Description of device parameters

J22 TDLAS Gas Analyzer

Modbus TCP and RS485
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1 About this document

1.1 Warnings

<table>
<thead>
<tr>
<th>Structure of Information</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WARNING</strong></td>
<td>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation can result in a fatal or serious injury.</td>
</tr>
<tr>
<td>Causes (consequences)</td>
<td></td>
</tr>
<tr>
<td>Consequences of non-compliance (if applicable)</td>
<td></td>
</tr>
<tr>
<td>Corrective action</td>
<td></td>
</tr>
</tbody>
</table>

| **CAUTION**               | This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries. |
| Causes (consequences)    |         |
| If necessary, consequences of non-compliance (if applicable) |         |
| Corrective action        |         |

| **NOTICE**                | This symbol alerts you to situations which may result in damage to property. |
| Cause/situation           |         |
| If necessary, consequences of non-compliance (if applicable) |         |
| Action/note               |         |

Table 1. Warnings

1.2 Symbols on the device

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Laser Radiation symbol" /></td>
<td>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.</td>
</tr>
<tr>
<td><img src="image" alt="High Voltage symbol" /></td>
<td>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.</td>
</tr>
<tr>
<td><img src="image" alt="ETL Listed Mark" /></td>
<td>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.</td>
</tr>
<tr>
<td><img src="image" alt="WEEE symbol" /></td>
<td>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.</td>
</tr>
<tr>
<td><img src="image" alt="CE Marking" /></td>
<td>The CE Marking indicates conformity with health, safety, and environmental protection standards for products sold within the European economic area (EEA).</td>
</tr>
</tbody>
</table>

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.

Sample graphic for the schematic layout of the operating menu
1.5.2 Structure of a parameter description

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

<table>
<thead>
<tr>
<th>Completed Parameter Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation</td>
<td>Navigation path to the parameter via the local display or web browser</td>
</tr>
<tr>
<td></td>
<td>Navigation path to the parameter via the operating tool</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Prerequisite</td>
<td>The parameter is only available under these specific conditions</td>
</tr>
<tr>
<td>Description</td>
<td>Description of the parameter function</td>
</tr>
<tr>
<td>Selection</td>
<td>List of the individual options for the parameter</td>
</tr>
<tr>
<td></td>
<td>• Option 1</td>
</tr>
<tr>
<td></td>
<td>• Option 2</td>
</tr>
<tr>
<td>User entry</td>
<td>Parameter entry range</td>
</tr>
<tr>
<td>User interface</td>
<td>Display value/data of the parameter</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Default setting ex works</td>
</tr>
<tr>
<td>Additional information</td>
<td>Additional explanations such as:</td>
</tr>
<tr>
<td></td>
<td>• On individual options</td>
</tr>
<tr>
<td></td>
<td>• On display values/data</td>
</tr>
<tr>
<td></td>
<td>• On the input range</td>
</tr>
<tr>
<td></td>
<td>• On the factory setting</td>
</tr>
<tr>
<td></td>
<td>• On the parameter function</td>
</tr>
</tbody>
</table>

1.6 Symbols used

1.6.1 Symbols for types of information

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Tip" /></td>
<td>Tip Indicates additional information.</td>
</tr>
<tr>
<td><img src="image2" alt="Reference" /></td>
<td>Reference to documentation</td>
</tr>
<tr>
<td><img src="image3" alt="Reference" /></td>
<td>Reference to page</td>
</tr>
<tr>
<td><img src="image4" alt="Reference" /></td>
<td>Reference to graphic</td>
</tr>
<tr>
<td><img src="image5" alt="Operation" /></td>
<td>Operation via local display</td>
</tr>
<tr>
<td><img src="image6" alt="Operation" /></td>
<td>Operation via operating tool</td>
</tr>
</tbody>
</table>
### 1.6.2 Symbols in graphics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3 ...</td>
<td>Item numbers</td>
</tr>
<tr>
<td>A, B, C, ...</td>
<td>Views</td>
</tr>
<tr>
<td>A-A, B-B, C-C, ...</td>
<td>Sections</td>
</tr>
</tbody>
</table>

### 1.7 Documentation

#### 1.7.1 Standard documentation

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

<table>
<thead>
<tr>
<th>Expert</th>
<th>Page Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking status</td>
<td>10</td>
</tr>
<tr>
<td>User role</td>
<td>11</td>
</tr>
<tr>
<td>Enter access code</td>
<td>11</td>
</tr>
<tr>
<td>System</td>
<td>12</td>
</tr>
<tr>
<td>Display</td>
<td>11</td>
</tr>
<tr>
<td>Configuration backup</td>
<td>21</td>
</tr>
<tr>
<td>Diagnostic handling</td>
<td>24</td>
</tr>
<tr>
<td>Administration</td>
<td>26</td>
</tr>
<tr>
<td>Sensor</td>
<td>31</td>
</tr>
<tr>
<td>Measured values</td>
<td>31</td>
</tr>
<tr>
<td>System units</td>
<td>39</td>
</tr>
<tr>
<td>Stream</td>
<td>42</td>
</tr>
<tr>
<td>Dew point</td>
<td>43</td>
</tr>
<tr>
<td>Peak tracking</td>
<td>44</td>
</tr>
<tr>
<td>Sensor adjustment</td>
<td>47</td>
</tr>
<tr>
<td>Stream change compensation (SCC)</td>
<td>49</td>
</tr>
<tr>
<td>Calibration</td>
<td>51</td>
</tr>
<tr>
<td>I/O configuration</td>
<td>52</td>
</tr>
<tr>
<td>Input</td>
<td>54</td>
</tr>
<tr>
<td>Current input 1 to n</td>
<td>54</td>
</tr>
<tr>
<td>Output</td>
<td>57</td>
</tr>
<tr>
<td>Current output 1 to n</td>
<td>57</td>
</tr>
<tr>
<td>Switch output 1 to n</td>
<td>62</td>
</tr>
</tbody>
</table>
Description of device parameters

- Relay output 1 to n → 67
- Communication
  - Modbus configuration → 71
  - Modbus information → 71
  - Modbus data map → 77
  - Web server → 77
- Diagnostics
  - Actual diagnostics → 81
  - Previous diagnostics → 82
  - Operating time from restart → 82
  - Operating time → 82
  - Diagnostic list → 83
  - Event logbook → 86
  - Device information → 87
  - Main electronic module + I/O module 1 → 89
  - Sensor electronic module (ISEM) → 90
  - I/O module 2 → 91
  - I/O module 3 → 92
  - Display module → 93
  - Data logging → 93
  - Heartbeat Technology → 97
  - Simulation → 110
  - Spectrum plots → 115
  - SD card → 119
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.

<table>
<thead>
<tr>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking status</td>
</tr>
<tr>
<td>User role</td>
</tr>
<tr>
<td>Enter access code</td>
</tr>
<tr>
<td>▶ System</td>
</tr>
<tr>
<td>▶ Sensor</td>
</tr>
<tr>
<td>▶ I/O configuration</td>
</tr>
<tr>
<td>▶ Input</td>
</tr>
<tr>
<td>▶ Output</td>
</tr>
<tr>
<td>▶ Communication</td>
</tr>
<tr>
<td>▶ Diagnostics</td>
</tr>
</tbody>
</table>

**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 → [3].

**Selection**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>The access authorization displayed in the Locking status parameter → [3] applies. Only appears on local display.</td>
</tr>
<tr>
<td>Hardware locked (priority 1)</td>
<td>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).</td>
</tr>
</tbody>
</table>
Options | Description
---|---
Temorarily 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]

- [System → 12]
- [Display → 11]
- [Configuration backup → 21]
- [Diagnostic handling → 24]
- [Administration → 26]
### 3.1.1 Display

**Navigation**  
Expert → System → Display

#### Display language

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display language</td>
<td>12</td>
</tr>
<tr>
<td>Format display</td>
<td>13</td>
</tr>
<tr>
<td>Value 1 display</td>
<td>14</td>
</tr>
<tr>
<td>0% bargraph 1</td>
<td>14</td>
</tr>
<tr>
<td>100% bargraph 1</td>
<td>14</td>
</tr>
<tr>
<td>Decimal places 1</td>
<td>15</td>
</tr>
<tr>
<td>Value 2 display</td>
<td>16</td>
</tr>
<tr>
<td>Decimal places 2</td>
<td>16</td>
</tr>
<tr>
<td>Value 3 display</td>
<td>17</td>
</tr>
<tr>
<td>0% bargraph 3</td>
<td>17</td>
</tr>
<tr>
<td>100% bargraph 3</td>
<td>17</td>
</tr>
<tr>
<td>Decimal places 3</td>
<td>17</td>
</tr>
<tr>
<td>Value 4 display</td>
<td>17</td>
</tr>
<tr>
<td>Decimal places 4</td>
<td>18</td>
</tr>
<tr>
<td>Display interval</td>
<td>18</td>
</tr>
<tr>
<td>Display damping</td>
<td>19</td>
</tr>
<tr>
<td>Header</td>
<td>20</td>
</tr>
<tr>
<td>Header text</td>
<td>20</td>
</tr>
<tr>
<td>Separator</td>
<td>21</td>
</tr>
<tr>
<td>Contrast display</td>
<td>21</td>
</tr>
<tr>
<td>Backlight</td>
<td>21</td>
</tr>
</tbody>
</table>

#### 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

![Image of H2O Analyzer display showing 46.21 ppmv]
Description of device parameters

1. **1 bargraph + 1 value** option

2. **2 values** option

3. **1 value large + 2 values** option

4. **4 values** option

---

**Value 1 display**

**Navigation**

[1] 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
- Dew point 2
- 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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Display → 0% bargraph 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>A local display is provided.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter the 0% bar graph value to be shown on the display for the measured value 1.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>ppmv</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>The <a href="#">Format display parameter</a> is used to specify that the measured value is to be displayed as a bar graph.</td>
</tr>
<tr>
<td></td>
<td>User entry</td>
</tr>
<tr>
<td></td>
<td>The unit of the displayed measured value is taken from <a href="#">System units</a>.</td>
</tr>
</tbody>
</table>

#### 100% bargraph value 1

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Display → 100% bargraph 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>A local display is provided.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter the 100% bar graph value to be shown on the display for the measured value 1.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>ppmv</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>The <a href="#">Format display parameter</a> is used to specify that the measured value is to be displayed as a bar graph.</td>
</tr>
</tbody>
</table>

1 Visibility depends on order options or device settings

---

Endress+Hauser
Description of device parameters

**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 the 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.
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) 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

Endress+Hauser
Description of device parameters

**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 → [0x0].
- **Free text** is defined in the Header text parameter → [0x0].

**Header text**

**Navigation**
Expert → System → Display → Header text

**Prerequisite**
The Free text option is selected in the Header parameter → [0x0].

**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

- Configuration backup
- Operating time
- Last backup
- Configuration management
- Backup state
- Comparison result
Description of device parameters

J22 TDLAS Gas Analyzer

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
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
- Clear backup data
- Compare

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: 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: 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.

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

---

Endress+Hauser
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

---

Endress+Hauser
Description of device parameters

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 → 31.

3.1.4 Administration

Navigation
Expert → System → Administration

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<td>Software option overview</td>
<td>→ 28</td>
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<tr>
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<td>→ 28</td>
</tr>
<tr>
<td>▶ Reset access code</td>
<td>→ 29</td>
</tr>
</tbody>
</table>

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

Factory setting
- Cancel

Additional information
- **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.

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.

  - 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

Endress+Hauser
• Once the activation code has been entered, check if the new software option is displayed in the Software option overview parameter → 29.
  ⇐ 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 → 29.

