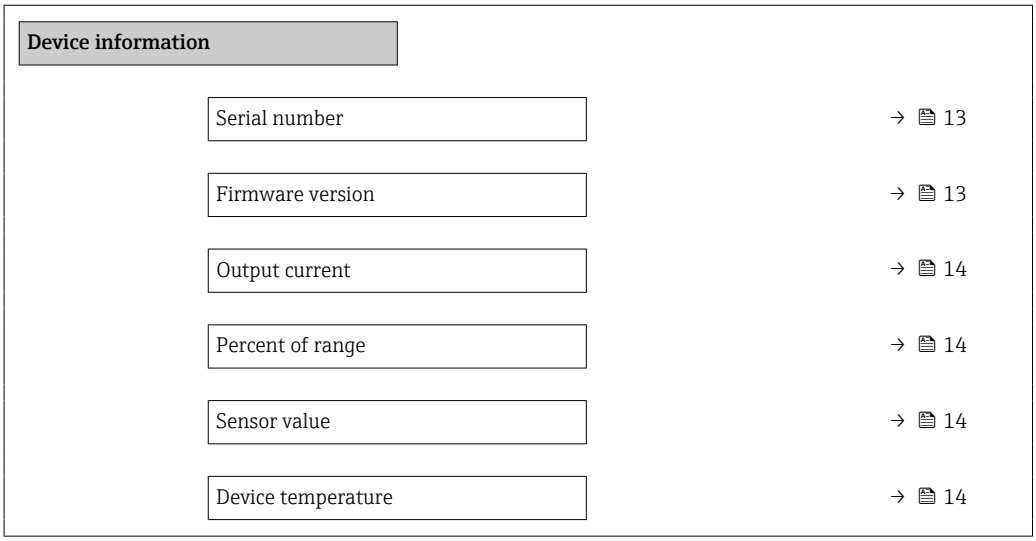
Description Use this function to set the upper calculation limit for special sensor linearization.

User entry Depends on the **sensor type** selected

Factory setting Depends on the **sensor type** selected

4 "Device information" menu

Navigation Device information



Serial number

Navigation Device information → Serial number

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

Additional information:

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

User interface Character string comprising numbers, letters and special characters

Firmware version

Navigation Device information → Firmware version

Description Use this function to view the device firmware version installed.

User interface Character string comprising numbers, letters and special characters

Output current

Navigation Device information → Output current

Description Use this function to view the calculated output current in mA.

User interface 3.58 to 23.0 mA

Percent of range

Navigation Device information → Percent of range

Description Use this function to display the measured value in % of the span.

User interface Signed floating-point number

Sensor value

Navigation Device information → Sensor value

Description Use this function to display the current measured value at the sensor input.

User interface Signed floating-point number

Device temperature

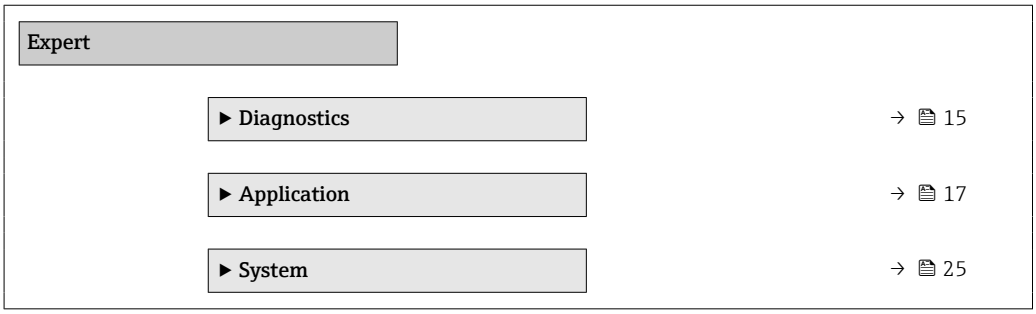
Navigation Device information → Device temperature

Description Use this function to display the current electronics temperature.

