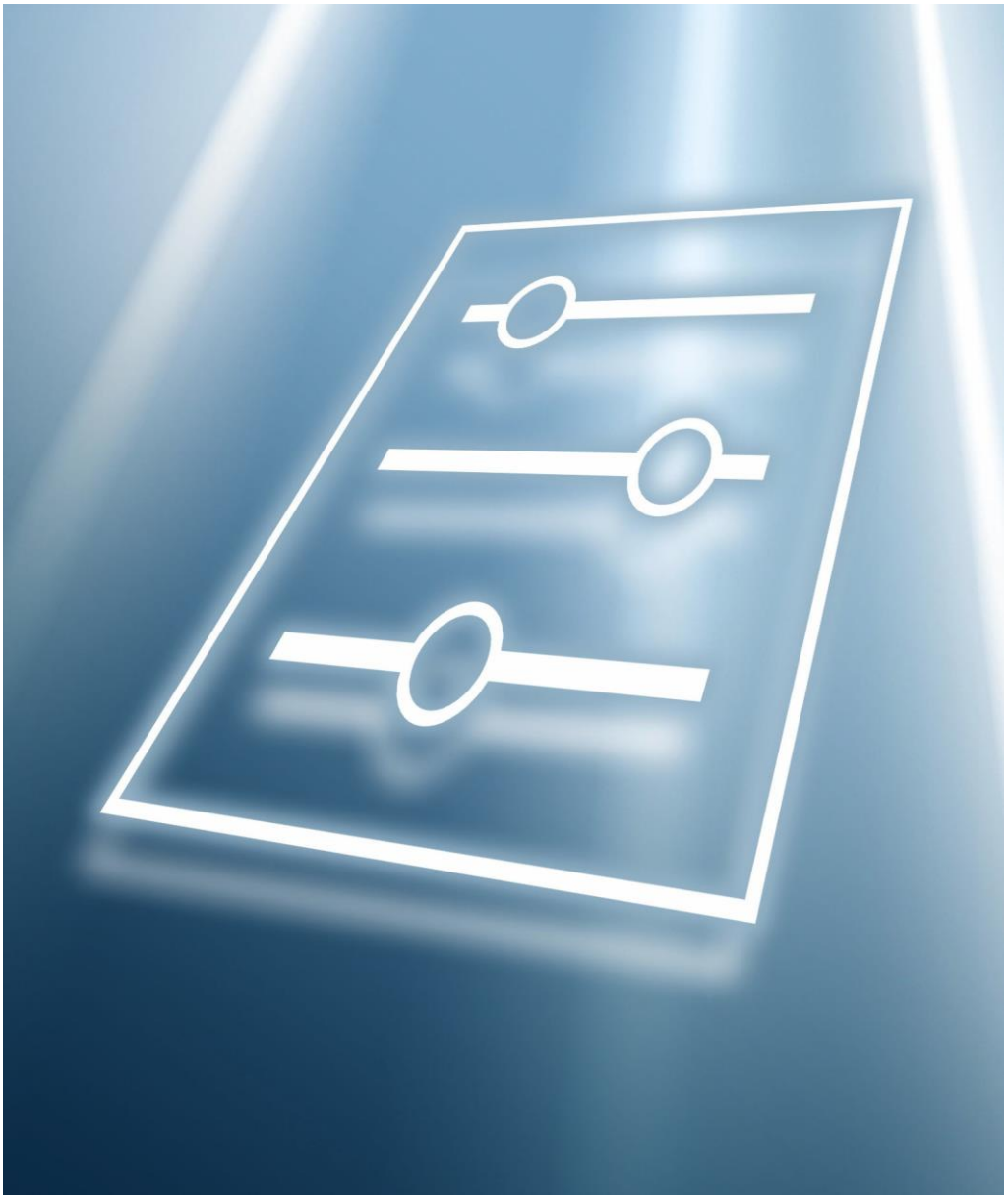
GP01198C/66/EN/01.22
70200790

Valid as of version
V 01.04 (device firmware)

Description of device parameters
J22 TDLAS Gas Analyzer

Modbus TCP and RS485



Endress+Hauser
People for Process Automation

Table of Contents

1 About this document

1.1 Warnings

Structure of Information	Meaning
⚠ WARNING Causes (/consequences) Consequences of non-compliance (if applicable) ▸ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation can result in a fatal or serious injury.
⚠ CAUTION Causes (/consequences) If necessary, consequences of non-compliance (if applicable) ▸ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.
NOTICE Cause/situation If necessary, consequences of non-compliance (if applicable) ▸ Action/note	This symbol alerts you to situations which may result in damage to property.

Table 1. Warnings

1.2 Symbols on the device

Symbol	Description
	The Laser Radiation symbol is used to alert the user to the danger of exposure to hazardous visible laser radiation when using the J22 TDLAS Gas Analyzer.
	The High Voltage symbol that alerts people to the presence of electric potential large enough to cause injury or damage. In certain industries, high voltage refers to voltage above a certain threshold. Equipment and conductors that carry high voltage warrant special safety requirements and procedures.
	The ETL Listed Mark provides proof of product compliance with North American safety standards. Authorities Having Jurisdiction (AHJ) and code officials across the US and Canada accept the ETL Listed Mark as proof of product compliance to published industry standards.
	The WEEE symbol indicates that the product should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.
	The CE Marking indicates conformity with health, safety, and environmental protection standards for products sold within the European economic area (EEA).

Table 2. Symbols

1.3 U.S. export compliance

The policy of Endress+Hauser is strict compliance with U.S. export control laws as detailed in the website of the Bureau of Industry and Security at the U.S. Department of Commerce.

1.4 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.

1.4.1 Target group

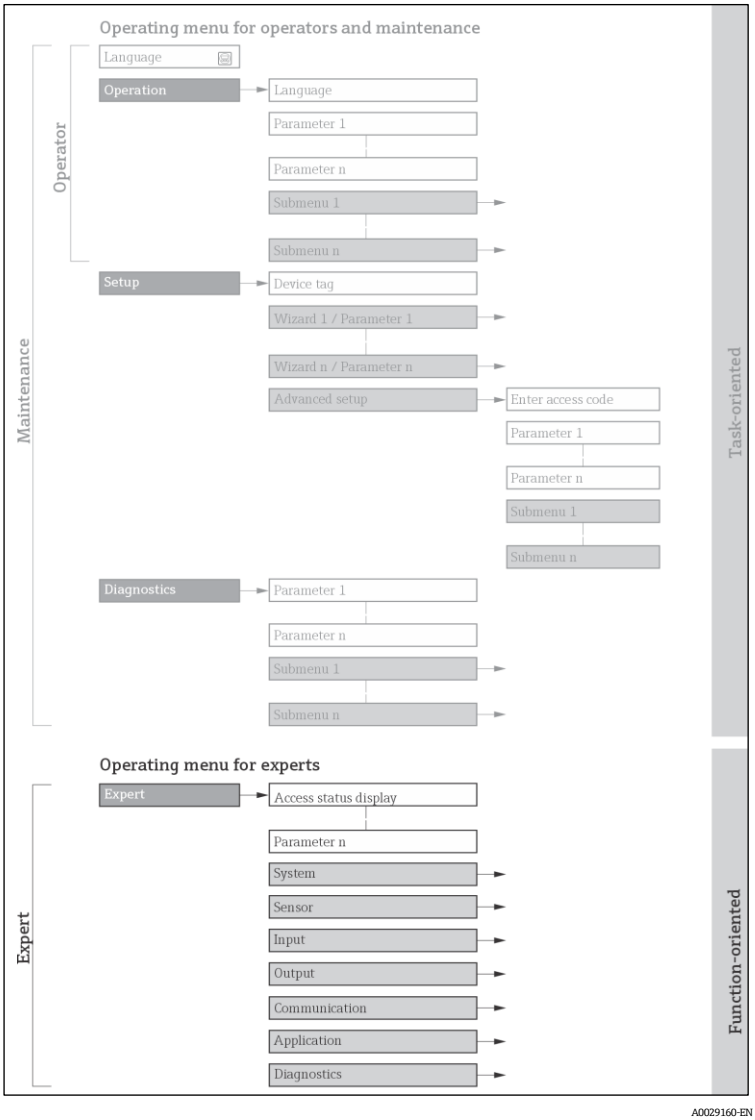
The document is aimed at specialists who work with the device over the entire life cycle and perform specific configurations. It is used to perform tasks that require detailed knowledge of the function of the device:

- Commissioning measurements under difficult conditions
- Optimal adaptation of the measurement to difficult conditions
- Detailed configuration of the communication interface
- Error diagnostics in difficult cases

1.5 Using this document

1.5.1 Document structure

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



1 *Sample graphic for the schematic layout of the operating menu*

NOTICE

- 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 can be found in the Operating Instructions → 🖹.
- Operating concept of the operating menus can also be found in the Operating Instructions → 🖹.

1.5.2 Structure of a parameter description

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

Completed Parameter Name	Description
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
Selection	List of the individual options for the parameter ▪ Option 1 ▪ Option 2
User entry	Parameter entry range
User interface	Display value/data of the parameter
Factory setting	Default setting ex works
Additional information	Additional explanations such as: ▪ On individual options ▪ On display values/data ▪ On the input range ▪ On the factory setting ▪ On the parameter function

1.6 Symbols used

1.6.1 Symbols for types of information

Symbol	Description
 A0011193	Tip Indicates additional information.
 A0028658	Reference to documentation
 A0028659	Reference to page
 A0028660	Reference to graphic
 A0028662	Operation via local display
 A0028663	Operation via operating tool

Symbol	Description
 A0028665	Access code protected parameter

1.6.2 Symbols in graphics

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

1.7 Documentation

1.7.1 Standard documentation

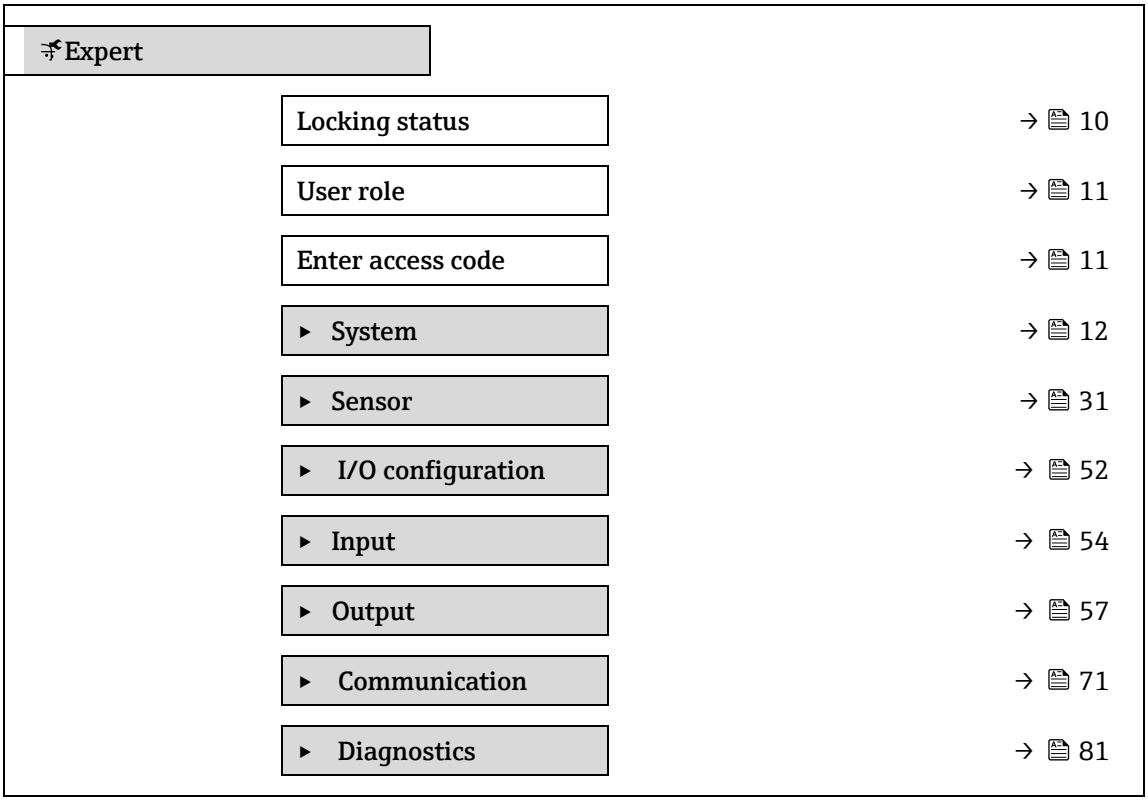
Part Number	Document Type	Description
BA02152C	Operating Instruction	A complete overview of the operations required to install, commission, and maintain the device.
XA02708C	Safety Instruction	Requirements for installing or operating the J22 TDLAS Gas Analyzer related to personnel or equipment safety.
XA03086C	Safety Instruction INMETRO	Requirements for installing or operating the J22 TDLAS Gas Analyzer related to personnel or equipment safety. Document for INMETRO Certification.
XA03087C	Safety Instruction JPNEx	Requirements for installing or operating the J22 TDLAS Gas Analyzer related to personnel or equipment safety. Document for JPNEx Certification.
XA03090C	Safety Instruction PESO/KC	Requirements for installing or operating the J22 TDLAS Gas Analyzer related to personnel or equipment safety. Document for PESO/KC Certification.
TI01607C	Technical Information	Planning aid for your device. The document contains all the technical data on the analyzer.

2 Overview of the Expert 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.

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.



Locking status

Navigation Expert → Locking status

Description Displays the active write protection.

User interface
- Hardware locked
- Temporarily locked

Additional information

User interface

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.

NOTICE

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

Selection

Options	Description
None	The access authorization displayed in the Locking status parameter → 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).

Options	Description
Temporarily locked (priority 4)	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 Operator
Maintenance

Factory setting Maintenance

Additional information Access authorization can be modified via the Enter access code parameter → 📄.
If additional write protection is active, this restricts the current access authorization even further.

NOTICE

▶ Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operating 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.

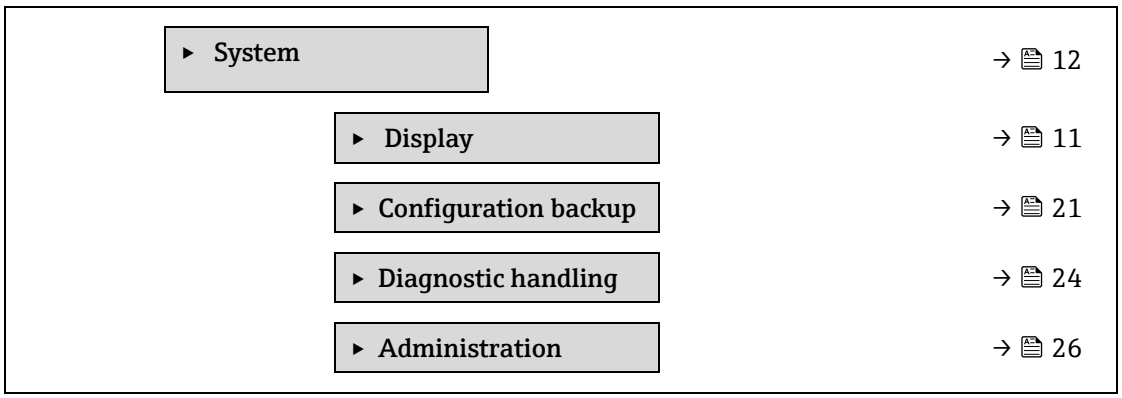
User entry Max. 16-digit character string comprising numbers, letters, and special characters

Factory setting 0000; can be changed by customer

Additional information See the J22 Operating instruction BA02152C → 📖 for instructions on logging in.

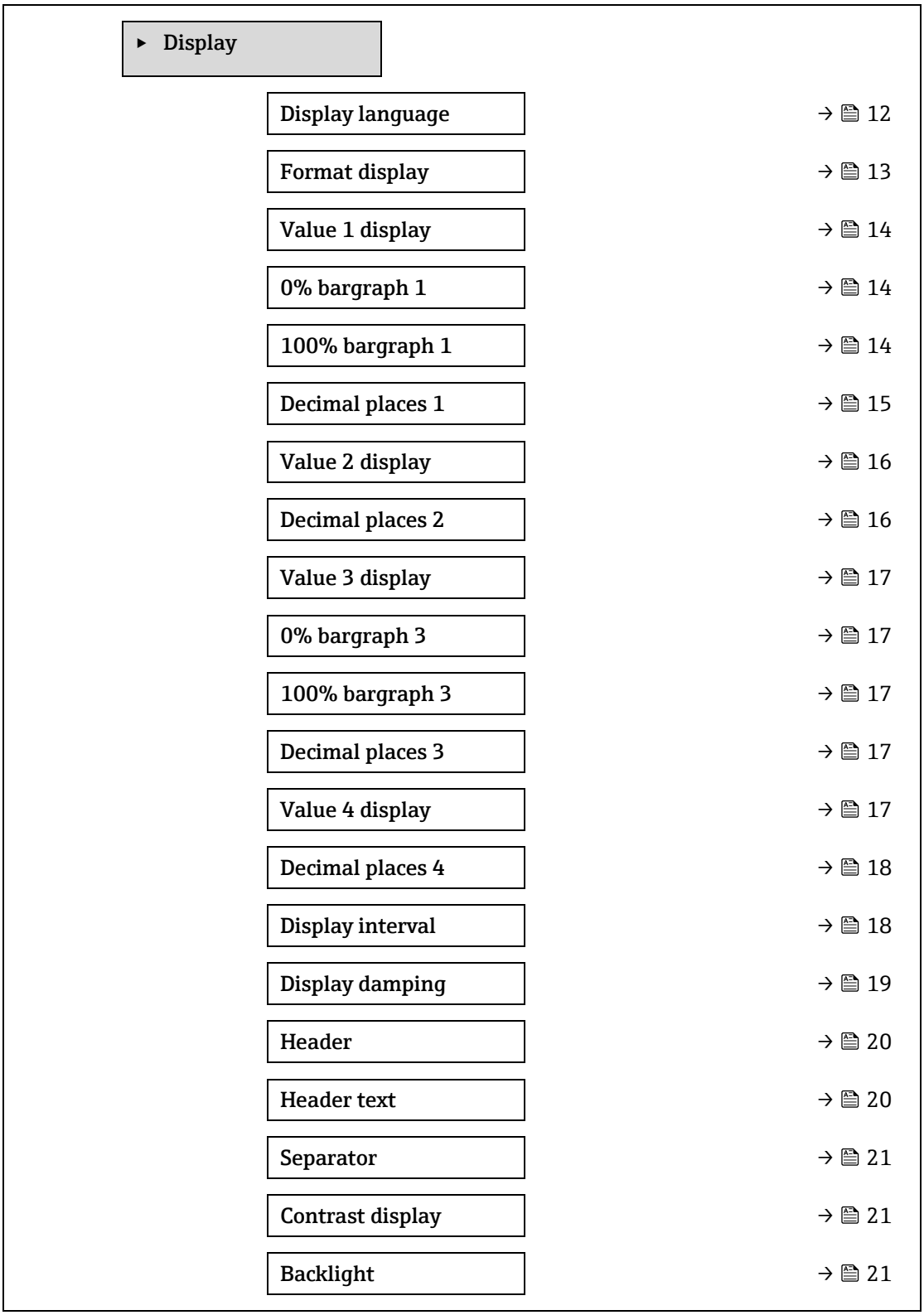
3.1 System

Navigation Expert → System



3.1.1 Display

Navigation Expert → System → Display



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
English
Français
Italiano
русский язык (Russian)
中文 (Chinese)

Factory setting English (alternatively, the ordered language is preset in the device)

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

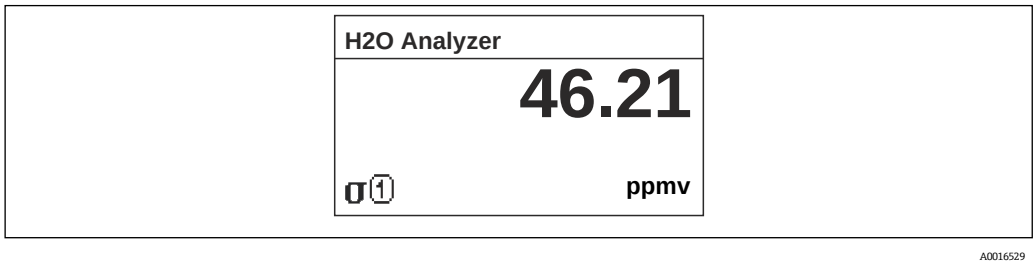
Description
The display format (size, bar graph, etc.) and number of measured values displayed simultaneously (1 to 4) can be configured. This setting only applies to normal operation.

The Value 1 display parameter → to Value 4 display parameters are used to specify which measured values are shown on the local display and in what order.

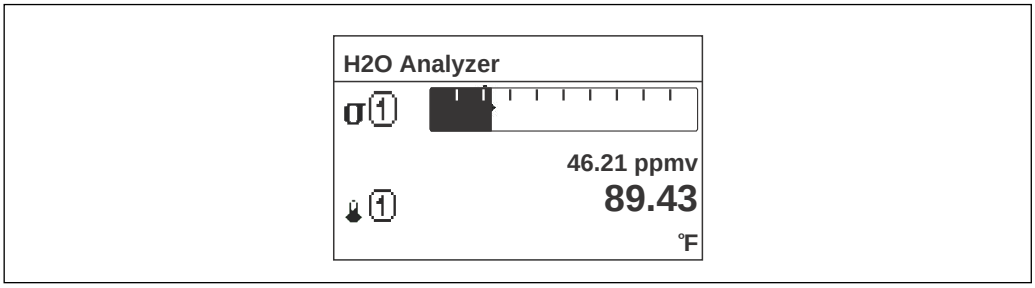
If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured using the Display interval parameter →.

Possible measured values shown on the local display:

"1 value, max. size" option

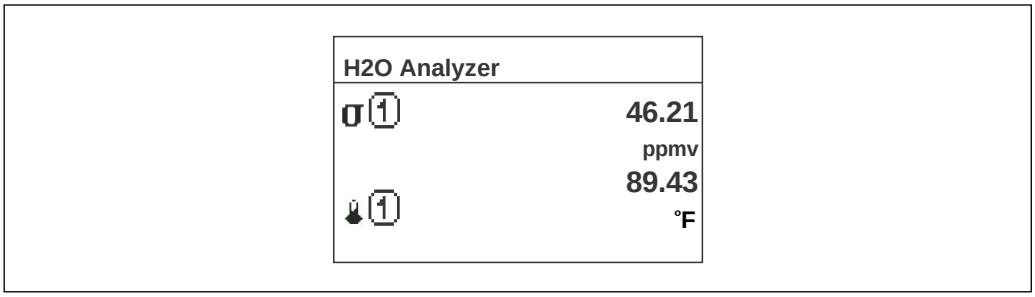


"1 bargraph + 1 value" option



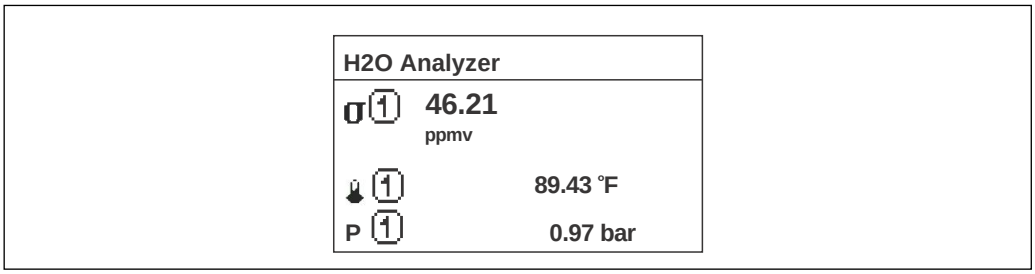
A0013098

"2 values" option



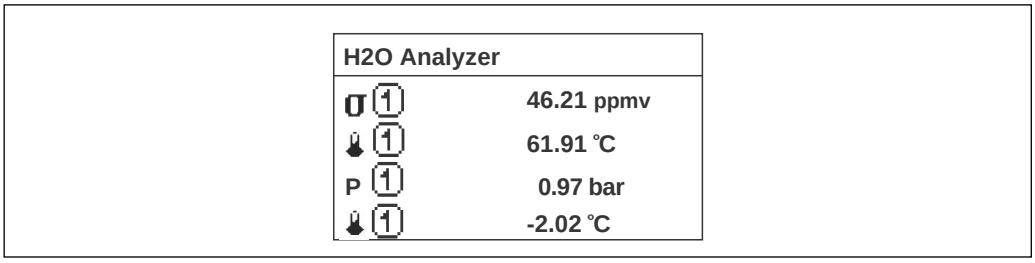
A0013100

"1 value large + 2 values" option



A0013102

"4 values" option



A0013103

Value 1 display

Navigation Expert → System → Display→ Value 1 display

Prerequisite A local display is provided.

Description Use this function to select one of the measured values shown on the local display.

Selection
- Concentration
- Dew point 1[1]
- Dew point 2[1]
- Cell gas pressure
- Cell gas temperature

Factory setting Concentration

Additional information

Description
If several measured values are displayed at once, the measured value selected here will be the first value to be displayed. The value is only displayed during normal operation.
The Format display parameter → is used to specify how many measured values are displayed simultaneously and how.

Dependency
The unit of the displayed measured value is taken from System units →.

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 ppmv

Additional information

Description
The Format display parameter → 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 System units →.

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 ppmv

Additional information

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

[1] Visibility depends on order options or device settings

User entry
The unit of the displayed measured value is taken from System units →.

Decimal places 1

Navigation Expert → System → Display → Decimal places 1

Prerequisite A measured value is specified in the Value 1 display parameter →.

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

Selection Signed floating-point number
- 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 A local display is provided.

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

User entry For the picklist, see the Value 1 display parameter →.

Factory setting None

Additional information
Description
If several measured values are displayed at once, the measured value selected here will be the second value to be displayed. The value is only displayed during normal operation.
The Format display parameter → is used to specify how many measured values are displayed simultaneously and how.

Dependency
The unit of the displayed measured value is taken from System units →.

Decimal places 2

Navigation Expert → System → Display → Decimal places 2

Prerequisite A measured value is specified in the Value 2 display parameter →.

Description Use this function to select the number of decimal places for measured value 2.

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 3 display

Navigation Expert → System → Display → Value 3 display

Prerequisite A local display is provided.

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

Selection For the picklist, see the Value 1 display parameter →.

Factory setting None

Additional information *Description*
If several measured values are displayed at once, 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 → is used to specify how many measured values are displayed simultaneously and how.

Selection
The unit of the displayed measured value is taken from System units →.

0% bargraph value 3

Navigation Expert → System → Display → 0% bargraph 3

Prerequisite A selection was made in the Value 3 display parameter →.

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 None

Additional information *Description*
The Format display parameter → 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 System units →.

100% bargraph value 3

Navigation Expert → System → Display → 100% bargraph 3

Prerequisite A selection was made in the Value 3 display parameter →.

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 None

Additional information

Description
The Format display parameter → 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 →.

Decimal places 3

Navigation Expert → System → Display → Decimal places 3

Prerequisite A measured value is specified in the Value 3 display parameter →.

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 A local display is provided.

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

Selection For the picklist, see the Value 1 display parameter →.

Factory setting None

Additional information

Description
If several measured values are displayed at once, the measured value selected here will be the fourth value to be displayed. The value is only displayed during normal operation.
The Format display parameter → is used to specify how many measured values are displayed simultaneously and how.

Selection
The unit of the displayed measured value is taken from System units →.

Decimal places 4

Navigation Expert → System → Display → Decimal places 4

Prerequisite A measured value is specified in the Value 4 display parameter →.

Description Use this function to select the number of decimal places for measured value 4.

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.

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 *Description*
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.
- The Value 1 display parameter → to Value 4 display parameter → is 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 →.

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 *User entry*
Use this function to enter a time constant (PT1 element[1]) for display damping:
- If a low time constant is entered, the display reacts particularly quickly to fluctuating measured variables.
- On the other hand, the display reacts more slowly if a high time constant is entered.
- Damping is switched off if **0** is entered (factory setting).

[1] Proportional transmission behavior with first order delay

Header

Navigation Expert → System → Display → Header

Prerequisite A local display is provided.

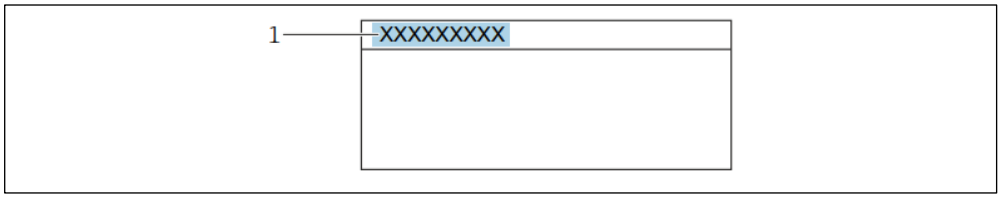
Description Use this function to select the contents of the header of the local display.

Selection
- Device tag
- Free text

Factory setting Device tag

Additional information

Description
The header text only appears during normal operation.



1 Position of the header text on the display

Selection
Device tag is defined in the Device tag parameter →.
Free text is defined in the Header text parameter →.

Header text

Navigation Expert → System → Display → Header text

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

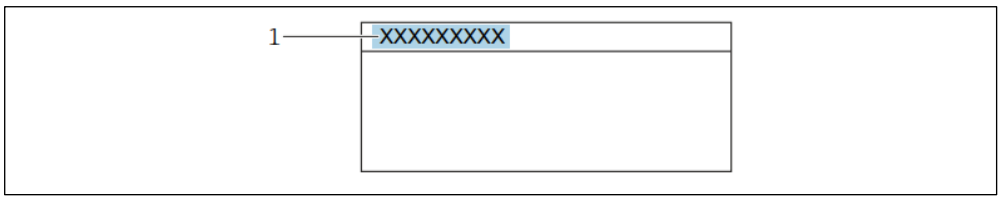
Description Use this function to enter a customer-specific text for the header of the local display.

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

Factory setting . (point)

Additional information

Description
The header text only appears during normal operation.



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
- . (point)
- , (comma)

Factory setting ----------

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 Default value is 50 %

Backlight

Navigation Expert → System → Display → Backlight

Prerequisite A local display is provided.

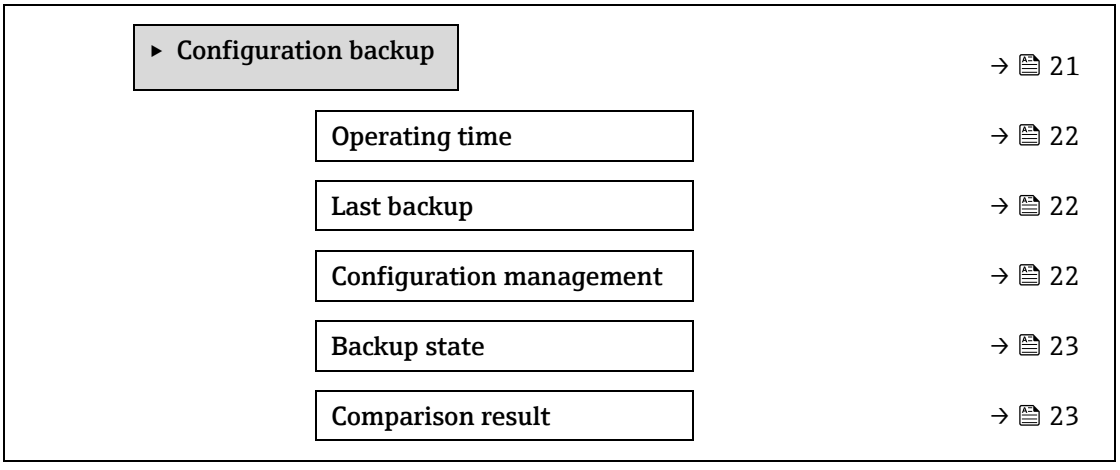
Description Use this function to switch the backlight of the local display on and off.