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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Administration → SW option overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays all the software options that are enabled in the device.</td>
</tr>
<tr>
<td>User interface</td>
<td>▪ Extended HistoROM 1</td>
</tr>
<tr>
<td></td>
<td>▪ Heartbeat Monitoring 1</td>
</tr>
<tr>
<td></td>
<td>▪ Heartbeat Verification 1</td>
</tr>
<tr>
<td>Additional</td>
<td>Description</td>
</tr>
<tr>
<td>information</td>
<td>Displays all the options that are available if ordered by the customer.</td>
</tr>
</tbody>
</table>

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

Define access code

Define access code  ➤ 29

Confirm access code  ➤ 29

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

**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)

Endress+Hauser
## Description of device parameters

**J22 TDLAS Gas Analyzer**

### Additional information

*User interface*

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

### Reset access code

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<th><strong>Navigation</strong></th>
<th># Expert → System → Administration → Reset access code → Reset access code</th>
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</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter a reset code to reset the user-specific access codes to the factory setting.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>Character string comprising numbers, letters, and special characters.</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0x00</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td><em>Description</em> For a reset code, contact your Endress+Hauser service organization.</td>
</tr>
</tbody>
</table>

*User entry*

The reset code can only be entered via:

- Web browser
- Fieldbus
3.2 Sensor

Navigation  ☐ ☐ Expert → Sensor

- Sensor
  - Measured values → 31
  - System units → 38
  - Stream → 42
  - Dew point → 43
  - Peak tracking → 44
  - Sensor adjustment → 47
  - Stream change compensation (SCC) → 49
  - Calibration → 51

3.2.1 Measured values

Navigation  ☐ ☐ Expert → Sensor → Measured values

- Measured values
  - Measured variables → 31
  - Input values → 35
  - Output values → 36

Measured variables submenu

Navigation  ☐ ☐ Expert → Sensor → Measured values → Measured variables

- Measured variables
  - Concentration → 32
  - Dew point 1 → 32
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Description of device parameters

J22 TDLAS Gas Analyzer

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<tr>
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<tr>
<td>Peak 2 index delta</td>
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<tr>
<td>Peak track index delta</td>
<td>34</td>
</tr>
<tr>
<td>Midpoint delta</td>
<td>34</td>
</tr>
</tbody>
</table>

**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  
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  
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  
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  
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**  
  → 35

- **Value status input 1 to n**  
  → 36

Current input 1 to n submenu

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

- **Current input 1 to n**  
  → 35

  - **Measured values 1 to n**  
    → 35

  - **Measured current 1 to n**  
    → 36

Measured values 1 to n

**Navigation**  
Expert → Sensor → Measured values → Input values → Current input 1 to n → Measured values 1 to n
Description of device parameters

**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 current input 1 to n | → | 36 |

---

### 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

| Output values | → | 36 |

| Value current output 1 to n | → | 36 |

| Switch output 1 to n | → | 37 |

| Relay output 1 to n | → | 37 |

---

### Value current output 1 to n submenu

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

| Value current output 1 to n | → | 37 |

---

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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 → 37.

Description
Displays the current switch status of the status output.

User interface
- Open
- Closed

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

Relay output 1 to n submenu

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

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

**Description**  
Displays the current status of the relay output.

**User interface**  
- Open
- Closed

**Additional information**  
- **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

- **Concentration unit (ppmv)** → 39
- **Temperature unit (°C)** → 39
- **Pressure unit (bar)** → 40
- **Length unit (m)** → 40
- **Date/time format** → 40
**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 →
Description of device parameters

Selection
For an explanation of the abbreviated units, see Approval specific factory settings → ⑦.

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 → ⑦
- Pipeline pressure fixed → ⑦
- Pipeline pressure → ⑦

Selection
For an explanation of the abbreviated units, see Approval specific factory settings → ⑦.

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 → ⑦.
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**  
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
Description of device parameters

J22 TDLAS Gas Analyzer

**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

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane CH4</td>
<td>Sets the mole fraction of Methane in the dry gas mixture.</td>
<td>0.4 to 1.0 mol</td>
<td>0.75 mol</td>
</tr>
<tr>
<td>Ethane C2H6</td>
<td>Sets the mole fraction of Ethane in the dry gas mixture.</td>
<td>0.0 to 0.2 mol</td>
<td>0.1 mol</td>
</tr>
<tr>
<td>Propane C3H8</td>
<td>Sets the mole fraction of Propane in the dry gas mixture.</td>
<td>0.0 to 0.15 mol</td>
<td>0.05 mol</td>
</tr>
<tr>
<td>iButane C4H10</td>
<td>Sets the mole fraction of iButane in the dry gas mixture.</td>
<td>0.0 to 0.1 mol</td>
<td>0 mol</td>
</tr>
<tr>
<td>n-Butane C4H10</td>
<td>Sets the mole fraction of n-Butane in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isopentane C5H12</td>
<td>Sets the mole fraction of Isopentane in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Pentane C5H12</td>
<td>Sets the mole fraction of n-Pentane in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neopentane C5H12</td>
<td>Sets the mole fraction of Neopentane in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexane+ C6H14+</td>
<td>Sets the mole fraction of Hexane+ in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen N2</td>
<td>Sets the mole fraction of Nitrogen in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon diox. CO2</td>
<td>Sets the mole fraction of Carbon dioxide in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrog. sulf. H2S</td>
<td>Sets the mole fraction of Hydrogen sulfide in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogen H2</td>
<td>Sets the mole fraction of Hydrogen in the dry gas mixture.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream change compensation</td>
<td>Enables or disables the Stream Change Compensation feature.</td>
<td>□ On □ Off</td>
<td>Off</td>
</tr>
<tr>
<td>Methane CH4</td>
<td>Sets the mole fraction of Methane in the dry gas mixture.</td>
<td>0.4 to 1.0 mol</td>
<td>0.75 mol</td>
</tr>
<tr>
<td>Ethane C2H6</td>
<td>Sets the mole fraction of Ethane in the dry gas mixture.</td>
<td>0.0 to 0.2 mol</td>
<td>0.1 mol</td>
</tr>
<tr>
<td>Propane C3H8</td>
<td>Sets the mole fraction of Propane in the dry gas mixture.</td>
<td>0.0 to 0.15 mol</td>
<td>0.05 mol</td>
</tr>
<tr>
<td>iButane C4H10</td>
<td>Sets the mole fraction of iButane in the dry gas mixture.</td>
<td>0.0 to 0.1 mol</td>
<td>0 mol</td>
</tr>
</tbody>
</table>

Endress+Hauser 45
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-Butane C4H10</td>
<td>Sets the mole fraction of N-Butane in the dry gas mixture.</td>
<td>0.0 to 0.1 mol</td>
<td>0 mol</td>
</tr>
<tr>
<td>Isopentane C5H12</td>
<td>Sets the mole fraction of Isopentane in the dry gas mixture.</td>
<td>0.0 to 0.1 mol</td>
<td>0 mol</td>
</tr>
<tr>
<td>N-Pentane C5H12</td>
<td>Sets the mole fraction of N-Pentane in the dry gas mixture</td>
<td>0.0 to 0.1 mol</td>
<td>0 mol</td>
</tr>
<tr>
<td>Neopentane C5H12</td>
<td>Sets the mole fraction of Neopentane in the dry gas mixture</td>
<td>0.0 to 0.1 mol</td>
<td>0 mol</td>
</tr>
<tr>
<td>Hexane+ C6H14+</td>
<td>Sets the mole fraction of Hexane+ in the dry gas mixture</td>
<td>0.0 to 0.1 mol</td>
<td>0 mol</td>
</tr>
<tr>
<td>Nitrogen N2</td>
<td>Sets the mole fraction of Nitrogen in the dry gas mixture</td>
<td>0.0 to 0.55 mol</td>
<td>0 mol</td>
</tr>
<tr>
<td>Carbon dioxide C02</td>
<td>Sets the mole fraction of Carbon dioxide in the dry gas mixture.</td>
<td>0.0 to 0.3 mol</td>
<td>0.1 mol</td>
</tr>
<tr>
<td>Hydrogen sulfide H2S</td>
<td>Sets the mole fraction of Hydrogen sulfide in the dry gas mixture.</td>
<td>0.0 to 0.05 mol</td>
<td>0 mol</td>
</tr>
<tr>
<td>Hydrogen H2</td>
<td>Sets the mole fraction of Hydrogen in the dry gas mixture</td>
<td>0.0 to 0.2 mol</td>
<td>0 mol</td>
</tr>
</tbody>
</table>

**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 tracking**
  - Peak track analyzer control  → 46
  - Peak track reset  → 46
  - Peak track average number  → 46

**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

**Sensor adjustment**

<table>
<thead>
<tr>
<th>Sensor adjustment</th>
<th>47</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration adjust</td>
<td>47</td>
</tr>
<tr>
<td>Conc. multiplier</td>
<td>47</td>
</tr>
<tr>
<td>Concentration offset (RATA)</td>
<td>47</td>
</tr>
<tr>
<td>2f base crv source</td>
<td>47</td>
</tr>
<tr>
<td>2f base RT update</td>
<td>49</td>
</tr>
<tr>
<td>Calibration 1 to n</td>
<td>48</td>
</tr>
</tbody>
</table>

**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
Description of device parameters

Factory setting
Off

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

Conc. multiplier

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Sensor adjustment → Conc. multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Set the value that the concentration is multiplied by when concentration adjustment is turned on.</td>
</tr>
<tr>
<td>User interface</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Concentration offset (RATA)

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Sensor adjustment → Concentration offset (RATA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Set the value added (i.e., offset) to the concentration when concentration adjustment is turned on.</td>
</tr>
<tr>
<td>User interface</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0.0000 ppmv</td>
</tr>
</tbody>
</table>

2f base curve source

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Sensor adjustment → 2f base curve source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Select source for base curve (i.e., Ref0 from factory or Ref0 from last RT update) used in measurement calculations.</td>
</tr>
<tr>
<td>Selection</td>
<td>- Ref0 curve</td>
</tr>
<tr>
<td></td>
<td>- Ref0 RT curve</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Ref0 curve</td>
</tr>
</tbody>
</table>

2f base RT update

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Sensor adjustment → 2f base curve source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>When Ref0 RT curve is selected, start will initiate saving the RT (Real Time) base curve data for measurement calculations.</td>
</tr>
<tr>
<td>Selection</td>
<td>- Cancel</td>
</tr>
<tr>
<td></td>
<td>- Start</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Ref0 curve</td>
</tr>
</tbody>
</table>
Calibration 1 to n submenu

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

<table>
<thead>
<tr>
<th>➤ Calibration 1</th>
<th>➤ 48</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser midpoint default</td>
<td>➤ 48</td>
</tr>
<tr>
<td>Laser ramp default</td>
<td>➤ 48</td>
</tr>
<tr>
<td>Mod amp default</td>
<td>➤ 48</td>
</tr>
</tbody>
</table>

**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

| ➤ Stream change compensation (SCC) |
| ➤ 49 |
| ➤ Calibration 1 to n    | ➤ 51 |

Stream change compensation
Description of device parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane CH4</td>
<td>→ 51</td>
</tr>
<tr>
<td>Ethane C2H6</td>
<td>→ 51</td>
</tr>
<tr>
<td>Propane C3H8</td>
<td>→ 51</td>
</tr>
<tr>
<td>n-Butane C4H10</td>
<td>→ 51</td>
</tr>
<tr>
<td>n-Butane C4H10</td>
<td>→ 51</td>
</tr>
<tr>
<td>Isopentane C5H12</td>
<td>→ 51</td>
</tr>
<tr>
<td>n-Pentane C5H12</td>
<td>→ 51</td>
</tr>
<tr>
<td>Neopentane C5H12</td>
<td>→ 51</td>
</tr>
<tr>
<td>Hexane+ C6H14+</td>
<td>→ 51</td>
</tr>
<tr>
<td>Nitrogen N2</td>
<td>→ 51</td>
</tr>
<tr>
<td>Carbon diox. CO2</td>
<td>→ 51</td>
</tr>
<tr>
<td>Hydrog. sulf. H2S</td>
<td>→ 51</td>
</tr>
<tr>
<td>Hydrogen H2</td>
<td>→ 51</td>
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</table>

**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 → 51.
3.2.8 Calibration

**Navigation**

Expert → Sensor → Calibration

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</tr>
<tr>
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</tr>
<tr>
<td>Flow switch input</td>
<td>Normally Open, Normally Closed, Off</td>
</tr>
<tr>
<td>Flow switch state</td>
<td>No Flow, Flow</td>
</tr>
</tbody>
</table>