User interface Signed floating-point number

5 "Expert" menu

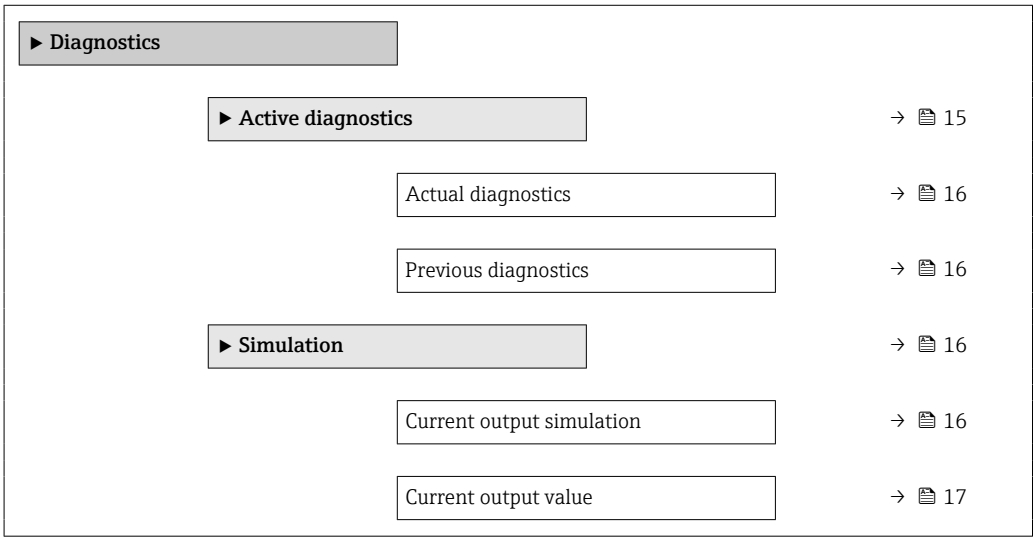
Navigation Expert



5.1 "Diagnostics" submenu

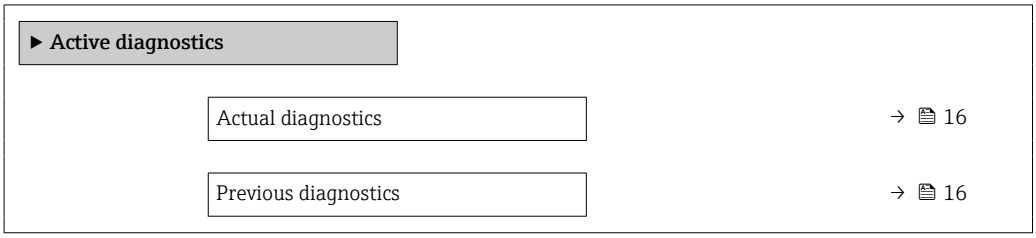
Settings and information concerning diagnostics as well as help for troubleshooting

Navigation Expert → Diagnostics



5.1.1 "Active diagnostics" submenu

Navigation Expert → Diagnostics → Active diagnostics



Actual diagnostics

Navigation Expert → Diagnostics → Active diagnostics → Actual diagnostics

Description Displays the currently active diagnostic message.

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

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

Previous diagnostics

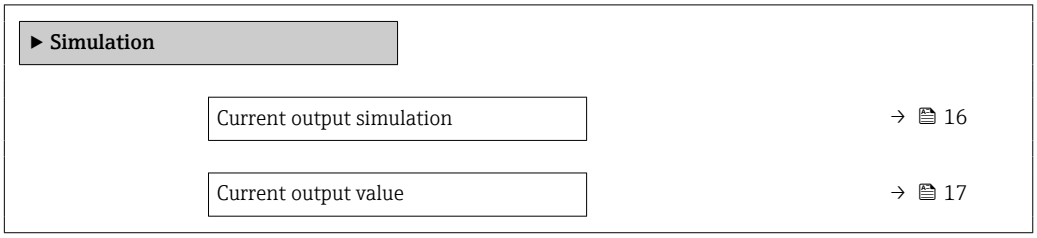
Navigation Expert → Diagnostics → Active diagnostics → Previous diagnostics

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

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

5.1.2 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation



Current output simulation

Navigation Expert → Diagnostics → Simulation → Current output simulation

Description Use this function to switch simulation of the current output on and off. While simulation is in progress the display a diagnostics message of the "function check" category (C).

Selection
- Off
- On

Factory setting Off

Current output value

Navigation Expert → Diagnostics → Simulation → Current output value

Description Use this function to set 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.

