Description of Device Parameters

Proline Promag 400
PROFIBUS DP

Electromagnetic flowmeter
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1 About this document

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

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

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

1.3 Using this document

1.3.1 Information on the document structure
The document lists the submenus and their parameters according to the structure from the Expert menu (→ 8), which is displayed when the "Maintenance" user role is enabled.
Operating menu for operators and maintenances

- **Language**
  - Parameter 1
  - Parameter n

- **Setup**
  - Device tag
  - Wizard 1 / Parameter 1
  - Wizard n / Parameter n
  - Advanced setup

- **Diagnostics**
  - Parameter 1
  - Parameter n
  - Submenu 1
  - Submenu n

Operating menu for experts

- **Expert**
  - Access status display
  - Parameter n
  - System
  - Sensor
  - Input
  - Output
  - Communication
  - Application
  - Diagnostics

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

Sample graphic for the schematic layout of the operating menu
1.3.2 Structure of a parameter description
The individual parts of a parameter description are described in the following section:

<table>
<thead>
<tr>
<th>Complete parameter name</th>
<th>Write-protected parameter</th>
</tr>
</thead>
</table>

**Navigation**
- Navigation path to the parameter via the local display (direct access code) or web browser
- Navigation path to the parameter via the operating tool
  The names of the menus, submenus and parameters are abbreviated to the form in which they appear on the display and in the operating tool.

**Prerequisite**
The parameter is only available under these specific conditions

**Description**
Description of the parameter function

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

**User entry**
Input range for the parameter

**User interface**
Display value/data for the parameter

**Factory setting**
Default setting ex works

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

1.4 Symbols used

1.4.1 Symbols for certain types of information

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Tip" /></td>
<td>Indicates additional information.</td>
</tr>
<tr>
<td><img src="image" alt="Reference to documentation" /></td>
<td>Reference to documentation</td>
</tr>
<tr>
<td><img src="image" alt="Reference to page" /></td>
<td>Reference to page</td>
</tr>
<tr>
<td><img src="image" alt="Reference to graphic" /></td>
<td>Reference to graphic</td>
</tr>
<tr>
<td><img src="image" alt="Operation via local display" /></td>
<td>Operation via local display</td>
</tr>
<tr>
<td><img src="image" alt="Operation via operating tool" /></td>
<td>Operation via operating tool</td>
</tr>
<tr>
<td><img src="image" alt="Write-protected parameter" /></td>
<td>Write-protected parameter</td>
</tr>
</tbody>
</table>
1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promag D 400</td>
<td>BA01232D</td>
</tr>
<tr>
<td>Promag L 400</td>
<td>BA01233D</td>
</tr>
<tr>
<td>Promag W 400</td>
<td>BA01234D</td>
</tr>
</tbody>
</table>

1.5.2 Supplementary device-dependent documentation

Special Documentation

<table>
<thead>
<tr>
<th>Content</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heartbeat Verification + Monitoring application package</td>
<td>SD02569D</td>
</tr>
<tr>
<td>Display modules A309/A310</td>
<td>SD01793D</td>
</tr>
</tbody>
</table>
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>
</tr>
</thead>
</table>
| Direct access (0106) | → 11  
| Locking status (0004) | → 12  
| Access status (0005) | → 13  
| Enter access code (0003) | → 14  

<table>
<thead>
<tr>
<th>System</th>
</tr>
</thead>
</table>
| Display | → 14  
| Diagnostic handling | → 27  
| Administration | → 34  

<table>
<thead>
<tr>
<th>Sensor</th>
</tr>
</thead>
</table>
| Measured values | → 40  
| System units | → 44  
| Process parameters | → 51  
| External compensation | → 67  
| Sensor adjustment | → 69  
| Calibration | → 76  

<table>
<thead>
<tr>
<th>Communication</th>
</tr>
</thead>
</table>
| PROFIBUS DP configuration | → 78  
| PROFIBUS DP info | → 80  
| Physical block | → 82  
| Address shifting configuration | → 91  