**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

<table>
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<td>I/O module 1 to n information → 52</td>
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<tr>
<td>Apply I/O configuration → 53</td>
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<tr>
<td>I/O alteration code → 53</td>
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</table>

#### 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 of device parameters

### I/O configuration

**Description**: Use this function to select the I/O module type for the configuration of the I/O module.

**Selection**
- Off
- Current output
- Current input
- Switch output
- Relay output

**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**

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

- Input
  →  Current input 1 to n

3.4.1  Current input 1 to n

Navigation  ☒  ☐  Expert → Input → Current input 1 to n

- Current input 1 to n
  →  Terminal number
  →  Signal mode
  →  Current span
  →  0/4 mA value
  →  20 mA value
  →  Failure mode
  →  Failure value

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 → 📲.
Description of device parameters

J22 TDLAS Gas Analyzer

### 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**
- **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  

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</thead>
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<td>▶ Current output 1 to n</td>
</tr>
<tr>
<td>▶ Switch output 1 to n</td>
</tr>
<tr>
<td>▶ Relay output 1 to n</td>
</tr>
</tbody>
</table>

### 3.5.1 Current output 1 to n

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

<table>
<thead>
<tr>
<th>Current output 1 to n</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Signal mode</td>
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<tr>
<td>Process variable current output</td>
</tr>
<tr>
<td>Current range out</td>
</tr>
<tr>
<td>Fixed current</td>
</tr>
<tr>
<td>Lower range value outp</td>
</tr>
<tr>
<td>Upper range value outp</td>
</tr>
<tr>
<td>Damping current output</td>
</tr>
<tr>
<td>Failure behavior current output</td>
</tr>
<tr>
<td>Failure current</td>
</tr>
<tr>
<td>Output current 1 to n</td>
</tr>
<tr>
<td>Measured current 1 to n</td>
</tr>
</tbody>
</table>

#### 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)
Description of device parameters

**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**

- In the event of a device alarm, the current output adopts the value specified in the *Failure mode parameter → [link]*.
- 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 → [link]* and *Upper range value output parameter → [link]*.

*Fixed current* option

The current value is set via the *Fixed current parameter → [link]*.

**Example**

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

<table>
<thead>
<tr>
<th>Selection</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4...20 mA NAMUR (3.8...20.5 mA)</td>
<td>3.8 to 20.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>4...20 mA US (3.9...20.8 mA)</td>
<td>3.9 to 20.8 mA US</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>4...20 mA (4...20.5 mA)</td>
<td>4 to 20.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>0...20 mA (0...20.5 mA)</td>
<td>0 to 20.5 mA</td>
<td>0 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
</tbody>
</table>

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) 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.
Description of device parameters

### 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

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<tr>
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<td>Switch-on value</td>
<td>64</td>
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<td>Switch-off value</td>
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<tr>
<td>Assign status</td>
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<td>Switch-on delay</td>
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<td>Switch-off delay</td>
<td>65</td>
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<td>Switch state</td>
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<tr>
<td>Invert output signal</td>
<td>65</td>
</tr>
</tbody>
</table>
### 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 of device parameters

**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**

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.
### Description of device parameters

**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)

- Yes option (passive - positive)
3.5.3 Relay output 1 to n

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

| Relay output function |  
|----------------------|---|
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| Assign diag. behavior| 68 |
| Assign status        | 68 |
| Switch-off value     | 68 |
| Switch-off delay     | 68 |
| Switch-on value      | 70 |
| Switch-on delay      | 70 |
| Switch state         | 70 |
| Powerless relay status| 70 |

**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**

- **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 → Limit, 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 → Limit, 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 → Limit.

**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).
## Description of device parameters

### Switch-on delay

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Output → Relay output 1 to n → Switch-on delay (0814–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>In the Relay output function parameter → , the Limit option is selected.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter a delay time for switching on the switch output.</td>
</tr>
<tr>
<td>User entry</td>
<td>0.0 to 100.0 s</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0.0 s</td>
</tr>
</tbody>
</table>

### Switch state

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Output → Relay output 1 to n → Switch state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the current status of the relay output.</td>
</tr>
<tr>
<td>User interface</td>
<td>• Open</td>
</tr>
<tr>
<td></td>
<td>• Closed</td>
</tr>
<tr>
<td>Additional info</td>
<td>User interface</td>
</tr>
<tr>
<td></td>
<td>• Open. The relay output is not conductive.</td>
</tr>
<tr>
<td></td>
<td>• Closed. The relay output is conductive.</td>
</tr>
</tbody>
</table>

### Powerless relay status

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Output → Relay output 1 to n → Powerless relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to select the quiescent state for the relay output.</td>
</tr>
<tr>
<td>Selection</td>
<td>• Open</td>
</tr>
<tr>
<td></td>
<td>• Closed</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Open</td>
</tr>
<tr>
<td>Additional info</td>
<td>Selection</td>
</tr>
<tr>
<td></td>
<td>• Open. The relay output is not conductive.</td>
</tr>
<tr>
<td></td>
<td>• Closed. The relay output is conductive.</td>
</tr>
</tbody>
</table>
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.
### Baudrate

**User entry** 1 to 247  
**Factory setting** 247

**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**  
- **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

**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 → 📊**.

<table>
<thead>
<tr>
<th>FLOAT</th>
<th>Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options</td>
<td>1. Byte 1 (MMMMMMMMM)</td>
</tr>
<tr>
<td>1 - 0 - 3 - 2</td>
<td></td>
</tr>
<tr>
<td>0 - 1 - 2 - 3</td>
<td></td>
</tr>
<tr>
<td>2 - 3 - 0 - 1</td>
<td></td>
</tr>
</tbody>
</table>
Description of device parameters

<table>
<thead>
<tr>
<th>INTEGER</th>
<th>Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options</td>
<td>1.</td>
</tr>
<tr>
<td>1 - 0 - 3 - 2 *</td>
<td>Byte 1 (MSB)</td>
</tr>
<tr>
<td>3 - 2 - 1 - 0</td>
<td></td>
</tr>
<tr>
<td>0 - 1 - 2 - 3</td>
<td>Byte 0 (LSB)</td>
</tr>
<tr>
<td>2 - 3 - 0 - 1</td>
<td></td>
</tr>
</tbody>
</table>

* = factory setting, MSB = most significant byte, LSB = least significant byte

<table>
<thead>
<tr>
<th>STRING</th>
<th>Presentation taking the example of a device parameter with a data length of 18 bytes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options</td>
<td>1.</td>
</tr>
<tr>
<td>1 - 0 - 3 - 2 *</td>
<td>Byte 17 (MSB)</td>
</tr>
<tr>
<td>3 - 2 - 1 - 0</td>
<td></td>
</tr>
<tr>
<td>0 - 1 - 2 - 3</td>
<td>Byte 16</td>
</tr>
<tr>
<td>2 - 3 - 0 - 1</td>
<td></td>
</tr>
</tbody>
</table>

* = 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
- Last valid value

**Factory setting**
NaN value

**Additional information**
*Options*
- **NaN value**. The device outputs the NaN value.
- **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

Endress+Hauser
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

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan list register 0 to 15</td>
<td>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.</td>
</tr>
<tr>
<td>Scan list area 0 to 15</td>
<td>Use this function to enter the scan list area.</td>
</tr>
</tbody>
</table>

**User entry**  
1 to 65,535

**Factory setting**  
1

### 3.6.4 Web server

**Navigation**  
Expert → Communication → Web server

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web server language</td>
<td></td>
</tr>
<tr>
<td>MAC address</td>
<td></td>
</tr>
<tr>
<td>DHCP client</td>
<td></td>
</tr>
<tr>
<td>IP address</td>
<td></td>
</tr>
<tr>
<td>Subnet mask</td>
<td></td>
</tr>
<tr>
<td>Default gateway</td>
<td></td>
</tr>
<tr>
<td>Web server functionality</td>
<td></td>
</tr>
</tbody>
</table>

Endress+Hauser
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**

- **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.
<table>
<thead>
<tr>
<th><strong>Login page</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
| **Selection** | • Without header  
| | • With header |
| **Factory setting** | With header |
# 3.7 Diagnostics

*Navigation*  
Expert → Diagnostics

<p>| | |</p>
<table>
<thead>
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</table>
Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

*Example*
For the display format:
>F271 Main electronics failure

### Previous diagnostics service ID

<table>
<thead>
<tr>
<th>Navigation</th>
<th>👽专家 → Diagnostics → Previous diagnostics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>Two diagnostic events have already occurred.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays the diagnostic message that occurred before the current message.</td>
</tr>
<tr>
<td>User interface</td>
<td>0 to 65,535</td>
</tr>
<tr>
<td>Additional info</td>
<td>Display</td>
</tr>
<tr>
<td>Additional info</td>
<td>Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.</td>
</tr>
</tbody>
</table>

*Example*
For the display format:
>F271 Main electronics failure

### Operating time from restart

<table>
<thead>
<tr>
<th>Navigation</th>
<th>👽专家 → Diagnostics → Operating time from restart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to display the time the device has been in operation since the last device restart.</td>
</tr>
<tr>
<td>User interface</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
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</tbody>
</table>

### Operating time

<table>
<thead>
<tr>
<th>Navigation</th>
<th>👽专家 → Diagnostics → Operating time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to display the length of time the device has been in operation.</td>
</tr>
<tr>
<td>User interface</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
<tr>
<td>Additional info</td>
<td>User interface</td>
</tr>
<tr>
<td>Additional info</td>
<td>The maximum number of days is 9999, which is equivalent to 27 years.</td>
</tr>
</tbody>
</table>
3.7.1 Diagnostic list

**Navigation**
Expert → Diagnostics → Diagnostic list

<table>
<thead>
<tr>
<th>Diagnostic list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics 1 → 83</td>
</tr>
<tr>
<td>Diagnostics 2 → 83</td>
</tr>
<tr>
<td>Diagnostics 3 → 84</td>
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<tr>
<td>Diagnostics 4 → 85</td>
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<tr>
<td>Diagnostics 5 → 85</td>
</tr>
</tbody>
</table>

### 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 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 key.

#### Examples

For the display format:

- ![F271 Main electronics failure](image)
- ![F276 I/O module failure](image)

---

### 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 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 key.

#### Examples

For the display format:

- ![F271 Main electronics failure](image)
- ![F276 I/O module failure](image)

---

### 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 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 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 key.

Examples
For the display format:
◆ F271 Main electronics failure
◆ F276 I/O module failure
Description of device parameters

**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

<table>
<thead>
<tr>
<th>Device information</th>
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<tbody>
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<td>Device tag</td>
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<tr>
<td>Serial number</td>
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<tr>
<td>Firmware version</td>
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<tr>
<td>Device name</td>
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<tr>
<td>Order code</td>
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<tr>
<td>Extended order code 1</td>
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<td>Extended order code 2</td>
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<tr>
<td>Extended order code 3</td>
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<tr>
<td>ENP version</td>
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</tbody>
</table>

**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*

![Device tag](image)

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.
## Description of device parameters

### J22 TDLAS Gas Analyzer

#### 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 Description of device parameters

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 → 89
- Build no. software → 89
- Bootloader revision → 90
Description of device parameters

### 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

- Sensor electronic module (ISEM)
  - Firmware version → 90
  - Build no. software → 90
  - Bootloader revision → 90

### 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**


**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 | → 92 |
| Firmware version              | → 92 |
| Build no. software            | → 92 |
| Bootloader revision           | → 92 |

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


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.