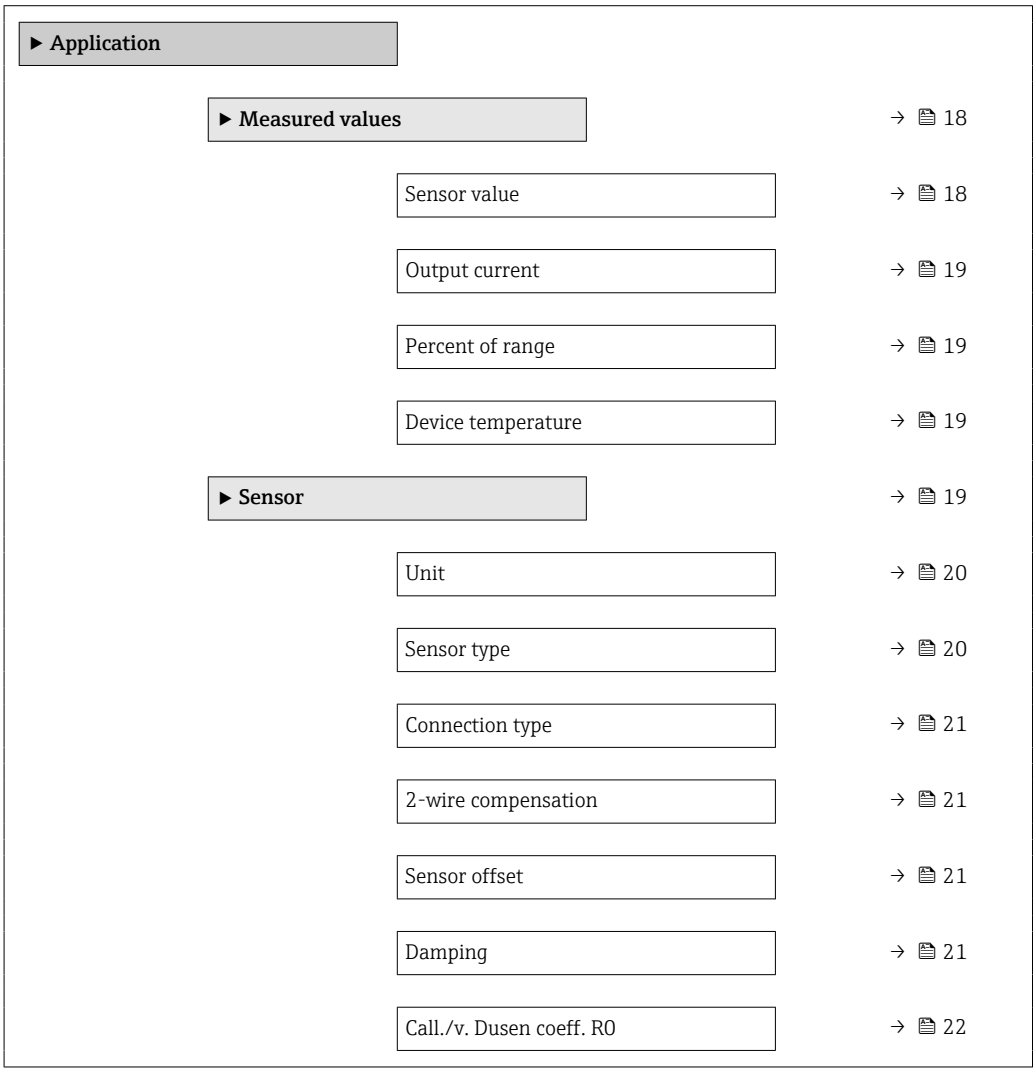
User entry 3.58 to 23.0 mA

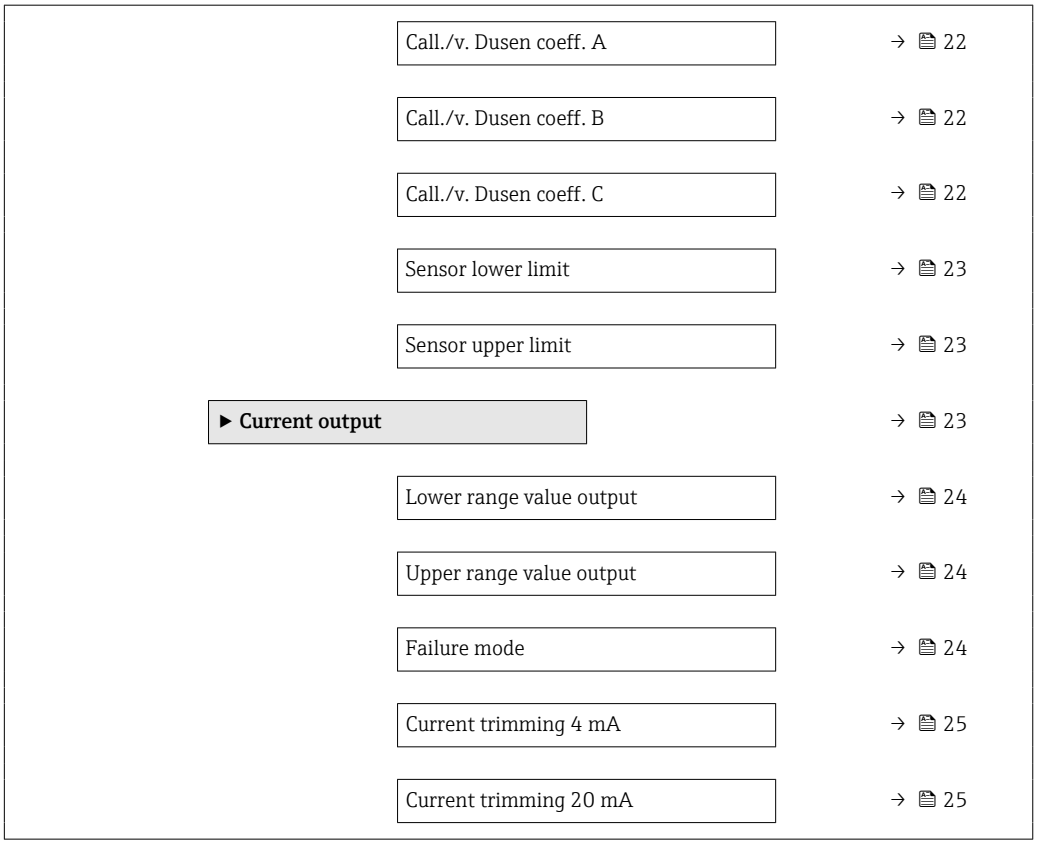
Factory setting 3.58 mA

5.2 "Application" submenu

Functions for detailed process adaptation to integrate the device optimally into your application

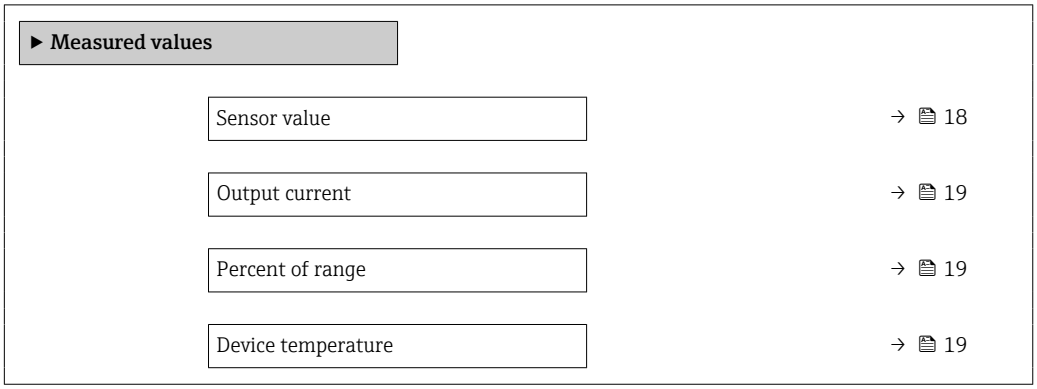
Navigation Expert → Application





5.2.1 "Measured values" submenu

Navigation Expert → Application → Measured values



Sensor value

Navigation Expert → Application → Measured values → Sensor value

Description Use this function to display the current measured value at the sensor input.