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web server</td>
<td>91</td>
</tr>
<tr>
<td>WLAN settings</td>
<td>95</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>101</td>
</tr>
<tr>
<td>Analog input 1 to n</td>
<td>101</td>
</tr>
<tr>
<td>Discrete inputs</td>
<td>115</td>
</tr>
<tr>
<td>Discrete input 1 to n</td>
<td>115</td>
</tr>
<tr>
<td>Analog outputs</td>
<td>122</td>
</tr>
<tr>
<td>Analog output 1 to n</td>
<td>122</td>
</tr>
<tr>
<td>Discrete outputs</td>
<td>134</td>
</tr>
<tr>
<td>Discrete output 1 to n</td>
<td>134</td>
</tr>
<tr>
<td>Application</td>
<td>144</td>
</tr>
<tr>
<td>Reset all totalizers (2806)</td>
<td>144</td>
</tr>
<tr>
<td>Totalizer 1 to n</td>
<td>145</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>158</td>
</tr>
<tr>
<td>Actual diagnostics (0691)</td>
<td>159</td>
</tr>
<tr>
<td>Previous diagnostics (0690)</td>
<td>160</td>
</tr>
<tr>
<td>Operating time from restart (0653)</td>
<td>161</td>
</tr>
<tr>
<td>Operating time (0652)</td>
<td>161</td>
</tr>
<tr>
<td>Diagnostic list</td>
<td>161</td>
</tr>
<tr>
<td>Event logbook</td>
<td>166</td>
</tr>
<tr>
<td>Device information</td>
<td>168</td>
</tr>
<tr>
<td>Main electronic module</td>
<td>171</td>
</tr>
<tr>
<td>Sensor electronic module (ISEM)</td>
<td>172</td>
</tr>
<tr>
<td>Display module</td>
<td>173</td>
</tr>
<tr>
<td>Min/max values</td>
<td>174</td>
</tr>
</tbody>
</table>
Overview of the Expert operating menu

Proline Promag 400 PROFIBUS DP

<table>
<thead>
<tr>
<th>Feature</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data logging</td>
<td>176</td>
</tr>
<tr>
<td>Heartbeat Technology</td>
<td>184</td>
</tr>
<tr>
<td>Simulation</td>
<td>184</td>
</tr>
</tbody>
</table>
3 Description of device parameters

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

**Navigation**

Expert → Direct access (0106)

**Description**

Use this function to enter the access code to enable direct access to the desired parameter via the local display. A parameter number is assigned to each parameter for this purpose.

**User entry**

0 to 65535
**Additional information**

*User entry*

The direct access code consists of a 5-digit number (at maximum) and the channel number, which identifies the channel of a process variable: e.g. 00914-2. In the navigation view, this appears on the right-hand side in the header of the selected parameter.

![Direct access code](image)

1  **Direct access code**

Note the following when entering the direct access code:
- The leading zeros in the direct access code do not have to be entered. Example: Enter "914" instead of "00914"
- If no channel number is entered, channel 1 is opened automatically. Example: Enter **00914** → **Assign process variable** parameter
- If a different channel is opened: Enter the direct access code with the corresponding channel number. Example: Enter **00914-2** → **Assign process variable** parameter

**Locking status**

**Navigation**

Expert → Locking status (0004)

**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.

Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device →  7

**Selection**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>The access status displayed in the <strong>Access status display</strong> parameter (→  13) 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 main electronics module. This locks write access to the parameters (e.g. via local display or operating tool).</td>
</tr>
<tr>
<td>Temporarily locked (priority 2)</td>
<td>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.</td>
</tr>
</tbody>
</table>
Access status display

Navigation  
Expert → Access stat.disp (0091)

Prerequisite  
A local display is provided.

Description  
Displays the access authorization to the parameters via the local display.

User interface  
- Operator
- Maintenance

Factory setting  
Operator

Additional information  
Description
If the symbol appears in front of a parameter, it cannot be modified via the local display with the current access authorization.

Access authorization can be modified via the Enter access code parameter (→ 14).