Selection
- Disable
- Enable

Factory setting Enable

3.1.2 Configuration backup

Navigation Expert → System → Configuration Backup



Operating Time

Navigation Expert → System → Configuration backup → Operating time

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

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

Additional information
User interface
The maximum number of days is 9999, which is equivalent to 27 years.

Last backup

Navigation Expert → System → Configuration 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 → Configuration backup → Configuration management

Description Use this function to select an action to save the data to the device memory.

Selection
- Cancel
- Execute backup
- Restore[1]
- Clear backup data
- Compare[1]

Factory setting Cancel

Additional information
Selection
- **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[1]:** 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!
- **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
- **Compare[1]:** 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 Compar. result parameter.

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

[1] Visibility depends on order options or device settings

Backup state

Navigation Expert → System → Configuration backup → Backup state

Description Displays the status of the data backup process.

User interface
- None
- Backup in progress
- Restoring in progress
- Delete in progress
- Compare in progress
- Restoring failed
- Backup failed

Factory setting None

Comparison result

Navigation Expert → System → Configuration 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 → .

Selection

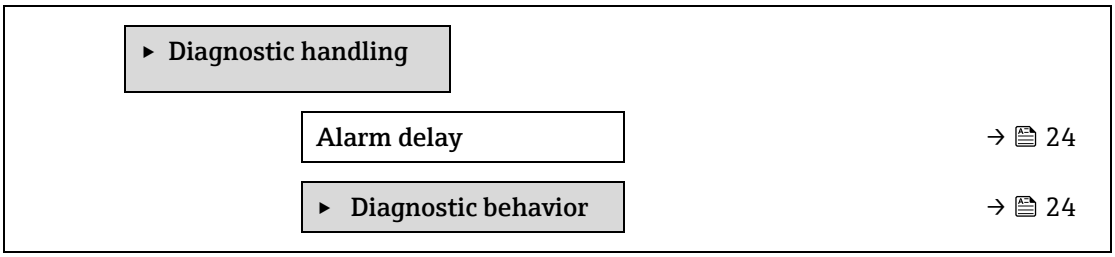
- **Settings identical.** The current device configuration of the HistoROM is identical to the backup copy in the device memory.

  If the transmitter configuration of another device has been transmitted to the device via HistoROM in the 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

Navigation Expert → System → Diagnostic Handling



Alarm delay

Navigation Expert → System → Diagnostic 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 *Result*
This setting affects the following diagnostic messages:
- 832 Electronics temperature too high
- 833 Electronics temperature too low
- 904 Cell gas flow not detected

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.
The following options are available in the **Diagnostic no. xxx** parameters:

Alarm The device stops measurement. The measured value output via Modbus RS485 assume the defined alarm condition. A diagnostic message is generated.
The background lighting changes to red.

Warning The device continues to measure. The measured value output via Modbus RS485 is not affected. A diagnostic message is generated.

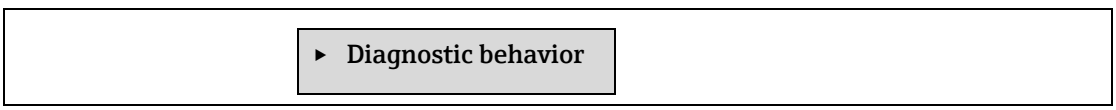
Logbook entry only The device continues to measure. The diagnostic message is displayed only in the Event logbook submenu → and is not displayed in alternation with the operational display.

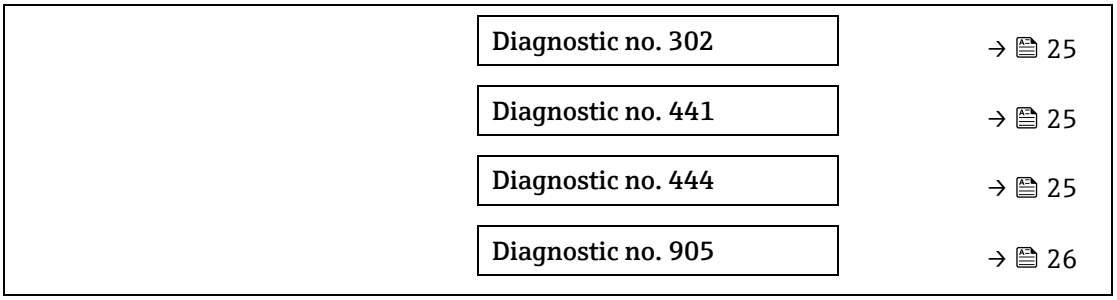
Off The diagnostic event is ignored, and no diagnostic message is generated or entered.

NOTICE

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

Navigation Expert → System → Diagnostic handling → Diagnostic Behavior





Diagnostic no. 302 (Device verification active)

Navigation Expert → System → Diagnostic handling → Diagnostic behavior → Diagnostic no. 302

Description Option for changing the diagnostic behavior of the diagnostic message **302 Device verification active**.

Selection
- Alarm
- Warning

Factory setting Warning

Additional information For a detailed description of the options available, refer to the Diagnostic behavior submenu description → .

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

Navigation Expert → System → Diagnostic handling → Diagnostic 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, refer to the Diagnostic behavior submenu description → .

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

Navigation Expert → System → Diagnostic handling → Diagnostic 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
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available: → 31

Diagnostic no. 905 (Validation failed)

Navigation Expert → System → Diagnostic handling → Diagnostic behavior → Diagnostic no. 905

Description Use this function to change the diagnostic behavior of the **905 Validation failed** diagnostic message.

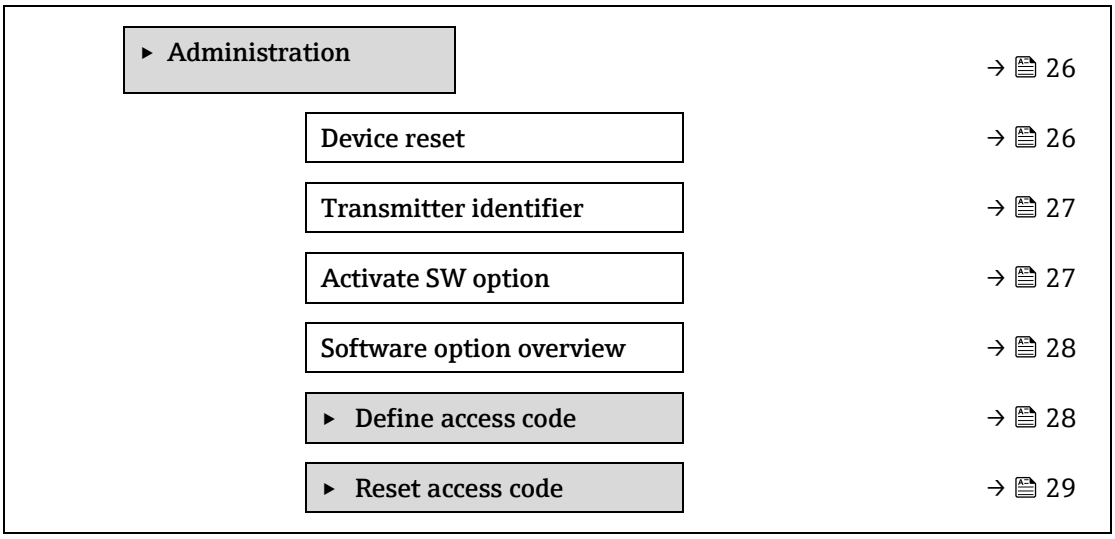
Selection
- Off
- Alarm
- Warning
- Logbook entry only
- Reset

Factory setting Warning

Additional information For a detailed description of the options available, refer to the Diagnostic behavior submenu description → .

3.1.4 Administration

Navigation Expert → System → Administration



Device reset

Navigation Expert → System → Administration → Device reset

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

Selection
- Cancel
- Restart device

- To delivery settings
- Restore S-DAT backup[1]

Factory setting Cancel

Additional information

Options

- **Cancel**. No action is executed, and the user exits the parameter.
- **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.
- **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.
- **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.

Transmitter identifier

Navigation Expert → System → Administration → Transmitter identifier

Description Select transmitter identifier.

User interface

- Unknown
- 500
- 300

Factory setting 300

Activate SW option

Navigation Expert → System → Administration → Activate SW option

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

User entry Max. 10-digit string consisting 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.

User entry

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

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.

[1] Visibility depends on order options or device settings

- Once the activation code has been entered, check if the new software option is displayed in the Software option overview parameter → 📄.
  ↳ The new software option is active if it is displayed.
  ↳ If the new software option is not displayed or all software options have been deleted, the code entered was either incorrect or invalid.
- 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
"Extended HistoROM"
The software options currently enabled are displayed in the Software option overview parameter → 📄.

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

NOTICE

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

Software option overview

Navigation Expert → System → Administration → SW option overview

Description Displays all the software options that are enabled in the device.

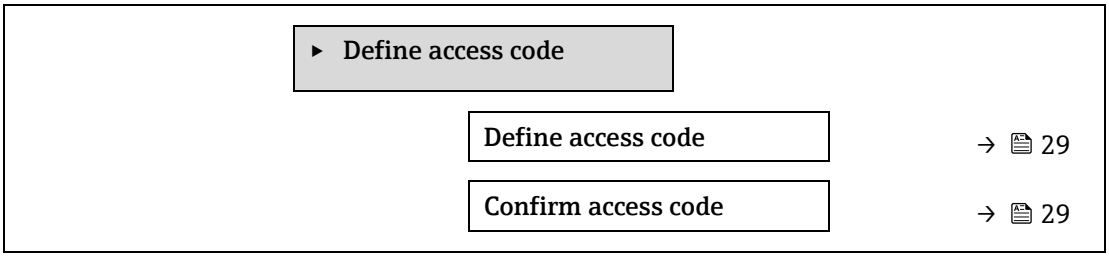
User interface
- Extended HistoROM[1]
- Heartbeat Monitoring [1]
- Heartbeat Verification [1]

Additional information *Description*
Displays all the options that are available if ordered by the customer.

Define access code wizard

The **Define access code** wizard 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 → Define access code



[1] Visibility depends on order options or device settings

Define access code

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

NOTICE

- 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 → .
- 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

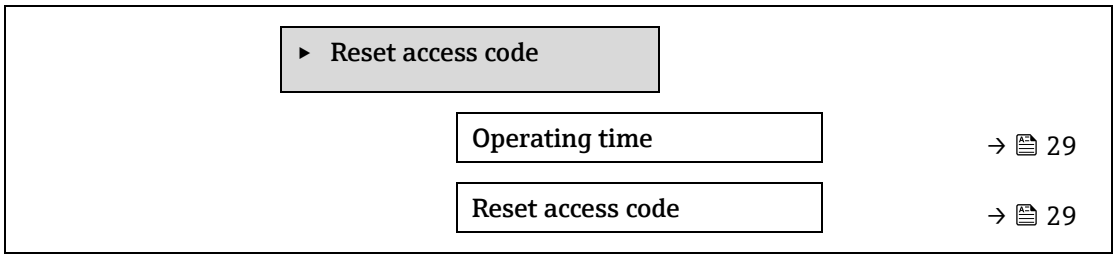
Navigation Expert → System → Administration → Define access code → Confirm code

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 access code



Operating time

Navigation Expert → System → Administration → Reset access code → Operating time

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

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

Additional information

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

Reset access code

Navigation

Expert → System → Administration → Reset access code → Reset access 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

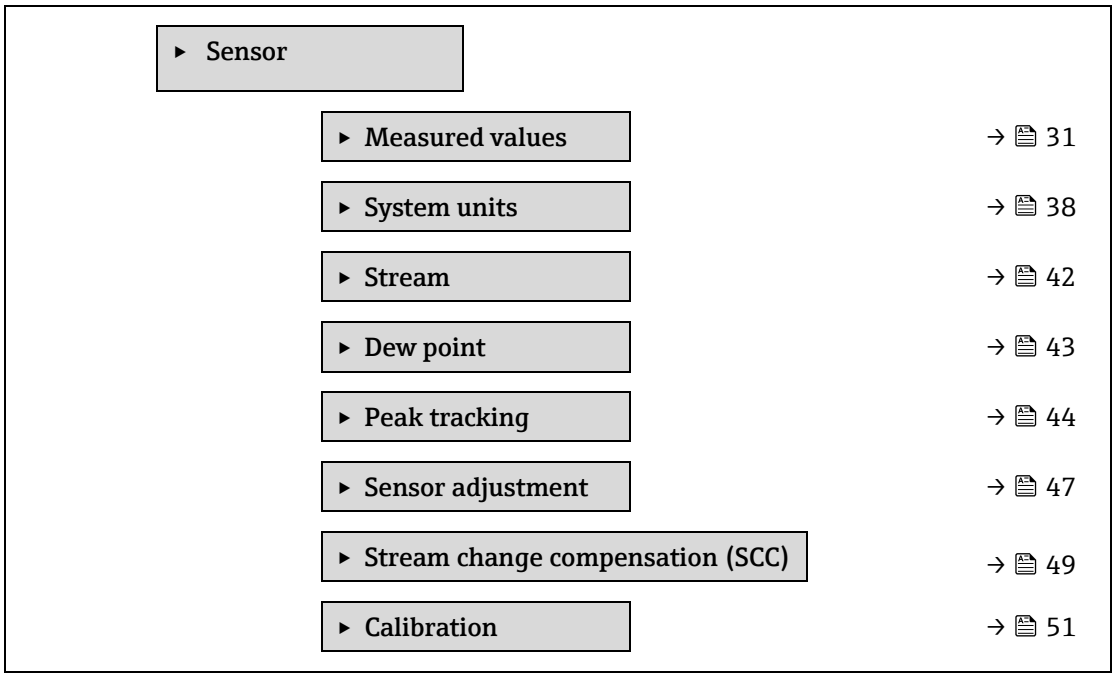
Additional information

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

User entry
The reset code can only be entered via:
- Web browser
- Fieldbus

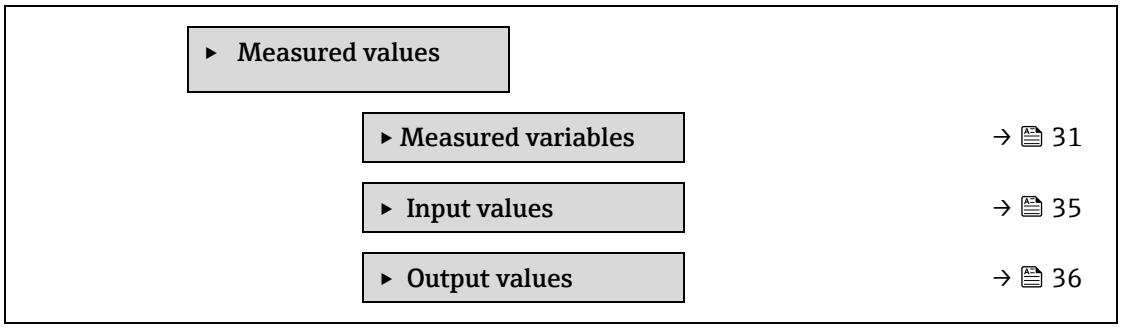
3.2 Sensor

Navigation Expert → Sensor



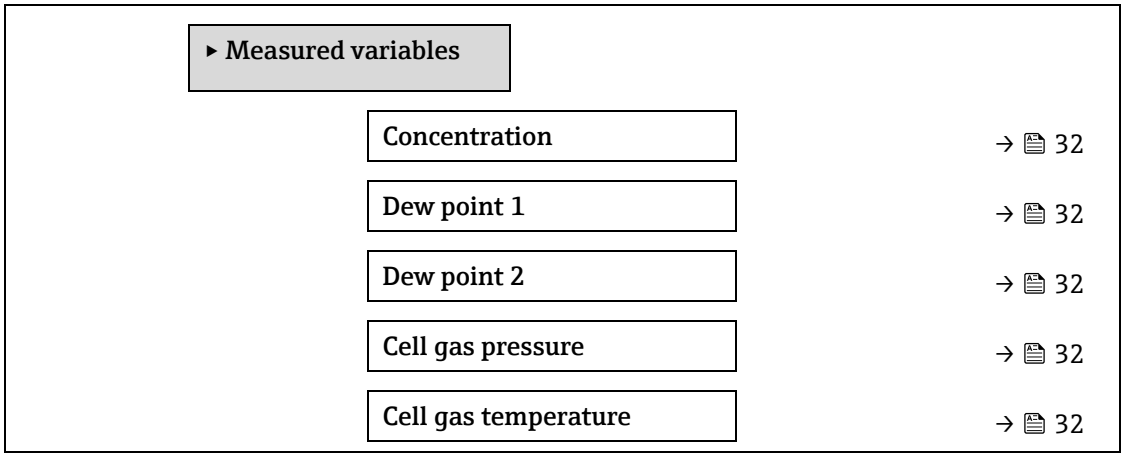
3.2.1 Measured values

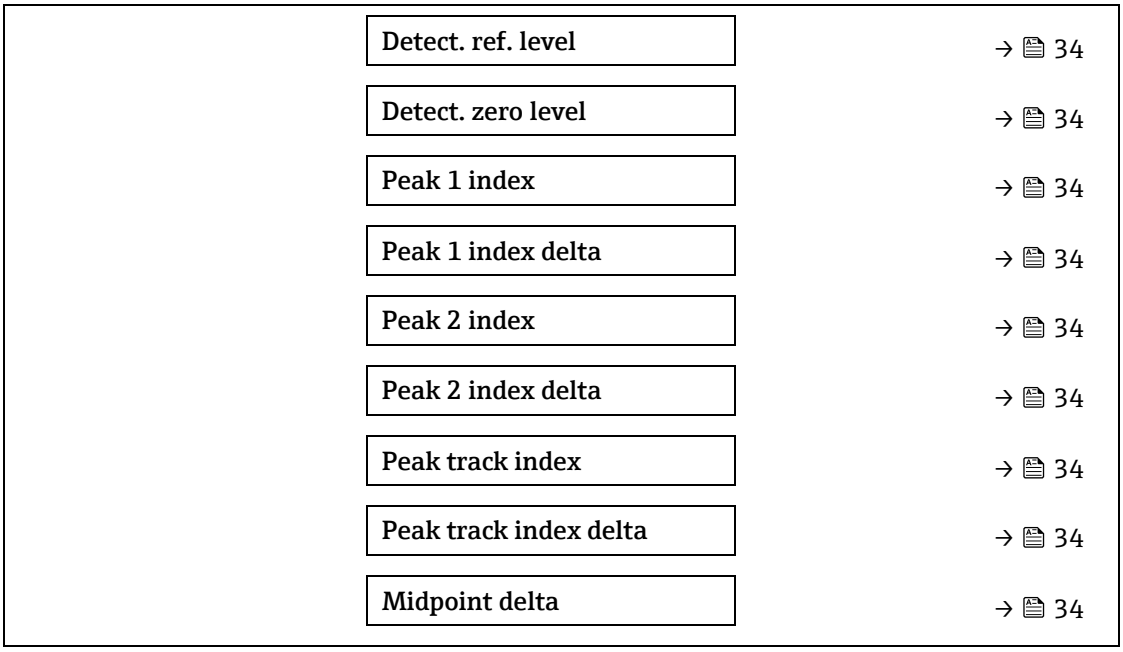
Navigation Expert → Sensor → Measured values



Measured variables submenu

Navigation Expert → Sensor → Measured values → Measured variables





Concentration

Navigation Expert → Sensor → Measured values → Measured variables → Concentration

Description Displays the concentration of the analyte currently measured in the sample cell.

User interface 0 to 1000000 ppmv

Additional information The unit is taken from the concentration unit parameter → .
Concentration refers to the amount of water vapor in gaseous phase within the gas sample to be measured.

Dew point 1

Navigation Expert → Sensor → Measured values → Measured variables → Dew point 1

Prerequisite The Analyte type is moisture “H2O.”
In the Dew point method 1 parameter, the Off selection is not selected.

Description Displays the moisture dew point temperature that is currently calculated.

User interface Signed floating-point number

Additional information The unit is taken from the temperature unit parameter → .
Dew point is the temperature at which moisture will start to condense into liquid for a given concentration and pressure. There are several industry accepted methods for moisture dew point calculation. See BA02152C → for more details.

Dew point 2

Navigation Expert → Sensor → Measured values → Measured variables → Dew point 2

Prerequisite The Analyte type is moisture "H2O".
In the Dew point method 2 parameter, the Off selection is not selected.

Description	Displays the moisture dew point temperature that is currently calculated.
User interface	Signed floating-point number
Additional information	The unit is taken from the temperature unit parameter →. Dew point is the temperature at which moisture will start to condense into liquid for a given concentration and pressure. There are several industry accepted methods for moisture dew point calculation. See BA02152C → for more details.

Cell gas pressure

Navigation	Expert → Sensor → Measured values → Measured variables → Cell gas pressure
Description	Displays the gas pressure currently measured in the sample cell.
User interface	0 to 1000000 ppmv
Additional information	The unit is taken from the pressure unit parameter →. The current pressure of the sample cell during measurement.

Cell gas temperature

Navigation	Expert → Sensor → Measured values → Measured variables → Cell gas temperature
Description	Displays the gas temperature currently measured in the sample cell.
User interface	Signed floating-point number
Additional information	The unit is taken from the temperature unit parameter →. The current temperature of the sample cell during measurement.

Detector reference level

Navigation	Expert → Sensor → Measured values → Measured variables → Detector reference level
Description	Displays the laser detector reference level currently measured.
User interface	0 to 5 mA
Additional information	The magnitude of the DC laser power. An out-of-range value can indicate the optics need to be cleaned or there is an alignment problem.

Detector zero level

Navigation	Expert → Sensor → Measured values → Measured variables → Detector zero level
Description	Displays the laser detector zero level currently measured.
User interface	0 to 5 mA
Additional information	The DC laser power when the laser is turned off (e.g., dark current).

Peak 1 index

Navigation Expert → Sensor → Measured values → Measured variables → Peak 1 index

Description Displays the absorption peak 1 index position in the currently measured 2f spectrum.

User interface 0.0 to 511.0

Additional information Position of the absorption peak along the scan.

Peak 1 index delta

Navigation Expert → Sensor → Measured values → Measured variables → Peak 1 index delta

Description Displays the difference in the peak 1 index position and the target index in the currently measured 2f spectrum.

User interface -511.0 to 511.0

Peak 2 index

Navigation Expert → Sensor → Measured values → Measured variables → Peak 2 index

Prerequisite The analyzer is calibrated for two peaks.

Description Displays the absorption peak 2 index position in the currently measured 2f spectrum.

User interface 0.0 to 511.0

Additional information Position of the secondary peak along the scan. Used for peak tracking purposes.

Peak 2 index delta

Navigation Expert → Sensor → Measured values → Measured variables → Peak 2 index delta

Prerequisite The analyzer is calibrated for two peaks.

Description Displays the difference in the peak 2 index position and the target index in the currently measured 2f spectrum.

User interface -511.0 to 511.0

Peak track index

Navigation Expert → Sensor → Measured values → Measured variables → Peak track index

Description Displays the peak track index for the peak used for peak tracking in the currently measured 2f spectrum.

User interface 0.0 to 511.0

Additional information *Description*
If Off is selected in the Peak tracking analyzer control parameter, this value will be zero. Otherwise, this value will mimic the parameter Peak 1 to n index depending on which peak is being used for peak tracking.

Peak track index delta

Navigation Expert → Sensor → Measured values → Measured variables → Peak track index delta

Description Displays the difference in the peak track index and the target index in the currently measured 2f spectrum.

User interface -511.0 to 511.0

Additional information *Description*
If Off is selected in the Peak tracking analyzer control parameter, this value will be zero. Otherwise, this value will mimic the parameter Peak 1 to n index delta depending on which peak is being used for peak tracking.

Midpoint delta

Navigation Expert → Sensor → Measured values → Measured variables → Midpoint delta

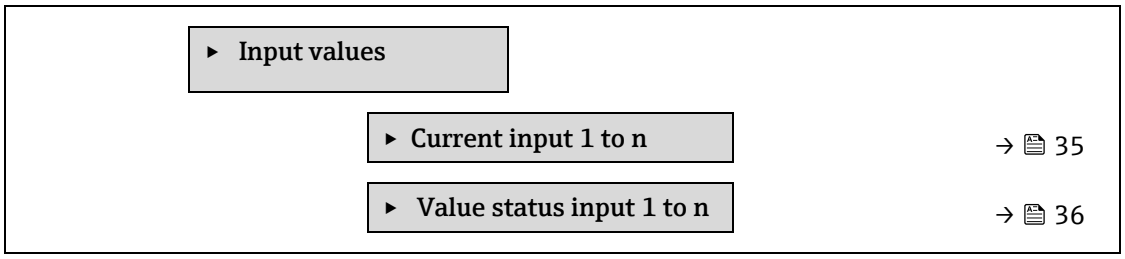
Description Displays the difference in the calibrated midpoint value and the currently used midpoint value.

User interface 0.0 to 120.0 mA

Additional information *Description*
If Off is selected in the Peak tracking analyzer control parameter, this value will be zero. Otherwise, this value will be the amount of change applied to the calibrated midpoint value by the peak tracking algorithm.

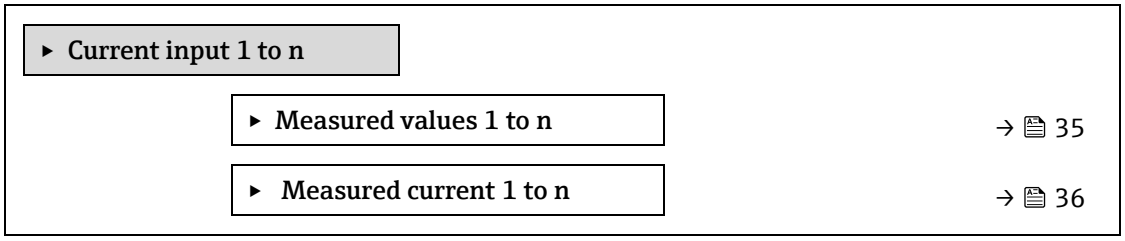
Input values submenu

Navigation Expert → Sensor → Measured val. → Input values



Current input 1 to n submenu

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



Measured values 1 to n

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

Description Displays the current input value.

User interface Signed floating-point number

Measured current 1 to n

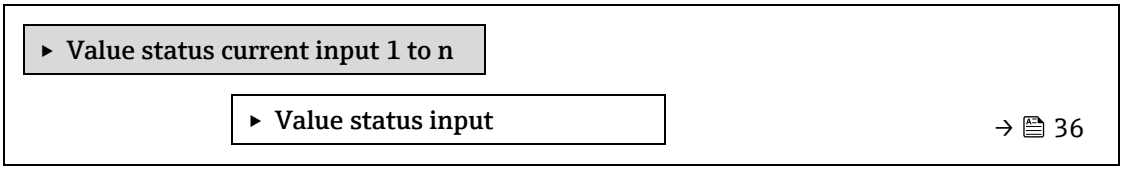
Navigation Expert → Sensor → Measured values → Input values → Current input 1 to n → Measured current 1 to n

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 values → Input values → Value status input 1 to n



Value status input

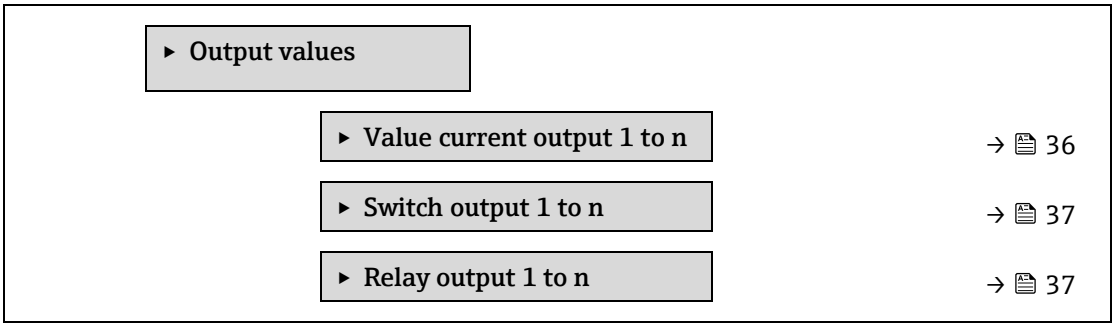
Navigation Expert → Sensor → Measured values → Input values → Value status input 1 to n → Value status input

Description Displays the current input signal level.

User interface
- High
- Low

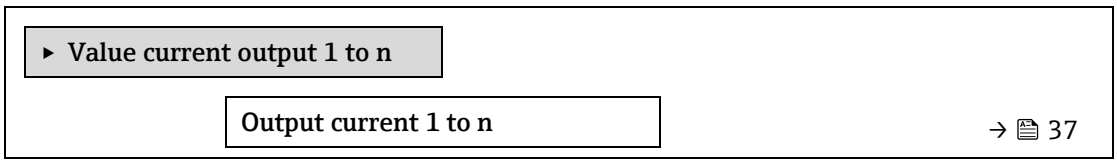
Output values submenu

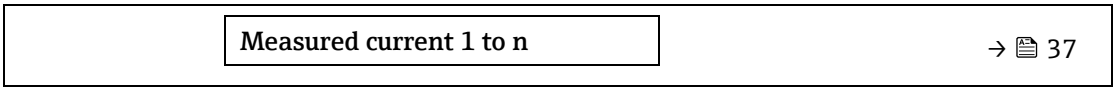
Navigation Expert → Sensor → Measured val. → Output values



Value current output 1 to n submenu

Navigation Expert → Sensor → Measured val. → Output values → Val. curr.outp 1 to n





Output current 1 to n

Navigation Expert → Sensor → Measured values → Output values → Value current output 1 to n → Output current 1 to n

Description Displays the current value currently calculated for the current output.

User interface 0 to 22.5 mA

Measured current 1 to n

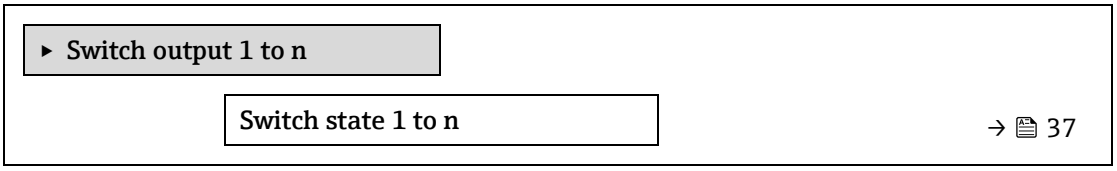
Navigation Expert → Sensor → Measured val. → Output values → Val. Current output 1 to n → Measured current 1 to n

Description Displays the actual measured value of the output current.

User interface 0 to 30 mA

Switch output 1 to n submenu

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



Switch state 1 to n

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

Prerequisite The **Switch** option is selected in the Operating mode parameter → .