User interface Signed floating-point number

Output current

Navigation Expert → Application → Measured values → Output current

Description Use this function to view the calculated output current in mA.

User interface 3.58 to 23.0 mA

Percent of range

Navigation Expert → Application → Measured values → Percent of range

Description Use this function to display the measured value in % of the span.

User interface Signed floating-point number

Device temperature

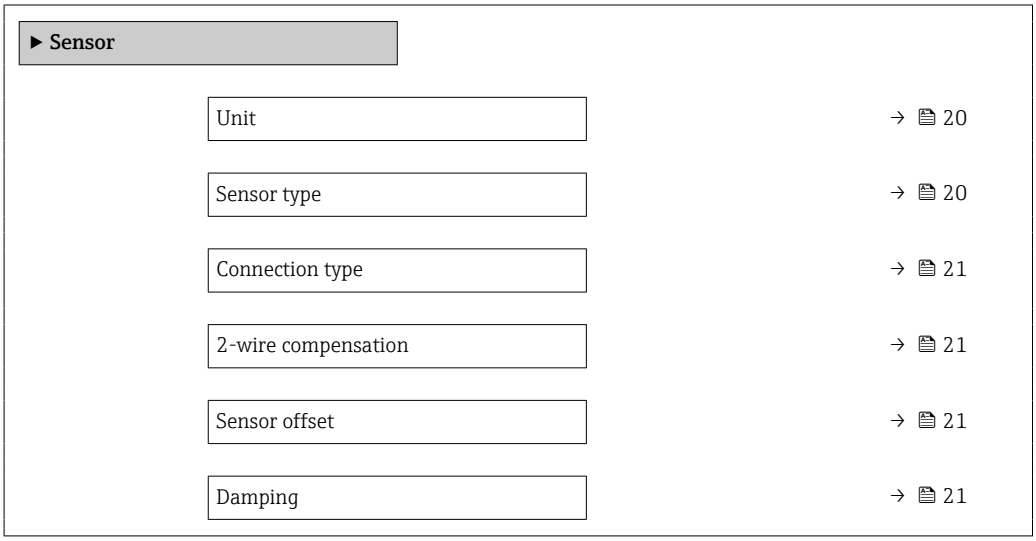
Navigation Expert → Application → Measured values → Device temperature