### Data logging

**Assign chan. 1 to n**  
→ 94

**Logging interval**  
→ 94

**Clear logging data**  
→ 95

**Data logging**  
→ 95
**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: \( T_{\text{log}} = 500 \times t_{\text{log}} \)
- If 3 logging channels are used: \( T_{\text{log}} = 333 \times t_{\text{log}} \)
- If 4 logging channels are used: \( T_{\text{log}} = 250 \times t_{\text{log}} \)

Once this time elapses, the oldest data points in the data log are cyclically overwritten such that a time of \( T_{\text{log}} \) 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:
- \( T_{\text{log}} = 1000 \times 1 \text{ s} = 1000 \text{ s} \approx 15 \text{ min} \)
- \( T_{\text{log}} = 1000 \times 10 \text{ s} = 10000 \text{ s} \approx 3 \text{ h} \)
- \( T_{\text{log}} = 1000 \times 80 \text{ s} = 80000 \text{ s} \approx 1 \text{ d} \)
- \( T_{\text{log}} = 1000 \times 3600 \text{ s} = 3600000 \text{ s} \approx 41 \text{ d} \)

## 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**
- **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**
- **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
### Description of device parameters

#### J22 TDLAS Gas Analyzer

### Logging delay

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<th>Navigation</th>
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<tbody>
<tr>
<td></td>
<td>Expert → Diagnostics → Data logging → Logging delay</td>
</tr>
</tbody>
</table>

**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

<table>
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<th>Navigation</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Expert → Diagnostics → Data logging → Data logging control</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Diagnostics → Data logging → Data log. status</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Expert → Diagnostics → Data logging → Data log. status</td>
</tr>
</tbody>
</table>

**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

- **Heartbeat settings** → 97
- **Performing verification** → 100
- **Verification results** → 105
- **Gas validation results** → 108
- **Monitoring results** → 110

- **Plant operator** → 97
- **Location** → 97
- **Gas validation settings** → 98
Description of device parameters

**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

1. **Gas validation settings**

- **Select validation calibration** → 98
- **Validation Type** → 98
- **Num Validations** → 99
- **Validation gas purge time** → 99
- **Meas. duration** → 99
- **Validation gas information** → 99
- **Validation concentration** → 99
- **Validation allowance** → 100

**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
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Selection</th>
<th>Factory Setting</th>
</tr>
</thead>
</table>
| Validation Type            | Select whether the validation gas flow is manual (user controlled) or auto (device controlled). | ▪ Validation manual gas  
▪ Validation auto gas             | Validation manual gas                                                   |
| Num Validations            | Select the number of validation points.                                      | 1                                                                         | 1                             |
| Validation gas purge time  | Enter the validation gas purge time.                                         | 0 to 5 minutes                                                           | 1.00 min                      |
| Meas. Duration             | Enter the duration for calculating the measurement statistics (mean, standard deviation). | 0.25 to 60 minutes                                                      | 1.00 min                      |
| Validation gas information | Enter a description or identifier for the source of validation gas (stream, bottle, bottle serial number). | Max. 32 characters such as letters, numbers, or special characters (e.g., @, %, /). | Unknown validation gas        |
Description of device parameters

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**  

![Performing verification wizard](image)
### Year

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Heartbeat Technology → Performing verification → Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>Can be edited if Heartbeat Verification is not active.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter the year of verification.</td>
</tr>
<tr>
<td>User entry</td>
<td>9 to 99</td>
</tr>
<tr>
<td>Factory setting</td>
<td>21</td>
</tr>
</tbody>
</table>

### Month

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Heartbeat Technology → Performing verification → Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>Can be edited if Heartbeat Verification is not active.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to select the month of verification.</td>
</tr>
<tr>
<td>User entry</td>
<td>January, February, March, April, May, June, July, August, September, October, November, December</td>
</tr>
<tr>
<td>Factory setting</td>
<td>January</td>
</tr>
</tbody>
</table>

### Day

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Heartbeat Technology → Performing verification → Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>Can be edited if Heartbeat Verification is not active.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter the day of the month of verification.</td>
</tr>
<tr>
<td>User entry</td>
<td>1 to 31 d</td>
</tr>
<tr>
<td>Factory setting</td>
<td>1 d</td>
</tr>
</tbody>
</table>
Description of device parameters

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
User entry 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
- Output 1 high value
- Output 2 low value
- Output 2 high value
- 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 Technology → 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
### Description of device parameters

**J22 TDLAS Gas Analyzer**

#### Verification ID

<table>
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<th>Navigation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The verification has been performed.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays consecutive numbering of the verification results in the measuring device.</td>
</tr>
<tr>
<td>User interface</td>
<td>0 to 65,535</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Operating time

<table>
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<tr>
<th>Navigation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The verification has been performed.</td>
</tr>
<tr>
<td>Description</td>
<td>Indicates how long the device has been in operation up to the verification.</td>
</tr>
<tr>
<td>User interface</td>
<td>Days (d), hours (h), minutes (m), seconds (s)</td>
</tr>
</tbody>
</table>

#### Verification result

<table>
<thead>
<tr>
<th>Navigation</th>
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</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the overall result of the verification.</td>
</tr>
</tbody>
</table>
| User interface | ▪ Not supported  
▪ Passed  
▪ Not done  
▪ Failed |
| Factory setting | Not done |

#### Sensor

<table>
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<tr>
<th>Navigation</th>
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</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The Failed option result is shown in the Verification result parameter → ☐.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays the result for the sensor.</td>
</tr>
</tbody>
</table>
| User interface | ▪ Not supported  
▪ Passed  
▪ Not done  
▪ Failed |
| Factory setting | Not done |

#### Sensor electronic module (ISEM)

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<tbody>
<tr>
<td>Prerequisite</td>
<td>The Failed option result is shown in the Verification result parameter → ☐.</td>
</tr>
</tbody>
</table>

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
### Description of device parameters

- Passed
- Not done
- Failed

**Factory setting**  
Not done

### Gas validation results submenu

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/time (manually entered)</td>
<td>108</td>
</tr>
<tr>
<td>Operating time</td>
<td>108</td>
</tr>
<tr>
<td>Gas validation</td>
<td>108</td>
</tr>
<tr>
<td>Concentration average</td>
<td>109</td>
</tr>
<tr>
<td>Conc. std. dev.</td>
<td>109</td>
</tr>
<tr>
<td>Conc. max</td>
<td>109</td>
</tr>
<tr>
<td>Conc. min</td>
<td>109</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Monitoring results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detector reference level → 110</td>
</tr>
<tr>
<td>Peak 1 index delta → 110</td>
</tr>
<tr>
<td>Peak 2 index delta → 110</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curr.inp 1 to n sim. → 110</td>
</tr>
<tr>
<td>Value curr.inp1 to n</td>
</tr>
<tr>
<td>Curr.outp1 to n sim. → 111</td>
</tr>
<tr>
<td>Curr.outpval. 1 to n</td>
</tr>
<tr>
<td>Switch sim. 1 to n → 111</td>
</tr>
</tbody>
</table>
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
**Description of device parameters**

**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
**Description of device parameters**

**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 → 114](#).

**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 → 114](#).

---

**3.7.12 Spectrum plots**

**Navigation**

Expert → Diagnostics → Spectrum plots

[Midpoint default 1 to n → 114](#)

[Ramp default 1 to n → 115](#)

[Concentration → 115](#)

[Dew point 1 → 115](#)

[Dew point 2 → 115](#)

[Cell gas press. → 116](#)

[Cell gas temp. → 116](#)
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 100000 ppmv
### Description of device parameters

<table>
<thead>
<tr>
<th>Device Parameter</th>
<th>Description</th>
<th>Selection</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dew point 1</strong></td>
<td>Displays the moisture dew point 1 temperature that is currently calculated.</td>
<td>Signed floating-point number</td>
<td>The unit is taken from the <code>temperature unit parameter →</code> . 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 <a href="#">BA02152C →</a> for more details.</td>
</tr>
<tr>
<td><strong>Dew point 2</strong></td>
<td>Displays the moisture dew point 2 temperature that is currently calculated.</td>
<td>Signed floating-point number</td>
<td>The unit is taken from the <code>temperature unit parameter →</code> . 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 <a href="#">BA02152C →</a> for more details.</td>
</tr>
<tr>
<td><strong>Cell gas pressure</strong></td>
<td>Plots the gas pressure currently measured in the sample cell.</td>
<td>-0.5 to 6.9 Bar</td>
<td>The unit is taken from the <code>pressure unit parameter →</code> . The current pressure of the sample cell during measurement.</td>
</tr>
<tr>
<td><strong>Cell gas temperature</strong></td>
<td>Displays the gas pressure currently measured in the sample cell.</td>
<td>-20 to +60 °C</td>
<td>The unit is taken from the <code>temperature unit parameter →</code> . The current temperature of the sample cell during measurement.</td>
</tr>
</tbody>
</table>
**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 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.
Description of device parameters

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

- Spectra log rate → 119
- Numver of spectra files → 119
- Validation log level → 120
- Number of validation files → 120

#### 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 \(\rightarrow\) Diagnostics \(\rightarrow\) SD card \(\rightarrow\) 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 \(\rightarrow\) Diagnostics \(\rightarrow\) SD card \(\rightarrow\) 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 \(\rightarrow\) Diagnostics \(\rightarrow\) SD card \(\rightarrow\) 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

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>°C</td>
</tr>
<tr>
<td>Pressure</td>
<td>bar a</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Output Current output 1...n</th>
<th>Current range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output 1...n</td>
<td>4 to 20 mA NAMUR</td>
</tr>
</tbody>
</table>

4.2 US units

4.2.1 System units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>°F</td>
</tr>
<tr>
<td>Pressure</td>
<td>psi a</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Output Current output 1...n</th>
<th>Current range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output 1...n</td>
<td>4 to 20 mA US</td>
</tr>
</tbody>
</table>
5 Explanation of abbreviated units

5.1 SI units

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

5.2 US units

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

5.3 Imperial units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
</tr>
<tr>
<td></td>
<td>am, pm</td>
<td>Ante meridiem (before midday), post meridiem (after midday)</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Navigation: navigation path to the parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>Name of parameter</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Function code</th>
<th>Access type</th>
<th>Register in accordance with &quot;Modbus Applications Protocol Specification&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>03 04 23</td>
<td>Read</td>
<td>XXXX Example: 9455 Concentration</td>
</tr>
<tr>
<td>06 16 23</td>
<td>Write</td>
<td>XXXX Example: 2439 Concentration Unit</td>
</tr>
</tbody>
</table>
### 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.

<table>
<thead>
<tr>
<th>Expert</th>
<th></th>
<th>Page Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Locking status</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>User role</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Enter access code</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>System</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Display</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Display language</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Format display</td>
<td>13</td>
</tr>
<tr>
<td></td>
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<td>0% bargraph 1</td>
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<td>100% bargraph 1</td>
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<tr>
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<td>Decimal places 1</td>
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<tr>
<td></td>
<td>Value 2 display</td>
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</tr>
<tr>
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<td>16</td>
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<td>Value 3 display</td>
<td>17</td>
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<tr>
<td></td>
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</tr>
<tr>
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<td>Decimal places 3</td>
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<tr>
<td></td>
<td>Value 4 display</td>
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</tr>
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<td>Display interval</td>
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<td>Display damping</td>
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<td></td>
<td>Separator</td>
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<td>Contrast display</td>
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<td>Backlight</td>
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<tr>
<td></td>
<td>Configuration backup</td>
<td>21</td>
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<tr>
<td></td>
<td>Operating time</td>
<td>22</td>
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<td>Last backup</td>
<td>22</td>
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<td>Configuration mgmt.</td>
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<td>Backup state</td>
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<td>Comparison result</td>
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<td>Diagnostic handling</td>
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<tr>
<td></td>
<td>Alarm delay</td>
<td>24</td>
</tr>
</tbody>
</table>
Description of device parameters

**Diagnostic behavior**
- Diagnostic no. 302
- Diagnostic no. 441
- Diagnostic no. 444
- Diagnostic no. 905

**Administration**
- Device reset
- Transmitter identifier
- Activate SW option
- Software option overview
  - Define access code
    - Define access code
    - Confirm access code
  - Reset access code
    - Operating time
    - Reset access code

**Sensor**
- Measured values
  - Measured variables
    - Concentration
    - Dew point 1
    - Dew point 2
    - Cell gas pressure
    - Cell gas temperature
    - Detect. ref. level
    - Detect. zero level
    - Peak 1 index
    - Peak 1 index delta
    - Peak 2 index
    - Peak 2 index delta
    - Peak track index
    - Peak track index delta
    - Midpoint delta

**Input values**
- Current input 1 to n
- Measured val. 1 to n
- Measured curr. 1 to n
  - Val.stat.inp. 1 to n
  - Val.stat.inp. 1 to n

**Output values**
Description of device parameters

J22 TDLAS Gas Analyzer

- Val. curr.outp 1 to n
  - Output curr.
  - Measur. curr.
- Switch output 1
  - Switch state
- Relay output 1 to n
  - Switch state
  - Switch cycles
  - Max. cycles no.