For information about the Enter access code parameter: see the "Disabling write protection via the access code" section of the Operating Instructions for the device → 7

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

User interface
Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 7

Access status

Navigation  
Expert → Access status (0005)

Description  
Displays the access authorization to the parameters via the operating tool or Web browser.

User interface  
- Operator
- Maintenance

Factory setting  
Maintenance
Additional information

**Description**

Access authorization can be modified via the **Enter access code** parameter (→ 14).

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

**User interface**

Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 7

---

### Enter access code

**Navigation**

[ ] Expert → Ent. access code (0003)

**Description**

Use this function to enter the user-specific release code to remove parameter write protection.

**User entry**

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

---

### 3.1 "System" submenu

**Navigation**

[ ] [ ] Expert → System

**3.1.1 "Display" submenu**

**Navigation**

[ ] [ ] Expert → System → Display

- Display language (0104) → 15
- Format display (0098) → 16
- Value 1 display (0107) → 18
**Display language**

**Navigation**

Expert → System → Display → Display language (0104)

**Prerequisite**

A local display is provided.

**Description**

Use this function to select the configured language on the local display.

**Selection**

- English
- Deutsch
- Français
### Format display

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Display → Format display (0098)</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 select how the measured value is shown on the local display.</td>
</tr>
</tbody>
</table>
| 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

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 (→  18) to **Value 4 display** parameter (→  22) 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 via the **Display interval** parameter (→  23).

* Visibility depends on order options or device settings
Possible measured values shown on the local display:

"1 value, max. size" option

```
 XXXXXXXXX
 ________ 900.00
  l/h
```

"1 bargraph + 1 value" option

```
 XXXXXXXXX
 m(1) 900.00
 kg/h
  l/h
```

"2 values" option

```
 XXXXXXXXX
 m(1) 900.00
 kg/h
  l/h
```

"1 value large + 2 values" option

```
 XXXXXXXXX
 m(1) 900.00
 kg/h
  l/h
 p(1) 1.00 kg/l
```

"4 values" option

```
 XXXXXXXXX
 m(1) 900.00 kg/h
  l/h
 p(1) 1.0 kg/l
 s(1) 213.94 kg
```
**Value 1 display**

**Navigation**

Expert → System → Display → Value 1 display (0107)

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature
- Noise
- Coil current shot time
- Reference electrode potential against PE
- Build-up measured value
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

Volume flow

**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 (→ 16) is used to specify how many measured values are displayed simultaneously and how.*

*Dependency*

*The unit of the displayed measured value is taken from the System units submenu (→ 44).*

---

**0% bargraph value 1**

**Navigation**

Expert → System → Display → 0% bargraph 1 (0123)

**Prerequisite**

A local display is provided.

**Description**

Use this function to enter the 0% bar graph value to be shown on the display for the measured value 1.

**User entry**

Signed floating-point number

*Visibility depends on order options or device settings*
**Factory setting**

Country-specific:
- 0 l/h
- 0 gal/min (us)

**Additional information**

*Description*

The **Format display** parameter (→ 16) is used to specify that the measured value is to be displayed as a bar graph.

*User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 44).

---

### 100% bargraph value 1

**Navigation**

Expert → System → Display → 100% bargraph 1 (0125)

**Prerequisite**

A local display is provided.

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

Depends on country and nominal diameter → 187

**Additional information**

*Description*

The **Format display** parameter (→ 16) is used to specify that the measured value is to be displayed as a bar graph.

*User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 44).

---

### Decimal places 1

**Navigation**

Expert → System → Display → Decimal places 1 (0095)

**Prerequisite**

A measured value is defined in the **Value 1 display** parameter (→ 18).

**Description**

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

**Selection**

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

**Factory setting**

x.xx
### Additional information

**Description**

This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

### Value 2 display

**Navigation**

Expert → System → Display → Value 2 display (0108)

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

For the picklist, see the Value 1 display parameter (→ 18)

**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 (→ 16) is used to specify how many measured values are displayed simultaneously and how.