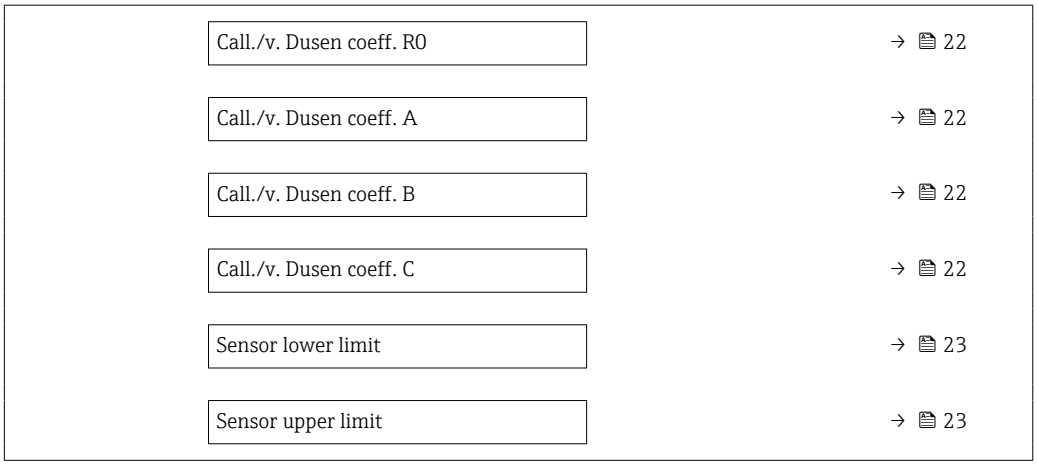
Description Use this function to display the current electronics temperature.

User interface Signed floating-point number

5.2.2 "Sensor" submenu

Navigation Expert → Application → Sensor





Unit

Navigation Expert → Application → Sensor → Unit

Description Selection of the unit for all measured values.

Selection

SI units
- °C
- K

Custom-specific units
°F

Sensor type

Navigation Expert → Application → Sensor → Sensor type

Description Use this function to select the sensor type for the sensor input.

Info:

Please observe the terminal assignment when connecting the sensor.

Selection
- Pt100 IEC60751, a=0.00385 (1)
- Pt1000 IEC60751, a=0.00385 (4)
- Pt100 JIS C1604, a=0.003916 (5)
- Pt100 GOST 6651-94, a=0.00391 (9)
- RTD Platinium (Callendar/van Dusen)

Factory setting Pt100 IEC60751, a=0.00385 (1)

Connection type

Navigation Expert → Application → Sensor → Connection type

Description Use this function to select the connection type for the sensor.

Selection
- 2- wire
- 3- wire
- 4- wire

Factory setting 4- wire

2-wire compensation

Navigation Expert → Application → Sensor → 2-wire compensation

Description Use this function to specify the resistance value for two-wire compensation in RTDs.

User entry 0.0 to 30.0 Ohm

Factory setting 0 Ohm

Sensor offset

Navigation Expert → Application → Sensor → Sensor offset

Description Use this function to set the zero point correction (offset) of the sensor measured value. The value indicated is added to the measured value.

User entry −10.0 to 10.0

Factory setting 0

Damping

Navigation Expert → Application → Sensor → Damping

Description Use this function to set the time constant for the damping of the measured value.

User entry 0 to 120 s

Factory setting 0 s

Call./v. Dusen coeff. R0

Navigation Expert → Application → Sensor → Call./v. Dusen coeff. R0

Description Use this function to set the R0 value for sensor linearization with the Callendar/Van Dusen polynomial.

User entry 10.0 to 4 000.0 Ohm

Factory setting 100 Ohm

Call./v. Dusen coeff. A

Navigation Expert → Application → Sensor → Call./v. Dusen coeff. A

Description Use this function to set the coefficients for sensor linearization with the Callendar/Van Dusen polynomial.