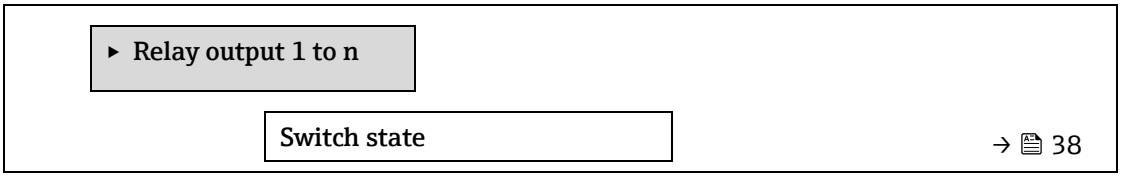
Description Displays the current switch status of the status output.

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 cycles	→ 38
Max. switch cycles number	→ 38

Switch state

Navigation Expert → Sensor → Measured val. → Output values → Relay outpt 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

Navigation Expert → Sensor → System units

▸ System units	
Concentration unit (ppmv)	→ 39
Temperature unit (°C)	→ 39
Pressure unit (bar)	→ 40
Length unit (m)	→ 40
Date/time format	→ 40

	▸ User-specific units	→ 41

Concentration unit

Navigation Expert → Sensor → System units → Concentration unit

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

Selection
- ppmv
- ppbv
- %vol
- lb/MMscf
- mg/sm3
- mg/Nm3
- User conc.

Factory setting ppmv

Additional information

Effect
The selected unit applies for:
- Concentration parameter →.
- Concentration offset →
- Validation concentration →
- Measured concentration →
- Concentration average →
- Concentration standard deviation →
- Concentration minimum →
- Concentration maximum →

Selection
For an explanation of the abbreviated units, see Approval specific factory settings →.

Temperature unit

Navigation Expert → Sensor → System units → Temperature unit

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

Selection

SI units
- °C
- K

US units
- °F
- °R

Factory setting Approval-specific:
- °C
- °F

Additional information

Effect
The selected unit applies for:
- Cell gas temperature →
- Dew point 1 parameter →
- Dew point 2 parameter →

Selection
For an explanation of the abbreviated units, see Approval specific factory settings →.

Pressure unit

Navigation Expert → Sensor → System units → Pressure unit

Description Use this function to select the unit for the pipe pressure.

Selection

SI units
- MPa a
- MPa g
- kPa a
- kPa g
- Pa a
- Pa g
- bar
- bar g

US units
- psi a
- psi g

Factory setting Approval-specific:
- bar a
- psi a

Additional information

Result
The unit is taken from:
- Cell gas pressure value parameter →
- Pipeline pressure fixed →
- Pipeline pressure →

Selection
For an explanation of the abbreviated units, see Approval specific factory settings →.

Length unit

Navigation Expert → Sensor → System units → Length unit

Description Use this function to select the length unit for nominal diameter.

Selection
- m
- ft
- in
- mm
- µm

Factory setting m

Additional information

Selection
For an explanation of the abbreviated units, see Approval specific factory settings →.

Date/time format

Navigation Expert → Sensor → System units → Date/time format

Description Use this function to select the desired time format for calibration history.

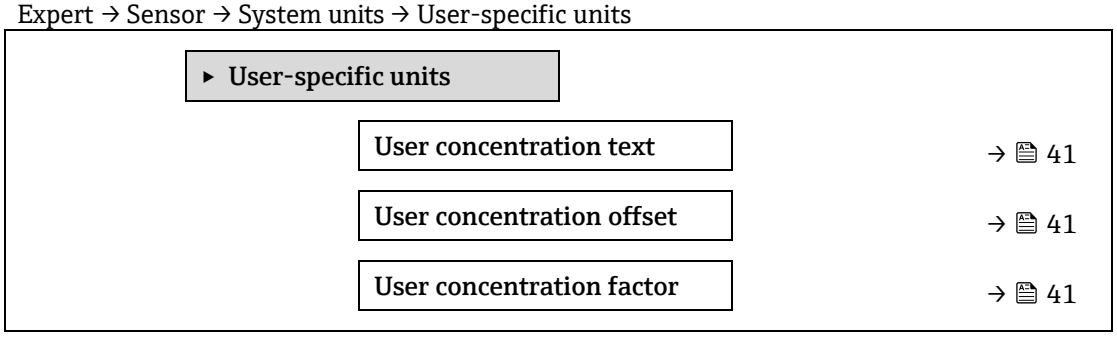
Selection
- dd.mm.yy hh:mm
- dd.mm.yy hh:mm am/pm
- mm/dd/yy hh:mm
- mm/dd/yy hh:mm am/pm

Factory setting dd.mm.yy hh:mm

Additional information *Selection*
For an explanation of the abbreviated units, see Approval specific factory settings → 📄.

User-specific units submenu

Navigation Expert → Sensor → System units → User-specific units



User concentration text

Navigation Expert → Sensor → System units → User-specific units → User concentration text

Description Use this function to enter a text for the user-specific unit of concentration. The corresponding concentration units are generated automatically.

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

Factory setting User conc.

Additional information *Result*
The defined unit is shown as an option in the choose list of the concentration unit parameter → 📄.

Example
Enter text "ppmw" for parts per million by weight.

User concentration offset

Navigation Expert → Sensor → System units → User-specific units → User concentration offset

Description Use this function to enter the zero-point shift for the user-specific concentration unit.

User entry Signed floating-point number

Factory setting 0.0

Additional information Value in user-specific unit = (factor × value in basic unit) + offset

User concentration factor

Navigation Expert → Sensor → System units → User-specific units → User concentration factor

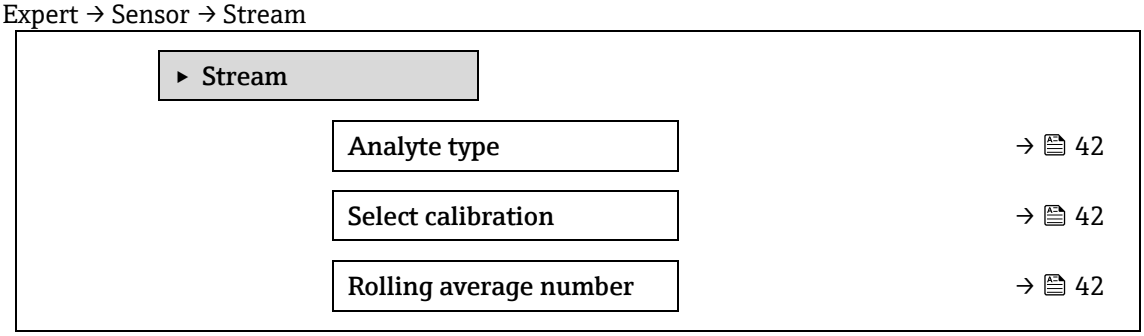
Description Use this function to enter a quantity factor for the user-specific concentration unit.

User entry Signed floating-point number

Factory setting 1.0

3.2.3 Stream

Navigation Expert → Sensor → Stream



Analyte type

Navigation Expert → Sensor → Stream → Analyte type

Description Displays the analyte of interest the analyzer has been calibrated for.

User interface
- H2O
- CO2
- H2S
- CH4
- NH3
- HCl
- O2
- CO
- SO2
- C2H2

Select calibration

Navigation Expert → Sensor → Stream → Select calibration

Description Select the calibration to use for measurement. The analyzer may have several calibrations to choose from.

Selection
- 1
- 2
- 3
- 4

Factory setting 1

Additional information Some analyzers may be configured with multiple calibrations including a calibration for validation gas. Refer to the Calibration Reports provided with this shipment for information on the stream calibrations.

Rolling average number

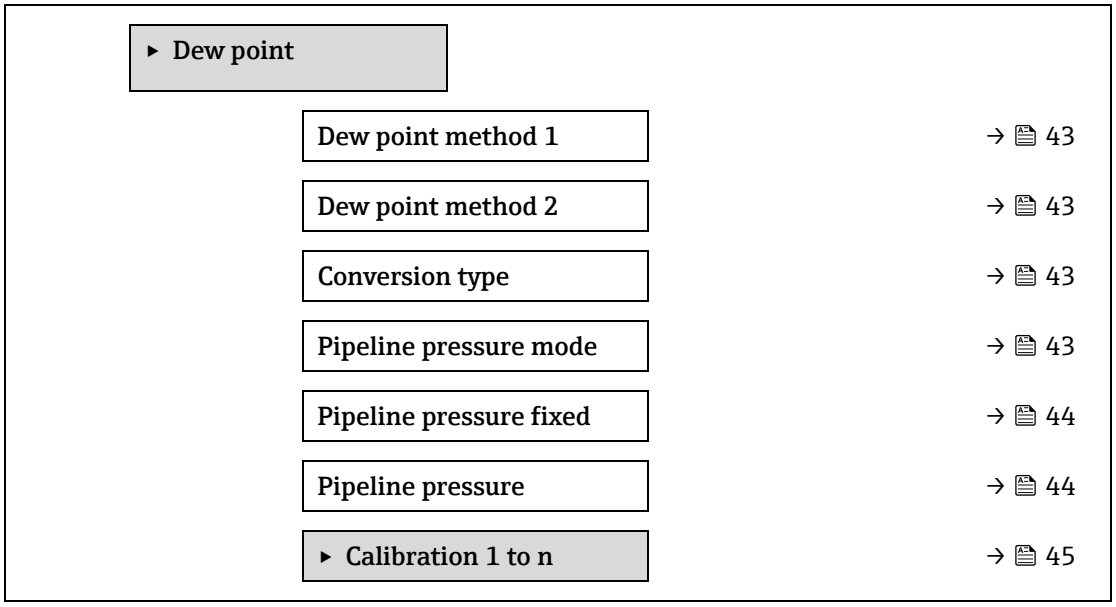
Navigation Expert → Sensor → Stream → Rolling average number

Description Displays the number of concentration measurements included in the rolling average.

User interface 1 to 256

3.2.4 Dew point

Navigation Expert → Sensor → Dew point



Dew point method 1

Navigation Expert → Sensor → Dew point → Dew point method 1

Description Select the dew point temperature method to use for conversion from concentration and pressure.

Selection
- Off
- ASTM1
- ASTM2
- ISO
- AB

Factory setting Off

Dew point method 2

Navigation Expert → Sensor → Dew point → Dew point method 2

Description Select the dew point temperature method to use for conversion from concentration and pressure.

Selection
- Off
- ASTM1
- ASTM2
- ISO
- AB

Factory setting Off

Conversion type

Navigation Expert → Sensor → Dew point → Conversion type

Description Select to use ideal or real gas laws for the dew point method.

Selection
- Ideal
- Real

Factory setting Ideal

Pipeline pressure mode

Navigation Expert → Sensor → Dew point → Pipeline pressure mode

Description Select how the pipeline pressure will be input.

Selection
- Fixed value
- External value

Factory setting Fixed

Pipeline pressure fixed

Navigation Expert → Sensor → Dew point → Pipeline pressure fixed

Description Enter the fixed pipeline pressure value.

User entry Signed floating-point number

Factory setting 0.0000 bar

Pipeline pressure external

Navigation Expert → Sensor → Dew point → Pipeline pressure external

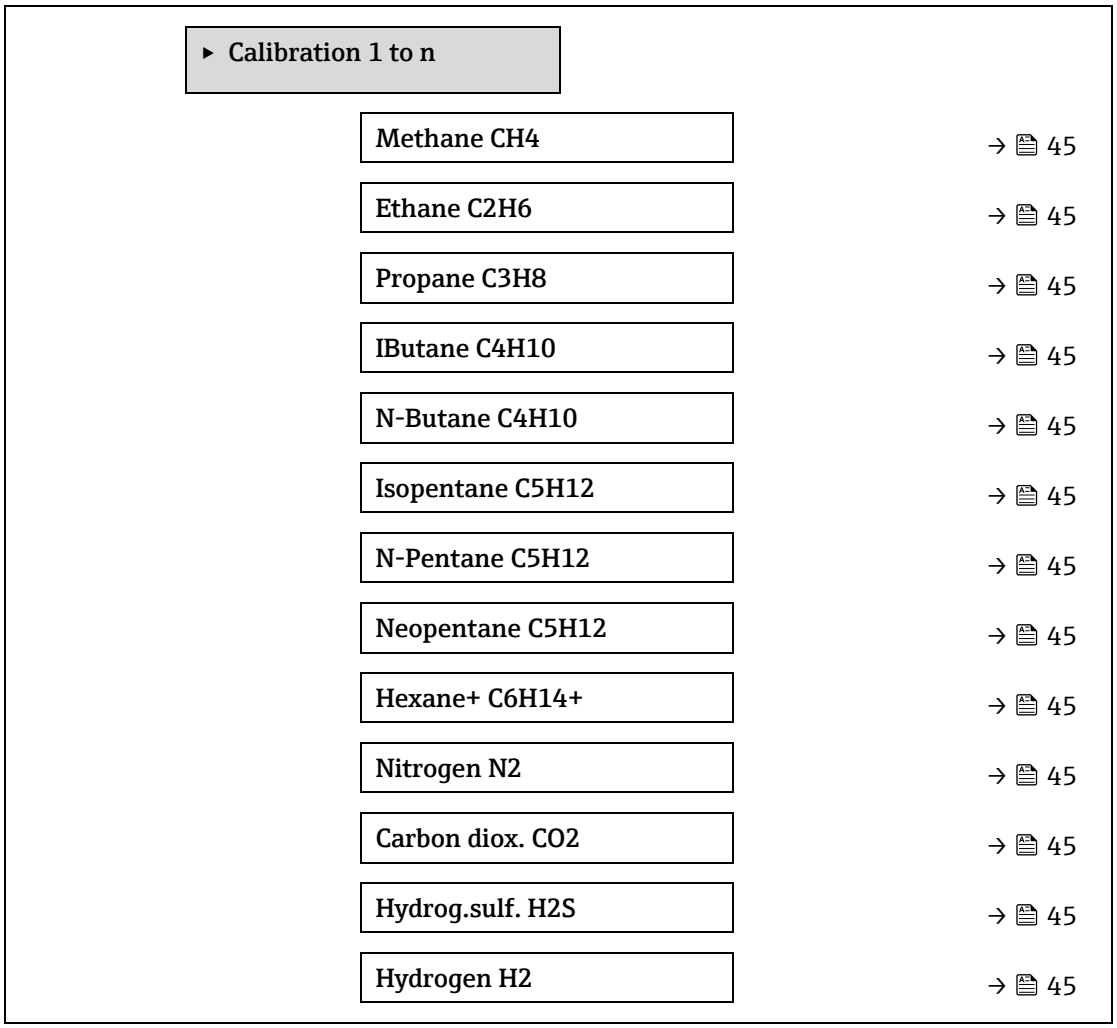
Description Enter the external pipeline pressure value.

User entry Signed floating-point number

Factory setting 0.0000 bar

Calibration 1 to n submenu

Navigation Expert → Sensor → Dew point → Calibration 1 to n



Component (n)

Navigation Expert → Sensor → Dew point → Calibration 1 to n → Component (n)

Description Describes the mole fraction of each background component within the gas stream.

The term “mol” in the table below is an abbreviation for mole fraction.

Parameter	Description	User entry	Factory setting
Stream change compensation	Enables or disables the Stream Change Compensation feature.	▪ On ▪ Off	Off
Methane CH4	Sets the mole fraction of Methane in the dry gas mixture.	0.4 to 1.0 mol	0.75 mol
Ethane C2H6	Sets the mole fraction of Ethane in the dry gas mixture.	0.0 to 0.2 mol	0.1 mol
Propane C3H8	Sets the mole fraction of Propane in the dry gas mixture.	0.0 to 0.15 mol	0.05 mol
IButane C4H10	Sets the mole fraction of Ibutane in the dry gas mixture.	0.0 to 0.1 mol	0 mol

Parameter	Description	User entry	Factory setting
N-Butane C4H10	Sets the mole fraction of N-Butane in the dry gas mixture.	0.0 to 0.1 mol	0 mol
Isopentane C5H12	Sets the mole fraction of Isopentane in the dry gas mixture.	0.0 to 0.1 mol	0 mol
N-Pentane C5H12	Sets the mole fraction of N-Pentane in the dry gas mixture	0.0 to 0.1 mol	0 mol
Neopentane C5H12	Sets the mole fraction of Neopentane in the dry gas mixture	0.0 to 0.1 mol	0 mol
Hexane+ C6H14+	Sets the mole fraction of Hexane+ in the dry gas mixture	0.0 to 0.1 mol	0 mol
Nitrogen N2	Sets the mole fraction of Nitrogen in the dry gas mixture.	0.0 to 0.55 mol	0 mol
Carbon dioxide CO2	Sets the mole fraction of Carbon dioxide in the dry gas mixture.	0.0 to 0.3 mol	0.1 mol
Hydrogen sulfide H2S	Sets the mole fraction of Hydrogen sulfide in the dry gas mixture.	0.0 to 0.05 mol	0 mol
Hydrogen H2	Sets the mole fraction of Hydrogen in the dry gas mixture.	0.0 to 0.2 mol	0 mol

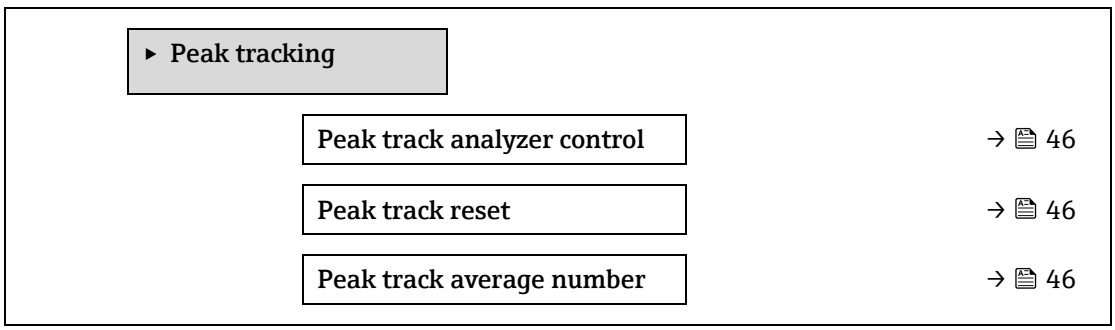
User entry Positive floating-point value (reference each component in above table).

Factory setting Refer to table.

Additional information The mole fraction of each background component should add up to 1.

3.2.5 Peak tracking

Navigation Expert → Sensor → Peak tracking



Peak track analyzer control

Navigation Expert → Sensor → Peak tracking → Peak track analyzer control

Description Switch peak track on or off for the analyzer. There are separate peak track settings for each calibration. Normal operation peak tracking should be on.

Selection
- Off
- On

Factory setting Off

Peak track reset

Navigation Expert → Sensor → Peak tracking → Peak track reset

Description Reset analyzer peak midpoint current value to original calibrated peak location.

Selection
- Off
- Reset

Factory setting Off

Peak track average number

Navigation Expert → Sensor → Peak tracking → Peak track average number

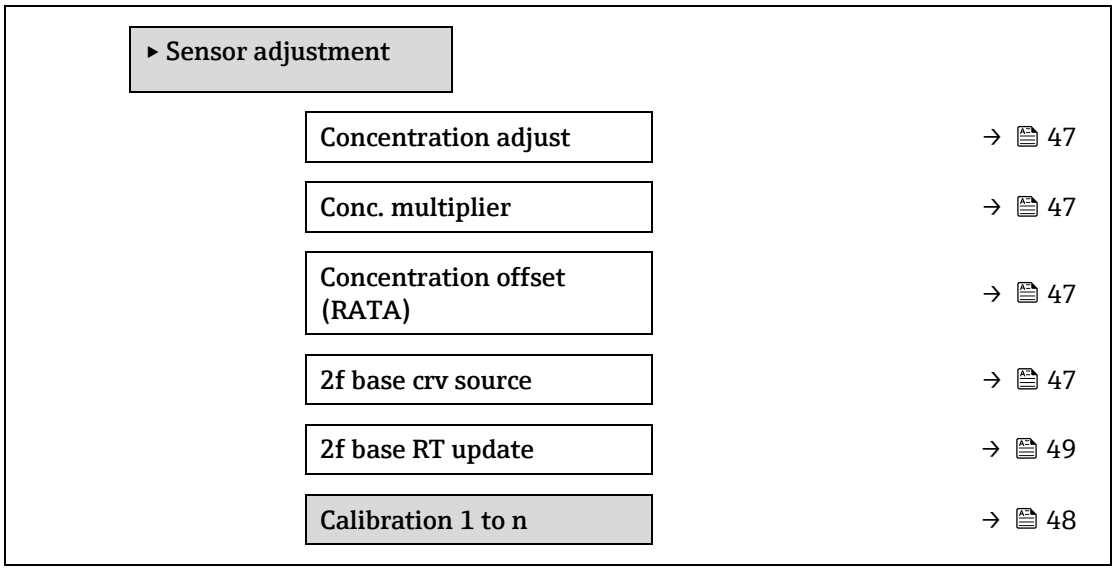
Description Average number of peak index measurements used for peak tracking.

User entry 1 to 3600

Factory setting 60

3.2.6 Sensor adjustment

Navigation Expert → Sensor → Sensor adjustment



Concentration adjust

Navigation Expert → Sensor → Sensor adjustment → Concentration adjust

Description Switch concentration adjustment feature (e.g., concentration multiplier and offset) on or off.

Selection
- On
- Off

Factory setting Off

Additional information Allows user definable adjustment of the analyzer reading without affecting factory calibration.

Conc. multiplier

Navigation Expert → Sensor → Sensor adjustment → Conc. multiplier

Description Set the value that the concentration is multiplied by when concentration adjustment is turned on.

User interface Signed floating-point number

Factory setting 1.0000

Concentration offset (RATA)

Navigation Expert → Sensor → Sensor adjustment → Concentration offset (RATA)

Description Set the value added (i.e., offset) to the concentration when concentration adjustment is turned on.

User interface Signed floating-point number

Factory setting 0.0000 ppmv

2f base curve source

Navigation Expert → Sensor → Sensor adjustment → 2f base curve source

Description Select source for base curve (i.e., Ref0 from factory or Ref0 from last RT update) used in measurement calculations.

Selection
- Ref0 curve
- Ref0 RT curve

Factory setting Ref0 curve

2f base RT update

Navigation Expert → Sensor → Sensor adjustment → 2f base curve source

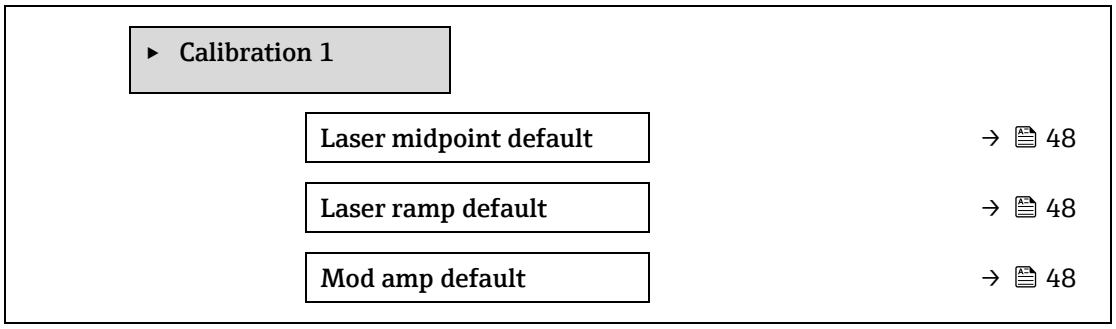
Description When Ref0 RT curve is selected, start will initiate saving the RT (Real Time) base curve data for measurement calculations.

Selection
- Cancel
- Start

Factory setting Ref0 curve

Calibration 1 to n submenu

Navigation Expert → Sensor → Sensor adjustment → Calibration 1 to n



Laser midpoint default

Navigation Expert → Sensor → Sensor adjustment → Calibration 1 to n → Laser midpoint default

Description Displays factory calibrated midpoint for each calibration stream.

User interface 0 to 120 mA

Additional information This value serves as a starting point for midpoint delta to optimized peak position.

Laser ramp default

Navigation Expert → Sensor → Sensor adjustment → Calibration 1 to n → Laser ramp default

Description Displays factory calibrated ramp for each calibration stream.

User interface 0 to 120 mA

Additional information Laser ramp represents the scan width of the spectrum.

Laser modulation amplitude default

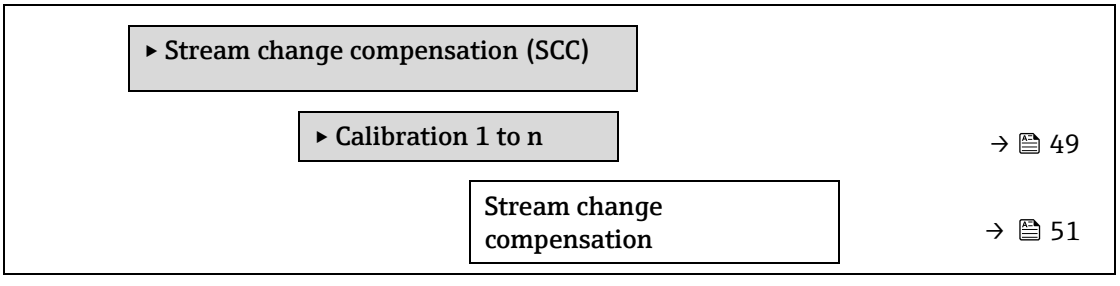
Navigation Expert → Sensor → Sensor adjustment → Calibration 1 to n → Mod amp default

Description Modulation amplitude setting to optimize peak performance.

User interface 0 to 100 mA

3.2.7 Stream change compensation

Navigation Expert → Sensor → Stream change compensation



Methane CH4	→ 51
Ethane C2H6	→ 51
Propane C3H8	→ 51
IButane C4H10	→ 51
N-Butane C4H10	→ 51
Isopentane C5H12	→ 51
N-Pentane C5H12	→ 51
Neopentane C5H12	→ 51
Hexane+ C6H14+	→ 51
Nitrogen N2	→ 51
Carbon diox. CO2	→ 51
Hydrog.sulf. H2S	→ 51
Hydrogen H2	→ 51

Calibration 1 to n → Stream change compensation

Navigation Expert → Sensor → Stream change compensation → Calibration 1 to n → Stream change compensation

Description Switch on to allow concentration measurement compensation based on gas background composition values. Values can be static or live.

Selection
- Off
- On

Factory setting Off

Component (n)

Navigation Expert → Sensor → Stream change compensation → Calibration 1 to n → Component (n)

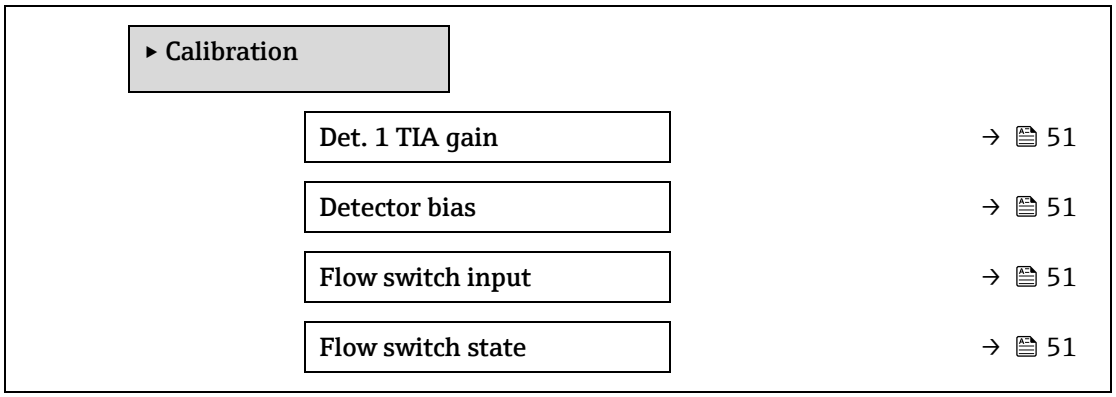
Description These values define the gas background values. They are shared with the dew point.

User entry Signed floating-point number, mole fraction

Factory setting Gas background dependent. Refer to dew point calibration components → .

3.2.8 Calibration

Navigation Expert → Sensor → Calibration



Det. 1 TIA gain

Navigation Expert → Sensor → Calibration → Det. 1 TIA gain

Description Transimpedance amplifier (TIA) gain setting

Selection 0 to 15

Detector bias

Navigation Expert → Sensor → Calibration → Detector bias

Description Bias voltage used to run the optical detector.

Selection Signed floating-point number

Flow switch input

Navigation Expert → Sensor → Calibration → Flow switch input

Description Discrete input from flow switch to signal flow / no-flow of sample gas.

Selection
- Normally Open
- Normally Closed
- Off

Flow switch state

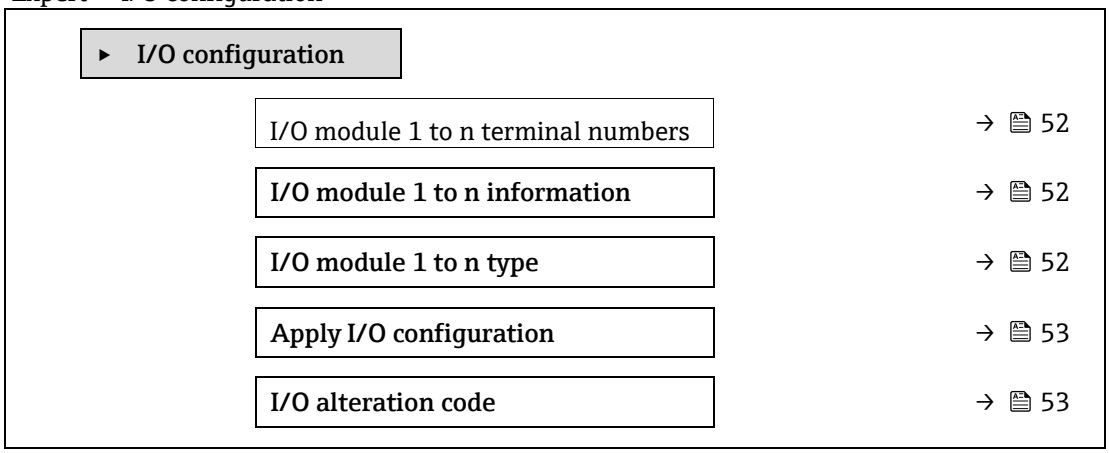
Navigation Expert → Sensor → Calibration → Flow switch state

Description Displays current status of flow switch.

Selection
- No Flow
- Flow

3.3 I/O configuration

Navigation Expert → I/O configuration



I/O module 1 to n terminal numbers

Navigation Expert → I/O configuration → I/O module 1 to n terminals

Description Displays the terminal numbers used by the I/O module.

User interface
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)

I/O module 1 to n information

Navigation Expert → I/O configuration → I/O module 1 to n information

Description Displays information about the plugged in I/O module.

User interface
- Not plugged
- Invalid
- Not configurable
- Configurable
- MODBUS

Additional information
- **Not plugged.** The I/O module is not plugged in.
- **Invalid.** The I/O module is not plugged correctly.
- **Not configurable.** The I/O module is not configurable.
- **Configurable.** The I/O module is configurable.
- **MODBUS.** The I/O module is configured for Modbus.