**Dependency**

The unit of the displayed measured value is taken from the System units submenu (→ 44).

### Decimal places 2

**Navigation**

Expert → System → Display → Decimal places 2 (0117)

**Prerequisite**

A measured value is specified in the Value 2 display parameter (→ 20).

**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 measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.
**Value 3 display**

**Navigation**
- Expert → System → Display → Value 3 display (0110)

**Prerequisite**
A local display is provided.

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

**Selection**
For the picklist, see the **Value 1 display** parameter (→ 18)

**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 (→ 16) 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 submenu (→ 44).

---

**0% bargraph value 3**

**Navigation**
- Expert → System → Display → 0% bargraph 3 (0124)

**Prerequisite**
A selection was made in the **Value 3 display** parameter (→ 21).

**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**
Country-specific:
- 0 l/h
- 0 gal/min (us)

**Additional information**

*Description*
The **Format display** parameter (→ 16) is used to specify that the measured value is to be displayed as a bar graph.

*User entry*
The unit of the displayed measured value is taken from the System units submenu (→ 44).
### 100% bargraph value 3

**Navigation**
Expert → System → Display → 100% bargraph 3 (0126)

**Prerequisite**
A selection was made in the **Value 3 display** parameter (→ #21).

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

**User entry**
Signed floating-point number

**Factory setting**
0

**Additional information**
- **Description**
  - The **Format display** parameter (→ #16) is used to specify that the measured value is to be displayed as a bar graph.
  - **User entry**
  - The unit of the displayed measured value is taken from the **System units** submenu (→ #44).

### Decimal places 3

**Navigation**
Expert → System → Display → Decimal places 3 (0118)

**Prerequisite**
A measured value is specified in the **Value 3 display** parameter (→ #21).

**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 measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

### Value 4 display

**Navigation**
Expert → System → Display → Value 4 display (0109)

**Prerequisite**
A local display is provided.
Description
Use this function to select one of the measured values shown on the local display.

Selection
For the picklist, see the Value 1 display parameter (→ 18)

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 (→ 16) 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 submenu (→ 44).

Decimal places 4

Navigation
Expert → System → Display → Decimal places 4 (0119)

Prerequisite
A measured value is specified in the Value 4 display parameter (→ 22).

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

Selection
• x
• x.x
• x.xx
• x.xxx
• x.xxxx

Factory setting
x.xx

Additional information
Description
This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

Display interval

Navigation
Expert → System → Display → Display interval (0096)

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
Description of device parameters

**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 (→ 18) to **Value 4 display** parameter (→ 22) are used to specify which measured values are shown on the local display.
- The display format of the displayed measured values is specified using the **Format display** parameter (→ 16).

### Display damping

**Navigation**

Expert → System → Display → Display damping (0094)

**Prerequisite**

A local display is provided.

**Description**

Use this function to enter a time constant for the reaction time of the local display to fluctuations in the measured value caused by process conditions.

**User entry**

0.0 to 999.9 s

**Factory setting**

0.0 s

**Additional information**

*User entry*

Use this function to enter a time constant (PT1 element 1) for display damping:
- If a low time constant is entered, the display reacts particularly quickly to fluctuating measured variables.
- On the other hand, the display reacts more slowly if a high time constant is entered.

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

### Header

**Navigation**

Expert → System → Display → Header (0097)

**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

---

1) proportional transmission behavior with first order delay
Additional information

Description

The header text only appears during normal operation.

![Header text example]

1  Position of the header text on the display

Selection

- Device tag
  Is defined in the Device tag parameter (→ 168).
- Free text
  Is defined in the Header text parameter (→ 25).

Header text

Navigation  
Expert → System → Display → Header text (0112)

Prerequisite

In the Header parameter (→ 24), the Free text option is selected.

Description

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

User entry

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

Factory setting

-----------

Additional information

Description

The header text only appears during normal operation.