User entry 3.0E-03 to 4.0E-03

Factory setting 3.9083E-03

Call./v. Dusen coeff. B

Navigation Expert → Application → Sensor → Call./v. Dusen coeff. B

Description Use this function to set the coefficients for sensor linearization with the Callendar/Van Dusen polynomial.

User entry −2.0E-06 to 2.0E-06

Factory setting −5.775E-07

Call./v. Dusen coeff. C

Navigation Expert → Application → Sensor → Call./v. Dusen coeff. C

Description Use this function to set the coefficients for sensor linearization with the Callendar/Van Dusen polynomial.

User entry −1.0E-09 to 1.0E-09

Factory setting −4.183E-12

Sensor lower limit

Navigation Expert → Application → Sensor → Sensor lower limit

Prerequisite The RTD platinum (Callendar/Van Dusen) option is enabled in the Sensor type parameter

Description Use this function to set the lower calculation limit for special sensor linearization.

User entry Depends on the **sensor type** selected

Factory setting Depends on the **sensor type** selected

Sensor upper limit

Navigation Expert → Application → Sensor → Sensor upper limit

Prerequisite The RTD platinum (Callendar/Van Dusen) option is enabled in the Sensor type parameter

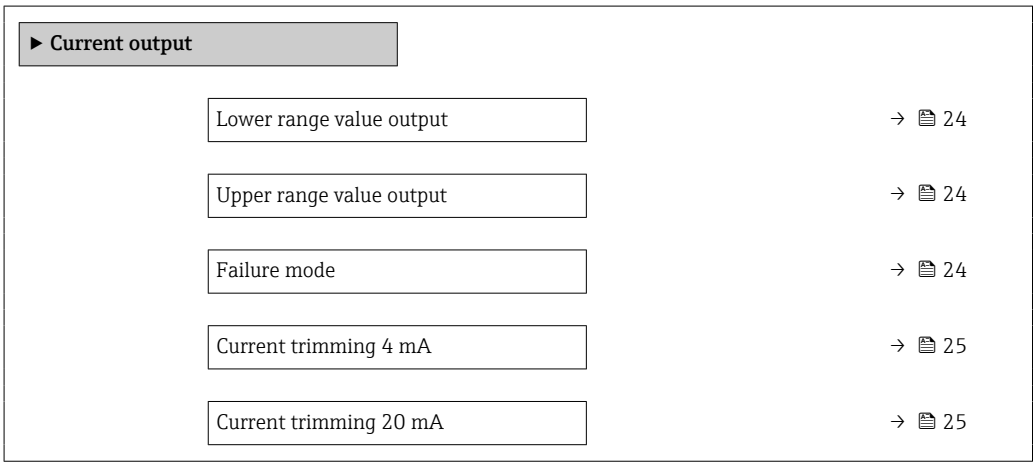
Description Use this function to set the upper calculation limit for special sensor linearization.

User entry Depends on the **sensor type** selected

Factory setting Depends on the **sensor type** selected

5.2.3 "Current output" submenu

Navigation Expert → Application → Current output



Lower range value output

Navigation Expert → Application → Current output → Lower range value output

Description Use this function to assign a measured value to the current value 4 mA.

Info:

The set point that can be set depends on the sensor type used in the Sensor type parameter.

User entry −50 000.0 to 50 000.0

Factory setting 0.0

Upper range value output

Navigation Expert → Application → Current output → Upper range value output

Description Use this function to assign a measured value to the current value 20 mA.

Info:

The set point that can be set depends on the sensor type used in the Sensor type parameter.

User entry −50 000.0 to 50 000.0

Factory setting 100

Failure mode

Navigation Expert → Application → Current output → Failure mode

Description Use this function to select the signal on alarm level of the current output in the event of an error.

Selection
- Max.
- Min.

Factory setting Min.

Current trimming 4 mA

Navigation Expert → Application → Current output → Current trimming 4 mA

Description Use this function to set the correction value for the current output at the start of the measuring range at 4 mA.

User entry 3.85 to 4.15 mA

Factory setting 4 mA

Current trimming 20 mA

Navigation Expert → Application → Current output → Current trimming 20 mA

Description Use this function to set the correction value for the current output at the end of the measuring range at 20 mA.