I/O module 1 to n type

Navigation Expert → I/O configuration → I/O module 1 to n type

Prerequisite Must have I/O Module installed. For the following order code:
- “Output; input 2,” “Configurable I/O initial setting off”
- “Output; input 3,” “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
- Off
- Current output [1]
- Current input [1]
- Switch output [1]
- Relay output [1]

Factory setting Off

Apply I/O configuration

Navigation Expert → I/O configuration → Apply I/O configuration

Description Use this function to activate the newly configured I/O module type.

Selection
- No
- Yes

Factory setting No

I/O alteration code

Navigation Expert → I/O configuration → I/O alteration code

Description Activates configuration for each I/O.

User entry Positive integer

Factory setting Device specific

Additional information

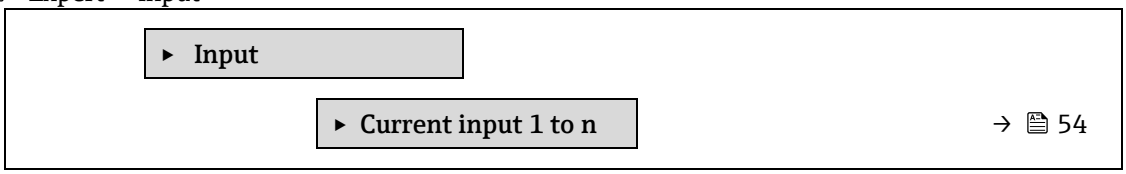
Description

The I/O configuration is changed in the I/O module type parameter →.

[1] Visibility depends on order options or device settings

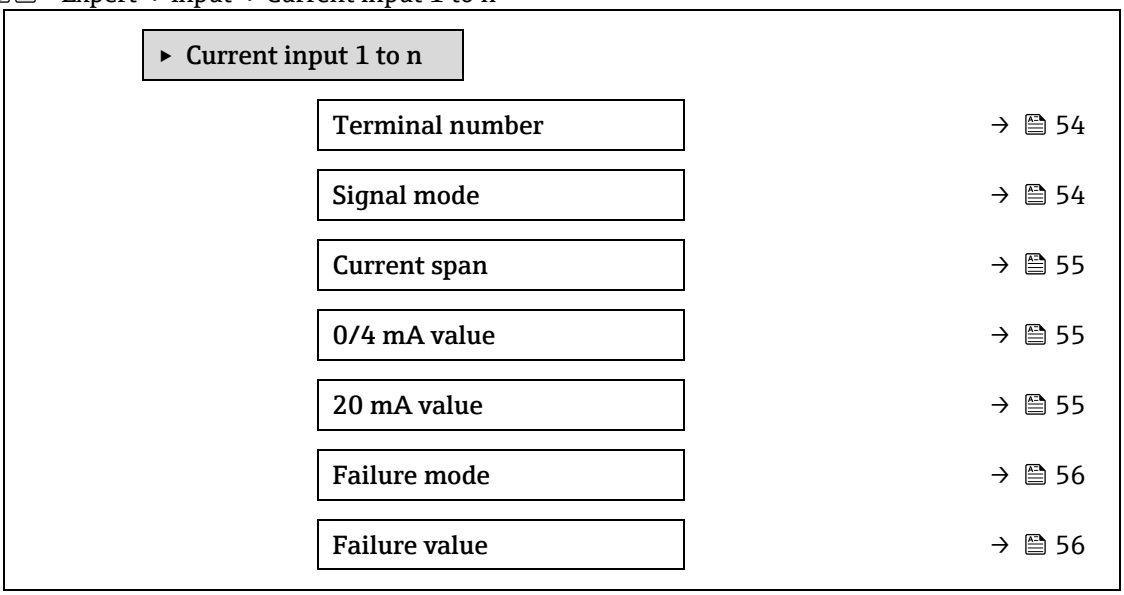
3.4 Input

Navigation Expert → Input



3.4.1 Current input 1 to n

Navigation Expert → Input → Current input 1 to n



Terminal number

Navigation Expert → Input → Current input 1 to n → Terminal number

Description Displays the terminal numbers used by the current input module.

User interface
- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)

Additional information *"Not used" option*
The current input module does not use any terminal numbers.

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.

User interface
- Passive
- Active

Additional information Active

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
- 0-20 mA
- 4-20 mA NAMUR
- 4-20 mA US
- FIXED CURRENT

Factory setting Approval-specific:
- 4 to 20 mA NAMUR (3.8 to 20.5 mA)
- 4 to 20 mA US (3.9 to 20.8 mA)

Additional information Sample values for the current range: Current range output →.

0/4 mA value

Navigation Expert → Input → Current input 1 to n → 0/4 mA value

Description Use this function to enter a value for the 4 mA current.

Selection Signed floating-point number

Factory setting 0

Additional information

Current input behavior

The current input behaves differently depending on the settings configured in the following parameters:
- Current span →
- Failure mode →

Configuration examples

Pay attention to the configuration examples for 4 mA value parameter →.

20 mA value

Navigation Expert → Input → Current input 1 to n → 20 mA value

Description Use this function to enter a value for the 20 mA current.

User entry Signed floating-point number

Factory setting Depends on country and factory calibration

Additional information

Configuration examples

Pay attention to the configuration examples for the 4 mA value parameter →.

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 →.

Selection
- Alarm
- Last valid value
- Defined value

Factory setting Alarm

Additional information
Options
- **Alarm.** An error message is set.
- **Last valid value.** The last valid measured value is used.
- **Defined value.** The Failure value parameter →.

Failure value

Navigation Expert → Input → Current input 1 to n → Failure value

Prerequisite In the Failure mode parameter → the **Defined value** option is selected.

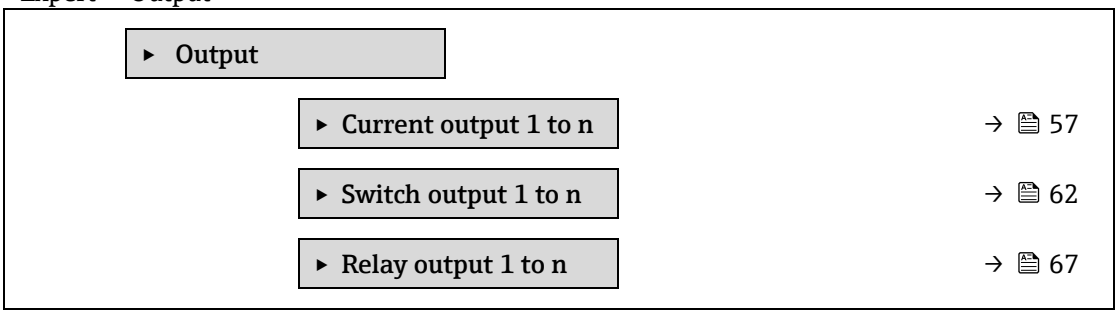
Description Use this function to enter the value that the device uses if it does not receive an input signal from the external device, or if the input signal is invalid.

User entry Signed floating-point number

Factory setting 0

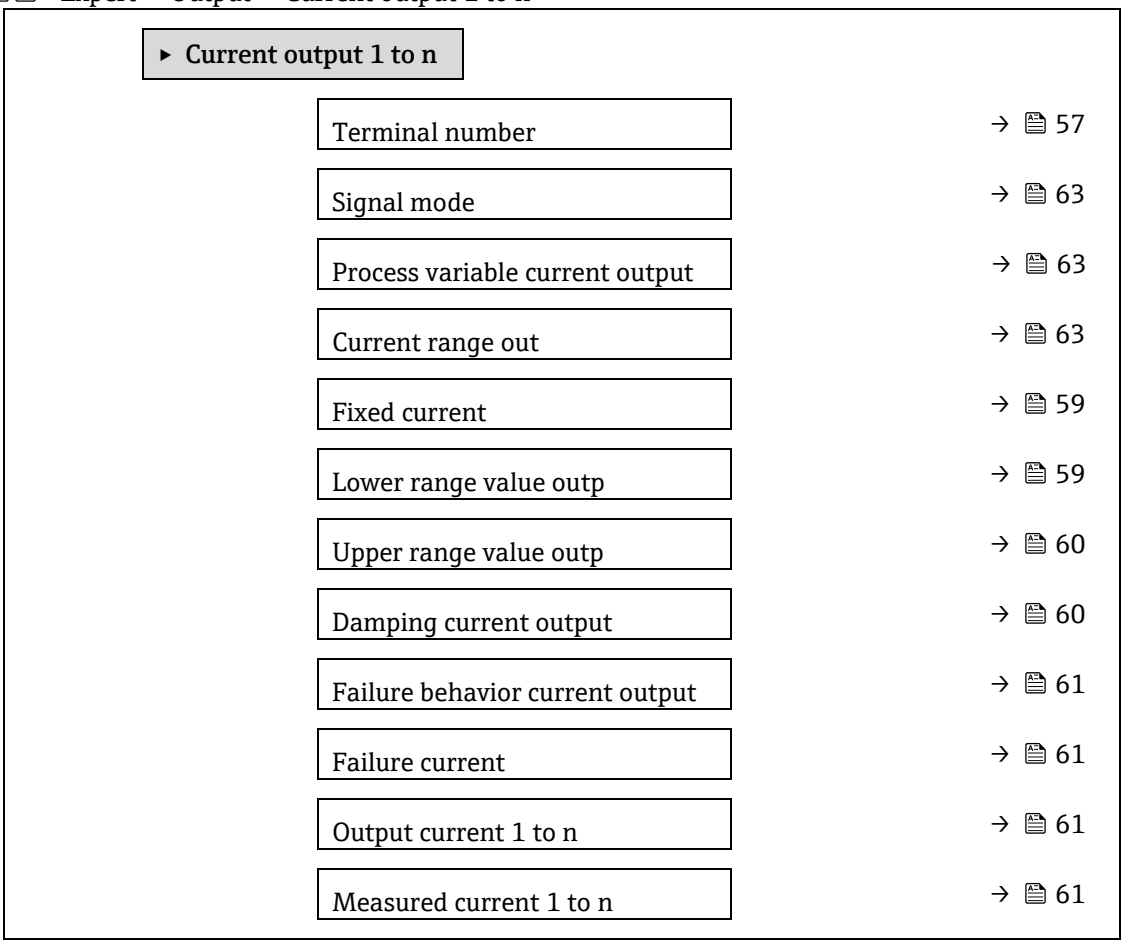
3.5 Output

Navigation Expert → Output



3.5.1 Current output 1 to n

Navigation Expert → Output → Current output 1 to n



Terminal number

Navigation Expert → Output → Current output 1 to n → Terminal number

Description Displays the terminal numbers used by the current output module.

User interface
- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)

Additional information

"Not used" option
The current output module does not use any terminal numbers.

Signal mode

Navigation Expert → Output → Current output 1 to n → Signal mode

Description Use this function to select the signal mode for the current output.

Selection
- Active
- Passive

Factory setting Active

Process variable current output

Navigation Expert → Output → Current output 1 to n → Process variable current output

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

Selection
- Off
- Concentration
- Dew Point 1
- Dew Point 2
- Cell Gas Temperature

Current range output

Navigation Expert → Output → Current output 1 to n → Current range output

Description Select current range for process value output and upper/lower level for alarm signal.

Selection
- 0-20 mA
- 4-20 mA NAMUR
- 4-20 mA US
- FIXED CURRENT

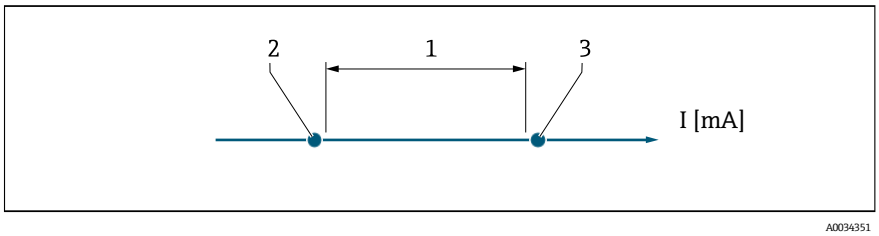
Factory setting
Approval specific:
- 4...20 mA NAMUR (3.8. 20.5 mA)
- 4...20 mA US (3.9. 20.8 mA)

Additional information

Description
- In the event of a device alarm, the current output adopts the value specified in the Failure mode parameter →.
- If the measured value is outside the measuring range, the **⚠S441 Current output 1 to n** diagnostic message is displayed.
- The measuring range is specified via the Lower range value output parameter → and Upper range value output parameter →.

"Fixed current" option
The current value is set via the Fixed current parameter →.

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	1	2	3
4...20 mA NAMUR (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

If the measurement exceeds or falls below the upper or lower signal on alarm level, the ⚠**S441 Current output 1 to n** diagnostic message is displayed.

Fixed Current

Navigation Expert → Output → Current output 1 to n → Fixed current

Prerequisite The **Fixed current** option is selected in the Current range output parameter →.

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 → Current output 1 to n → Lower range output

Prerequisite One of the following options is selected in the Current range output parameter →:
- 0-20 mA
- 4-20 mA NAMUR
- 4-20 mA US
- FIXED CURRENT

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

User entry Signed non-negative floating-point number

Factory setting 0 ppmv

Additional information

Dependency
The unit depends on the process variable selected in the Assign current output parameter →.

Current output behavior

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

- Current span →
- Failure mode →

Upper range value output

Navigation Expert → Output → Current output 1 to n → Upper range output

Prerequisite One of the following options is selected in the Current range output →:

- 0-20 mA
- 4-20 mA NAMUR
- 4-20 mA US
- FIXED CURRENT

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

User entry Signed positive floating-point number

Factory setting Calibration dependent (remove link)

Additional information

Dependency

The unit depends on the process variable selected in the Assign current output parameter →.

Damping current output

Navigation Expert → Output → Current output 1 to n → Damping current output

Prerequisite A process variable is selected in the Assign current output parameter → and one of the following options is selected in the Current range output →:

- 0-20 mA
- 4-20 mA NAMUR
- 4-20 mA US
- FIXED CURRENT

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

Use this function to enter a time constant (PT1 element[1]) for current output damping:

- 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.

Damping is switched off if **0** is entered (factory setting).

[1] Proportional transmission behavior with first order delay

Failure behavior current output

Navigation Expert → Output → Current output 1 to n → Failure behavior output

Prerequisite A process variable is selected in the Assign current output parameter → and one of the following options is selected in the Current range output →:
- 0-20 mA
- 4-20 mA NAMUR
- 4-20 mA US
- FIXED CURRENT

Description Use this function to select the value of the current output in the event of a device alarm.

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

Factory setting Max.

Additional information

Description
This setting does not affect the failsafe mode of other outputs. 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 range output →.

"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 range output →.

"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 based on the current 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 →.

Failure current

Navigation Expert → Output → Current output 1 to n → Failure current

Prerequisite The **Defined value** option is selected in the Failure mode parameter →.

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 1 to n

Navigation Expert → Output → Current output 1 to n → Output current 1 to n

Description Displays the current value currently calculated for the current output.

User interface 0 to 22.5 mA

Measured current 1 to n

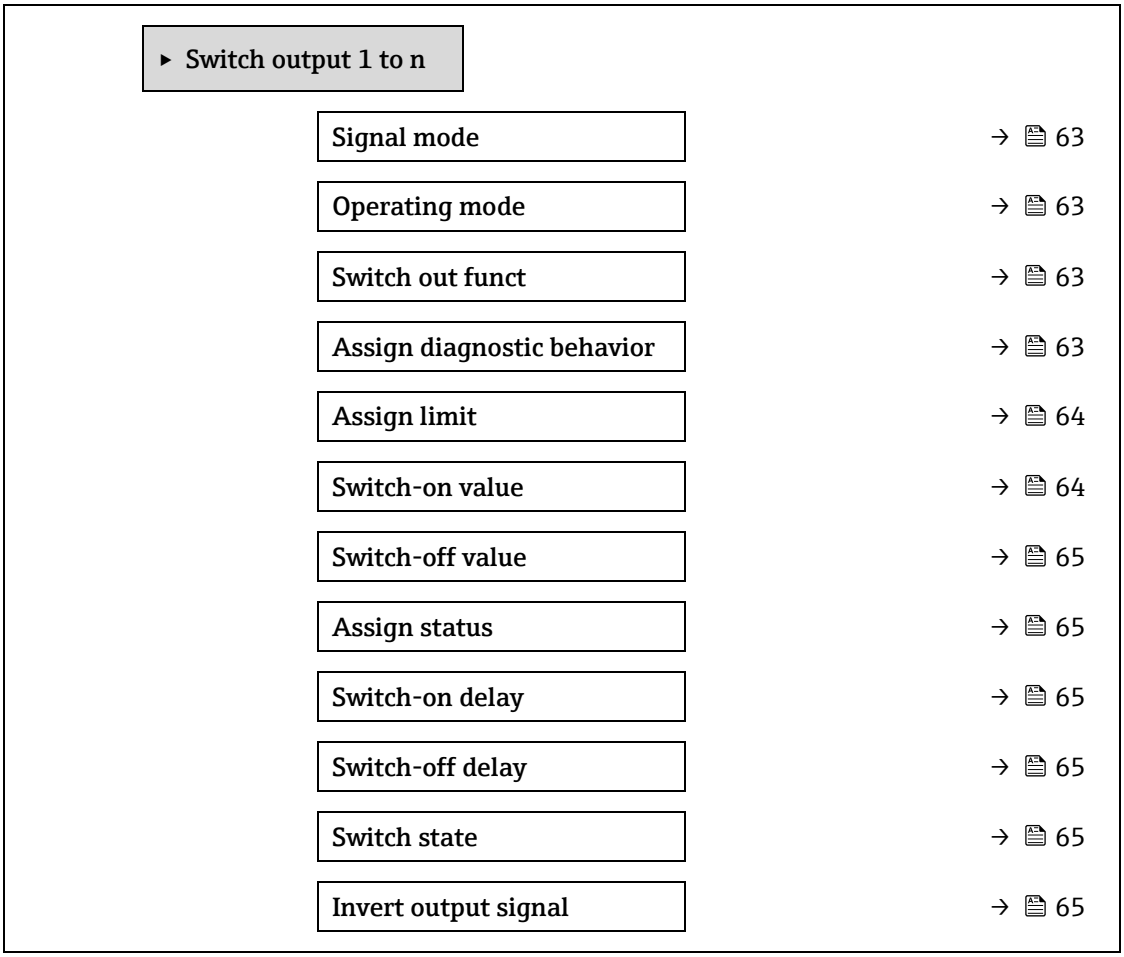
Navigation Expert → Output → Current output 1 to n → Measured current 1 to n

Description Displays the actual measured value of the output current.

User interface 0 to 30 mA

3.5.2 Switch output 1

Navigation Expert → Output → Switch output 1 to n



Signal mode

Navigation Expert → Output → Switch output 1 to n → Signal mode

Description Use this function to select the signal mode for the switch output.

Selection
- Passive
- Passive NAMUR

Additional information
- Passive
- Active

Operating mode

Navigation Expert → Output → Switch output 1 to n → Operating mode

Description Displays the operating mode of the output.

Selection Switch

Factory setting Switch

Switch output function

Navigation Expert → Output → Switch output 1 to n → Switch out function

Prerequisite The **Switch** option is selected in the Operating mode parameter → .

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

Selection
- Off
- On
- Diagnostic behavior
- Limit
- Status

Factory setting Off

Additional information

Selection
- **Off.** The switch output is permanently switched off (open, non-conductive).
- **On.** The switch output is permanently switched on (closed, conductive).
- **Diagnostic behavior.** Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level.
- **Limit.** Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level.
- **Status.** Displays the device status when validation control is selected.

Assign diagnostic behavior

Navigation Expert → Output → Switch output 1 to n → Assign diagnostic behavior

Prerequisite
- In the Operating mode parameter → , the **Switch** option is selected.
- In the Switch output function parameter → , the **Diagnostic behavior** option is selected.

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

Selection
- Alarm
- Alarm or warning
- Warning

Factory setting Alarm

Additional information

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

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

Assign limit

Navigation Expert → Output → Switch output 1 to n → Assign limit

Prerequisite
- In the Operating mode parameter → 📄, the **Switch** option is selected.
- In the Switch output function parameter → 📄, the **Limit** option is selected.

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

Selection
- Off
- Concentration
- Dew Point 1
- Dew Point 2

Factory setting Concentration

Switch-on value

Navigation Expert → Output → Switch output 1 to n → Switch-on value

Prerequisite
- The **Switch** option is selected in the Operating mode parameter → 📄.
- The **Limit** option is selected in the Switch output function parameter → 📄.

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

Selection Signed floating-point number

Factory setting 0 ppmv

Additional information

Description
Use this function to enter the limit value for the switch-on value (process variable > switch-on value = closed, conductive).
When using a hysteresis: Switch-on value > Switch-off value.

Dependency
The unit depends on the process variable selected in the **Assign limit** parameter (→ 📄 139).

Switch-off value

Navigation Expert → Output → Switch output 1 to n → Switch-off value

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

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

User entry Signed floating-point number

Factory setting 0 ppmv

Additional information

Description
Use this function to enter the limit value for the switch-off value (process variable < switch-off value = open, non-conductive).
When using a hysteresis: Switch-on value > Switch-off value.

Dependency
The unit depends on the process variable selected in the **Assign limit** parameter (→ 139).

Assign status

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

Prerequisite
- The **Switch** option is selected in the Operating mode parameter →.
- The **Status** option is selected in the Switch output function parameter →.

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

Selection
- Off
- Validation Control

Factory setting Off

Switch-on delay

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

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

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 → Switch output 1 to n → Switch-off delay

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

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 state

Navigation Expert → Output → Switch output 1 to n → Switch state

Prerequisite The **Switch** option is selected in the Operating mode parameter →.

Description Displays the current switch status of the status output.

Selection
- Open
- Closed

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

Invert output signal

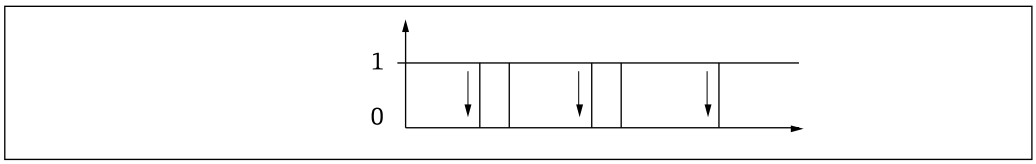
Navigation Expert → Output → Switch output 1 to n → Invert output signal

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)



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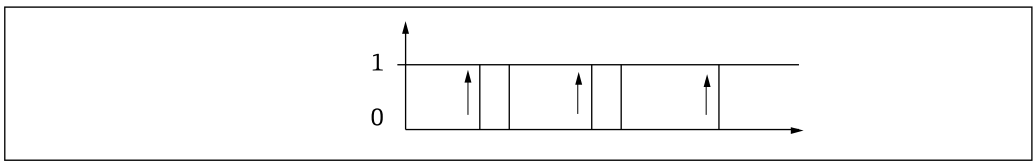
Yes option (passive - positive)



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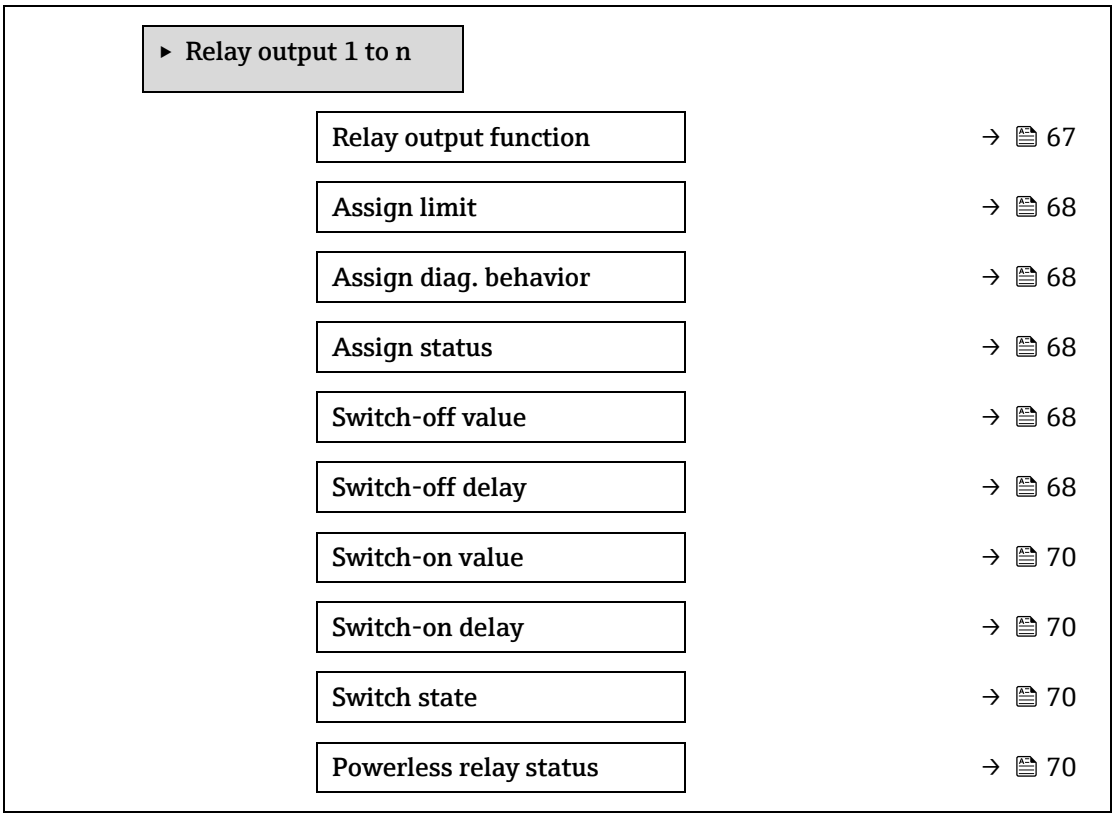
3.5.3 Relay output 1 to n

Navigation Expert → Output → Relay output 1 to n



Relay output function

Navigation Expert → Output → Relay output 1 to n → Relay output function

Description Use this function to select an output function for the relay output.

User interface
- Closed
- Open
- Diagnostic behavior
- Limit
- Status

Factory setting Closed

Additional information

Selection
- **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.
- **Status.** Displays the device status when validation control is selected.

Assign limit

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

Prerequisite The **Limit** option is selected in the Relay output function parameter →.

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

Selection
- Off
- Concentration
- Dew Point 1
- Dew Point 2

Factory setting Off

Assign diagnostic behavior

Navigation Expert → Output → Relay output 1 to n → Assign diagnostic behavior

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

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

Selection
- Off
- Validation Control

Factory setting Off

Switch-off value

Navigation Expert → Output → Relay output 1 to n → Switch-off value

Prerequisite In the Relay output function parameter →, the **Limit** option is selected.

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

User entry Signed floating-point number

Factory setting 0 ppmv

Additional information

Description
Use this function to enter the limit value for the switch-off value (process variable < switch-off value = open, non-conductive).
When using a hysteresis: Switch-on value > Switch-off value.

Dependency
The unit is dependent on the process variable selected in the **Assign limit** parameter (→ 146).

Switch-off delay

Navigation Expert → Output → Relay output 1 to n → Switch-off delay

Prerequisite In the Relay output function parameter →, the **Limit** option is selected.

Description Use this function to enter a delay time for switching off the switch output

Selection 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 →.

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

User entry Signed floating-point number

Selection
- Off
- Validation Control

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 (→ 146).

Switch-on delay

Navigation Expert → Output → Relay output 1 to n → Switch-on delay (0814–1 to n)

Prerequisite In the Relay output function parameter →, 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

Switch state

Navigation Expert → Output → 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.

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.

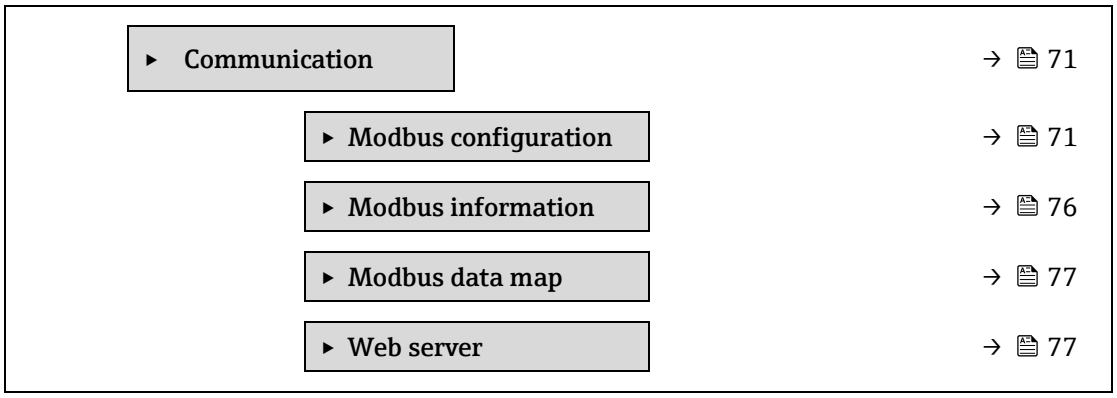
Selection
- Open
- Closed

Factory setting Open

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

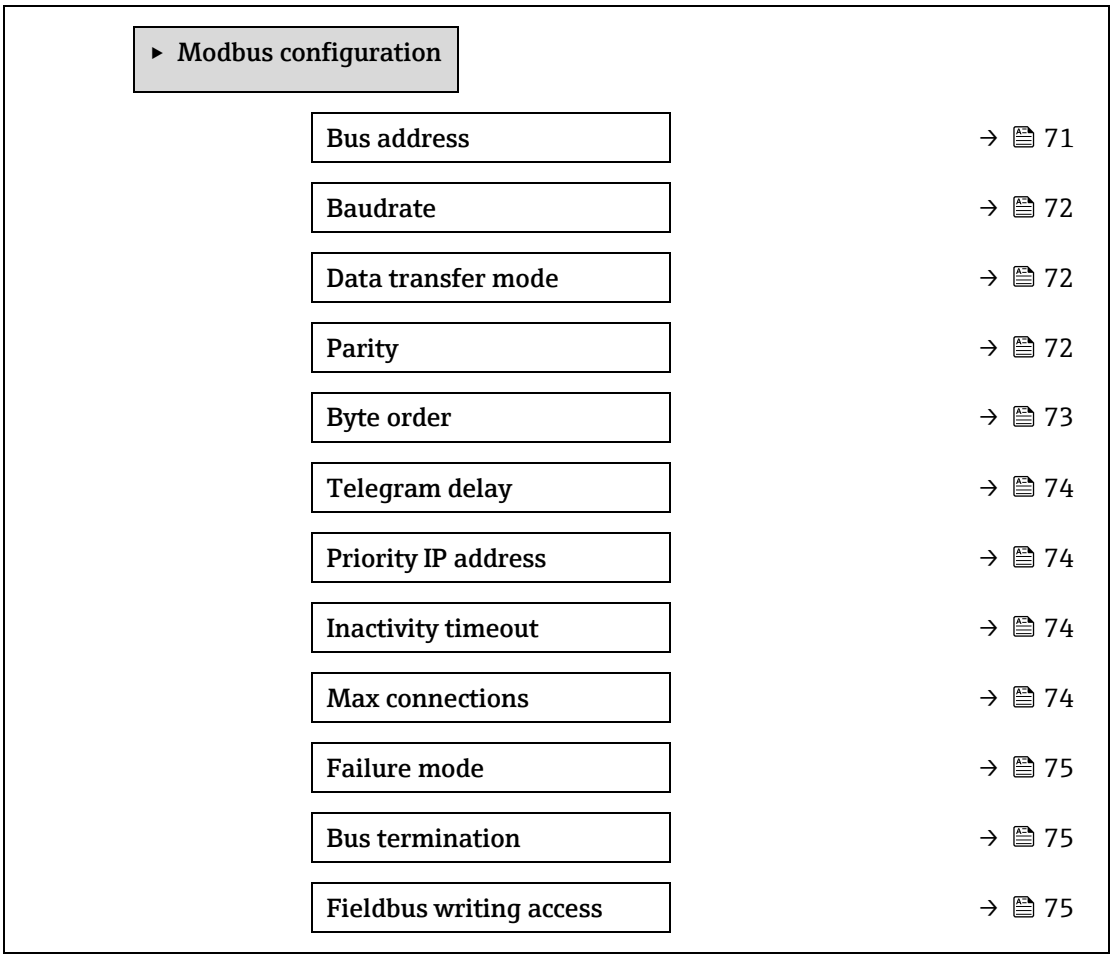
3.6 Communication

Navigation Expert → Communication



3.6.1 Modbus configuration

Navigation Expert → Communication → Modbus configuration



Bus address

Navigation Expert → Communication → Modbus configuration → Bus address

Prerequisite Modbus RS485 Device

Description Use this function to enter the device address.