![Header text example]

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 (0101)

**Prerequisite**
A local display is provided.

**Description**
Use this function to select the decimal separator.

**Selection**
- . (point)
- , (comma)

**Factory setting**
. (point)

Contrast display

**Navigation**
Expert → System → Display → Contrast display (0105)

**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**
50 %

Backlight

**Navigation**
Expert → System → Display → Backlight (0111)

**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

Access status display

**Navigation**
Expert → System → Display → Access stat.disp (0091)

**Prerequisite**
A local display is provided.
**Description**
Displays the access authorization to the parameters via the local display.

**User interface**
- Operator
- Maintenance

**Factory setting**
Operator

**Additional information**
*Description*
If the \(\boldsymbol{\text{\textregistered}}\)-symbol appears in front of a parameter, it cannot be modified via the local display with the current access authorization.

1. Access authorization can be modified via the **Enter access code** parameter (→ 14).
2. For information about the **Enter access code** parameter: see the "Disabling write protection via the access code" section of the Operating Instructions for the device → 7.
3. If additional write protection is active, this restricts the current access authorization even further.

**User interface**
1. Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 7.

### 3.1.2 "Diagnostic handling" submenu

**Navigation**

- Expert → System → Diagn. handling

#### Alarm delay (0651)

**Navigation**
- Expert → System → Diagn. handling → Alarm delay (0651)

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

1. 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:

- 190 Special event 1
- 832 Electronics temperature too high
- 833 Electronics temperature too low
- 862 Pipe empty
- 990 Special event 4

**“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 (→ 28).

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

<table>
<thead>
<tr>
<th>Diagnostic behavior</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>The device stops measurement. The totalizers assume the defined alarm condition. A diagnostic message is generated.</td>
</tr>
<tr>
<td>Warning</td>
<td>The device continues to measure. The output of measured values via PROFIBUS and totalizers is not affected. A diagnostic message is generated.</td>
</tr>
<tr>
<td>Logbook entry only</td>
<td>The device continues to measure. The diagnostic message is only displayed in the Event logbook submenu (→ 166) (Event list submenu (→ 166)) and is not displayed in alternating sequence with the operational display.</td>
</tr>
<tr>
<td>Off</td>
<td>The diagnostic event is ignored, and no diagnostic message is generated or entered.</td>
</tr>
</tbody>
</table>

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

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior

<table>
<thead>
<tr>
<th>Diagnostic behavior</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign behavior of diagnostic no. 043 (0650)</td>
<td>→ 29</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 302 (0739)</td>
<td>→ 30</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 376 (0645)</td>
<td>→ 30</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 377 (0777)</td>
<td>→ 30</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 531 (0741)</td>
<td>→ 31</td>
</tr>
</tbody>
</table>
Assign behavior of diagnostic no. 043 (Sensor short circuit)

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 043 (0650)

**Description**

Use this function to change the diagnostic behavior of the **043 Sensor short circuit** diagnostic message.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:
Assign behavior of diagnostic no. 302 (Device verification active)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 302 (0739)

**Description**
Use this function to change the diagnostic behavior of the **302 Device verification active** diagnostic message.

**Selection**
- Alarm
- Warning

**Factory setting**
Warning

**Additional information**
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 376 (Sensor electronics (ISEM) faulty)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 376 (0645)

**Description**
Use this function to change the diagnostic behavior of the **376 Sensor electronics (ISEM) faulty** diagnostic message.

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

**Factory setting**
Warning

**Additional information**
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 377 (Sensor electronics (ISEM) faulty)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 377 (0777)

**Description**
Use this function to change the diagnostic behavior of the **377 Sensor electronics (ISEM) faulty** diagnostic message.