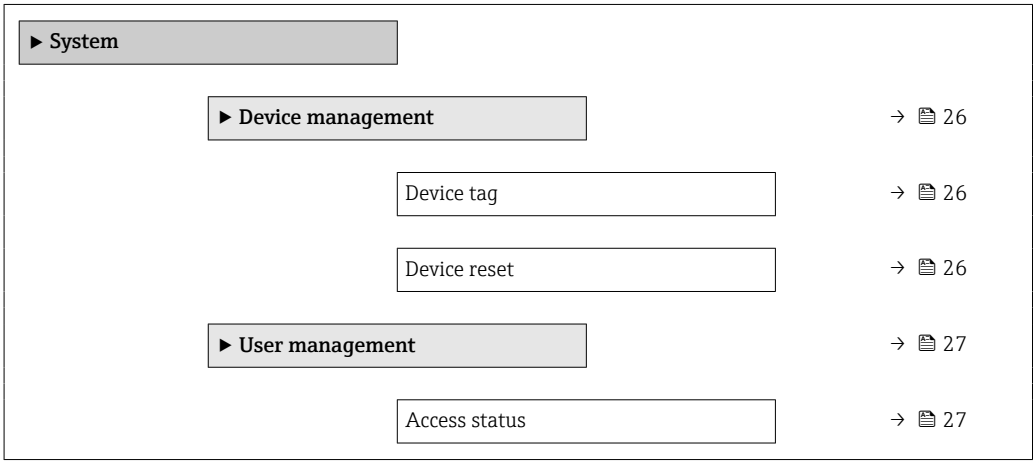
User entry 19.85 to 20.15 mA

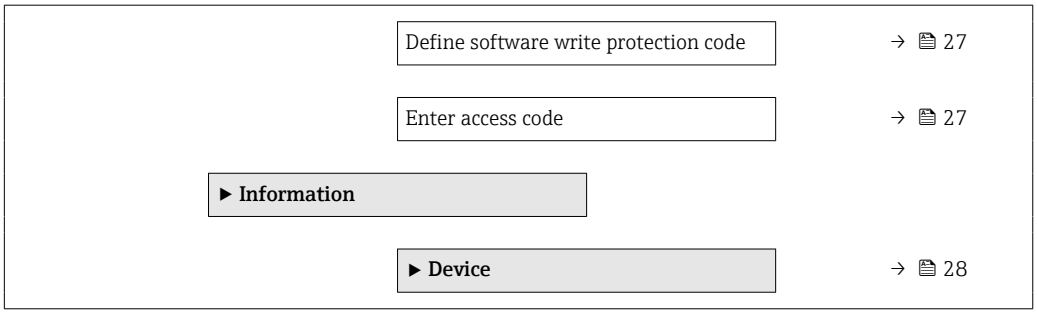
Factory setting 20 mA

5.3 "System" submenu

System settings concerning device management, user administration or safety

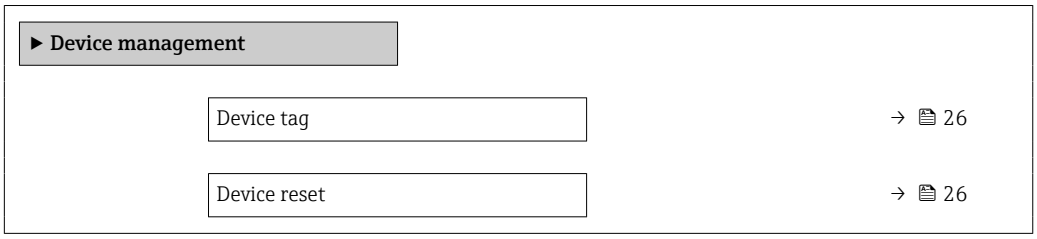
Navigation Expert → System





5.3.1 "Device management" submenu

Navigation Expert → System → Device management



Device tag

Navigation Expert → System → Device management → Device tag

Description Displays the name for the measuring point.

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

Device reset

Navigation Expert → System → Device management → Device reset

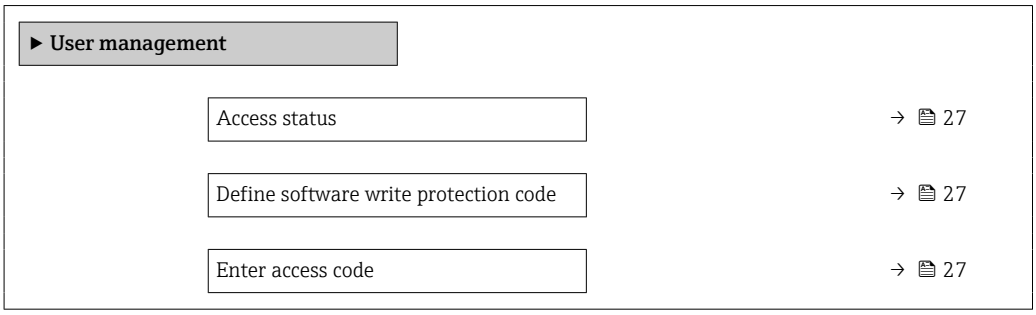
Description Use this function to reset the device configuration to a defined state.