User entry 1 to 247

Factory setting 247

Baudrate

Navigation Expert → Communication → Modbus configuration → Baudrate

Prerequisite Modbus RS485 Device

Description Use this function to select a transmission rate.

User entry
- 1200 BAUD
- 2400 BAUD
- 4800 BAUD
- 9600 BAUD
- 19200 BAUD
- 38400 BAUD
- 57600 BAUD
- 115200 BAUD

Factory setting 19200 BAUD

Data transfer mode

Navigation Expert → Communication → Modbus configuration → Data transfer mode

Prerequisite Modbus RS485 Device

Description Use this function to select the data transmission mode.

Selection
- ASCII
- RTU

Factory setting RTU

Additional information *Options*
- **ASCII.** Transmission of data in the form of readable ASCII characters. Error protection via LRC.
- **RTU.** Transmission of data in binary form. Error protection via CRC16.

Parity

Navigation Expert → Communication → Modbus configuration → Parity

Prerequisite Modbus RS485 Device

Description Use this function to select the parity bit.

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

Factory setting Even

Additional information

Options

Picklist **ASCII** option:
- 0 = **Even** option
- 1 = **Odd** option

Picklist **RTU** option:
- 0 = **Even** option
- 1 = **Odd** option
- 2 = None / 1 stop bit option
- 3 = None / 2 stop bits option

Byte order

Navigation Expert → Communication → Modbus configuration → Byte order

Description Use this function to select the sequence in which the bytes are transmitted. The transmission sequence must be coordinated with the Modbus master.

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

Factory setting 1-0-3-2

Additional information

Description

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

Changing the byte sequence in the host system often requires an extensive knowledge and significant programming efforts. Endress+Hauser introduced the Byte order parameter → for this reason.

This makes it possible to use the standard settings of the host system and change the byte sequence on the measuring device by trial and error. If correct data exchange cannot be achieved by changing the byte sequence, the settings for the byte sequence of the host system must be adapted accordingly.

Byte transmission sequence

Byte addressing, i.e., the transmission sequence of the bytes, is not specified in the Modbus specification. For this reason, it is important to coordinate or match the addressing method between the master and slave during commissioning. This can be configured in the measuring device using the Byte order parameter →.

The bytes are transmitted depending on the selection in the Byte order parameter →.

FLOAT				
	Sequence			
Options	1.	2.	3.	4.
1 – 0 – 3 – 2 *	Byte 1 (MMMMMMMM)	Byte 0 (MMMMMMMM)	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM)
0 – 1 – 2 – 3	Byte 0 (MMMMMMMM)	Byte 1 (MMMMMMMM)	Byte 2 (EMMMMMMM)	Byte 3 (SEEEEEEE)
2 – 3 – 0 – 1	Byte 2 (EMMMMMMM)	Byte 3 (SEEEEEEE)	Byte 0 (MMMMMMMM)	Byte 1 (MMMMMMMM)

3 – 2 – 1 – 0	Byte 3 (SEEEEEEE)	Byte 2 (EMMMMMMM)	Byte 1 (MMMMMMMM)	Byte 0 (MMMMMMMM)
* = factory setting, S = sign, E = exponent, M = mantissa				

INTEGER		
	Sequence	
Options	1.	2.
1 – 0 – 3 – 2 * 3 – 2 – **1 – 0**	Byte 1 (MSB)	Byte 0 (LSB)
0 – 1 – 2 – 3 2 – 3 – **0 – 1**	Byte 0 (LSB)	Byte 1 (MSB)
* = factory setting, MSB = most significant byte, LSB = least significant byte		

STRING Presentation taking the example of a device parameter with a data length of 18 bytes.					
	Sequence				
Options	1.	2.	…	17.	18.
1 – 0 – 3 – 2 * 3 – 2 – **1 – 0**	Byte 17 (MSB)	Byte 16	…	Byte 1	Byte 0 (LSB)
0 – 1 – 2 – 3 2 – 3 – **0 – 1**	Byte 16	Byte 17 (MSB)	…	Byte 0 (LSB)	Byte 1
* = factory setting, MSB = most significant byte, LSB = least significant byte					

Telegram delay

Navigation Expert → Communication → Modbus configuration → Telegram delay

Prerequisite Modbus RS485 Device

Description Use this function to enter a delay time after which the measuring device replies to the request telegram of the Modbus master. This allows communication to adapt to slow Modbus RS485 masters.

User entry 0 to 100 ms

Factory setting 6 ms

Priority IP address

Navigation Expert → Communication → Modbus configuration → Priority IP address

Prerequisite Modbus RS485 Device

Description The client IP address which has a guaranteed connection to the server (analyzer).

User entry Signed floating-point number

Factory setting 0.0.0.0

Inactivity timeout

Navigation Expert → Communication → Modbus configuration → Inactivity timeout

Prerequisite Modbus RS485 Device

Description The amount of inactivity time before the client connection is closed for non-priority IP addresses.

User entry 0 to 99 s

Factory setting 0 s

Max connections

Navigation Expert → Communication → Modbus configuration → Max connections

Prerequisite Modbus TCP Device

Description Number of connections to the Modbus server.

User entry 1 to 4

Factory setting 4

Failure mode

Navigation Expert → Communication → Modbus configuration → Failure mode

Description Use this function to select the measured value output in the event of a diagnostic message via Modbus communication.

Selection
- NaN value[1]
- Last valid value

Factory setting NaN value

Additional information

Options
- **NaN value.** The device outputs the NaN value[1].
- **Last valid value.** The device outputs the last valid measured value before the fault occurred. This effect of this parameter depends on the option selected in the **Assign diagnostic behavior** parameter.

Bus termination

Navigation Expert → Communication → Modbus configuration → Bus termination

Prerequisite Modbus RS485 Device

Description Displays whether the terminating resistor is enabled or disabled.

User interface
- Off
- On

[1] Not a Number

Factory setting Off

Additional information *Selection*
- **Off.** The terminating resistor is disabled.
- **On.** The terminating resistor is enabled.

For detailed information about enabling the terminating resistor, see the Operating Instructions for the device → 🖹, "Enabling the terminating resistor" section

Fieldbus writing access

Navigation Expert → Communication → Modbus configuration → Fieldbus writing access

Description Use this function to restrict access to the measuring device via fieldbus (Modbus protocol).

Selection
- Read + write
- Read only

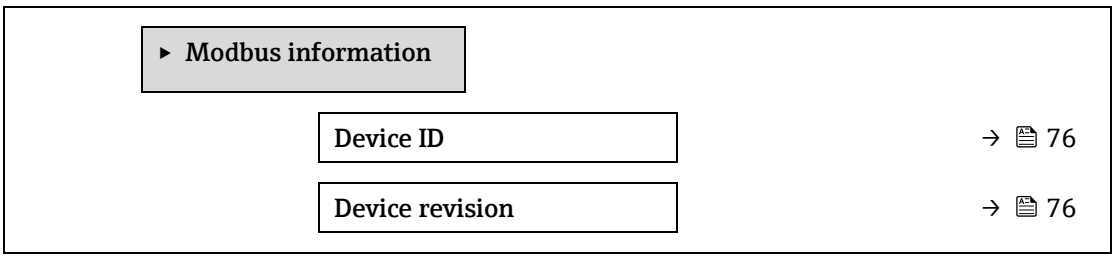
Factory setting Read + write

Additional information *Description*
If read and write protection is enabled, the parameter can only be controlled and reset via local operation. Access is no longer possible via operating tools. This does not affect cyclic measured value transmission to the higher-order system, which is always guaranteed.

Selection
- **Read + write.** The parameters are read and write parameters.
- **Read only.** The parameters are read only parameters.

3.6.2 Modbus information

Navigation Expert → Communication → Modbus information



Device ID

Navigation Expert → Communication → Modbus information → Device ID

Description Displays the device ID for identifying the measuring device.

User interface 4-digit hexadecimal number

Device revision

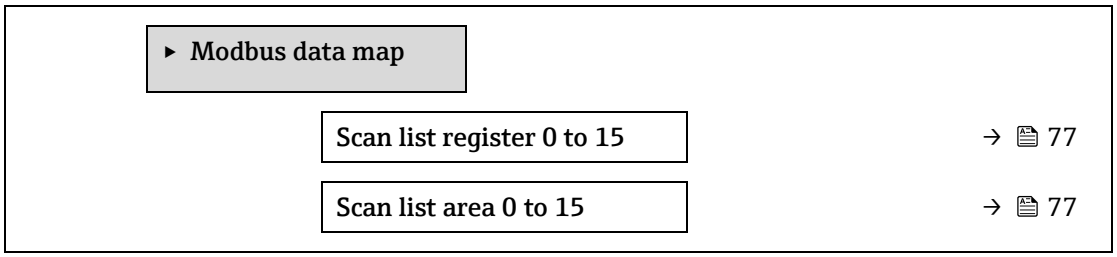
Navigation Expert → Communication → Modbus information → Device revision

Description Displays the device revision.

User interface 4-digit hexadecimal number

3.6.3 Modbus data map

Navigation Expert → Communication → Modbus data map



Scan list register 0 to 15

Navigation Expert → Communication → Modbus data map → Scan list register 0 to 15

Description Use this function to enter the scan list register. By entering the register address (1-based), up to 16 device parameters can be grouped by assigning them to the scan list registers 0 to 15. The data of the device parameters assigned here are read out via the register addresses 5051 to 5081.

User entry 1 to 65,535

Factory setting 1

Scan list area 0 to 15

Navigation Expert → Communication → Modbus data map → Scan list area 0 to 15

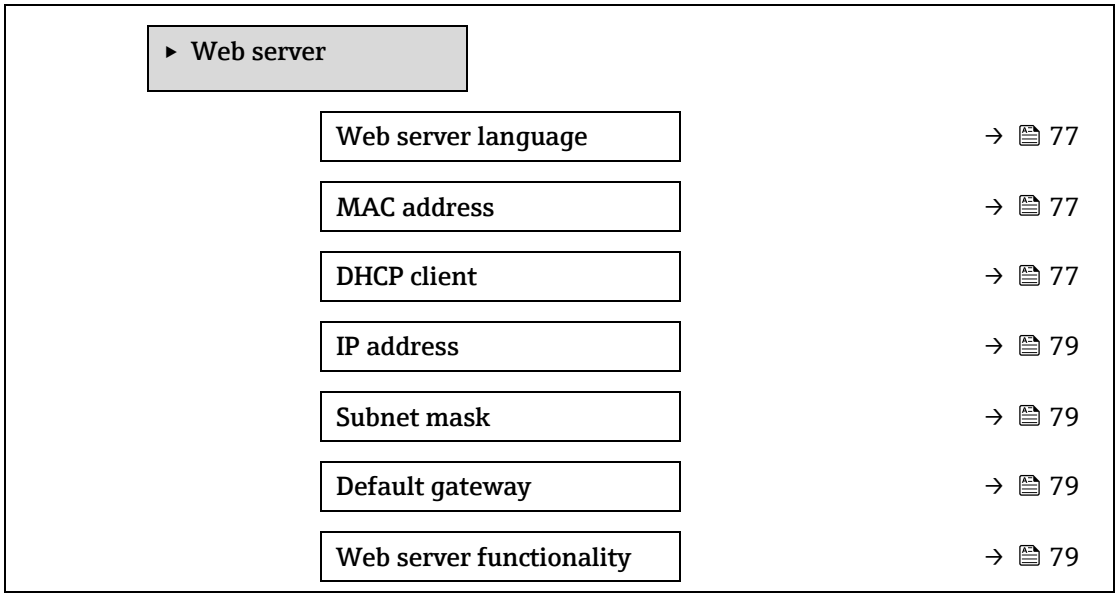
Description Use this function to enter the scan list area.

User entry 1 to 65,535

Factory setting 1

3.6.4 Web server

Navigation Expert → Communication → Web server



Login page	→ 79

Web server language

Navigation Expert → Communication → Web server → Webserv.language

Description Use this function to select the language configured for the Web server.

User entry
- English
- Français
- Italiano
- русский язык (Russian)
- 中文 (Chinese)

Factory setting English

MAC address

Navigation Expert → Communication → Web server → MAC Address

Description Displays the MAC address of the measuring device.

User entry 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

DHCP client

Navigation Expert → Communication → Web server → DHCP client

Description Use this function to activate and deactivate the DHCP client functionality.

Selection
- Off
- On

Factory setting Off

Additional information *Effect*
If the DHCP client functionality of the web server is selected, the IP address → 📄, Subnet mask → 📄, and Default gateway → 📄 are set automatically.

NOTICE

- ▶ Identification is via the MAC address of the measuring device.
- ▶ The IP address → 📄 in the IP address parameter → 📄 is ignored as long as the DHCP client parameter → 📄 is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address → 📄 in the parameter of the same name is only used if the DHCP client parameter → 📄 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.

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 functionality

Description Use this function to switch the Web server on and off.

Selection
- Off
- HTML Off
- On

Factory setting On

Additional information

Description

- **Off.** The Web server is completely disabled.
  - Port 80 is locked.
- **HTML Off.** The HTML version of the Web server is not available.
- **On.** 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

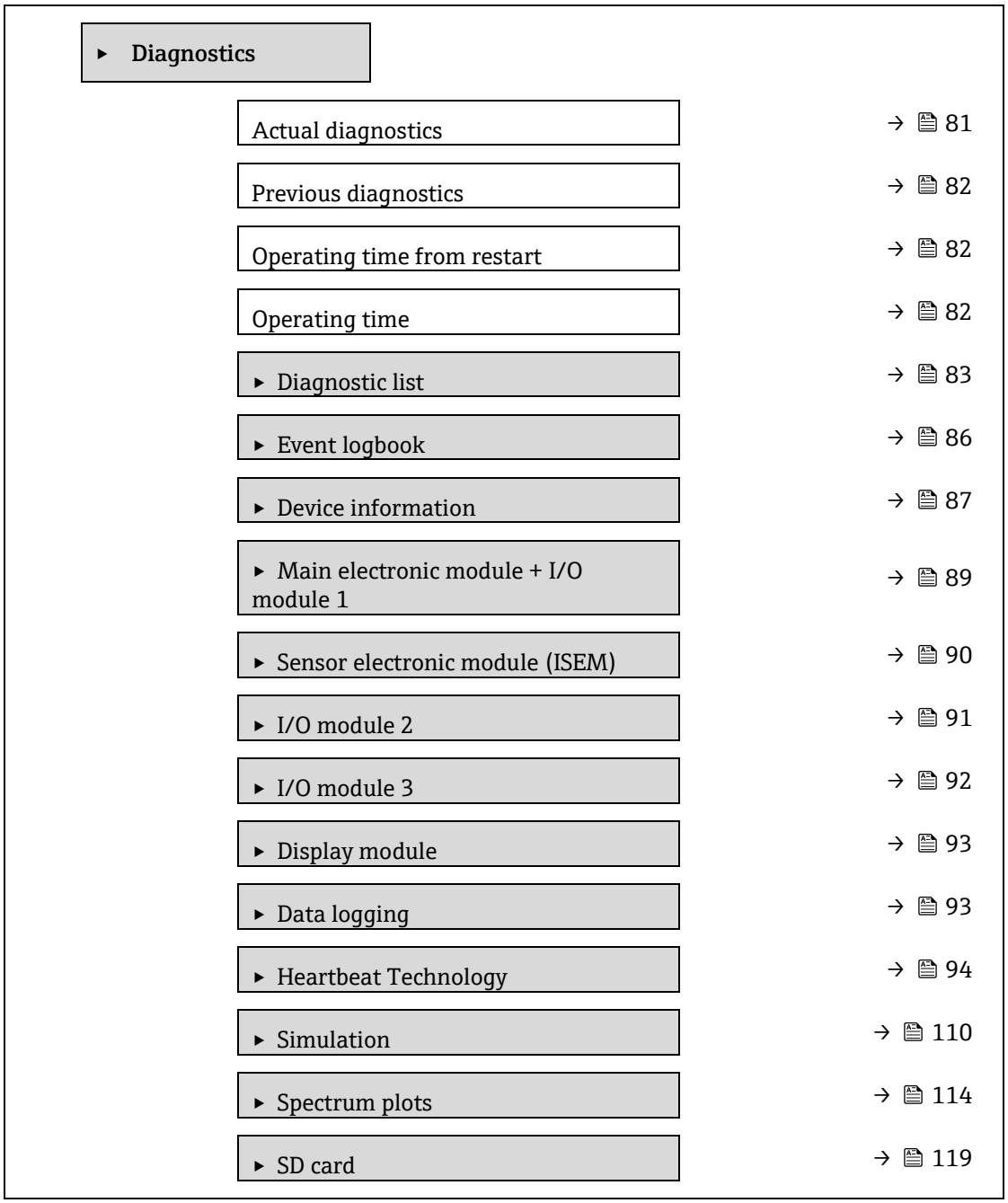
Description Use this function to select the format of the login page.

Selection
- Without header
- With header

Factory setting With header

3.7 Diagnostics

Navigation Expert → Diagnostics



Actual diagnostics

Navigation Expert → Diagnostics → Actual diagnostics

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 *Display*
Additional pending diagnostic messages can be viewed in the Diagnostic list Submenu → 📄.

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

Example
For the display format:
⊗F271 Main electronics failure

Previous diagnostics service ID

Navigation Expert → Diagnostics → Previous diagnostics

Prerequisite Two diagnostic events have already occurred.

Description Displays the diagnostic message that occurred before the current message.

User interface 0 to 65,535

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 E key.

Example
For the display format:
⊗ F271 Main electronics failure

Operating time from restart

Navigation Expert → Diagnostics → Operating time from restart

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

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

Operating time

Navigation Expert → Diagnostics → Operating time

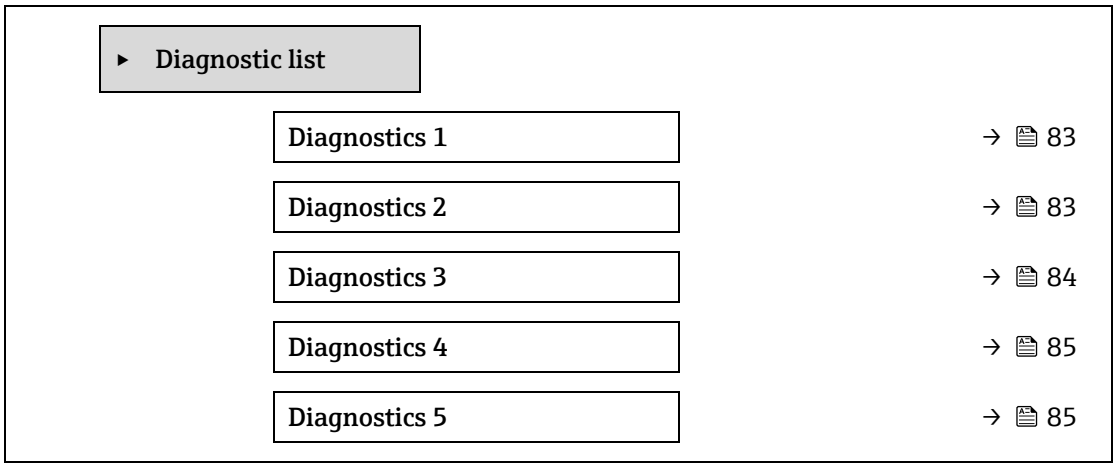
Description Use this function to display the length of time the device has been in operation.

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

Additional information
User interface
The maximum number of days is 9999, which is equivalent to 27 years.

3.7.1 Diagnostic list

Navigation Expert → Diagnostics → Diagnostic list



Diagnostics 1

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 1

Description Displays the current diagnostics message with the highest priority.

User interface 0 to 65,535

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 E key.

Examples
For the display format:
⊗F 271 Main electronics failure
⊗ F276 I/O module failure

Timestamp 1

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the highest priority occurred.

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

Additional information

Display
The diagnostic message can be viewed via the Diagnostics 1 parameter → .

Example
For the display format:
24d12h13m00s

Diagnostics 2

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 2

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

User interface 0 to 65,535

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 E key.

Examples
For the display format:
⊗ F271 Main electronics failure
⊗ F276 I/O module failure

Timestamp 2

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the second-highest priority occurred.

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

Additional information
Display
The diagnostic message can be viewed via the Diagnostics 2 parameter →.

Example
For the display format:
24d12h13m00s

Diagnostics 3

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 3

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

User interface 0 to 65,535

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 E key.

Examples
For the display format:
⊗ F271 Main electronics failure
⊗ F276 I/O module failure

Timestamp 3

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the third-highest priority occurred.

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

Additional information
Display
The diagnostic message can be viewed via the Diagnostics 3 parameter →.

Example
For the display format:
24d12h13m00s

Diagnostics 4

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 4

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

User interface 0 to 65,535

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 E key.

Examples
For the display format:
⊗ F271 Main electronics failure
⊗ F276 I/O module failure

Timestamp 4

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fourth-highest priority occurred.

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

Additional information
Display
The diagnostic message can be viewed via the Diagnostics 4 parameter →.

Example
For the display format:
24d12h13m00s

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

Examples
For the display format:
⊗ F271 Main electronics failure
⊗ F276 I/O module failure

Timestamp 5

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fifth-highest priority occurred.

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

Additional information

Display
The diagnostic message can be viewed via the Diagnostics 5 parameter → 📄.

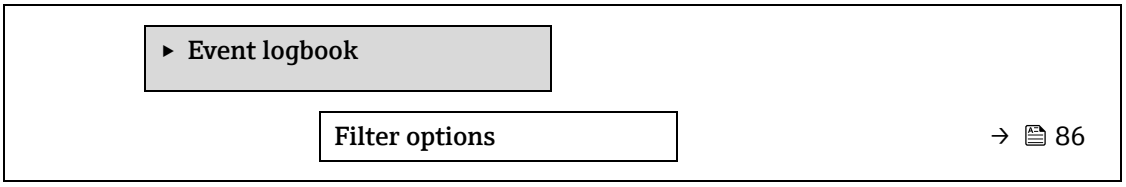
Example
For the display format:
24d12h13m00s

3.7.2 Event logbook

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 logbook of the local display.

Selection
- All
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- Information (I)

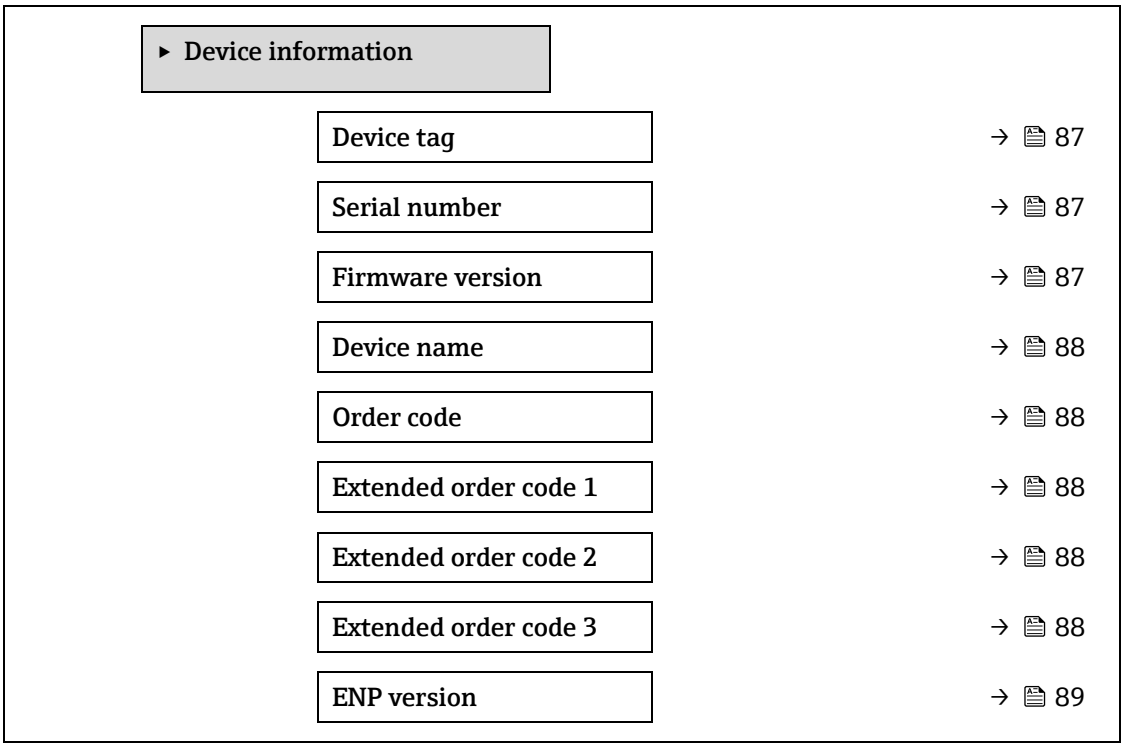
Factory setting All

Additional information

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

3.7.3 Device information

Navigation Expert → Diagnostics → Device info



Device tag

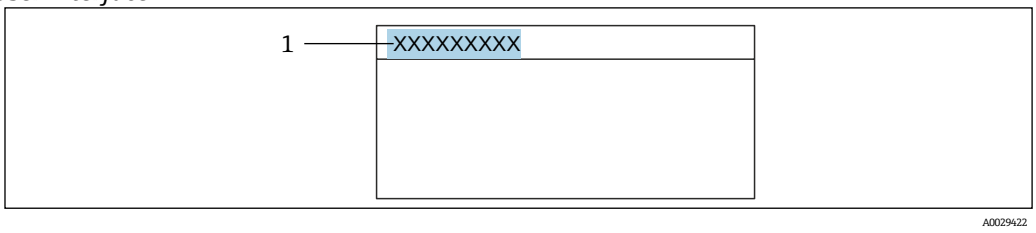
Navigation Expert → Diagnostics → Device information → Device tag

Description Displays a unique name for the measuring point so it can be identified quickly within the user's facility. It is displayed in the header.

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

Factory setting H2O Analyzer

Additional information *User interface*



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 information → Serial number

Description Displays the serial number of the measuring device.
The number can be found on the nameplate of the analyzer.

User interface Max. 11-digit character string comprising letters and numbers.

Additional information

Description

Uses of the serial number:

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

Firmware version

Navigation Expert → Diagnostics → Device information → 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 information → Device name

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

User interface H2O Analyzer

Order code

Navigation Expert → Diagnostics → Device information → 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 can be found on the nameplate of the sensor and transmitter in the "Order code" field.

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 information → Extended order code 1

Description Displays the first part of the extended order code. Due to 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 information → Extended order code 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 → 📄.

Extended order code 3

Navigation Expert → Diagnostics → Device information → Extended order code 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 → 📄.

ENP version

Navigation Expert → Diagnostics → Device information → ENP version

Description Displays the version of the electronic nameplate.

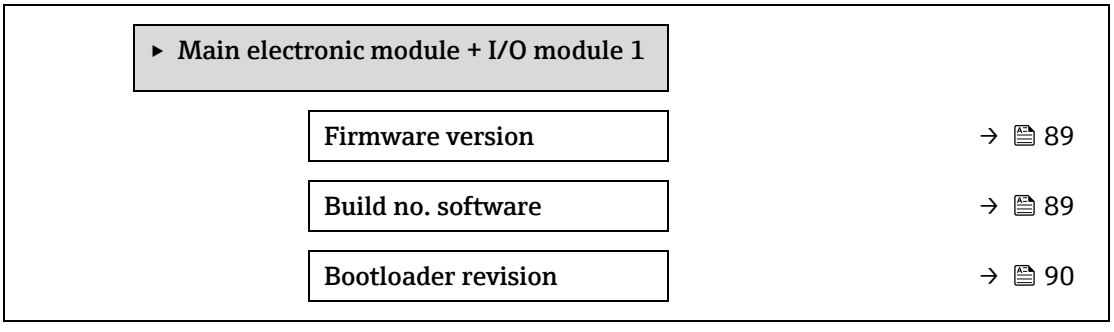
User interface Character string

Factory setting 2.02.00

Additional information *Description*
This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.

3.7.4 Main electronic module + I/O module 1

Navigation Expert → Diagnostics → Main electronic +I/O module 1



Firmware version

Navigation Expert → Diagnostics → Main electronic +I/O module 1 → Firmware version

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

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → Main electronic +I/O module 1 → Build no. software

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

User interface Positive integer

Bootloader revision

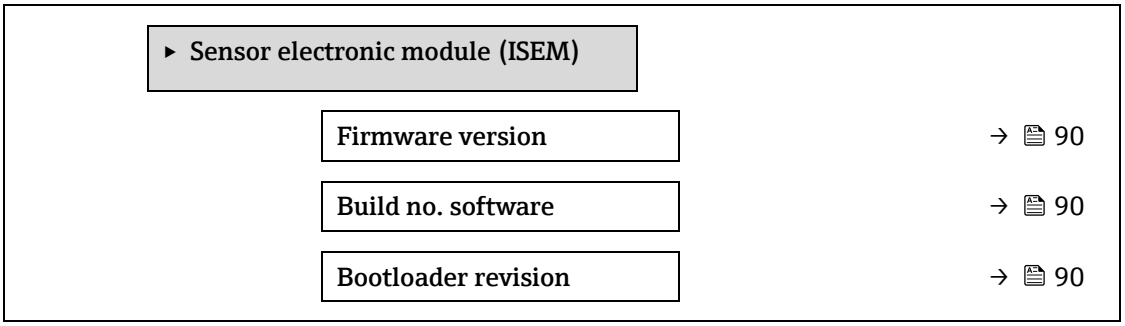
Navigation Expert → Diagnostics → Main electronic +I/O module 1 → Bootloader revision

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

User interface Positive integer

3.7.5 Sensor electronic module (ISEM)

Navigation Expert → Diagnostics → Sens. Electronic



Firmware version

Navigation Expert → Diagnostics → Sensor electronic module (ISEM) → Firmware version

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

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → Sensor electronic module (ISEM) → Build no. software

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

User interface Positive integer

Bootloader revision

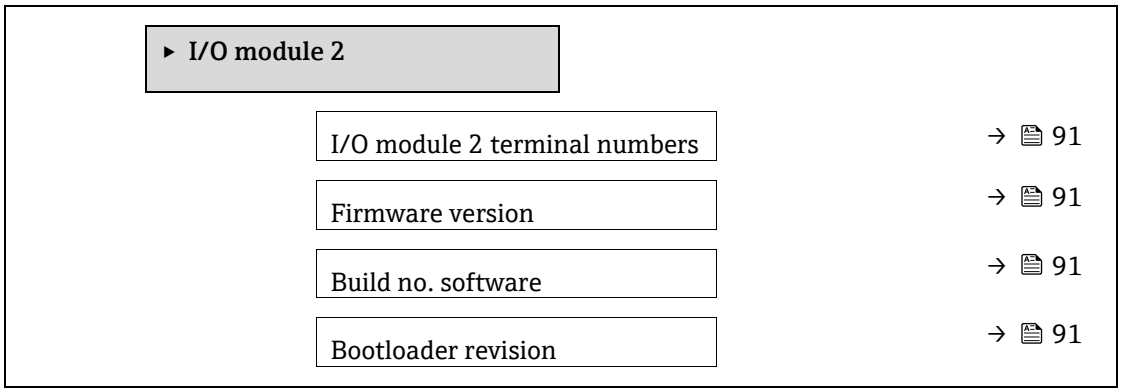
Navigation Expert → Diagnostics → Sensor electronic module (ISEM) → Bootloader rev.