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

**Factory setting**
Warning

**Additional information**
Detailed description of the options available for selection:
Assign behavior of diagnostic no. 531 (Empty pipe detection)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 531 (0741)

Description
Use this function to change the diagnostic behavior of the 531 Empty pipe detection diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 832 (Electronics temperature too high)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0681)

Description
Use this function to change the diagnostic behavior of the 832 Electronics temperature too high diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Logbook entry only

Additional information
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 833 (Electronics temperature too low)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0682)

Description
Use this function to change the diagnostic behavior of the 833 Electronics temperature too low diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Logbook entry only

Additional information
Detailed description of the options available for selection:
**Assign behavior of diagnostic no. 834 (Process temperature too high)**

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0700)

**Description**

Use this function to change the diagnostic behavior of the **834 Process temperature too high** diagnostic message.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:

**Assign behavior of diagnostic no. 835 (Process temperature too low)**

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0702)

**Description**

Use this function to change the diagnostic behavior of the **835 Process temperature too low** diagnostic message.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:

**Assign behavior of diagnostic no. 842**

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 842 (0638)

**Description**

Change behavior of diagnostic event with diagnostic number 842 'Process limit'.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Off
Assign behavior of diagnostic no. 962 (Pipe empty)

Navigation  
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 962 (0745)

Description  
Use this function to change the diagnostic behavior of the 862 Pipe empty diagnostic message.

Selection  
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting  
Warning

Additional information  
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 937 (EMC interference)

Navigation  
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 937 (0743)

Description  
Use this function to change the diagnostic behavior of the 937 EMC interference diagnostic message.

Selection  
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting  
Warning

Additional information  
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 938 (EMC interference)

Navigation  
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 938 (0642)

Description  
Use this function to change the diagnostic behavior of the 938 EMC interference diagnostic message.

Selection  
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting  
Alarm

Additional information  
Detailed description of the options available for selection:
Assign behavior of diagnostic no. 961

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 961 (0736)

Description
Select diagnostic behavior for the selected diagnostic number.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Alarm

3.1.3 "Administration" submenu

Navigation
Expert → System → Administration

"Define access code" wizard
The Define access code wizard (→ 34) is only available when operating via the local display or Web browser.

If operating via the operating tool, the Define access code parameter (→ 37) can be found directly in the Administration submenu. There is no Confirm access code parameter if the device is operated via the operating tool.

Navigation
Expert → System → Administration → Def. access code

"Define access code" wizard

- Define access code → 35
- Confirm access code → 35
Define access code

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

**Description**
Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the configuration of the device against any inadvertent changes via the local display or Web browser.

**User entry**
0 to 9999

**Factory setting**
0

**Additional information**
- **Description**
  The write protection affects all parameters in the document marked with the symbol.
  On the local display, the symbol in front of a parameter indicates that the parameter is write-protected.
  The parameters that cannot be write-accessed are grayed out in the Web browser.

  - Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the Enter access code parameter (→ 14).
  - If you lose the access code, please contact your Endress+Hauser sales organization.

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

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

Confirm access code

**Navigation**
- Expert → System → Administration → Def. access code → Confirm code

**Description**
Enter the defined release code a second time to confirm the release code.

**User entry**
0 to 9999

**Factory setting**
0

"Reset access code" submenu

**Navigation**
- Expert → System → Administration → Reset acc. code

- Reset access code
### Operating time

**Navigation**

[Expert → System → Administration → Reset acc. code → Operating time (0652)]

**Description**

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

**User interface**

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

**Additional information**

*User interface*

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

---

### Reset access code

**Navigation**

[Expert → System → Administration → Reset acc. code → Reset acc. code (0024)]

**Description**

Use this function to enter a reset code to reset the user-specific access codes to the factory setting.

**User entry**

Character string comprising numbers, letters and special characters

**Factory setting**

0x00

**Additional information**

*Description*

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

*User entry*

The reset code can only be entered via:

- Web browser
- DeviceCare, FieldCare (via CDI RJ45 interface)
- Fieldbus
Additional parameters in the "Administration" submenu

Define access code

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Administration → Def. access code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the configuration of the device against any inadvertent changes via the operating tool.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 9 999</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>The write protection affects all parameters in the document marked with the symbol.</td>
</tr>
<tr>
<td></td>
<td>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 (→ 14).</td>
</tr>
<tr>
<td></td>
<td>If you lose the access code, please contact your Endress+Hauser sales organization.</td>
</tr>
<tr>
<td>User entry</td>
<td>A message is displayed if the access code is not in the input range.</td>
</tr>
<tr>
<td>Factory setting</td>
<td>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 &quot;Maintenance&quot; role.</td>
</tr>
</tbody>
</table>