- System units
  - Concentration unit (ppmv)
  - Temperature unit (°C)
  - Pressure unit (bar)
  - Length unit (m)
  - Date/time format
- User-specific units
  - User concentration text
  - User concentration offset
  - User concentration factor

- Stream
  - Analyte type
  - Select calibration
  - Rolling average number

- Dew point
  - Dew point method 1
  - Dew point method 2
  - Conversion type
  - Pipeline pressure mode
  - Pipeline pressure fixed
  - Pipeline pressure

- Calibration 1 to n
  - Methane CH4
  - Ethane C2H6
  - Propane C3H8
  - iButane C4H10
  - N-Butane C4H10
  - Isopentane C5H12
  - N-Pentane C5H12
  - Neopentane C5H12
  - Hexane+ C6H14+
  - Nitrogen N2
<table>
<thead>
<tr>
<th>Peak tracking</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak track analyzer control</td>
<td>→ 46</td>
</tr>
<tr>
<td>Peak track reset</td>
<td>→ 46</td>
</tr>
<tr>
<td>Peak track average number</td>
<td>→ 46</td>
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</table>

<table>
<thead>
<tr>
<th>Sensor adjustment</th>
<th></th>
</tr>
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<tbody>
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<td>Concentration adjustment</td>
<td>→ 47</td>
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<tr>
<td>Concentration multiplier</td>
<td>→ 47</td>
</tr>
<tr>
<td>Concentration offset</td>
<td>→ 47</td>
</tr>
<tr>
<td>2f base crv source</td>
<td>→ 47</td>
</tr>
<tr>
<td>2f base RT update</td>
<td>→ 49</td>
</tr>
<tr>
<td>Calibration 1 to n</td>
<td>→ 48</td>
</tr>
<tr>
<td>Midpoint default</td>
<td>→ 48</td>
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<tr>
<td>Ramp default</td>
<td>→ 48</td>
</tr>
<tr>
<td>Mod ramp default</td>
<td>→ 48</td>
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</table>

<table>
<thead>
<tr>
<th>Stream change compensation (SCC)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration 1 to n</td>
<td>→ 49</td>
</tr>
<tr>
<td>Stream change compensation</td>
<td>→ 51</td>
</tr>
<tr>
<td>Methane CH4</td>
<td>→ 51</td>
</tr>
<tr>
<td>Ethane C2H6</td>
<td>→ 51</td>
</tr>
<tr>
<td>Propane C3H8</td>
<td>→ 51</td>
</tr>
<tr>
<td>IButane C4H10</td>
<td>→ 51</td>
</tr>
<tr>
<td>N-Butane C4H10</td>
<td>→ 51</td>
</tr>
<tr>
<td>Isopentane C5H12</td>
<td>→ 51</td>
</tr>
<tr>
<td>N-Pentane C5H12</td>
<td>→ 51</td>
</tr>
<tr>
<td>Neopentane C5H12</td>
<td>→ 51</td>
</tr>
<tr>
<td>Hexane+ C6H14+</td>
<td>→ 51</td>
</tr>
<tr>
<td>Nitrogen N2</td>
<td>→ 51</td>
</tr>
<tr>
<td>Carbon diox. CO2</td>
<td>→ 51</td>
</tr>
<tr>
<td>Hydrog. sulf. H2S</td>
<td>→ 51</td>
</tr>
<tr>
<td>Hydrogen H2</td>
<td>→ 51</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Calibration</th>
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<tbody>
<tr>
<td>Det. 1 TIA gain</td>
<td>→ 51</td>
</tr>
<tr>
<td>Detector bias</td>
<td>→ 51</td>
</tr>
<tr>
<td>Flow switch input</td>
<td>→ 51</td>
</tr>
<tr>
<td>Flow switch state</td>
<td>→ 51</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I/O configuration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O module 1 to n terminals</td>
<td>→ 52</td>
</tr>
<tr>
<td>I/O module 1 to n information</td>
<td>→ 52</td>
</tr>
</tbody>
</table>
### I/O module 1 to n type

- Apply I/O configuration
- I/O alteration code

#### Input

- Current input 1 to n
  - Terminal no.
  - Signal mode
  - Current span
  - 0/4 mA value
  - 20 mA value
  - Failure mode
  - Failure value

#### Output

- Current output 1 to n
  - Terminal no.
  - Signal mode
  - Proc.var. outp
  - Curr.range out
  - Fixed current
  - Low.range outp
  - Upp.range outp
  - Damp.curr.outp
  - Fail.behav.out
  - Fail. current
  - Output curr.
  - Measur. curr.

- Switch output 1 to n
  - Signal mode
  - Operating mode
  - Switch out funct
  - Assign diag. beh
  - Assign limit
  - Switch-on value
  - Switch-off value
  - Assign status
  - Switch-on delay
  - Switch-off delay
  - Switch state
  - Invert outp.sig.

- Relay output 1 to n
  - Relay output function
Description of device parameters

Assign limit
Assign diag. beh
Assign status
Switch-off value
Switch-off delay
Switch-on value
Switch-on delay
Switch state
Powerless relay

Communication

Modbus configuration
Bus address
Baudrate
Data transfer mode
Parity
Byte order
Telegram delay
Prio. IP address
Inactivity timeout
Max connections
Failure mode
Bus termination
Fieldbus writing access

Modbus information
Device ID
Device revision

Modbus data map
Scan list register 0 to 15

Web server
Web server language
MAC address
DHCP client
IP address
Subnet mask
Default gateway
Web server functionality
Login page

Diagnostics
Actual diagnostics
Previous diagnostics
Operating time from restart
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Operating time</td>
<td>→ 82</td>
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<tr>
<td>Diagnostic list</td>
<td>→ 83</td>
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<tr>
<td>Diagnostics 1</td>
<td>→ 83</td>
</tr>
<tr>
<td>Diagnostics 2</td>
<td>→ 83</td>
</tr>
<tr>
<td>Diagnostics 3</td>
<td>→ 83</td>
</tr>
<tr>
<td>Diagnostics 4</td>
<td>→ 85</td>
</tr>
<tr>
<td>Diagnostics 5</td>
<td>→ 85</td>
</tr>
<tr>
<td>Event logbook</td>
<td>→ 86</td>
</tr>
<tr>
<td>Filter option</td>
<td>→ 86</td>
</tr>
<tr>
<td>Device information</td>
<td>→ 87</td>
</tr>
<tr>
<td>Device tag</td>
<td>→ 87</td>
</tr>
<tr>
<td>Serial number</td>
<td>→ 87</td>
</tr>
<tr>
<td>Firmware version</td>
<td>→ 87</td>
</tr>
<tr>
<td>Device name</td>
<td>→ 88</td>
</tr>
<tr>
<td>Order code</td>
<td>→ 88</td>
</tr>
<tr>
<td>Extended order code 1</td>
<td>→ 88</td>
</tr>
<tr>
<td>Extended order code 2</td>
<td>→ 88</td>
</tr>
<tr>
<td>Extended order code 3</td>
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<tr>
<td>ENP version</td>
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<tr>
<td>Main electronic module + I/O module 1</td>
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</tr>
<tr>
<td>Firmware version</td>
<td>→ 89</td>
</tr>
<tr>
<td>Build no. software</td>
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</tr>
<tr>
<td>Bootloader revision</td>
<td>→ 90</td>
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<tr>
<td>Sensor electronic module (ISEM)</td>
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<tr>
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<td>Build no. software</td>
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<td>Bootloader revision</td>
<td>→ 90</td>
</tr>
<tr>
<td>I/O module 2</td>
<td>→ 91</td>
</tr>
<tr>
<td>I/O module 2 terminal numbers</td>
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</tr>
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<td>→ 91</td>
</tr>
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<td>→ 91</td>
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<td>Bootloader revision</td>
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</tr>
<tr>
<td>I/O module 3</td>
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<tr>
<td>I/O module 3 terminal numbers</td>
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<td>Bootloader revision</td>
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<tr>
<td>Display module</td>
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<tr>
<td>Firmware version</td>
<td>→ 93</td>
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<td>Build no. software</td>
<td>→ 93</td>
</tr>
<tr>
<td>Bootloader revision</td>
<td>→ 93</td>
</tr>
</tbody>
</table>
### Data logging
- Assign chan. 1 to n  
- Logging interval  
- Clear logging  
- Data logging  
- Logging delay  
- Data log.control  
- Data log. status  
- Logging duration

### Heartbeat Technology
- Heartbeat settings

### Gas validation settings
- Select val. cal.  
- Validation type  
- Num. val. Points  
- Val. purge time  
- Meas. duration  
- Val. gas info  
- Val. conc.  
- Val. allowance

### Performing verification
- Year  
- Month  
- Day  
- Hour  
- AM/PM  
- Minute  
- Meas. Duration  
- Verification mode  
- Ext. device info  
- Start verification  
- Progress  
- Status  
- Measured val.  
- Output values  
- Measured conc.  
- Verification result

### Verification results
- Date/time (man. entered)
<table>
<thead>
<tr>
<th>Description of device parameters</th>
<th>J22 TDLAS Gas Analyzer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification ID</td>
<td>➔ 106</td>
</tr>
<tr>
<td>Operating time</td>
<td>➔ 106</td>
</tr>
<tr>
<td>Verification result</td>
<td>➔ 106</td>
</tr>
<tr>
<td>Sensor</td>
<td>➔ 106</td>
</tr>
<tr>
<td>Sens. electronic</td>
<td>➔ 106</td>
</tr>
<tr>
<td>Gas validation</td>
<td>➔ 106</td>
</tr>
<tr>
<td>I/O module</td>
<td>➔ 106</td>
</tr>
<tr>
<td>System status</td>
<td>➔ 106</td>
</tr>
<tr>
<td><strong>Gas validation results</strong></td>
<td>➔ 108</td>
</tr>
<tr>
<td>Date/time (man. entered)</td>
<td>➔ 108</td>
</tr>
<tr>
<td>Operating time</td>
<td>➔ 108</td>
</tr>
<tr>
<td>Gas validation</td>
<td>➔ 108</td>
</tr>
<tr>
<td>Concentration average</td>
<td>➔ 108</td>
</tr>
<tr>
<td>Conc. std. dev.</td>
<td>➔ 109</td>
</tr>
<tr>
<td>Conc. max</td>
<td>➔ 109</td>
</tr>
<tr>
<td>Conc. min</td>
<td>➔ 109</td>
</tr>
<tr>
<td><strong>Monitoring results</strong></td>
<td>➔ 110</td>
</tr>
<tr>
<td>Detector reference level</td>
<td>➔ 110</td>
</tr>
<tr>
<td>Peak 1 index delta</td>
<td>➔ 110</td>
</tr>
<tr>
<td>Peak 2 index delta</td>
<td>➔ 110</td>
</tr>
<tr>
<td><strong>Simulation</strong></td>
<td>➔ 110</td>
</tr>
<tr>
<td>Curr.inp 1 to n sim.</td>
<td>➔ 110</td>
</tr>
<tr>
<td>Value curr.inp1 to n</td>
<td>➔ 110</td>
</tr>
<tr>
<td>Curr.outp1 to n sim.</td>
<td>➔ 111</td>
</tr>
<tr>
<td>Curr.outpval. 1 to n</td>
<td>➔ 111</td>
</tr>
<tr>
<td>Switch sim. 1 to n</td>
<td>➔ 111</td>
</tr>
<tr>
<td>Switch state 1 to n</td>
<td>➔ 112</td>
</tr>
<tr>
<td>Relay out.1 to n sim</td>
<td>➔ 112</td>
</tr>
<tr>
<td>Switch state 1 to n</td>
<td>➔ 112</td>
</tr>
<tr>
<td>Dev. alarm sim.</td>
<td>➔ 113</td>
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<tr>
<td>Event category</td>
<td>➔ 113</td>
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<tr>
<td>Diag. event sim.</td>
<td>➔ 113</td>
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<tr>
<td><strong>Spectrum plots</strong></td>
<td>➔ 115</td>
</tr>
<tr>
<td>Midpoint default 1 to n</td>
<td>➔ 114</td>
</tr>
<tr>
<td>Ramp default 1 to n</td>
<td>➔ 115</td>
</tr>
<tr>
<td>Concentration</td>
<td>➔ 115</td>
</tr>
<tr>
<td>Dew point 1</td>
<td>➔ 115</td>
</tr>
<tr>
<td>Dew point 2</td>
<td>➔ 115</td>
</tr>
<tr>
<td>Cell gas press.</td>
<td>➔ 116</td>
</tr>
<tr>
<td>Cell gas temp.</td>
<td>➔ 116</td>
</tr>
<tr>
<td>Detect. ref. lvl</td>
<td>➔ 116</td>
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</table>
## 6.3 Register information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking status</td>
<td>4918</td>
<td>Integer</td>
<td>Read</td>
<td>256 = Hardware locked 512 = Temporarily locked</td>
</tr>
<tr>
<td>User role</td>
<td>2178</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Operator 1 = Maintenance</td>
</tr>
<tr>
<td>Enter access code</td>
<td>2177</td>
<td>Integer</td>
<td>Read/Write</td>
<td>Four-digit access code</td>
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</tbody>
</table>