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

User interface Positive integer

3.7.6 I/O module 2

Navigation Expert → Diagnostics → I/O module 2



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
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)

Firmware version

Navigation Expert → Diagnostics → I/O module 2 → Firmware version

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

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → I/O module 2 → Build no. software

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

User interface Positive integer

Bootloader revision

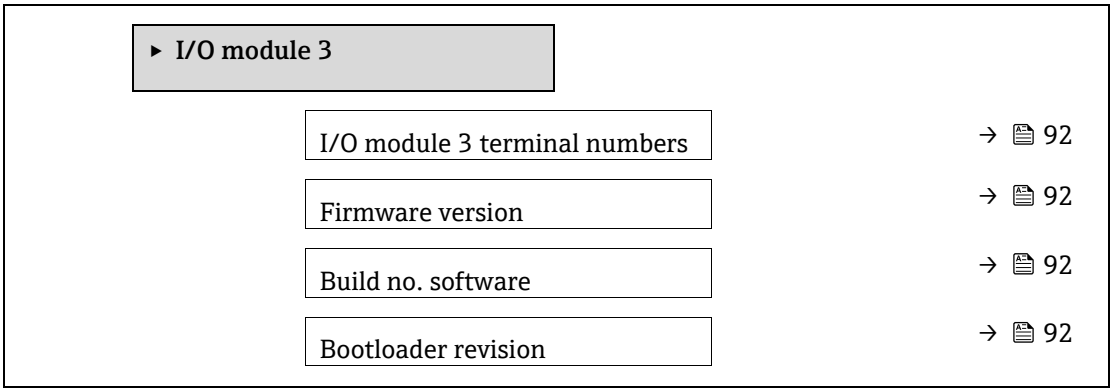
Navigation Expert → Diagnostics → I/O module 2 → Bootloader rev.

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

User interface Positive integer

3.7.7 I/O module 3

Navigation Expert → Diagnostics → I/O module 3



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
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)

Firmware version

Navigation Expert → Diagnostics → I/O module 3 → Firmware version

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

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → I/O module 3 → Build no. software

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

User interface Positive integer

Bootloader revision

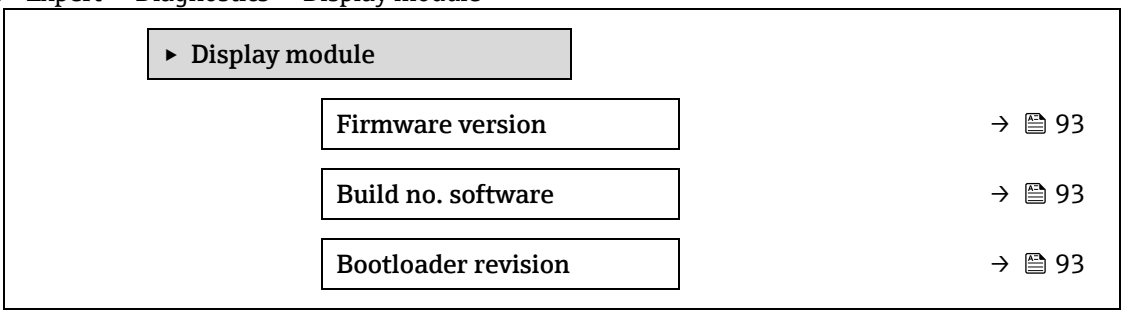
Navigation Expert → Diagnostics → I/O module 3 → Bootloader rev.

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

User interface Positive integer

3.7.8 Display module

Navigation Expert → Diagnostics → Display module



Firmware version

Navigation Expert → Diagnostics → Display module → Firmware version

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

User interface Positive integer

Build no. software

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

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.

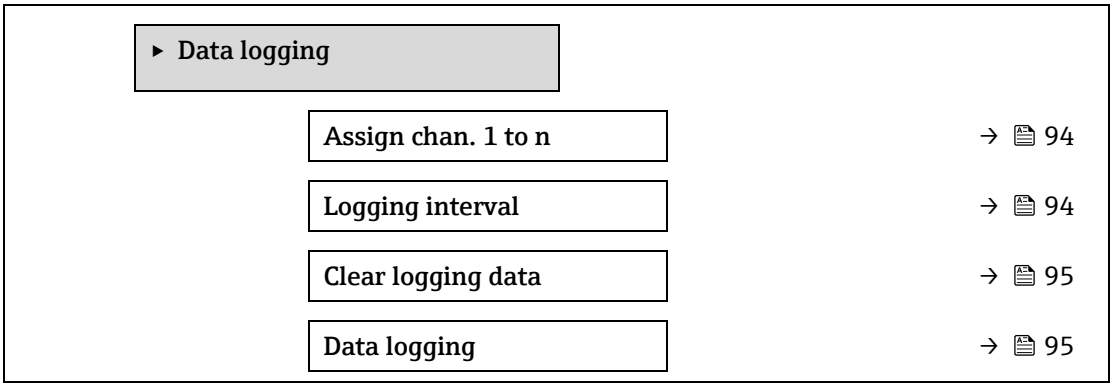
User interface Positive integer

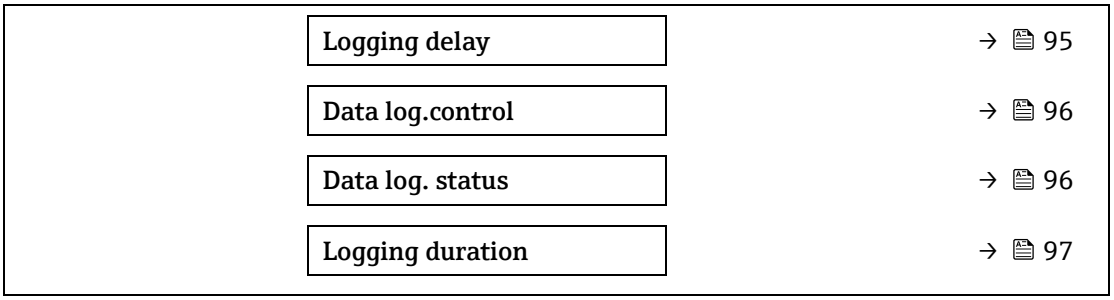
3.7.9 Data logging

Navigation Expert → Diagnostics → Data logging

NOTICE

▶ This menu is available through the web server only. The analyzer's local display does not support charts.





Assign channel 1 to n

Navigation Expert → Diagnostics → Data logging → Assign channel 1 to n

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

Selection
- Off
- Concentration
- Cell gas pressure
- Cell gas temperature
- Dew point 1
- Dew point 2
- Current output 1
- Current output 2
- Flow switch state

Factory setting Off

Additional information

Description

With the extended HistoROM 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).

NOTICE

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

Logging interval

Navigation Expert → Diagnostics → Data logging → Logging interval

Description Use this function to enter the logging interval T_{log} for data logging. This value defines the time interval between the individual data points in the memory.

User entry 0.1 to 3600.0 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 Tlog always remains in the memory (ring memory principle).

NOTICE

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

Example

If 1 logging channel is used:

- Tlog = 1000 × 1 s = 1 000 s ≈15 min
- Tlog = 1000 × 10 s = 10 000 s ≈ 3 h
- Tlog = 1000 × 80 s = 80 000 s ≈ 1 d
- Tlog = 1000 × 3 600 s = 3 600 000 s ≈ 41 d

Clear logging data

Navigation
Diagnostics → Data logging → Clear logging
Expert → Diagnostics → Data logging → Clear logging

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
Diagnostics → Data logging → Data logging
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[1] principle.
- **Not overwriting.** Data logging is canceled if the measured value memory is full (single shot).

[1] FIFO = First in, first out data storage

Logging delay

Navigation
Diagnostics → Data logging → Logging delay
Expert → Diagnostics → Data logging → Logging delay

Prerequisite
In the Data logging parameter → 🖹, 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
Description
Once data logging has been started with the Data logging control parameter → 🖹, the device does not save any data for the duration of the delay time entered.

Data logging control

Navigation
Diagnostics → Data logging → Data logging control
Expert → Diagnostics → Data logging → Data logging control

Prerequisite
In the Data logging parameter → 🖹, the **Not overwriting** option is selected.

Description
Use this function to start and stop measured value logging.

Selection
- None
- Delete + start
- Stop

Factory setting
None

Additional information
Selection
- **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
Diagnostics → Data logging → Data log. status
Expert → Diagnostics → Data logging → Data log. status

Prerequisite
In the Data logging parameter → 🖹, the **Not overwriting** option is selected.

Description
Displays the measured value logging status.

Selection
- Done
- Delay active
- Active
- Stopped

Factory setting
Done

Additional information
Selection
- **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.

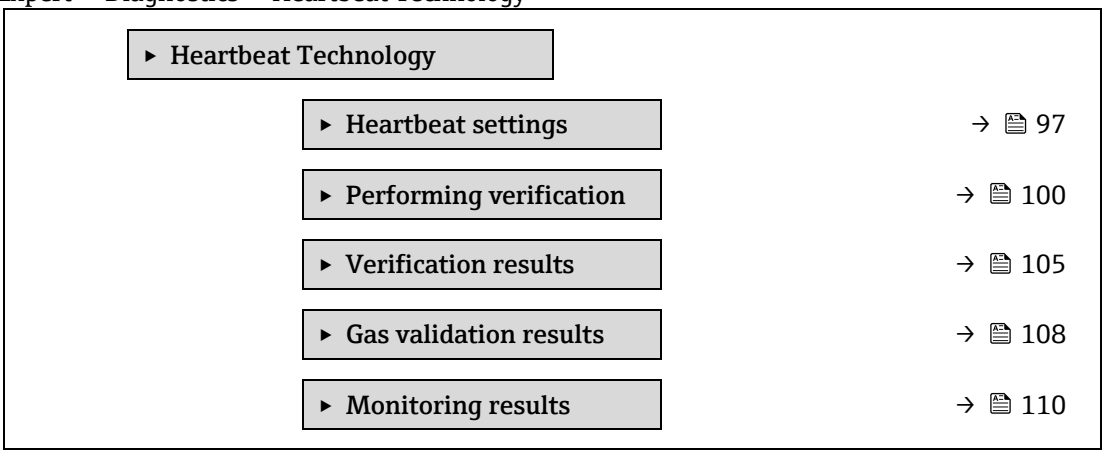
Logging duration

Navigation	Diagnostics → Data logging → Logging duration Expert → Diagnostics → Data logging → Logging duration
Prerequisite	In the Data logging parameter → 📄, the **Not overwriting** option is selected.
Description	Displays the total logging duration.
Selection	Positive floating-point number
Factory setting	0 s

3.7.10 Heartbeat Technology

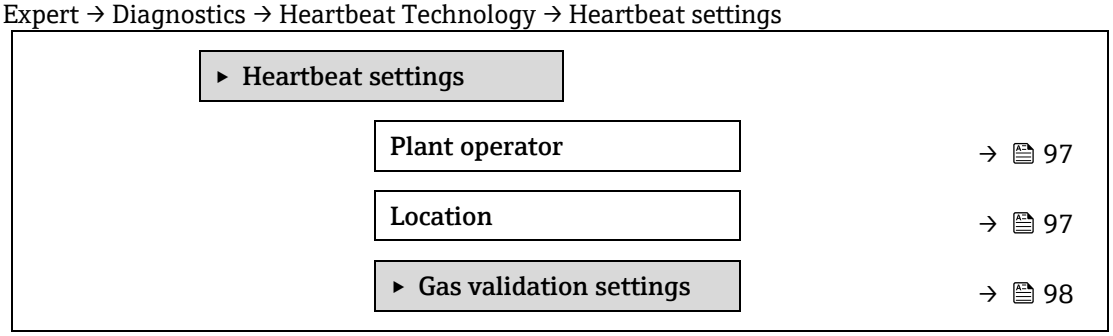
For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring**, refer to Special Documentation for the device → 📄 7.

Navigation Expert → Diagnostics → Heartbeat Technology



Heartbeat settings submenu

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings



Plant operator

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Plant operator

Description Use this function to enter the facility operator.

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

Location

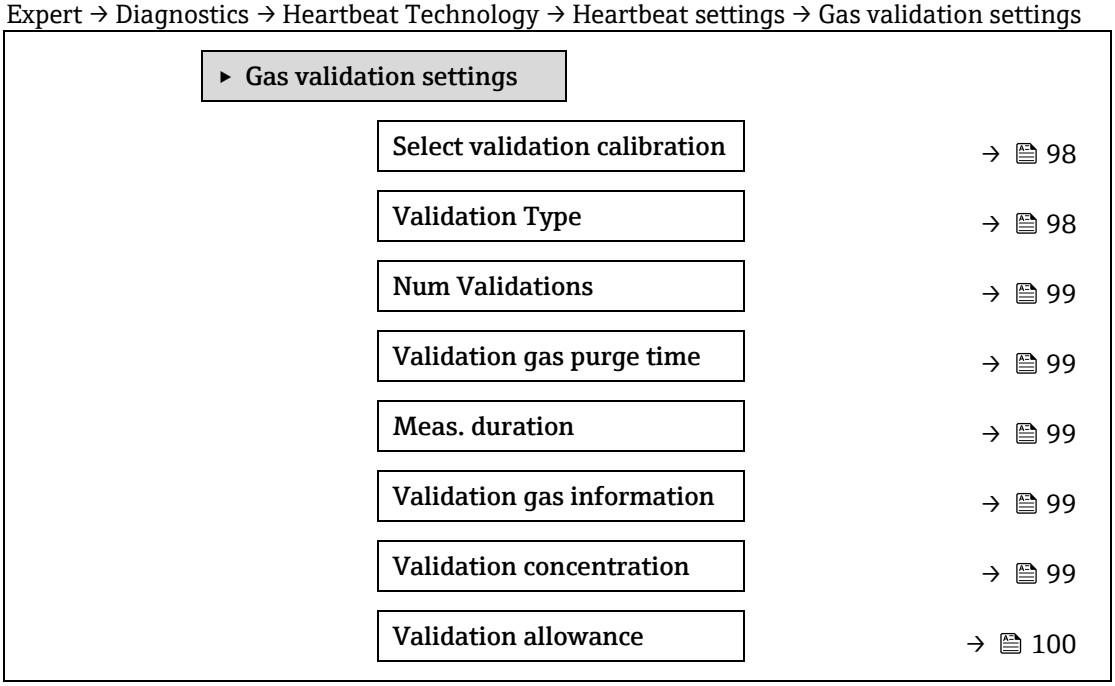
Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Location

Description Use this function to enter the location.

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

Gas validation settings submenu

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings



Select validation calibration

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings → Select validation calibration

Description Select the calibration for validation. It should closely match the composition of the validation gas.

Selection
- 1
- 2
- 3
- 4

Factory setting 1

Validation Type

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings → Validation Type

Description Select whether the validation gas flow is manual (user controlled) or auto (device controlled).

Selection
- Validation manual gas
- Validation auto gas

Factory setting Validation manual gas

Num Validations

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings → Num Validations

Description Select the number of validation points.

Selection 1

Factory setting 1

Validation gas purge time

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings → Validation gas purge time

Description Enter the validation gas purge time.

User entry 0 to 5 minutes

Factory setting 1.00 min

Meas. Duration

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings → Meas. duration

Description Enter the duration for calculating the measurement statistics (mean, standard deviation).

User entry 0.25 to 60 minutes

Factory setting 1.00 min

Validation gas information

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings → Validation gas information

Description Enter a description or identifier for the source of validation gas (stream, bottle, bottle serial number).

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

Factory setting Unknown validation gas

Validation concentration

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings → Validation concentration

Description Enter the concentration of the analyte in the validation gas.

User entry 0 to 1000000 ppmv

Factory setting 0 ppmv

Additional information Validation concentration value dependent upon the concentration unit.

Validation allowance

Navigation Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings → Validation allowance

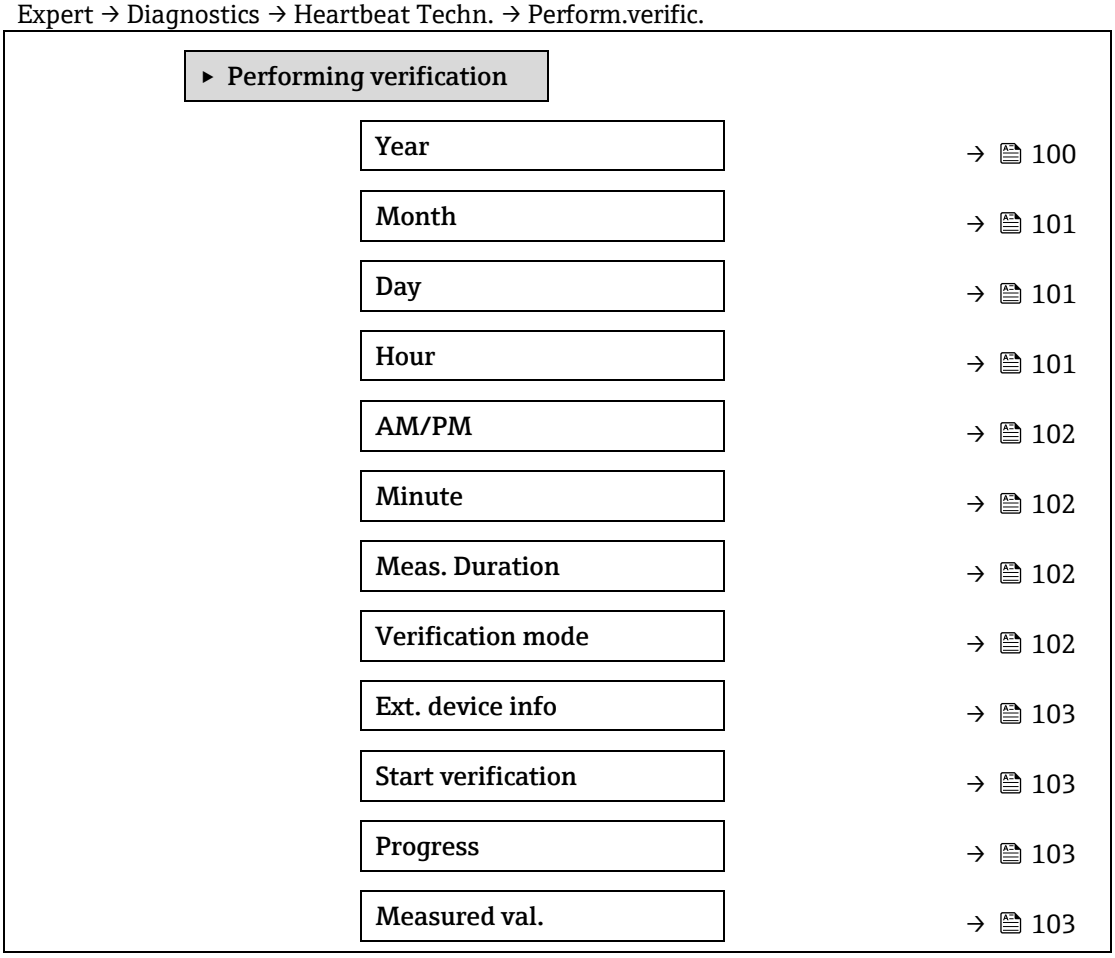
Description Set the deviation allowance between the validation concentration and the measured concentration.

User entry 0 to 100 %

Factory setting 0.0000%

Performing verification wizard

Navigation Expert → Diagnostics → Heartbeat Techn. → Perform.verific.



Output values	→ 104
Measured conc.	→ 104
Status	→ 104
Verification result	→ 104

Year

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Year

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to enter the year of verification.

User entry 9 to 99

Factory setting 21

Month

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Month

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to select the month of verification.

User entry
- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

Factory setting January

Day

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Day

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to enter the day of the month of verification.

User entry 1 to 31 d

Factory setting 1 d

Hour

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Hour

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to enter the hour of verification.

User entry 0 to 23 h

Factory setting 12 h

AM/PM

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → AM/PM

Prerequisite Can be edited if Heartbeat Verification is not active.
The **dd.mm.yy hh:mm am/pm** option or the **mm/dd/yy hh:mm am/pm** option is selected in the Date/time format parameter →.

Description Use this function to select the time entry in the morning (**AM** option) or afternoon (**PM** option) in the case of 12-hour notation.

User entry
- AM
- PM

Factory setting AM

Minute

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Minute

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to enter the minutes of verification.

User entry 0 to 59 min

Factory setting 0 min

Meas. duration

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Meas. Duration

Prerequisite Can be edited if verification status is not active.

Description Enter the duration for calculating the measurement statistics (mean, standard deviation).

User entry 0.25 to 60 minutes

Verification mode

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Verification mode

Prerequisite Can be edited if verification status is not active.

Description Select verification mode.
- **Standard verification.** Verification is performed automatically by the device and without manual checking of external measured variables.
- **Extended validation.** Similar to standard verification but with performing measurement using validation reference gas.
- **Extended current output.** Similar to standard verification but with performing measurement using validation reference gas.
- **Extended validation and current output.** This feature performs both extended validation and extended current output.

Selection
- Standard verification
- Extended validation
- Extended current output
- Extended validation and current output

Factory setting Standard verification

External device information

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Ext. device info

Prerequisite With the following conditions:
The **Extended current output or Extended val and current out** option is selected in the Verification mode parameter →.
Can be edited if the verification status is not active.

Description Record measuring equipment for extended verification.

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

Start verification

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Start verification

Description Start the verification.
To carry out a complete verification, select the selection parameters individually. Once the external measured values have been recorded, verification is started using the **Start** option.

Selection
- Cancel
- Output 1 low value[1]
- Output 1 high value [1]
- Output 2 low value [1]
- Output 2 high value [1]
- Start
- Prepare validation
- End validation

Factory setting Cancel

[1] Visibility depends on order options or device settings

Progress

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Progress

Description The progress of the process is indicated.

User interface 0 to 100 %

Measured values

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Measured values

Prerequisite One of the following options is selected in the Start verification parameter →:
- Output 1 low value
- Output 1 high value
- Output 2 low value
- Output 2 high value

Description Use this function to enter the measured values (actual values) for the external measured variable current output: Output current in [mA].

User entry Signed floating-point number

Factory setting 0

Output values

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Output values

Description Displays the simulated output values (target values) for the external measured variable current output: Output current in [mA].

User interface Signed floating-point number

Measured concentration

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Measured concentration

Description Displays the concentration of the validation gas during extended validation.

User interface 0 to 1000000 ppmv

Status

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Status

Description Displays the current status of the verification.

User interface
- Done
- Busy
- Failed
- Not done
- Purging

Verification result

Navigation Expert → Diagnostics → Heartbeat Technology → Performing verification → Verification Result

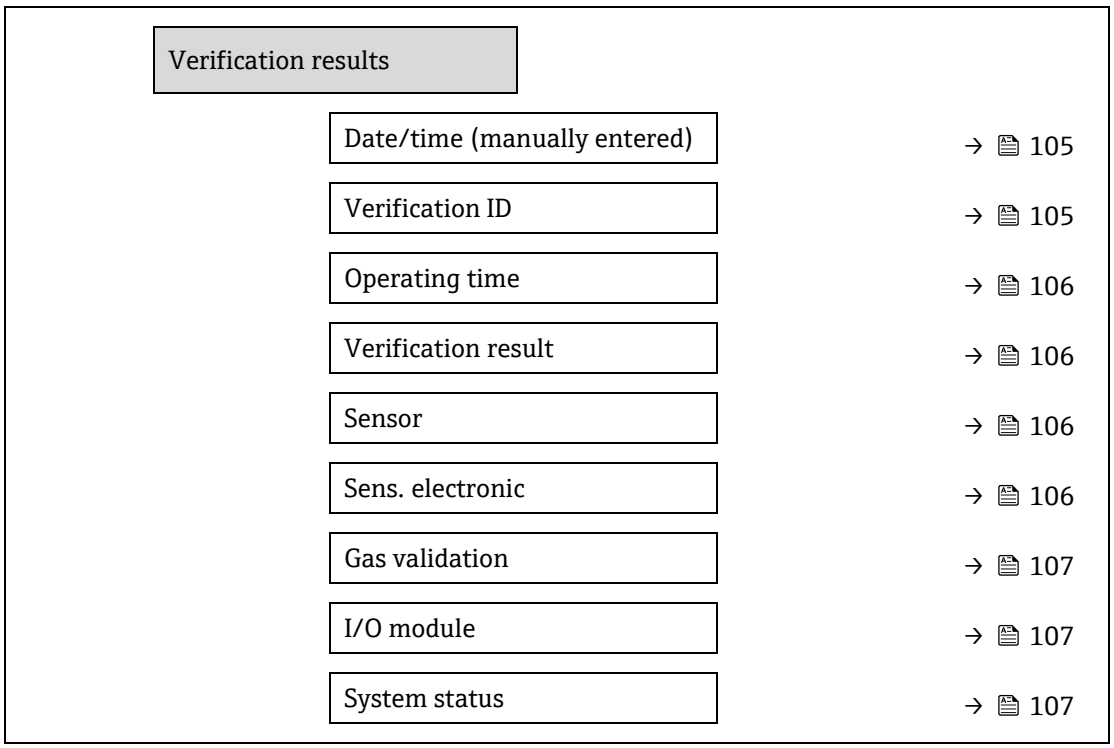
Description Displays the overall result of the verification.

User interface
- Not supported
- Passed
- Not done
- Failed
- Not plugged

Factory setting Not done

Verification results submenu

Navigation Expert → Diagnostics → Heartbeat Techn. → Verific. Results



Date/time (manually entered)

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → Date/time

Prerequisite The verification has been performed.

Description Date and time.

User interface dd.mmmm.yyyy; hh:mm

Factory setting 1 January 2010; 12:00

Verification ID

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → Verification ID

Prerequisite The verification has been performed.

Description Displays consecutive numbering of the verification results in the measuring device.

User interface 0 to 65,535

Factory setting 0

Operating time

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → Operating time

Prerequisite The verification has been performed.

Description Indicates how long the device has been in operation up to the verification.

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

Verification result

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → Verification result

Description Displays the overall result of the verification.

User interface
- Not supported
- Passed
- Not done
- Failed

Factory setting Not done

Sensor

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → Sensor

Prerequisite The **Failed** option result is shown in the Verification result parameter →.

Description Displays the result for the sensor.

User interface
- Not supported
- Passed
- Not done
- Failed

Factory setting Not done

Sensor electronic module (ISEM)

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → Sens. Electronic

Prerequisite The **Failed** option result is shown in the Verification result parameter →.

Description Displays the result for the sensor electronics module (ISEM).

User interface
- Not supported
- Passed
- Not done
- Failed

Factory setting Not done

Gas validation

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → Gas validation

Prerequisite The Failed option result is shown in the Verification result parameter →.

Description Displays the results for the gas validation.

User interface
- Failed
- Passed
- Not done
- Not supported
- Not plugged

Factory setting Not done

I/O module

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → I/O module

Prerequisite In the Verification result parameter →, the **Failed** option was displayed.

Description Displays the result for I/O module monitoring of the I/O module.
- For current output: Accuracy of the current
- Current input: Accuracy of the current
- Relay output: Number of switching cycles

Heartbeat Verification does not check the digital inputs and outputs and does not output any result for them.

User interface
- Not supported
- Passed
- Not done
- Not plugged
- Failed

Factory setting Not done

System status

Navigation Expert → Diagnostics → Heartbeat Technology → Verification results → System status

Prerequisite The **Failed** option result is shown in the Verification result parameter →.

Description Displays the system condition. Tests the measuring device for active errors.

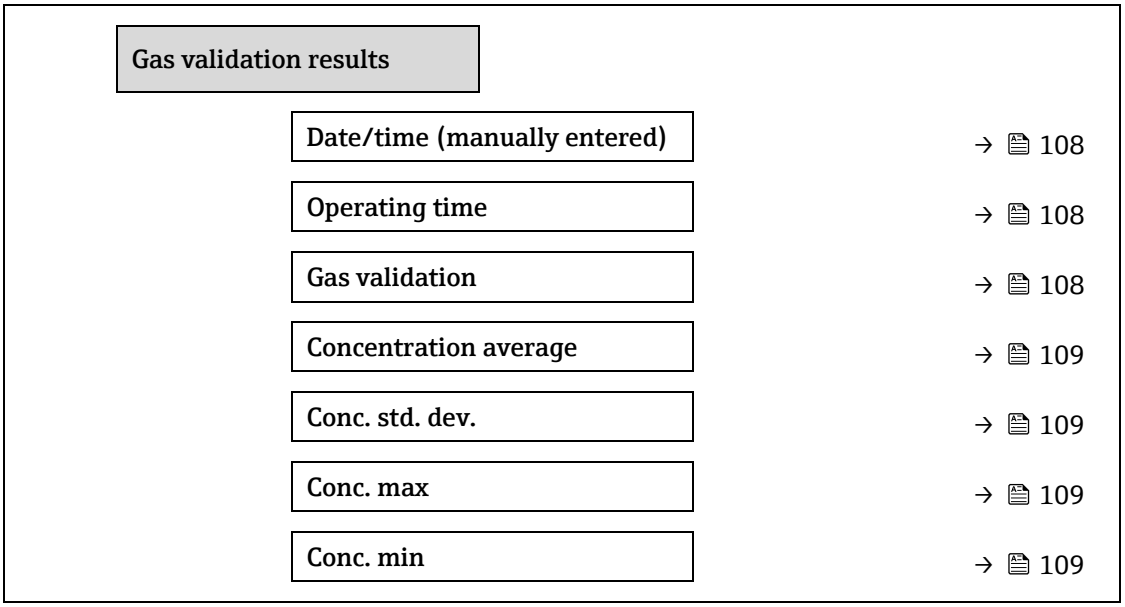
User interface
- Not supported

- Passed
- Not done
- Failed

Factory setting Not done

Gas validation results submenu

Navigation Expert → Diagnostics → Heartbeat Techn. → Gas validation results



Date/time (manually entered)

Navigation Expert → Diagnostics → Heartbeat Technology → Gas validation results → Date/time
Prerequisite The verification has been performed.
Description Date and time.
User interface dd.mm.yy hh:mm (Dependent on date/time format selected)
Factory setting 1 January 2010; 12:00

Operating time

Navigation Expert → Diagnostics → Heartbeat Technology → Gas validation results → Operating time
Prerequisite The verification has been performed.
Description Indicates how long the device has been in operation up to the verification.
User interface Days (d), hours (h), minutes (m), seconds (s)

Gas validation

Navigation Expert → Diagnostics → Heartbeat Technology → Gas validation results → Gas validation
Prerequisite The verification has been performed.
Description Status after gas validation is completed.