Selection
- Not active
- Restart device
- To factory defaults

Factory setting Not active

5.3.2 "User management" submenu

Navigation Expert → System → User management



Access status

Navigation Expert → System → User management → Access status

Description Shows the access authorization to the parameters via the operating tool

User interface
- Operator
- Maintenance

Factory setting Maintenance

Define software write protection code

Navigation Expert → System → User management → Define software write protection code

Description Enter the code to protect the device from unauthorized access

User entry 0 to 9 999

Factory setting 0

Enter access code

Navigation Expert → System → User management → Enter access code

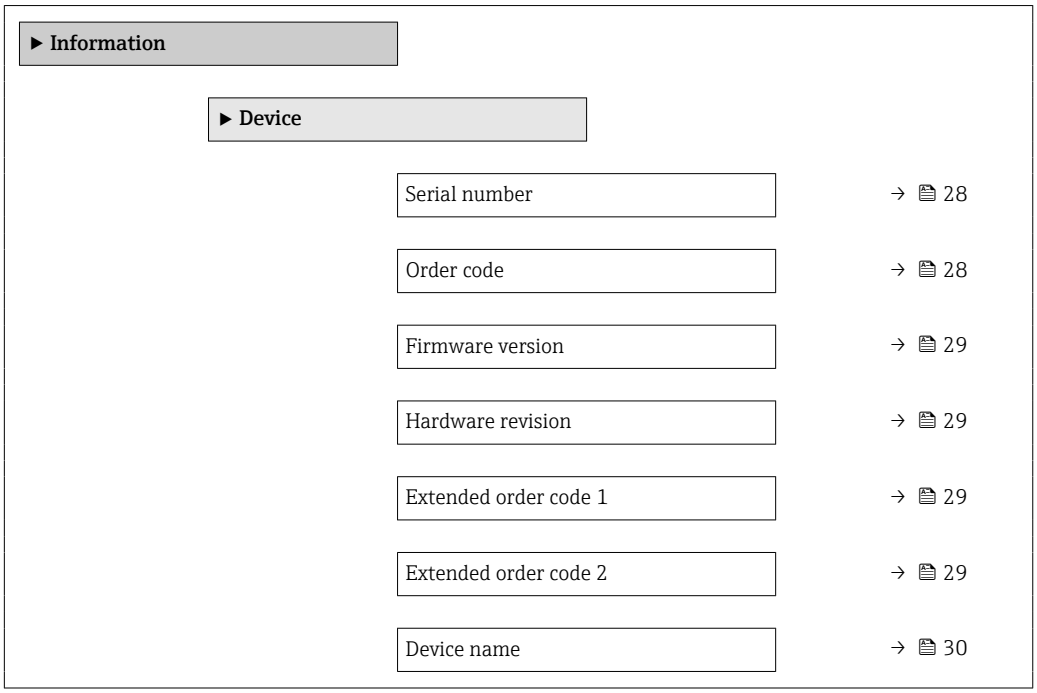
Description Entering the defined code to cancel the device protection

User entry 0 to 9 999

Factory setting 0

5.3.3 "Device" submenu

Navigation Expert → System → Information → Device



Serial number

Navigation Expert → System → Information → Device → Serial number

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

Additional information:

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

User interface Character string comprising numbers, letters and special characters

Order code

Navigation Expert → System → Information → Device → Order code

Description Displays the device order code.

Additional information:

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

User interface Character string comprising numbers, letters and special characters

Firmware version

Navigation Expert → System → Information → Device → Firmware version

Description Use this function to view the device firmware version installed.

User interface Character string comprising numbers, letters and special characters

Hardware revision

Navigation Expert → System → Information → Device → Hardware revision

Description Use this function to display the hardware revision of the device.

User interface Character string comprising numbers, letters and special characters

Extended order code 1

Navigation Expert → System → Information → Device → Extended order code 1

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

Additional information:

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

User interface Character string comprising numbers, letters and special characters

Extended order code 2

Navigation Expert → System → Information → Device → Extended order code 2

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

Additional information:

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

User interface Character string comprising numbers, letters and special characters

Device name

Navigation Expert → System → Information → Device → Device name

Description Displays the name of the transmitter.

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

User interface Character string comprising numbers, letters and special characters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