### 6.3.1 System submenu

#### 6.3.1.1 Display

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display language</td>
<td>3673</td>
<td>Integer</td>
<td>Read/Write</td>
<td>0 = English 1 = Français 2 = Italiano 3 = русский язык (Russian) 4 = 中文 (Chinese)</td>
</tr>
<tr>
<td>Format display</td>
<td>3625</td>
<td>Integer</td>
<td>Read/Write</td>
<td>0 = 1 value, max. size 1 = 1 bargraph + 1 value 2 = 2 values 3 = 1 value large + 2 values 4 = 4 values</td>
</tr>
<tr>
<td>Parameter</td>
<td>Register</td>
<td>Data type</td>
<td>Access</td>
<td>Selection/User entry/User interface</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------</td>
<td>-----------</td>
<td>----------</td>
<td>--------------------------------------</td>
</tr>
</tbody>
</table>
| 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 |
| 0% bargraph value 1       | 4136 to 4137 | Float     | Read / Write | Signed floating-point number |
| 100% bargraph value 1     | 4142 to 4143 | Float     | Read / Write | Signed floating-point number |
| Decimal places 1          | 3365         | Integer   | Read / Write | 0 = x  
1 = x.x  
2 = x.xx  
3 = x.xxx  
4 = x.xxxx |
| Value 2 display           | 3964         | Integer   | Read / Write | For the picklist, see the Value 1 display parameter (→ 14) |
| Decimal places 2          | 4049         | Integer   | Read / Write | 0 = x  
1 = x.x  
2 = x.xx  
3 = x.xxx  
4 = x.xxxx |
| Value 3 display           | 3966         | Integer   | Read / Write | For the picklist, see the Value 1 display |
| 0% bargraph value 3       | 4138 to 4139 | Float     | Read / Write | Signed floating-point number |
| 100% bargraph value 3     | 4140 to 4141 | Float     | Read / Write | Signed floating-point number |
| Decimal places 3          | 4050         | Integer   | Read / Write | 0 = x  
1 = x.x  
2 = x.xx  
3 = x.xxx  
4 = x.xxxx |
| Value 4 display           | 3965         | Integer   | Read / Write | For the picklist, see the Value 1 display |
| Decimal places 4          | 4051         | Integer   | Read / Write | 0 = x  
1 = x.x  
2 = x.xx  
3 = x.xxx  
4 = x.xxxx |
| Display interval          | 3604 to 3605 | Float     | Read / Write | 1 to 10 s |
| Display damping           | 3554 to 3555 | Float     | Read / Write | 0.0 to 999.9 s |
| Header                    | 3624         | Integer   | Read / Write | 0 = Device tag  
1 = Free text |
### Description of device parameters

#### 6.3.1.2 Configuration backup

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header text</td>
<td>3968 to 3973</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 12 characters, such as letters, numbers or special characters (e.g., @, %, /)</td>
</tr>
<tr>
<td>Separator</td>
<td>3671</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 = point . 2 = comma ,</td>
</tr>
<tr>
<td>Contrast display</td>
<td>3674 to 3675</td>
<td>Float</td>
<td>Read / Write</td>
<td>20 to 80 %</td>
</tr>
<tr>
<td>Backlight</td>
<td>3967</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Disable 1 = Enable</td>
</tr>
</tbody>
</table>

#### 6.3.1.3 Diagnostic handling

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm delay</td>
<td>6808 to 6809</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 60 s</td>
</tr>
</tbody>
</table>

---

**Navigation:** Expert → System → Display

**Navigation:** Expert → System → Configuration backup

**Navigation:** Expert → System → Diagnostic handling
### Diagnostic behavior submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign behavior of diagnostic no. 302</td>
<td>2312</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Alarm</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 441</td>
<td>4742</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Logbook entry only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Alarm</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 444</td>
<td>5120</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Logbook entry only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Alarm</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 905</td>
<td>30025</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Logbook entry only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = Reset</td>
</tr>
</tbody>
</table>

### Administration

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device reset</td>
<td>6817</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Cancel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Restart device</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = To delivery settings</td>
</tr>
<tr>
<td>Transmitter identifier</td>
<td>4510</td>
<td>Integer</td>
<td>Read</td>
<td>1 = 300</td>
</tr>
<tr>
<td>Activate SW option</td>
<td>2795</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 10-digit string consisting of numbers.</td>
</tr>
<tr>
<td>Software option overview</td>
<td>2902</td>
<td>Integer</td>
<td>Read</td>
<td>1 = Extended HistOROM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>32768 = Heartbeat Verification</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16384 = Heartbeat Monitoring</td>
</tr>
</tbody>
</table>

### Define access code submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define access code</td>
<td>8677 to 8684</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 16-digit character string comprising numbers, letters, and special characters</td>
</tr>
<tr>
<td>Confirm access code</td>
<td>8685 to 8692</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 16-digit character string comprising numbers, letters, and special characters</td>
</tr>
</tbody>
</table>
Reset access code submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time</td>
<td>2631 to 2637</td>
<td>String</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
<tr>
<td>Reset access code</td>
<td>8880 to 8895</td>
<td>String</td>
<td>Read / Write</td>
<td>Character string comprising numbers, letters, and special characters</td>
</tr>
</tbody>
</table>

### 6.3.2 Sensor

#### 6.3.2.1 Measured values

Measured variables submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>9455 to 9456</td>
<td>Float</td>
<td>Read</td>
<td>0 to 100000 ppmv</td>
</tr>
<tr>
<td>Dew point 1</td>
<td>21458 to 21459</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Dew point 2</td>
<td>21800 to 21801</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Cell gas pressure</td>
<td>25216 to 25217</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Cell gas temperature</td>
<td>21854 to 21855</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Detector reference level</td>
<td>4720 to 4721</td>
<td>Float</td>
<td>Read</td>
<td>0 to 5 mA</td>
</tr>
<tr>
<td>Detector zero level</td>
<td>9667 to 9668</td>
<td>Float</td>
<td>Read</td>
<td>0 to 5 mA</td>
</tr>
<tr>
<td>Peak 1 index</td>
<td>9834 to 9835</td>
<td>Float</td>
<td>Read</td>
<td>0.0 to 511.0</td>
</tr>
<tr>
<td>Peak 1 index delta</td>
<td>30581 to 30582</td>
<td>Float</td>
<td>Read</td>
<td>-511.0 to 511.0</td>
</tr>
<tr>
<td>Peak 2 index</td>
<td>27600 to 27601</td>
<td>Float</td>
<td>Read</td>
<td>0.0 to 511.0</td>
</tr>
<tr>
<td>Peak 2 index delta</td>
<td>30672 to 30673</td>
<td>Float</td>
<td>Read</td>
<td>-511.0 to 511.0</td>
</tr>
<tr>
<td>Peak track index</td>
<td>29018 to 29019</td>
<td>Float</td>
<td>Read</td>
<td>0.0 to 511.0</td>
</tr>
<tr>
<td>Peak track index delta</td>
<td>28814 to 28815</td>
<td>Float</td>
<td>Read</td>
<td>-511.0 to 511.0</td>
</tr>
<tr>
<td>Midpoint delta</td>
<td>47236 to 47237</td>
<td>Float</td>
<td>Read</td>
<td>0.0 to 120.0 mA</td>
</tr>
</tbody>
</table>

Input values submenu

*Current input 1 to n*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
</table>
| Measured values 1 to n        | 1: 6151 to 6152  
2: 6153 to 6154  
3: 6155 to 6156 | Float        | Read            | Signed floating-point number         |
| Measured current 1 to n       | 1: 6131 to 6132  
2: 6133 to 6134  
3: 6135 to 6136 | Float        | Read            | 0 to 22.5 mA                         |

Value status input 1 to n
### Description of device parameters

**J22 TDLAS Gas Analyzer**

#### Parameter Register Data type Access Selection/User entry/User interface

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value status input 1 to n</td>
<td>1: 2746 2: 4699 3: 4700</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Low 1 = High</td>
</tr>
</tbody>
</table>

### Output values submenu

**Value current output 1 to n**

#### Parameter Register Data type Access Selection/User entry/User interface

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output current 1 to n</td>
<td>1: 5931 to 5932 2: 5933 to 5934 3: 5935 to 5936</td>
<td>Float</td>
<td>Read</td>
<td>0 to 22.5 mA</td>
</tr>
<tr>
<td>Measured current 1 to n</td>
<td>1: 5779 to 5780 2: 5781 to 5782 3: 5783 to 5784</td>
<td>Float</td>
<td>Read</td>
<td>0 to 30 mA</td>
</tr>
</tbody>
</table>

### Switch output 1 to n

#### Parameter Register Data type Access Selection/User entry/User interface

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch state 1 to n</td>
<td>1: 2485 2: 2486 3: 9917</td>
<td>Integer</td>
<td>Read</td>
<td>1 = Open 6 = Closed</td>
</tr>
</tbody>
</table>

### Relay output 1 to n

#### Parameter Register Data type Access Selection/User entry/User interface

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch state</td>
<td>1: 3518 2: 3519 3: 9875</td>
<td>Integer</td>
<td>Read</td>
<td>1 = Open 6 = Closed</td>
</tr>
<tr>
<td>Switch cycles</td>
<td>1: 7625 2: 7627 3: 7629</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Max. switch cycles number</td>
<td>1: 21919 2: 21921 3: 21923</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
</tr>
</tbody>
</table>

### 6.3.2.2 System units

#### Parameter Register Data type Access Selection/User entry/User interface

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration unit</td>
<td>2439</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = ppmv 1 = lb/MMscf 2 = %vol</td>
</tr>
</tbody>
</table>

138 Endress+Hauser
### Description of device parameters

#### Navigation: Expert → Sensor → System units

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
</table>
| Temperature unit| 2109     | Integer   | Read / Write | 0 = °C  
1 = K  
2 = °F  
3 = °R  |
| 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  |
| Length unit     | 2087     | Integer   | Read / Write | 44 = ft  
45 = m  
47 = in  
49 = mm  
240 = μm  |
| 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  |

#### User-specific units submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>User concentration text</td>
<td>2585 to 2589</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 10 characters such as letters, numbers, or special characters (@, %, /)</td>
</tr>
<tr>
<td>User concentration offset</td>
<td>2490 to 2491</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>User concentration factor</td>
<td>2554 to 2555</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>

#### 6.3.2.3 Stream

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyte type</td>
<td>21930</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = H2O</td>
</tr>
</tbody>
</table>