User interface
- Not supported
- Passed
- Not done
- Not plugged
- Failed

Concentration average

Navigation Expert → Diagnostics → Heartbeat Technology → Gas validation results → Concentration average

Prerequisite The verification has been performed.

Description 0 to 1000000 ppmv

User interface Average gas concentration as determined during validation.

Concentration standard deviation

Navigation Expert → Diagnostics → Heartbeat Technology → Gas validation results → Conc. Std. dev.

Prerequisite The verification has been performed.

Description Positive floating-point value of concentration standard deviation as determined during validation.

User interface 0 to 1000000 ppmv

Concentration maximum

Navigation Expert → Diagnostics → Heartbeat Technology → Gas validation results → Conc. Max

Prerequisite The verification has been performed.

Description Maximum concentration as determined during gas validation.

User interface 0 to 1000000 ppmv

Concentration minimum

Navigation Expert → Diagnostics → Heartbeat Technology → Gas validation results → Conc. Min

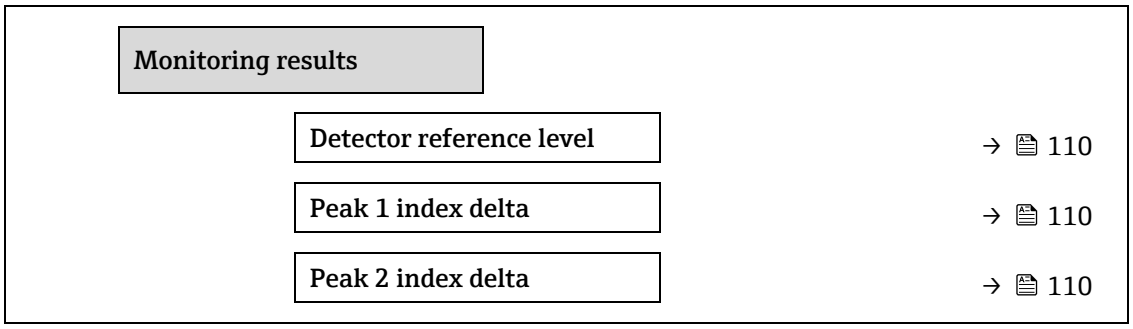
Prerequisite The verification has been performed.

Description Minimum concentration as determined during gas validation.

User interface 0 to 1000000 ppmv

Monitoring results submenu

Navigation Expert → Diagnostics → Heartbeat Techn. → Monitor. results



Detector reference level

Navigation Expert → Diagnostics → Heartbeat Technology → Monitor. results → Detector reference level

Description Signal from optical detector.

User interface 0 to 5 mA

Peak 1 index delta

Navigation Expert → Diagnostics → Heartbeat Technology → Monitor. results → Peak 1 index delta

Description Difference between target peak 1 value and current peak 1 value.

User interface -511.0 to 511.0

Peak 2 index delta

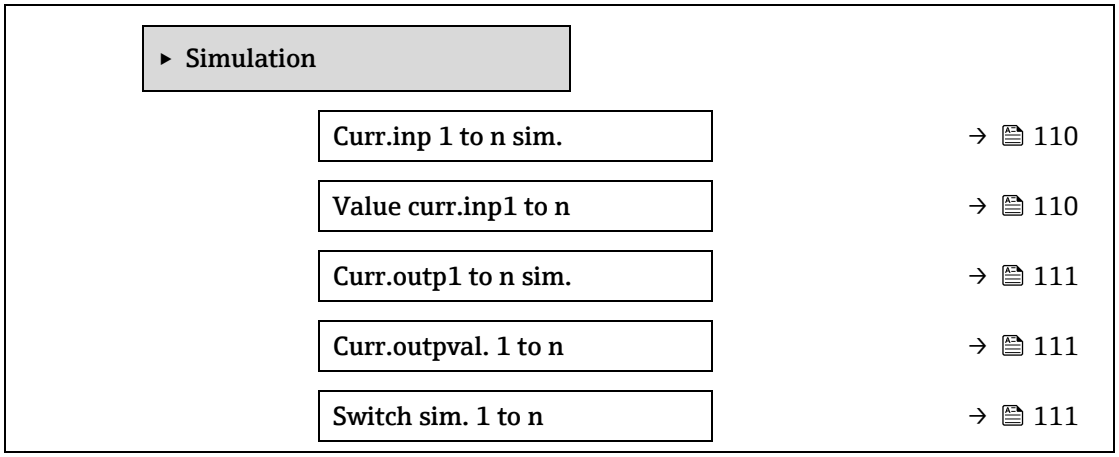
Navigation Expert → Diagnostics → Heartbeat Technology → Monitor. results → Peak 2 index delta

Description Difference between target peak 2 value and current peak 2 value.

User interface -511.0 to 511.0

3.7.11 Simulation

Navigation Expert → Diagnostics → Simulation



Switch state 1 to n	→ 112
Relay out.1 to n sim	→ 112
Switch state 1 to n	→ 112
Dev. alarm sim.	→ 113
Event category	→ 113
Diag. event sim.	→ 113

Current input 1 to n simulation

Navigation Expert → Diagnostics → Simulation → Current input 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
- Off
- On

Factory setting Off

Additional information *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.

Value current input 1 to n

Navigation Expert → Diagnostics → Simulation → Value current input 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

Current output 1 to n simulation

Navigation Expert → Diagnostics → Simulation → Current output 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 1 to n

Navigation Expert → Diagnostics → Simulation → Current output value 1 to n

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.

User entry 0 to 22.5 mA

Additional information

Dependency
The input range is dependent on the option selected in the Current span parameter →.

Switch output simulation 1 to n

Navigation Expert → Diagnostics → Simulation → Switch output simulation 1 to n

Prerequisite In the Operating mode parameter →, 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
- Off
- On

Factory setting Off

Additional information

Description
The desired simulation value is defined in the **Switch state 1 to n** parameter.

Selection
- **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
- Open
- Closed

Additional information

Selection

- **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

- Off
- On

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Switch state 1 to n** parameter.

Selection

- **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.

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

- Open
- Closed

Additional information

Selection

- **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 → Device alarm simulation

Description Use this function to switch the device alarm on and off.

Selection

- Off
- On

Factory setting Off

Additional information

Description
The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

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 →.

Selection
- Sensor
- Electronics
- Configuration
- Process

Factory setting Process

Diagnostic event simulation

Navigation Expert → Diagnostics → Simulation → Diag. event sim.

Description Use this function to select a diagnostic event for the simulation process that is activated.

Selection
- Off
- Diagnostic event picklist (depends on the category selected)

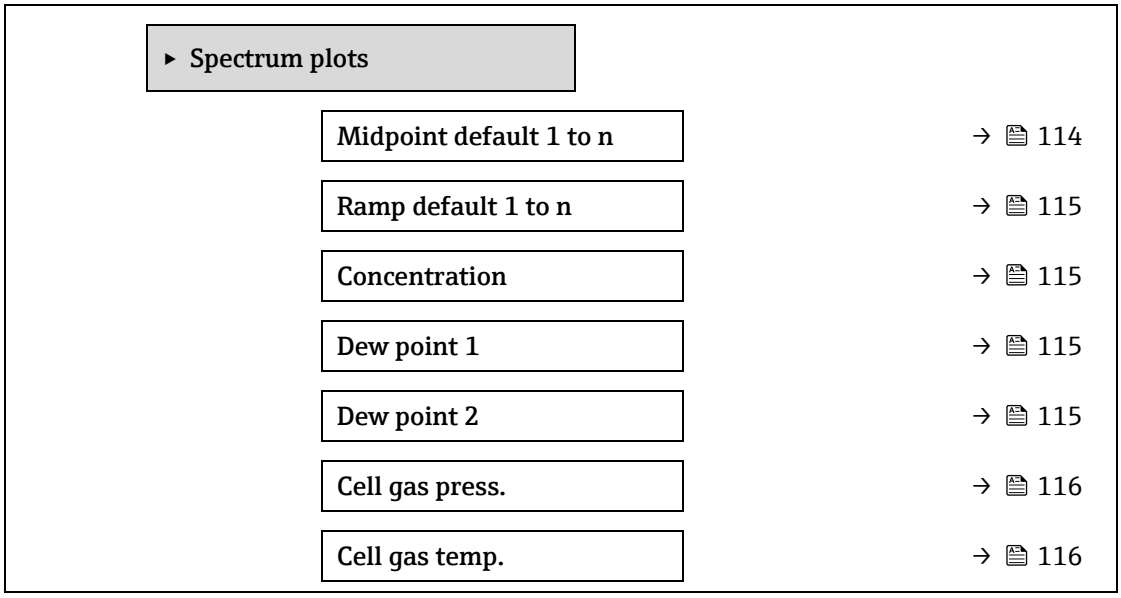
Factory setting Off

Additional information

Description
For the simulation, you can choose from the diagnostic events of the category selected in the Diagnostic event category parameter →.

3.7.12 Spectrum plots

Navigation Expert → Diagnostics → Spectrum plots



Midpoint default 1 to n

Navigation Expert → Diagnostics → Spectrum plots → Midpoint default 1 to n

Description This value serves as a starting point for midpoint delta to optimized peak position.

Selection 0 to 120 mA

Additional information Peak midpoint value set during factory calibration.

Ramp default 1 to n

Navigation Expert → Diagnostics → Spectrum plots → Ramp default 1 to n

Description Displays factory calibrated ramp for each calibration stream.

Selection 0 to 120 mA

Additional information Laser ramp represents the scan width of the spectrum.

Concentration

Navigation Expert → Diagnostics → Spectrum plots → Concentration

Description Concentration of the measured analyte within the gas stream.

Selection 0 to 1000000 ppmv

Additional information Provides a plot of the measured concentration of the analyte.

Dew point 1

Navigation Expert → Diagnostics → Spectrum plots → Dew point 1

Description Displays the moisture dew point 1 temperature that is currently calculated.

Selection Signed floating-point number

Additional information The unit is taken from the temperature unit parameter →. Dew point is the temperature at which moisture will start to condense into liquid for a given concentration and pressure. There are several industry accepted methods for moisture dew point calculation. See BA02152C → for more details.

Dew point 2

Navigation Expert → Diagnostics → Spectrum plots → Dew point 2

Description Displays the moisture dew point 2 temperature that is currently calculated.

Selection Signed floating-point number

Additional information The unit is taken from the temperature unit parameter →. Dew point is the temperature at which moisture will start to condense into liquid for a given concentration and pressure. There are several industry accepted methods for moisture dew point calculation. See BA02152C → for more details.

Cell gas pressure

Navigation Expert → Diagnostics → Spectrum plots → Cell gas pressure

Description Plots the gas pressure currently measured in the sample cell.

Selection -0.5 to 6.9 Bar

Additional information The unit is taken from the pressure unit parameter → .The current pressure of the sample cell during measurement.

Cell gas temperature

Navigation Expert → Diagnostics → Spectrum plots → Cell gas temperature

Description Displays the gas pressure currently measured in the sample cell.

Selection -20 to +60 °C

Additional information The unit is taken from the temperature unit parameter →.The current temperature of the sample cell during measurement.

Detector reference level

Navigation	Expert → Diagnostics → Spectrum plots → Detector reference level
Description	Plots the laser detector reference level currently measured.
Selection	0 to 5 mA
Additional information	The magnitude of the DC laser current. An out-of-range value can indicate the optics need to be cleaned or there is an alignment problem.

Detector zero level

Navigation	Expert → Diagnostics → Spectrum plots → Detector zero level
Description	Displays the laser detector zero level currently measured.
Selection	0 to 5 mA
Additional information	The DC laser power when the laser is turned off (e.g., dark current).

Peak 1 index

Navigation	Expert → Diagnostics → Spectrum plots → Peak 1 index
Description	Displays the absorption peak 1 index position in the currently measured 2f spectrum.
Selection	0 to 511.0
Additional information	Position of the absorption peak along the scan.

Peak 1 index delta

Navigation	Expert → Diagnostics → Spectrum plots → Peak 1 index delta
Description	Displays of peak 1 index delta.
Selection	-511.0 to 511.0
Additional information	Peak 1 index delta is the difference between target peak 1 value and current peak 1 value.

Peak 2 index

Navigation	Expert → Diagnostics → Spectrum plots → Peak 2 index
Description	Displays the absorption peak 2 index position in the currently measured 2f spectrum.
Selection	0 to 511.0
Additional information	Position of the secondary peak along the scan. Used for peak tracking purposes.

Peak 2 index delta

Navigation Expert → Diagnostics → Spectrum plots → Peak 2 index delta

Description Displays of Peak 2 index delta.

Selection -511.0 to 511.0

Additional information Peak 2 index delta is the difference between target peak 2 value and current peak 2 value.

Peak track index

Navigation Expert → Diagnostics → Spectrum plots → Peak track index

Description Displays the peak track index for the peak used for peak tracking in the currently measured 2f spectrum.

Selection 0 to 511.0

Additional information If Off is selected in the Peak tracking analyzer control parameter this value will be zero. Otherwise, this value will mimic the parameter Peak 1 to n index depending on which peak is being used for peak tracking.

Peak track index delta

Navigation Expert → Diagnostics → Spectrum plots → Peak track index delta

Description Displays the difference in the peak track index and the target index in the currently measured 2f spectrum.

Selection -511.0. to 511.0

Additional information If Off is selected in the Peak tracking analyzer control parameter, this value will be zero. Otherwise, this value will mimic the parameter Peak 1 to n index delta depending on which peak is being used for peak tracking.

Midpoint delta

Navigation Expert → Diagnostics → Spectrum plots → Midpoint delta

Description Displays the difference in the calibrated midpoint value and the currently used midpoint value.

Selection 0 to 120 mA

Additional information If Off is selected in the Peak tracking analyzer control parameter this value will be zero. Otherwise, this value will be the amount of change applied to the calibrated midpoint value by the peak tracking algorithm.

Analyzer control

Navigation Expert → Diagnostics → Spectrum plots → Analyzer control

Description Controls whether peak tracking is activated.

Selection
- Off
- On

Factory setting Off

Additional information Switch peak track on or off for the analyzer. There are separate peak track settings for each calibration. Normal operation peak tracking should be on.

Reset

Navigation Expert → Diagnostics → Spectrum plots → Reset

Description Reset analyzer peak midpoint current value.

Selection
- Off
- Reset

Factory setting Off

Additional information Reset will change analyzer peak midpoint current value to original calibrated peak location.

Det. 1 TIA gain

Navigation Expert → Diagnostics → Spectrum plots → Det. 1 TIA gain

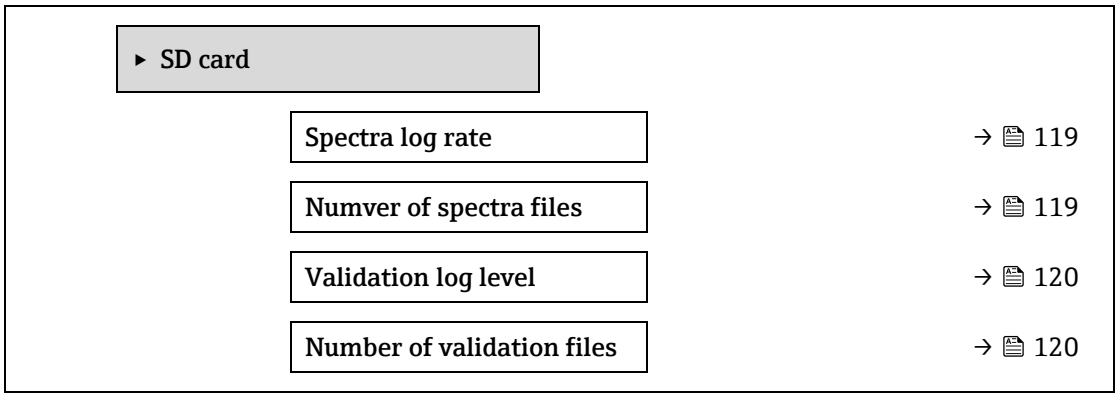
Description Display for TIA gain value.

Selection 0 to 15

Additional information Transimpedance amplifier (TIA) gain value.

3.7.13 SD card

Navigation Expert → Diagnostics → SD card



Spectra log rate

Navigation Expert → Diagnostics → SD card → Spectra log rate

Description The frequency in which spectra data is saved to the SD card.

Selection 45 to 86400 sec

Factory setting 3600 s

Additional information Under normal operation, one spectra log file per day will be generated; however, with faster logging rates more than one file each day will be generated.

Number of spectra files

Navigation Expert → Diagnostics → SD card → Number of spectra file

Description Estimated number of spectra files.

User interface 0 to 30

Additional information The analyzer supports up to 30 spectra log files. Files are saved as FIFO[1]. For smaller capacity SD cards, the number of files will be less.

Validation log level

Navigation Expert → Diagnostics → SD card → Validation log level

Description Determines the amount of information logged to the validation log file during Heartbeat extended validation.

Selection
- Off
- Normal
- Extended
- All

Factory setting Normal

Additional information
- **Off**. No validation log information is created.
- **Normal**. While validation is measuring; log trend, first/middle/last spectrum and validation results
- **Extended**. Includes Normal log level plus every spectrum while validation is measuring.
- **All**. Includes Extended log level plus every trend and spectrum during purge before and after validation.

Number of validation files

Navigation Expert → Diagnostics → SD card → Number of validation files

Description Current number of validation files saved to the SD card.

User interface 0 to 60

Additional information For SD cards < 1GB maximum number of files reduced to 30.

[1] FIFO = First in, first out data storage

4 Approval specific factory settings

4.1 SI units

4.1.1 System units

Process variable	Unit
Temperature	°C
Pressure	bar a

4.1.2 Full scale values

NOTICE

The factory settings apply to the following parameters:

- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

4.1.3 Output current span

Output	Current range
Current output 1…n	4 to 20 mA NAMUR

4.2 US units

4.2.1 System units

Process variable	Unit
Temperature	°F
Pressure	psi a

4.2.2 Full scale values

NOTICE

The factory settings apply to the following parameters:

- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

4.2.3 Output current span

Output	Current range
Current output 1…n	4 to 20 mA US

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Pressure	Pa a, kPa a, MPa a	Pascal, kilopascal, megapascal (absolute)
	bar	Bar
	Pa g, kPa g, MPa g	Pascal, kilopascal, megapascal (relative/gauge)
	bar g	Bar (relative/gauge)
Temperature	°C, K	Celsius, Kelvin
Time	s, m, h, d, y	Second, minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Pressure	psi a	Pounds per square inch (absolute)
	psi g	Pounds per square inch (gauge)
Temperature	°F, °R	Fahrenheit, Rankine
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

5.3 Imperial units

Process variable	Units	Explanation
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

6 Modbus register information

6.1 Notes

References to Modbus refers to Modbus TCP and RS485 devices unless otherwise noted.

6.1.1 Structure of the register information

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

Navigation: navigation path to the parameter					
Parameter	Register	Data type	Access type	User interface/ Selection/User entry	→ 🖹
Name of parameter	Indicated in decimal numerical format	Float length = 4 byte Integer length = 2 byte String length, depending on parameter	Possible type of access to parameter: Read access via function codes 03, 04 or 23 Write access via function codes 06, 16 or 23	Options List of the individual options for the parameter Option 1 Option 2 Option 3 (+) (+) = Factory setting depends on country, order options or device settings User entry Specific value or input range for the parameter	Page number information and cross-reference to the standard parameter description

NOTICE

If non-volatile device parameters are modified via the MODBUS function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device.

- The number of writes to the EEPROM is technically restricted to a maximum of 1 million.
- Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.
- Avoid constantly writing non-volatile device parameters via the MODBUS.

6.1.2 Address model

The Modbus register addresses of the measuring device are implemented in accordance with the “Modbus Applications Protocol Specification V1.1.” In the Modbus protocols, the addresses are encoded using 16 bits with a number between 0 and 65,535. These are 0-based addresses. Therefore, the Modbus protocol address is equal to the register minus one.

Function code	Access type	Register in accordance with "Modbus Applications Protocol Specification"
03 04 23	Read	XXXX Example: 9455 Concentration
06 16 23	Write	XXXX Example: 2439 Concentration Unit

6.2 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.

- ▸ Data logging → 94
  - Assign chan. 1 to n → 94
  - Logging interval → 94
  - Clear logging → 95
  - Data logging → 95
  - Logging delay → 95
  - Data log.control → 96
  - Data log. status → 96
  - Logging duration → 97
- ▸ Heartbeat Technology → 97
  - ▸ Heartbeat settings → 97
    - Plant operator → 97
    - Location → 97
    - ▸ Gas validation settings → 98
      - Select val. cal. → 98
      - Validation type → 98
      - Num. val. Points → 99
      - Val. purge time → 99
      - Meas. duration → 99
      - Val. gas info → 99
      - Val. conc. → 99
      - Val. allowance → 100
    - Performing verification → 100
      - Year → 100
      - Month → 101
      - Day → 101
      - Hour → 101
      - AM/PM → 102
      - Minute → 102
      - Meas. Duration → 102
      - Verification mode → 102
      - Ext. device info → 103
      - Start verification → 103
      - Progress → 103
      - Status → 103
      - Measured val. → 104
      - Output values → 104
      - Measured conc. → 104
      - Verification result → 104
    - Verification results → 106
      - Date/time (man. entered) → 106

6.3 Register information

Navigation: Expert					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Locking status	4918	Integer	Read	256 = Hardware locked 512 = Temporarily locked	10
User role	2178	Integer	Read	0 = Operator 1 = Maintenance	11
Enter access code	2177	Integer	Read / Write	Four-digit access code	11

6.3.1 System submenu

6.3.1.1 Display

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Display language	3673	Integer	Read / Write	0 = English 1 = Français 2 = Italiano 3 = русский язык (Russian) 4 = 中文 (Chinese)	12
Format display	3625	Integer	Read / Write	0 = 1 value, max. size 1 = 1 bargraph + 1 value 2 = 2 values 3 = 1 value large + 2 values 4 = 4 values	13

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→ 📄
Value 1 display	3963	Integer	Read / Write	2 = Cell gas pressure 3 = Cell gas temperature 4 = Dew point 1 5 = Dew point 2 151 = Concentration	14
0% bargraph value 1	4136 to 4137	Float	Read / Write	Signed floating-point number	14
100% bargraph value 1	4142 to 4143	Float	Read / Write	Signed floating-point number	14
Decimal places 1	3365	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	15
Value 2 display	3964	Integer	Read / Write	For the picklist, see the Value 1 display parameter (→ 📄 14)	16
Decimal places 2	4049	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	16
Value 3 display	3966	Integer	Read / Write	For the picklist, see the **Value 1 display**	17
0% bargraph value 3	4138 to 4139	Float	Read / Write	Signed floating-point number	17
100% bargraph value 3	4140 to 4141	Float	Read / Write	Signed floating-point number	17
Decimal places 3	4050	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	17
Value 4 display	3965	Integer	Read / Write	For the picklist, see the **Value 1 display**	17
Decimal places 4	4051	Integer	Read / Write	0 = x 1 = x.x 2 = x.xx 3 = x.xxx 4 = x.xxxx	18
Display interval	3604 to 3605	Float	Read / Write	1 to 10 s	18
Display damping	3554 to 3555	Float	Read / Write	0.0 to 999.9 s	19
Header	3624	Integer	Read / Write	0 = Device tag 1 = Free text	20

Navigation: Expert → System → Display					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Header text	3968 to 3973	String	Read / Write	Max. 12 characters, such as letters, numbers or special characters (e.g., @, %, /)	20
Separator	3671	Integer	Read / Write	1 = point . 2 = comma ,	21
Contrast display	3674 to 3675	Float	Read / Write	20 to 80 %	21
Backlight	3967	Integer	Read / Write	0 = Disable 1 = Enable	21

6.3.1.2 Configuration backup

Navigation: Expert → System → Configuration backup					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Operating time	2631 to 2637	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	22
Last backup	6430 to 6436	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	22
Configuration management	5500	Integer	Read / Write	0 = Cancel 1 = Execute backup 2 = Restore 4 = Clear backup data 5 = Compare	22
Backup state	5502	Integer	Read	1 = Backup in progress 2 = Restoring in progress 4 = Delete in progress 5 = Compare in progress 6 = Restoring failed 7 = Backup failed 251 = None	23
Comparison result	5514	Integer	Read	0 = Settings identical 1 = Settings not identical 2 = No backup available 3 = Check not done 4 = Backup settings corrupt 5 = Dataset incompatible	23

6.3.1.3 Diagnostic handling

Navigation: Expert → System → Diagnostic handling					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Alarm delay	6808 to 6809	Float	Read / Write	0 to 60 s	24

Diagnostic behavior submenu

Navigation: Expert → System → Diagnostic handling → Diagnostic behavior					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Assign behavior of diagnostic no. 302	2312	Integer	Read / Write	0 = Warning 1 = Alarm	25
Assign behavior of diagnostic no. 441	4742	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	25
Assign behavior of diagnostic no. 444	5120	Integer	Read / Write	0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm	25
Assign behavior of diagnostic no. 905	30025	Integer	Read / Write	0 = Off 1 = Alarm 2 = Warning 3 = Logbook entry only 4 = Reset	26

6.3.1.4 Administration

Navigation: Expert → System → Administration					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Device reset	6817	Integer	Read / Write	0 = Cancel 1 = Restart device 2 = To delivery settings	26
Transmitter identifier	4510	Integer	Read	1 = 300	27
Activate SW option	2795	String	Read / Write	Max. 10-digit string consisting of numbers.	27
Software option overview	2902	Integer	Read	1 = Extended HistoROM 32768 = Heartbeat Verification 16384 = Heartbeat Monitoring	28

Define access code submenu

Navigation: Expert → System → Administration → Define access code					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Define access code	8677 to 8684	String	Read / Write	Max. 16-digit character string comprising numbers, letters, and special characters	28
Confirm access code	8685 to 8692	String	Read / Write	Max. 16-digit character string comprising numbers, letters, and special characters	28

Reset access code submenu

Navigation: Expert → System → Administration → Reset access code					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Operating time	2631 to 2637	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	29
Reset access code	8880 to 8895	String	Read / Write	Character string comprising numbers, letters, and special characters	29

6.3.2 Sensor

6.3.2.1 Measured values

Measured variables submenu

Navigation: Expert → Sensor → Measured values → Measured variables					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Concentration	9455 to 9456	Float	Read	0 to 1000000 ppmv	32
Dew point 1	21458 to 21459	Float	Read	Signed floating-point number	32
Dew point 2	21800 to 21801	Float	Read	Signed floating-point number	32
Cell gas pressure	25216 to 25217	Float	Read	Signed floating-point number	33
Cell gas temperature	21854 to 21855	Float	Read	Signed floating-point number	33
Detector reference level	4720 to 4721	Float	Read	0 to 5 mA	33
Detector zero level	9667 to 9668	Float	Read	0 to 5 mA	34
Peak 1 index	9834 to 9835	Float	Read	0.0 to 511.0	34
Peak 1 index delta	30581 to 30582	Float	Read	-511.0 to 511.0	34
Peak 2 index	27600 to 27601	Float	Read	0.0 to 511.0	34
Peak 2 index delta	30672 to 30673	Float	Read	-511.0 to 511.0	34
Peak track index	29018 to 29019	Float	Read	0.0 to 511.0	34
Peak track index delta	28814 to 28815	Float	Read	-511.0 to 511.0	34
Midpoint delta	47236 to 47237	Float	Read	0.0 to 120.0 mA	34

Input values submenu

Current input 1 to n

Navigation: Expert → Sensor → Measured values → Input values → Current input 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Measured values 1 to n	1: 6151 to 6152 2: 6153 to 6154 3: 6155 to 6156	Float	Read	Signed floating-point number	35
Measured current 1 to n	1: 6131 to 6132 2: 6133 to 6134 3: 6135 to 6136	Float	Read	0 to 22.5 mA	36

Value status input 1 to n

Navigation: Expert → Sensor → Measured values → Input values → Value status input 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Value status input 1 to n	1: 2746 2: 4699 3: 4700	Integer	Read	0 = Low 1 = High	36

Output values submenu

Value current output 1 to n

Navigation: Expert → Sensor → Measured values → Output values → Value current output 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Output current 1 to n	1: 5931 to 5932 2: 5933 to 5934 3: 5935 to 5936	Float	Read	0 to 22.5 mA	36
Measured current 1 to n	1: 5779 to 5780 2: 5781 to 5782 3: 5783 to 5784	Float	Read	0 to 30 mA	36

Switch output 1 to n

Navigation: Expert → Sensor → Measured values → Output values → Switch output 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Switch state 1 to n	1: 2485 2: 2486 3: 9917	Integer	Read	1 = Open 6 = Closed	37

Relay output 1 to n

Navigation: Expert → Sensor → Measured values → Output values → Relay output 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Switch state	1: 3518 2: 3519 3: 9875	Integer	Read	1 = Open 6 = Closed	38
Switch cycles	1: 7625 2: 7627 3: 7629	Integer	Read	Positive integer	38
Max. switch cycles number	1: 21919 2: 21921 3: 21923	Integer	Read	Positive integer	38

6.3.2.2 System units

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Concentration unit	2439	Integer	Read / Write	0 = ppmv 1 = lb/MMscf 2 = %vol	39

Navigation: Expert → Sensor → System units					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
				3 = mg/sm3 4 = ppbv 5 = mg/Nm3 240 = User conc.	
Temperature unit	2109	Integer	Read / Write	0 = °C 1 = K 2 = °F 3 = °R	39
Pressure unit	2130	Integer	Read / Write	0 = bar 1 = psi a 2 = bar g 3 = psi g 4 = Pa a 5 = kPa a 6 = MPa a 7 = Pa g 8 = kPa g 9 = MPa g	40
Length unit	2087	Integer	Read / Write	44 = ft 45 = m 47 = in 49 = mm 240 = µm	40
Date/time format	2150	Integer	Read / Write	0 = dd.mm.yy hh:mm 1 = mm/dd/yy hh:mm am/pm 2 = dd.mm.yy hh:mm am/pm 3 = mm/dd/yy hh:mm	40

User-specific units submenu

Navigation: Expert → Sensor → System units → User-specific units					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
User concentration text	2585 to 2589	String	Read / Write	Max. 10 characters such as letters, numbers, or special characters (@, %, /)	41
User concentration offset	2490 to 2491	Float	Read / Write	Signed floating-point number	41
User concentration factor	2554 to 2555	Float	Read / Write	Signed floating-point number	41

6.3.2.3 Stream

Navigation: Expert → Sensor → Stream					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Analyte type	21930	Integer	Read / Write	0 = H2O	42

Navigation: Expert → Sensor → Stream					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
				1 = CO2 2 = H2S 3 = CH4 4 = NH3 5 = HCl 6 = O2 7 = CO 8 = SO2 9 = C2H2	
Select calibration	22968	Integer	Read / Write	0 = 1 1 = 2 2 = 3 3 = 4	42
Rolling average number	6876	Integer	Read / Write	1 to 256	42