---

Endress+Hauser
### Description of device parameters

**J22 TDLAS Gas Analyzer**

#### 6.3.2.4 Dew Point

**Navigation: Expert → Sensor → Stream**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select calibration</td>
<td>22968</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = 1 1 = 2 2 = 3 3 = 4</td>
</tr>
<tr>
<td>Rolling average number</td>
<td>6876</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 to 256</td>
</tr>
</tbody>
</table>

**Navigation: Expert → Sensor → Dew point**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dew point method 1</td>
<td>21595</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = ASTM1 2 = ASTM2 3 = ISO 4 = AB</td>
</tr>
<tr>
<td>Dew point method 2</td>
<td>7631</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = ASTM1 2 = ASTM2 3 = ISO 4 = AB</td>
</tr>
<tr>
<td>Conversion type</td>
<td>21596</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Ideal 1 = Real</td>
</tr>
<tr>
<td>Pipeline pressure mode</td>
<td>48175</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 = Fixed value 0 = External value 11 = Current input 1 12 = Current input 2 13 = Current input 3</td>
</tr>
<tr>
<td>Pipeline pressure fixed</td>
<td>48251 to 48252</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Pipeline pressure</td>
<td>9483 to 9484</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>
### Dew point calibration submenu

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

#### 6.3.2.5 Peak Tracking

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak track analyzer control</td>
<td>21460</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = On</td>
</tr>
<tr>
<td>Peak track reset</td>
<td>4727</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 3 = Reset</td>
</tr>
<tr>
<td>Peak track average number</td>
<td>21568</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 to 3600</td>
</tr>
</tbody>
</table>

#### 6.3.2.6 Sensor adjustment

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration adjustment</td>
<td>47129</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = On</td>
</tr>
</tbody>
</table>
### Description of device parameters

#### J22 TDLAS Gas Analyzer

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration multiplier</td>
<td>47222 to 47223</td>
<td>Float</td>
<td>Read / Write</td>
<td>-10000000 to 10000000</td>
</tr>
<tr>
<td>Concentration offset</td>
<td>47224 to 47225</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>2f base cvr source</td>
<td>28614</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Ref0 curve</td>
</tr>
<tr>
<td>2f base RT update</td>
<td>30669</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Cancel</td>
</tr>
</tbody>
</table>

### Sensor adjustment calibration submenu

#### Navigation: Expert → Sensor → Sensor adjustment → Calibration

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
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</thead>
<tbody>
<tr>
<td>Laser midpoint default</td>
<td>31090, 31092,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 120 mA</td>
</tr>
<tr>
<td></td>
<td>31094, 31096</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser ramp default</td>
<td>26750, 26752,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 120 mA</td>
</tr>
<tr>
<td></td>
<td>26754, 26756</td>
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</tr>
<tr>
<td>Laser modulation amplitude default</td>
<td>36077, 36079,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 100 mA</td>
</tr>
<tr>
<td></td>
<td>36081, 36083</td>
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### 6.3.2.7 Stream change compensation (SCC)

#### Navigation: Expert → Sensor → Stream change compensation (SCC)

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</thead>
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<tr>
<td>Calibration 1 to n</td>
<td>35689 to 35692</td>
<td>Integer</td>
<td>Read</td>
<td>1 = No</td>
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<td></td>
<td></td>
<td>0 = Yes</td>
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</tbody>
</table>

### SCC calibration submenu

#### Navigation: Expert → Sensor → Sensor adjustment → Calibration (1 to n)

<table>
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<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane CH₄</td>
<td>26445, 26453,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.4 to 1.0 mole fraction</td>
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<tr>
<td></td>
<td>26461, 26469</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethane C₂H₆</td>
<td>26317, 26325,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.0 to 0.2 mole fraction</td>
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<tr>
<td></td>
<td>26333, 26341</td>
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<td></td>
</tr>
<tr>
<td>Propane C₃H₈</td>
<td>26509, 26517,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.0 to 0.15 mole fraction</td>
</tr>
<tr>
<td></td>
<td>26525, 26533</td>
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<tr>
<td>Isobutane C₄H₁₀</td>
<td>25486, 25494,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.0 to 0.1 mole fraction</td>
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<tr>
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<td>25502, 25510</td>
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<tr>
<td>N-Butane C₄H₁₀</td>
<td>26915, 26917,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.0 to 0.1 mole fraction</td>
</tr>
<tr>
<td></td>
<td>26919, 26921</td>
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</tr>
<tr>
<td>Isopentane C₅H₁₂</td>
<td>27968, 27970,</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.0 to 0.1 mole fraction</td>
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<tr>
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<td>27972, 27974</td>
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### Description of device parameters

#### 6.3.2.8 Calibration

<table>
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<tr>
<td>Det. 1 TIA gain</td>
<td>29235</td>
<td>Integer</td>
<td>Read</td>
<td>0 to 15</td>
</tr>
<tr>
<td>Detector bias</td>
<td>29237 to 29238</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point value</td>
</tr>
<tr>
<td>Flow switch input</td>
<td>4712</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td>Flow switch state</td>
<td>29222</td>
<td>Integer</td>
<td>Read</td>
<td>0 = No flow</td>
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</table>

#### 6.3.3 I/O configuration submenu

<table>
<thead>
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<th>Access</th>
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</thead>
<tbody>
<tr>
<td>I/O module 1 to n</td>
<td>1: 6541</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Not used</td>
</tr>
<tr>
<td>terminal numbers</td>
<td>2: 6542</td>
<td></td>
<td></td>
<td>1 = 26-27 (I/O 1)</td>
</tr>
<tr>
<td></td>
<td>3: 6543</td>
<td></td>
<td></td>
<td>2 = 24-25 (I/O 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 22-23 (I/O 3)</td>
</tr>
<tr>
<td>I/O module 1 to n</td>
<td>1: 8659</td>
<td>Integer</td>
<td>Read</td>
<td>1 = MODBUS</td>
</tr>
<tr>
<td>information</td>
<td>2: 8660</td>
<td></td>
<td></td>
<td>2 = Configurable</td>
</tr>
<tr>
<td></td>
<td>3: 8661</td>
<td></td>
<td></td>
<td>3 = Not configurable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>254 = Not plugged</td>
</tr>
<tr>
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<td></td>
<td></td>
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<td>255 = Invalid</td>
</tr>
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</table>
Description of device parameters

### J22 TDLAS Gas Analyzer

#### 6.3.4 Input submenu

##### 6.3.4.1 Current input 1 to n

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal number</td>
<td>1: 6548</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Not used</td>
</tr>
<tr>
<td></td>
<td>2: 6549</td>
<td></td>
<td></td>
<td>1 = 26-27 (I/O 1)</td>
</tr>
<tr>
<td></td>
<td>3: 6550</td>
<td></td>
<td></td>
<td>2 = 24-25 (I/O 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Read/Write</td>
<td>3 = 22-23 (I/O 3)</td>
</tr>
</tbody>
</table>

| Signal mode       | 1: 6424  | Integer   | Read / Write| 0 = Passive                         |
|                   | 2: 6425  |           |             | 2 = Active                           |

| Current span      | 1: 6147  | Integer   | Read / Write| 0 = 4 to 20 mA (4 to 20.5 mA)       |
|                   | 2: 6148  |           |             | 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)       |

| 0/4 mA value      | 1: 6111 to 6112 | Float | Read / Write | Signed floating-point number |
|                   | 2: 6113 to 6114 |      |             |                              |

| 20 mA value       | 1: 6119 to 6120 | Float | Read / Write | Signed floating-point number |
|                   | 2: 6121 to 6122 |      |             |                              |

| Failure mode      | 1: 6159  | Integer | Read / Write | 1 = Last valid value          |
|                   | 2: 6160  |         |             | 2 = Alarm                      |
|                   |          |         |             | 6 = Defined value              |

| Failure value     | 1: 6163 to 6164 | Float | Read / Write | Signed floating-point number |
|                   | 2: 6165 to 6166 |      |             |                              |

1 Visibility depends on order options or device settings
### 6.3.5 Output submenu

#### 6.3.5.1 Current output 1 to n

<table>
<thead>
<tr>
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<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal number</td>
<td>1: 6545, 2: 6546</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Not used</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 26.27 (I/O 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 24.25 (I/O 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 22.23 (I/O 3)</td>
</tr>
<tr>
<td>Signal mode</td>
<td>1: 6421, 2: 6422</td>
<td>Integer</td>
<td>Read/Write</td>
<td>0 = Passive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Active</td>
</tr>
<tr>
<td>Process variable current output</td>
<td>5927 to 5929</td>
<td>Integer</td>
<td>Read/Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>151 = Concentration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Cell gas temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = Dew point 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 = Dew point 2</td>
</tr>
<tr>
<td>Current range output</td>
<td>1: 5923, 2: 5924</td>
<td>Integer</td>
<td>Read/Write</td>
<td>0 = 4 to 20 mA (4 to 20.5 mA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 4 to 20 mA US (3.9 to 20.8 mA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 4 to 20 mA NAMUR (3.8 to 20.5 mA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 0 to 20 mA (0 to 20.5 mA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = Fixed value</td>
</tr>
<tr>
<td>Fixed current</td>
<td>1: 5987 to 5988, 2: 5989 to 5990</td>
<td>Float</td>
<td>Read/Write</td>
<td>0 to 22.5 mA</td>
</tr>
<tr>
<td>Lower range value output</td>
<td>1: 6195 to 6196, 2: 6197 to 6198</td>
<td>Float</td>
<td>Read/Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Upper range value output</td>
<td>1: 5915 to 5916, 2: 5917 to 5918</td>
<td>Float</td>
<td>Read/Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Damping current output</td>
<td>1: 5903 to 5904, 2: 5905 to 5906</td>
<td>Float</td>
<td>Read/Write</td>
<td>0.0 to 999.9 s</td>
</tr>
<tr>
<td>Failure behavior current output</td>
<td>1: 5911, 2: 5912</td>
<td>Integer</td>
<td>Read/Write</td>
<td>0 = Min.</td>
</tr>
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<td>1 = Max.</td>
</tr>
<tr>
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<td>4 = Actual value</td>
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<tr>
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<td>5 = Last value</td>
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<td>6 = Fixed value</td>
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<tr>
<td>Failure current</td>
<td>1: 5979 to 5980, 2: 5981 to 5982</td>
<td>Float</td>
<td>Read/Write</td>
<td>0 to 22.5 mA</td>
</tr>
<tr>
<td>Output current 1 to n</td>
<td>1: 5931 to 5932, 2: 5933 to 5934</td>
<td>Float</td>
<td>Read</td>
<td>0 to 22.5 mA</td>
</tr>
<tr>
<td>Measured current 1 to n</td>
<td>1: 5779 to 5780, 2: 5781 to 5782</td>
<td>Float</td>
<td>Read</td>
<td>0 to 30 mA</td>
</tr>
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</table>
### 6.3.5.2 Switch output 1 to n

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

Navigation: Expert → Output → Relay output 1 to n

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

### 6.3.6 Communication submenu

#### 6.3.6.1 Modbus configuration

Navigation: Expert → Communication → Modbus configuration

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus address¹</td>
<td>4910</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 to 247</td>
</tr>
</tbody>
</table>

¹ Modbus RS485 only
### Description of device parameters

#### Navigation: Expert → Communication → Modbus configuration

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

#### 6.3.6.2 Modbus information

#### Navigation: Expert → Communication → Modbus information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device ID</td>
<td>2547</td>
<td>Integer</td>
<td>Read</td>
<td>4-digit hexadecimal number</td>
</tr>
<tr>
<td>Device revision</td>
<td>4481</td>
<td>Integer</td>
<td>Read</td>
<td>4-digit hexadecimal number</td>
</tr>
</tbody>
</table>

---

\(^1\) 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan list data area 0 to 15</td>
<td>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</td>
<td>Integer / Float</td>
<td>Read / Write</td>
<td>Dependent on scan list register entered</td>
</tr>
</tbody>
</table>

### 6.3.6.4 Web server

Navigation: Expert → Communication → Web server

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web server language</td>
<td>4219</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = English 1 = Français 2 = Italiano 3 = русский язык (Russian) 4 = 中文 (Chinese)</td>
</tr>
<tr>
<td>MAC address</td>
<td>4210 to 4218</td>
<td>String</td>
<td>Read</td>
<td>Unique 12-digit character string comprising letters and numbers</td>
</tr>
<tr>
<td>DHCP client</td>
<td>21781</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = On</td>
</tr>
</tbody>
</table>
### Description of device parameters