6.3.2.4 Dew Point

Navigation: Expert → Sensor → Dew point					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Dew point method 1	21595	Integer	Read / Write	0 = Off 1 = ASTM1 2 = ASTM2 3 = ISO 4 = AB	43
Dew point method 2	7631	Integer	Read / Write	0 = Off 1 = ASTM1 2 = ASTM2 3 = ISO 4 = AB	43
Conversion type	21596	Integer	Read / Write	0 = Ideal 1 = Real	43
Pipeline pressure mode	48175	Integer	Read / Write	1 = Fixed value 0 = External value 11 = Current input 1 12 = Current input 2 13 = Current input 3	43
Pipeline pressure fixed	48251 to 48252	Float	Read / Write	Signed floating-point number	44
Pipeline pressure	9483 to 9484	Float	Read / Write	Signed floating-point number	45

Dew point calibration submenu

Navigation: Expert → Sensor → Dew Point → Calibration 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Methane CH4	26445, 26453, 26461, 26469	Float	Read / Write	0.4 to 1.0 mole fraction	45
Ethane C2H6	26317, 26325, 26333, 26341	Float	Read / Write	0.0 to 0.2 mole fraction	45
Propane C3H8	26509, 26517, 26525, 26533	Float	Read / Write	0.0 to 0.15 mole fraction	45
Isobutane C4H10	25486, 25494, 25502, 25510	Float	Read / Write	0.0 to 0.1 mole fraction	45
N-Butane C4H10	26915, 26917, 26919, 26921	Float	Read / Write	0.0 to 0.1 mole fraction	45
Isopentane C5H12	27968, 27970, 27972, 27974	Float	Read / Write	0.0 to 0.1 mole fraction	45
N-Pentane C5H12	26931, 26933, 26935, 26937	Float	Read / Write	0.0 to 0.1 mole fraction	45
Neopentane C5H12	26923, 26925, 26927, 26929	Float	Read / Write	0.0 to 0.1 mole fraction	45
Hexane+ C6H14+	27976, 27978, 27980, 27982	Float	Read / Write	0.0 to 0.1 mole fraction	45
Nitrogen N2	25314, 25322, 25330, 25338	Float	Read / Write	0.0 to 0.55 mole fraction	45
Carbon diox. CO2	26199, 26207, 26215, 26223	Float	Read / Write	0.0 to 0.3 mole fraction	45
Hydrog.sulf. H2S	26381, 26389, 26397, 26405	Float	Read / Write	0.0 to 0.05 mole fraction	45
Hydrogen H2	29191, 29193, 29195, 29197	Float	Read / Write	0.0 to 0.2 mole fraction	45

6.3.2.5 Peak Tracking

Navigation: Expert → Sensor → Peak tracking					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Peak track analyzer control	21460	Integer	Read / Write	0 = Off 1 = On	46
Peak track reset	4727	Integer	Read / Write	0 = Off 3 = Reset	46
Peak track average number	21568	Integer	Read / Write	1 to 3600	46

6.3.2.6 Sensor adjustment

Navigation: Expert → Sensor → Sensor adjustment					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Concentration adjustment	47129	Integer	Read / Write	0 = Off 1 = On	47

Navigation: Expert → Sensor → Sensor adjustment					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Concentration multiplier	47222 to 47223	Float	Read / Write	-1000000 to 1000000	47
Concentration offset	47224 to 47225	Float	Read / Write	Signed floating-point number	48
2f base crv source	28614	Integer	Read / Write	0 = Ref0 curve 1 = Ref0 RT curve	47
2f base RT update	30669	Integer	Read / Write	0 = Cancel 1 = Start	49

Sensor adjustment calibration submenu

Navigation: Expert → Sensor → Sensor adjustment → Calibration					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Laser midpoint default	31090, 31092, 31094, 31096	Float	Read / Write	0 to 120 mA	48
Laser ramp default	26750, 26752, 26754, 26756	Float	Read / Write	0 to 120 mA	48
Laser modulation amplitude default	36077, 36079, 36081, 36083	Float	Read / Write	0 to 100 mA	48

6.3.2.7 Stream change compensation (SCC)

Navigation: Expert → Sensor → Stream change compensation (SCC)					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Calibration 1 to n	35689 to 35692	Integer	Read	1 = No 0 = Yes	49

SCC calibration submenu

Navigation: Expert → Sensor → Sensor adjustment → Calibration (1 to n)					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Methane CH4	26445, 26453, 26461, 26469	Float	Read / Write	0.4 to 1.0 mole fraction	51
Ethane C2H6	26317, 26325, 26333, 26341	Float	Read / Write	0.0 to 0.2 mole fraction	51
Propane C3H8	26509, 26517, 26525, 26533	Float	Read / Write	0.0 to 0.15 mole fraction	51
Isobutane C4H10	25486, 25494, 25502, 25510	Float	Read / Write	0.0 to 0.1 mole fraction	51
N-Butane C4H10	26915, 26917, 26919, 26921	Float	Read / Write	0.0 to 0.1 mole fraction	51
Isopentane C5H12	27968, 27970, 27972, 27974	Float	Read / Write	0.0 to 0.1 mole fraction	51

Navigation: Expert → Sensor → Sensor adjustment → Calibration (1 to n)					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
N-Pentane C5H12	26931, 26933, 26935, 26937	Float	Read / Write	0.0 to 0.1 mole fraction	51
Neopentane C5H12	26923, 26925, 26927, 26929	Float	Read / Write	0.0 to 0.1 mole fraction	51
Hexane+ C6H14+	27976, 27978, 27980, 27982	Float	Read / Write	0.0 to 0.1 mole fraction	51
Nitrogen N2	25314, 25322, 25330, 25338	Float	Read / Write	0.0 to 0.55 mole fraction	51
Carbon diox. CO2	26199, 26207, 26215, 26223	Float	Read / Write	0.0 to 0.3 mole fraction	51
Hydrog.sulf. H2S	26381, 26389, 26397, 26405	Float	Read / Write	0.0 to 0.05 mole fraction	51
Hydrogen H2	29191, 29193, 29195, 29197	Float	Read / Write	0.0 to 0.2 mole fraction	51

6.3.2.8 Calibration

Navigation: Expert → Sensor → Calibration					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Det. 1 TIA gain	29235	Integer	Read	0 to 15	51
Detector bias	29237 to 29238	Float	Read / Write	Signed floating-point value	51
Flow switch input	4712	Integer	Read / Write	0 = Off 1 = Normally open 2 = Normally closed	51
Flow switch state	29222	Integer	Read	0 = No flow 1 = Flow	51

6.3.3 I/O configuration submenu

Navigation: Expert → I/O configuration					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
I/O module 1 to n terminal numbers	1: 6541 2: 6542 3: 6543	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	52
I/O module 1 to n information	1: 8659 2: 8660 3: 8661	Integer	Read	1 = MODBUS 2 = Configurable 3 = Not configurable 254 = Not plugged 255 = Invalid	52

Navigation: Expert → I/O configuration					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→ 📄
I/O module 1 to n type	1: 6417 2: 6418 3: 6419	Integer	Read / Write	0 = Off 1 = Current output[1] 2 = Current input[1] 3 = Switch output[1] 5 = Status input[1] 6 = Relay output[1]	52
Apply I/O configuration	8665	Integer	Read / Write	0 = Yes 1 = No	52
I/O alteration code	6427	Integer	Read/Write	Positive integer	53

6.3.4 Input submenu

6.3.4.1 Current input 1 to n

Navigation: Expert → Input → Status input 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→ 📄
Terminal number	1: 6548 2: 6549 3: 6550	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	54
Signal mode	1: 6424 2: 6425	Integer	Read / Write	0 = Passive 2 = Active	54
Current span	1: 6147 2: 6148	Integer	Read / Write	0 = 4 to 20 mA (4 to 20.5 mA) 1 = 4 to 20 mA US (3.9 to 20.8 mA) 2 = 4 to 20 mA NAMUR (3.8 to 20.5 mA) 3 = 0 to 20 mA (0 to 20.5 mA)	55
0/4 mA value	1: 6111 to 6112 2: 6113 to 6114	Float	Read / Write	Signed floating-point number	55
20 mA value	1: 6119 to 6120 2: 6121 to 6122	Float	Read / Write	Signed floating-point number	55
Failure mode	1: 6159 2: 6160	Integer	Read / Write	1 = Last valid value 2 = Alarm 6 = Defined value	56
Failure value	1: 6163 to 6164 2: 6165 to 6166	Float	Read / Write	Signed floating-point number	56

[1] Visibility depends on order options or device settings

6.3.5 Output submenu

6.3.5.1 Current output 1 to n

Navigation: Expert → Output → Current output 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Terminal number	1: 6545 2: 6546	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	57
Signal mode	1: 6421 2: 6422	Integer	Read / Write	0 = Passive 2 = Active	63
Process variable current output	5927 to 5929	Integer	Read / Write	0 = Off 151 = Concentration 3 = Cell gas temperature 4 = Dew point 1 5 = Dew point 2	63
Current range output	1: 5923 2: 5924	Integer	Read / Write	0 = 4 to 20 mA (4 to 20.5 mA) 1 = 4 to 20 mA US (3.9 to 20.8 mA) 2 = 4 to 20 mA NAMUR (3.8 to 20.5 mA) 3 = 0 to 20 mA (0 to 20.5 mA) 4 = Fixed value	63
Fixed current	1: 5987 to 5988 2: 5989 to 5990	Float	Read / Write	0 to 22.5 mA	59
Lower range value output	1: 6195 to 6196 2: 6197 to 6198	Float	Read / Write	Signed floating-point number	59
Upper range value output	1: 5915 to 5916 2: 5917 to 5918	Float	Read / Write	Signed floating-point number	60
Damping current output	1: 5903 to 5904 2: 5905 to 5906	Float	Read / Write	0.0 to 999.9 s	60
Failure behavior current output	1: 5911 2: 5912	Integer	Read / Write	0 = Min. 1 = Max. 4 = Actual value 5 = Last valid value 6 = Fixed value	61
Failure current	1: 5979 to 5980 2: 5981 to 5982	Float	Read / Write	0 to 22.5 mA	61
Output current 1 to n	1: 5931 to 5932 2: 5933 to 5934	Float	Read	0 to 22.5 mA	61
Measured current 1 to n	1: 5779 to 5780 2: 5781 to 5782	Float	Read	0 to 30 mA	61

6.3.5.2 Switch output 1 to n

Navigation: Expert → Output → Switch output 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→ 🖹
Terminal number	1: 6551 2: 6552	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	63
Signal mode	1: 6235 2: 6236	Integer	Read / Write	0 = Passive 2 = Active 3 = Passive NAMUR	63
Operating mode	1: 4479 2: 4480	Integer	Read / Write	1 = Switch	63
Switch output function	1: 3022 2: 3023	Integer	Read / Write	0 = Off 1 = On 2 = Diagnostic behavior 4 = Limit 5 = Status	63
Assign diagnostic behavior	1: 3096 2: 3097	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	64
Assign limit	1: 3184 2: 3185	Integer	Read / Write	0 = Off 151 = Concentration 4 = Dew point 1 5 = Dew point 2	64
Switch-on value	1: 3242 to 3243 2: 3244 to 3245	Float	Read / Write	Signed floating-point number	65
Switch-off value	1: 3234 to 3235 2: 3236 to 3237	Float	Read / Write	Signed floating-point number	65
Switch-on delay	1: 6247 to 6248 2: 6249 to 6250	Float	Read / Write	0.0 to 100.0 s	65
Switch-off delay	1: 6239 to 6240 2: 6241 to 6242	Float	Read / Write	0.0 to 100.0 s	65
Failure mode	1: 3384 2: 3385	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	65
Switch state 1 to n	1: 2485 2: 2486	Integer	Read	1 = Open 6 = Closed	65
Invert output signal	1: 2583 2: 2584	Integer	Read / Write	0 = Yes 1 = No	65

6.3.5.3 Relay output 1

Navigation: Expert → Output → Relay output 1 to n					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Terminal number	1: 8278 2: 8279	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	67
Relay output function	1: 2488 2: 2489	Integer	Read / Write	1 = Open 2 = Diagnostic behavior 4 = Limit 5 = Status 6 = Closed	67
Assign limit	1: 8248 2: 8249	Integer	Read / Write	0 = Off 4 = Dew point 1 5 = Dew point 2 151 = Concentration	68
Assign diagnostic behavior	1: 8245 2: 8246	Integer	Read / Write	0 = Alarm 1 = Warning 2 = Alarm or warning	68
Switch-off value	1: 8260 to 8261 2: 8262 to 8263	Float	Read / Write	Signed floating-point number	68
Switch-off delay	1: 8254 to 8255 2: 8256 to 8257	Float	Read / Write	0.0 to 100.0 s	68
Switch-on value	1: 8233 to 8234 2: 8235 to 8236	Float	Read / Write	Signed floating-point number	68
Switch-on delay	1: 8266 to 8267 2: 8268 to 8269	Float	Read / Write	0.0 to 100.0 s	70
Failure mode	1: 8242 2: 8243	Integer	Read / Write	0 = Actual status 1 = Open 6 = Closed	70
Switch state	1: 3518 2: 3519	Integer	Read	1 = Open 6 = Closed	70
Powerless relay status	1: 7009 2: 7010	Integer	Read / Write	1 = Open 6 = Closed	70

6.3.6 Communication submenu

6.3.6.1 Modbus configuration

Navigation: Expert → Communication → Modbus configuration					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Bus address[1]	4910	Integer	Read / Write	1 to 247	71

[1] Modbus RS485 only

Navigation: Expert → Communication → Modbus configuration					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→ 📄
Baudrate[1]	4912	Integer	Read / Write	0 = 1200 BAUD 1 = 2400 BAUD 2 = 4800 BAUD 3 = 9600 BAUD 4 = 19200 BAUD 5 = 38400 BAUD 6 = 57600 BAUD 7 = 115200 BAUD	72
Data transfer mode[1]	4913	Integer	Read / Write	0 = RTU 1 = ASCII	72
Parity[1]	4914	Integer	Read / Write	0 = Even 1 = Odd 2 = None / 2 stop bits 3 = None / 1 stop bit	72
Byte order	4915	Integer	Read / Write	0 = 0-1-2-3 1 = 3-2-1-0 2 = 2-3-0-1 3 = 1-0-3-2	73
Telegram delay[1]	4916 to 4917	Float	Read / Write	0 to 100 ms	74
Priority IP address[2]	28273 to 28280	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	74
Inactivity timeout[2]	47014 to 47015	Float	Read / Write	0 to 99 s	74
Max connections[2]	47016	Integer	Read / Write	1 to 4	74
Failure mode	4920	Integer	Read / Write	1 = Last valid value 255 = NaN[3] value	75
Bus termination[1]	5774	Integer	Read	0 = Off 1 = On	75
Fieldbus writing access	6807	Integer	Read / Write	0 = Read + write 1 = Read only	75

6.3.6.2 Modbus information

Navigation: Expert → Communication → Modbus information					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→ 📄
Device ID	2547	Integer	Read	4-digit hexadecimal number	76
Device revision	4481	Integer	Read	4-digit hexadecimal number	76

[1] Modbus RS485 only
[2] Modbus TCP only
[3] NaN = Not a number

6.3.6.3 Modbus data map

Navigation: Expert → Communication → Modbus data map					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Scan list register 0 to 15	0: 5001 1: 5002 2: 5003 3: 5004 4: 5005 5: 5006 6: 5007 7: 5008 8: 5009 9: 5010 10: 5011 11: 5012 12: 5013 13: 5014 14: 5015 15: 5016	Integer	Read / Write	1 to 65,535	77
Scan list data area 0 to 15	0: 5051 to 5052 1: 5053 to 5054 2: 5055 to 5056 3: 5057 to 5058 4: 5059 to 5060 5: 5061 to 5062 6: 5063 to 5064 7: 5065 to 5066 8: 5067 to 5068 9: 5069 to 5070 10: 5071 to 5072 11: 5073 to 5074 12: 5075 to 5076 13: 5077 to 5078 14: 5079 to 5080 15: 5081 to 5082	Integer / Float	Read / Write	Dependent on scan list register entered	77

6.3.6.4 Web server

Navigation: Expert → Communication → Web server					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Web server language	4219	Integer	Read / Write	0 = English 1 = Français 2 = Italiano 3 = русский язык (Russian) 4 = 中文 (Chinese)	77
MAC address	4210 to 4218	String	Read	Unique 12-digit character string comprising letters and numbers	77
DHCP client	21781	Integer	Read / Write	0 = Off 1 = On	77

Navigation: Expert → Communication → Web server					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
IP address	4155 to 4162	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	77
Subnet mask	4163 to 4170	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	79
Default gateway	4171 to 4178	String	Read / Write	4 octet: 0 to 255 (in the particular octet)	79
Web server functionality	4220	Integer	Read / Write	0 = Off 1 = On 2 = HTML Off	79
Login page	5802	Integer	Read / Write	0 = Without header 1 = With header	79

6.3.7 Diagnostics

Navigation: Expert → Diagnostics					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Actual diagnostic status signal	2075	Integer	Read	0: OK 1: Failure (F) 2: Function check (C) 8: Out of specification (S) 4: Maintenance required (M) 16: --- 32: Not categorized	81
Actual diagnostic number	6801	Integer	Read	0 to 65,535	81
Actual diagnostic service ID	2732	Integer	Read	0 to 65,535	81
Actual diagnostic string	6821 to 6830	String	Read	Diagnostic number, service ID and status signal	81
Previous diagnostics service ID	2734	Integer	Read	0 to 65,535	82
Operating time from restart	2624 to 2630	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	82
Operating time	2631 to 2637	String	Read	Days (d), hours (h), minutes (m) and seconds (s)	82

6.3.7.1 Diagnostic list

Navigation: Expert → Diagnostics → Diagnostic list					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Diagnostics 1	2736	Integer	Read	0 to 65,535	83
Diagnostics 2	2738	Integer	Read	0 to 65,535	83
Diagnostics 3	2740	Integer	Read	0 to 65,535	83
Diagnostics 4	2742	Integer	Read	0 to 65,535	85
Diagnostics 5	2744	Integer	Read	0 to 65,535	85

6.3.7.2 Event logbook

Navigation: Expert → Diagnostics → Event logbook					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Filter options	4596	Integer	Read / Write	0 = Failure (F) 4 = Maintenance required (M) 8 = Function check (C) 12 = Out of specification (S) 16 = Information (I) 255 = All	86

6.3.7.3 Device information

Navigation: Expert → Diagnostics → Device information					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Device tag	2026 to 2041	String	Read	Max. 32 characters, such as letters, numbers, or special characters (e.g., @, %, /).	87
Serial number	7003 to 7008	String	Read	Max. 11-digit character string comprising letters and numbers.	87
Firmware version	7277 to 7280	String	Read	Character string in the format xx.yy.zz	87
Device name	7238 to 7245	String	Read	J22 TDLAS Gas Analyzer	88
Order code	2058 to 2067	String	Read	Character string composed of letters, numbers, and certain punctuation marks (e.g., /).	88
Extended order code 1	2212 to 2221	String	Read	Character string	88
Extended order code 2	2222 to 2231	String	Read	Character string	88
Extended order code 3	2232 to 2241	String	Read	Character string	88
ENP version	4003 to 4010	String	Read	Character string	89

6.3.7.4 Main electronic module + I/O module 1

Navigation: Expert → Diagnostics → Main electronic module + I/O module 1					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Firmware version	7039	Integer	Read	Positive integer	89
Build no. software	2326	Integer	Read	Positive integer	89
Bootloader revision	2264	Integer	Read	Positive integer	90

6.3.7.5 Sensor electronic module (ISEM)

Navigation: Expert → Diagnostics → Sensor electronic module (ISEM)					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Firmware version	5165	Integer	Read	Positive integer	90
Build no. software	4989	Integer	Read	Positive integer	90
Bootloader revision	4802	Integer	Read	Positive integer	90

6.3.7.6 I/O module 2

Navigation: Expert → Diagnostics → I/O module 2					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
I/O module 2 terminal numbers	6542	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	91
Firmware version	9877	Integer	Read	Positive integer	91
Build no. software	9918	Integer	Read	Positive integer	91
Bootloader revision	9984	Integer	Read	Positive integer	91

6.3.7.7 I/O module 3

Navigation: Expert → Diagnostics → I/O module 3					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
I/O module 3 terminal numbers	6543	Integer	Read	0 = Not used 1 = 26-27 (I/O 1) 2 = 24-25 (I/O 2) 3 = 22-23 (I/O 3)	92
Firmware version	9879	Integer	Read	Positive integer	92
Build no. software	9919	Integer	Read	Positive integer	92
Bootloader revision	9986	Integer	Read	Positive integer	92

6.3.7.8 Display module

Navigation: Expert → Diagnostics → Display module					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Firmware version	5163	Integer	Read	Positive integer	93
Build no. software	4988	Integer	Read	Positive integer	93
Bootloader revision	4800	Integer	Read	Positive integer	93

6.3.7.9 Data logging

Navigation: Expert → Diagnostics → Data logging					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Assign chan. 1	2445	Integer	Read / Write	0 = Off 2 = Cell gas pressure 3 = Cell gas temperature 4 = Dew point 1 5 = Dew point 2 121 = Current output 1 122 = Current output 2 151 = Concentration 152 = Flow switch state	94

Navigation: Expert → Diagnostics → Data logging					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Assign chan. 2	2446	Integer	Read / Write	0 = Off 2 = Cell gas pressure 3 = Cell gas temperature 4 = Dew point 1 5 = Dew point 2 121 = Current output 1 122 = Current output 2 151 = Concentration 152 = Flow switch state	94
Assign chan. 3	2548	Integer	Read / Write	0 = Off 2 = Cell gas pressure 3 = Cell gas temperature 4 = Dew point 1 5 = Dew point 2 121 = Current output 1 122 = Current output 2 151 = Concentration 152 = Flow switch state	94
Assign chan. 4	4286	Integer	Read / Write	0 = Off 2 = Cell gas pressure 3 = Cell gas temperature 4 = Dew point 1 5 = Dew point 2 121 = Current output 1 122 = Current output 2 151 = Concentration 152 = Flow switch state	94
Logging interval	4288 to 4289	Float	Read / Write	0.1 to 3600.0 s	94
Clear logging	4287	Integer	Read / Write	0 = Cancel 2 = Clear data	95
Data logging	5950	Integer	Read / Write	0 = Overwriting 1 = Not overwriting	95
Logging delay	5938	Integer	Read / Write	0 to 999 hours	95
Data logging control	5930	Integer	Read / Write	0 = None 1 = Stop 2 = Delete + start	96
Data logging status	5937	Integer	Read / Write	0 = Done 1 = Stopped 2 = Active 3 = Delay active	96
Logging duration	2827 to 2828	Float	Read / Write	Positive floating-point number	97

6.3.7.10 Heartbeat Technology

Heartbeat settings submenu

Navigation: Expert → Diagnostics → Heartbeat Technology → Heartbeat settings					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Plant operator	3414 to 3429	String	Read / Write	Max. 32 characters such as letters, numbers, or special characters (e.g., @, %, /)	97
Location	3430 to 3445	String	Read / Write	Max. 32 characters such as letters, numbers, or special characters (e.g., @, %, /)	97

Gas validation settings submenu

Navigation: Expert → Diagnostics → Heartbeat Technology → Heartbeat settings → Gas validation settings					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Select validation calibration	4717	Integer	Read / Write	0 = 1 1 = 2 2 = 3 3 = 4	98
Validation type	26456	Integer	Read / Write	0 = Validation manual gas 1 = Validation auto gas	98
Number of validation points	30005	Integer	Read / Write	0 = 1 1 = 2	99
Validation gas purge time	33276 to 33277	Float	Read / Write	0 to 5 minutes	99
Measurement duration	6476 to 6477	Float	Read / Write	0.25 to 60 minutes	99
Validation gas information	47238 to 47253	String	Read / Write	Max. 32 characters such as letters, numbers, or special characters (e.g., @, %, /)	99
Validation concentration	47226 to 47227	Float	Read / Write	0 to 1000000 ppmv	99
Validation allowance	47228 to 47229	Float	Read / Write	0 to 100%	100
Start validation	30015	Integer	Read/Write	0: Cancel, 1: Start	N/A[1]

[1] Modbus only parameter

Performing verification submenu

Navigation: Expert → Diagnostics → Heartbeat Technology → Performing verification					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Year	2495	Integer	Read / Write	9 to 99	100
Month	2494	Integer	Read / Write	0 = January 1 = February 2 = March 3 = April 4 = May 5 = June 6 = July 7 = August 8 = September 9 = October 10 = November 11 = December	101
Day	2493	Integer	Read / Write	1 to 31 d	101
Hour	2492	Integer	Read / Write	0 to 23 h	101
AM/PM	2496	Integer	Read / Write	0 = AM 1 = PM	102
Minute	2467	Integer	Read / Write	0 to 59 min	102
Measurement duration	6476 to 6477	Float	Read / Write	0.25 to 60 minutes	102
Verification mode	2366	Integer	Read / Write	0 = Standard verification 3 = Extended validation 4 = Extended current output 2 = Extended validation and current output	102
External device information	20493 to 20508	String	Read / Write	Max. 32 characters such as letters, numbers or special characters (e.g. @,%, /)	103
Start verification	2270	Integer	Read / Write	0 = Cancel 1 = Start 10 = Output 1 low value[1] 11 = Output 1 high value[1] 12 = Output 2 low value[1] 13 = Output 2 high value[1] 18 = Prepare validation 19 = End validation	103
Progress	6797	Integer	Read	0 to 100 %	103

[1] Visibility depends on order options or device settings

Navigation: Expert → Diagnostics → Heartbeat Technology → Performing verification					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Status	2079	Integer	Read	0 = Failed 1 = Done 3 = Not done 8 = Busy 9 = Purging	103
Measured values	5512 to 5513	Float	Read / Write	Signed floating-point number	104
Output values	5516 to 5517	Float	Read	Signed floating-point number	104
Measured concentration	36752 to 36753	Float	Read	0 to 1000000 ppmv	104
Verification result	2355	Integer	Read	0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged	104

Verification results submenu

Navigation: Expert → Diagnostics → Heartbeat Technology → Verification results					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Date/time (manually entered)	2372 to 2381	String	Read	dd.mm.yy hh:mm (Dependent on date/time format selected)	106
Verification ID	2315	Integer	Read	0 to 65,535	106
Operating time	3346 to 3352	String	Read	Days (d), hours (h), minutes (m), seconds (s)	106
Verification result	2355	Integer	Read	0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged	106
Sensor	2384	Integer	Read	0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged	106
Sensor electronic module (ISEM)	2385	Integer	Read	0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged	106
Gas validation	5199	Integer	Read	0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged	106

Navigation: Expert → Diagnostics → Heartbeat Technology → Verification results					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
I/O module	2386	Integer	Read	0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged	106
System status	5790	Integer	Read	0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged	106

Gas validation results submenu

Navigation: Expert → Diagnostics → Heartbeat Technology → Gas validation results					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Date/time (manually entered)	48598	String	Read	dd.mm.yy hh:mm (Dependent on date/time format selected)	108
Operating time	48608 to 48614	String	Read	Days (d), hours (h), minutes (m), seconds (s)	108
Gas validation	44668	Integer	Read	0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged	108
Concentration average	48034 to 48035	Float	Read	0 to 1000000 ppmv	109
Concentration standard deviation	36754 to 36755	Float	Read	0 to 1000000 ppmv	109
Concentration maximum	48229 to 48230	Float	Read	0 to 1000000 ppmv	109
Concentration minimum	48596 to 48597	Float	Read	0 to 1000000 ppmv	109

Monitoring results submenu

Navigation: Expert → Diagnostics → Heartbeat Technology → Monitoring results					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Detector reference level	4720 to 4721	Float	Read	0 to 5 mA	110
Peak 1 index delta	30581	Float	Read	-511.0 to 511.0	110
Peak 2 index delta	30672	Float	Read	-511.0 to 511.0	110

6.3.8 Simulation

Navigation: Expert → Diagnostics → Simulation					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Current input 1 to n simulation	1: 6127 2: 6128	Integer	Read / Write	0 = Off 1 = On	110
Value current input 1 to n	1: 6139 to 6140 2: 6141 to 6142	Float	Read / Write	0 to 22.5 mA	110
Current output 1 to n simulation	1: 5939 2: 5940	Integer	Read / Write	0 = Off 1 = On	111
Current output value 1 to n	1: 5995 to 5996 2: 5997 to 5998	Float	Read / Write	0 to 22.5 mA	111
Switch output simulation 1 to n	1: 6223 2: 6224	Integer	Read / Write	0 = Off 1 = On	111
Switch state 1 to n	1: 6227 2: 6228	Integer	Read / Write	1 = Open 6 = Closed	112
Relay output 1 to n simulation	1: 7523 2: 7524	Integer	Read / Write	0 = Off 1 = On	112
Switch state 1 to n	1: 8239 2: 8240	Integer	Read / Write	1 = Open 6 = Closed	112
Device alarm simulation	6812	Integer	Read / Write	0 = Off 1 = On	113
Diagnostic event category	4261	Integer	Read / Write	0 = Sensor 1 = Electronics 2 = Configuration 3 = Process	113
Diagnostic event simulation	4259	Integer	Read / Write	Off Diagnostic event picklist (depends on the category selected)	113

6.3.9 Spectrum plots

Navigation: Expert → Diagnostics → Spectrum plots					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Midpoint default 1 to n	31090, 31092, 31094, 31096	Float	Read / Write	0 to 120 mA	114
Ramp default 1 to n	26750, 26752, 26754, 26756	Float	Read / Write	0 to 120 mA	115
Concentration	9455 to 9456	Float	Read	0 to 1000000 ppmv	115
Dew point 1	21458 to 21459	Float	Read	Signed floating-point number	116
Dew point 2	21800 to 21801	Float	Read	Signed floating-point number	116
Cell gas pressure	25216 to 25217	Float	Read	-0.5 to 6.9 Bar	116
Cell gas temperature	21854 to 21855	Float	Read	-20 to +60 °C	116
Detector reference level	4720 to 4721	Float	Read	0 to 5 mA	116
Detector zero level	9667 to 9668	Float	Read	0 to 5 mA	117
Peak 1 index	9834 to 9835	Float	Read	0 to 511.0	116

Navigation: Expert → Diagnostics → Spectrum plots					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Peak 1 index delta	30581 to 30582	Float	Read	-511.0 to 511.0	117
Peak 2 index	27600 to 27601	Float	Read	0 to 511.0	117
Peak 2 index delta	30672 to 30673	Float	Read	-511.0 to 511.0	117
Peak track index	29018 to 29019	Float	Read	0 to 511.0	117
Peak track index delta	28814	Float	Read	-511.0 to 511.0	118
Midpoint delta	47236 to 47237	Float	Read	0 to 120 mA	118
Analyzer control	21460	Integer	Read / Write	0 = Off 1 = On	118
Reset	4727	Integer	Read / Write	0 = Off 3 = Reset	118
Det. 1 TIA gain	29235	Integer	Read / Write	0 to 15	119

6.3.10 SD card

Navigation: Expert → Diagnostics → Spectrum plots → Chart					
Parameter	Register	Data type	Access	Selection/User entry/User interface	→
Spectra log rate	26289 to 26290	Float	Read	45 to 86400 sec	119
Estimated number of spectra files	24902 to 24903	Float	Read	0 to 30	119
Validation log level	29082	Integer	Read / Write	0 = Off 1 = Normal 2 = Extended 255 = All	120
Number of validation files	30879	Integer	Read	0 to 60	120

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