**Navigation: Expert → Communication → Web server**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address</td>
<td>4155 to 4162</td>
<td>String</td>
<td>Read / Write</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
</tr>
<tr>
<td>Subnet mask</td>
<td>4163 to 4170</td>
<td>String</td>
<td>Read / Write</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
</tr>
<tr>
<td>Default gateway</td>
<td>4171 to 4178</td>
<td>String</td>
<td>Read / Write</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
</tr>
<tr>
<td>Web server functionality</td>
<td>4220</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = On 2 = HTML Off</td>
</tr>
<tr>
<td>Login page</td>
<td>5802</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Without header 1 = With header</td>
</tr>
</tbody>
</table>

### 6.3.7 Diagnostics

**Navigation: Expert → Diagnostics**

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

### 6.3.7.1 Diagnostic list

**Navigation: Expert → Diagnostics → Diagnostic list**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics 1</td>
<td>2736</td>
<td>Integer</td>
<td>Read</td>
<td>0 to 65,535</td>
</tr>
<tr>
<td>Diagnostics 2</td>
<td>2738</td>
<td>Integer</td>
<td>Read</td>
<td>0 to 65,535</td>
</tr>
<tr>
<td>Diagnostics 3</td>
<td>2740</td>
<td>Integer</td>
<td>Read</td>
<td>0 to 65,535</td>
</tr>
<tr>
<td>Diagnostics 4</td>
<td>2742</td>
<td>Integer</td>
<td>Read</td>
<td>0 to 65,535</td>
</tr>
<tr>
<td>Diagnostics 5</td>
<td>2744</td>
<td>Integer</td>
<td>Read</td>
<td>0 to 65,535</td>
</tr>
</tbody>
</table>
## 6.3.7.2 Event logbook

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter options</td>
<td>4596</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Failure (F) 4 = Maintenance required (M) 8 = Function check (C) 12 = Out of specification (S) 16 = Information (I) 255 = All</td>
</tr>
</tbody>
</table>

## 6.3.7.3 Device information

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

## 6.3.7.4 Main electronic module + I/O module 1

<table>
<thead>
<tr>
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<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware version</td>
<td>7039</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Build no. software</td>
<td>2326</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Bootloader revision</td>
<td>2264</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
</tr>
</tbody>
</table>

## 6.3.7.5 Sensor electronic module (ISEM)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware version</td>
<td>5165</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Build no. software</td>
<td>4989</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Bootloader revision</td>
<td>4802</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
</tr>
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</table>
### 6.3.7.6 I/O module 2

<table>
<thead>
<tr>
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<th>Access</th>
<th>Selection/User entry/User interface</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O module 2 terminal numbers</td>
<td>6542</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Not used</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 26-27 (I/O 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 24-25 (I/O 2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 22-23 (I/O 3)</td>
<td></td>
</tr>
<tr>
<td>Firmware version</td>
<td>9877</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>91</td>
</tr>
<tr>
<td>Build no. software</td>
<td>9918</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>91</td>
</tr>
<tr>
<td>Bootloader revision</td>
<td>9984</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>91</td>
</tr>
</tbody>
</table>

### 6.3.7.7 I/O module 3

<table>
<thead>
<tr>
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<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O module 3 terminal numbers</td>
<td>6543</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Not used</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 26-27 (I/O 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 24-25 (I/O 2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 22-23 (I/O 3)</td>
<td></td>
</tr>
<tr>
<td>Firmware version</td>
<td>9879</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>92</td>
</tr>
<tr>
<td>Build no. software</td>
<td>9919</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>92</td>
</tr>
<tr>
<td>Bootloader revision</td>
<td>9986</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>92</td>
</tr>
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</table>

### 6.3.7.8 Display module

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware version</td>
<td>5163</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>93</td>
</tr>
<tr>
<td>Build no. software</td>
<td>4988</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>93</td>
</tr>
<tr>
<td>Bootloader revision</td>
<td>4800</td>
<td>Integer</td>
<td>Read</td>
<td>Positive integer</td>
<td>93</td>
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</table>

### 6.3.7.9 Data logging

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
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<th>Access</th>
<th>Selection/User entry/User interface</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign chan. 1</td>
<td>2445</td>
<td>Integer</td>
<td>Read / Write</td>
<td>Off</td>
<td>0 = Off</td>
</tr>
</tbody>
</table>
## Navigation: Expert → Diagnostics → Data logging

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
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</thead>
<tbody>
<tr>
<td>Plant operator</td>
<td>3414 to 3429</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 32 characters such as letters, numbers, or special characters (e.g., @, %, /)</td>
</tr>
<tr>
<td>Location</td>
<td>3430 to 3445</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 32 characters such as letters, numbers, or special characters (e.g., @, %, /)</td>
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</tbody>
</table>

Gas validation settings submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select validation calibration</td>
<td>4717</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = 1, 1 = 2, 2 = 3, 3 = 4</td>
</tr>
<tr>
<td>Validation type</td>
<td>26456</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Validation manual gas, 1 = Validation auto gas</td>
</tr>
<tr>
<td>Number of validation points</td>
<td>30005</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = 1, 1 = 2</td>
</tr>
<tr>
<td>Validation gas purge time</td>
<td>33276 to 33277</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 5 minutes</td>
</tr>
<tr>
<td>Measurement duration</td>
<td>6476 to 6477</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.25 to 60 minutes</td>
</tr>
<tr>
<td>Validation gas information</td>
<td>47238 to 47253</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 32 characters such as letters, numbers, or special characters (e.g., @, %, /)</td>
</tr>
<tr>
<td>Validation concentration</td>
<td>47226 to 47227</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 1000000 ppmv</td>
</tr>
<tr>
<td>Validation allowance</td>
<td>47228 to 47229</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 100%</td>
</tr>
<tr>
<td>Start validation</td>
<td>30015</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0: Cancel, 1: Start</td>
</tr>
</tbody>
</table>

1 Modbus only parameter
Performing verification submenu

Navigation: Expert → Diagnostics → Heartbeat Technology → Performing verification

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

1 Visibility depends on order options or device settings

Endress+Hauser
### Description of device parameters

**J22 TDLAS Gas Analyzer**

#### Navigation:
- Expert → Diagnostics → Heartbeat Technology → Performing verification

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>2079</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Failed</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>1 = Done</td>
</tr>
<tr>
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<td></td>
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<td></td>
<td>3 = Not done</td>
</tr>
<tr>
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<td>8 = Busy</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>9 = Purging</td>
</tr>
<tr>
<td>Measured values</td>
<td>5512 to 5513</td>
<td>Float</td>
<td>Read/Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Output values</td>
<td>5516 to 5517</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Measured concentration</td>
<td>36752 to 36753</td>
<td>Float</td>
<td>Read</td>
<td>0 to 100000 ppmv</td>
</tr>
<tr>
<td>Verification result</td>
<td>2355</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Failed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Passed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>250 = Not supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>254 = Not plugged</td>
</tr>
</tbody>
</table>

#### Verification results submenu

**Navigation:**
- Expert → Diagnostics → Heartbeat Technology → Verification results

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O module</td>
<td>2386</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged</td>
</tr>
<tr>
<td>System status</td>
<td>5790</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Failed 2 = Passed 3 = Not done 250 = Not supported 254 = Not plugged</td>
</tr>
</tbody>
</table>

### Gas validation results submenu

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

### Monitoring results submenu

<table>
<thead>
<tr>
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<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detector reference level</td>
<td>4720 to 4721</td>
<td>Float</td>
<td>Read</td>
<td>0 to 5 mA</td>
</tr>
<tr>
<td>Peak 1 index delta</td>
<td>30581</td>
<td>Float</td>
<td>Read</td>
<td>-511.0 to 511.0</td>
</tr>
<tr>
<td>Peak 2 index delta</td>
<td>30672</td>
<td>Float</td>
<td>Read</td>
<td>-511.0 to 511.0</td>
</tr>
</tbody>
</table>
## 6.3.8 Simulation

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

## 6.3.9 Spectrum plots

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
<th>Value/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midpoint default 1 to n</td>
<td>31090, 31092, 31094, 31096</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 120 mA</td>
<td>114</td>
</tr>
<tr>
<td>Ramp default 1 to n</td>
<td>26750, 26752, 26754, 26756</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 120 mA</td>
<td>115</td>
</tr>
<tr>
<td>Concentration</td>
<td>9455 to 9456</td>
<td>Float</td>
<td>Read</td>
<td>0 to 1000000 ppmv</td>
<td>115</td>
</tr>
<tr>
<td>Dew point 1</td>
<td>21458 to 21459</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>116</td>
</tr>
<tr>
<td>Dew point 2</td>
<td>21800 to 21801</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>116</td>
</tr>
<tr>
<td>Cell gas pressure</td>
<td>25216 to 25217</td>
<td>Float</td>
<td>Read</td>
<td>-0.5 to 6.9 Bar</td>
<td>116</td>
</tr>
<tr>
<td>Cell gas temperature</td>
<td>21854 to 21855</td>
<td>Float</td>
<td>Read</td>
<td>-20 to +60 °C</td>
<td>116</td>
</tr>
<tr>
<td>Detector reference level</td>
<td>4720 to 4721</td>
<td>Float</td>
<td>Read</td>
<td>0 to 5 mA</td>
<td>116</td>
</tr>
<tr>
<td>Detector zero level</td>
<td>9667 to 9668</td>
<td>Float</td>
<td>Read</td>
<td>0 to 5 mA</td>
<td>117</td>
</tr>
<tr>
<td>Peak 1 index</td>
<td>9834 to 9835</td>
<td>Float</td>
<td>Read</td>
<td>0 to 511.0</td>
<td>116</td>
</tr>
</tbody>
</table>
### Description of device parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak 1 index delta</td>
<td>30581 to 30582</td>
<td>Float</td>
<td>Read</td>
<td>-511.0 to 511.0</td>
</tr>
<tr>
<td>Peak 2 index</td>
<td>27600 to 27601</td>
<td>Float</td>
<td>Read</td>
<td>0 to 511.0</td>
</tr>
<tr>
<td>Peak 2 index delta</td>
<td>30672 to 30673</td>
<td>Float</td>
<td>Read</td>
<td>-511.0 to 511.0</td>
</tr>
<tr>
<td>Peak track index</td>
<td>29018 to 29019</td>
<td>Float</td>
<td>Read</td>
<td>0 to 511.0</td>
</tr>
<tr>
<td>Peak track index delta</td>
<td>28814</td>
<td>Float</td>
<td>Read</td>
<td>-511.0 to 511.0</td>
</tr>
<tr>
<td>Midpoint delta</td>
<td>47236 to 47237</td>
<td>Float</td>
<td>Read</td>
<td>0 to 120 mA</td>
</tr>
</tbody>
</table>
| Analyzer control        | 21460            | Integer   | Read / Write | 0 = Off  
                                         |                               | 1 = On                        |
| Reset                   | 4727             | Integer   | Read / Write | 0 = Off  
                                         |                               | 1 = Reset                     |
| Det. 1 TIA gain         | 29235            | Integer   | Read / Write | 0 to 15                                      |

#### 6.3.10 SD card

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection/User entry/User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectra log rate</td>
<td>26289 to 26290</td>
<td>Float</td>
<td>Read</td>
<td>45 to 86400 sec</td>
</tr>
<tr>
<td>Estimated number of spectra files</td>
<td>24902 to 24903</td>
<td>Float</td>
<td>Read</td>
<td>0 to 30</td>
</tr>
</tbody>
</table>
| Validation log level    | 29082            | Integer   | Read / Write | 0 = Off  
                                         |                               | 1 = Normal                     |
|                         |                  |           |        | 2 = Extended                         |
|                         |                  |           |        | 255 = All                             |
| Number of validation files | 30879         | Integer   | Read   | 0 to 60                              |

Navigation: Expert → Diagnostics → Spectrum plots → Chart