Device reset

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Administration → Device reset (0000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to choose whether to reset the device configuration - either entirely or in part - to a defined state.</td>
</tr>
<tr>
<td>Selection</td>
<td>• Cancel</td>
</tr>
<tr>
<td></td>
<td>• To delivery settings</td>
</tr>
<tr>
<td></td>
<td>• Restart device</td>
</tr>
<tr>
<td></td>
<td>• Restore S-DAT backup *</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Cancel</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
### Activate SW option

#### Navigation

expert → System → Administration → Activate SW opt. (0029)

#### 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.

**NOTE!**

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

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

- Before you enter a new activation code, make a note of the current activation code.
- Enter the new activation code provided by Endress+Hauser when the new software option was ordered.
- Once the activation code has been entered, check if the new software option is displayed in the Software option overview parameter (→ 39).
  - 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**

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

The software options currently enabled are displayed in the Software option overview parameter (→ 39).

#### Web browser

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

Navigation  

Expert → System → Administration → SW option overv. (0015)

Description  

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

User interface  

- Extended HistoROM
- Electrode cleaning circuit
- Heartbeat Verification
- Build-up index
- Heartbeat Monitoring

Additional information  

Description  

Displays all the options that are available if ordered by the customer.

"Extended HistoROM" option  

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

"Electrode cleaning circuit" option  

Only available for Promag L and W.

Order code for "Application package", option EC "ECC electrode cleaning"

"Heartbeat Verification" option and "Heartbeat Monitoring" option  

Order code for "Application package", option EB "Heartbeat Verification + Monitoring"

3.2  "Sensor" submenu

Navigation  

Expert → Sensor

- Measured values  → 40
- System units  → 44
- Process parameters  → 51
- External compensation  → 67
- Sensor adjustment  → 69
- Calibration  → 76
3.2.1 "Measured values" submenu

Navigation  
Expert → Sensor → Measured val.

- Measured values
  - Process variables
    →  40
  - Totalizer
    →  43

"Process variables" submenu

Navigation  

- Process variables
  - Volume flow (1838)
    →  40
  - Mass flow (1847)
    →  41
  - Corrected volume flow (1851)
    →  41
  - Flow velocity (1854)
    →  41
  - Conductivity (1850)
    →  41
  - Corrected conductivity (1853)
    →  42
  - Temperature (1852)
    →  42
  - Density (1857)
    →  42

Volume flow

Navigation  

Description  
Displays the volume flow that is currently measured.

User interface  
Signed floating-point number

Additional information  
Dependency

The unit is taken from the Volume flow unit parameter (→  44)
**Mass flow**

**Navigation**


**Description**
Displays the mass flow that is currently calculated.

**User interface**
Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the Mass flow unit parameter (→ 47)

---

**Corrected volume flow**

**Navigation**


**Description**
Displays the corrected volume flow that is currently measured.

**User interface**
Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the Corrected volume flow unit parameter (→ 49)

---

**Flow velocity**

**Navigation**


**Description**
Displays the flow velocity that is currently calculated.

**User interface**
Signed floating-point number

---

**Conductivity**

**Navigation**


**Prerequisite**
The On option is selected in the Conductivity measurement parameter (→ 55).

**Description**
Displays the conductivity that is currently measured.

**User interface**
Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the Conductivity unit parameter (→ 46)
Corrected conductivity

**Navigation**

**Prerequisite**
The following conditions are met:
- The On option is selected in the Conductivity measurement parameter (→ 55).
- The Internal temperature sensor option or the External value option is selected in the Temperature source parameter (→ 68).

**Description**
Displays the conductivity that is currently corrected.

**User interface**
Positive floating-point number

**Additional information**
*Dependency*
- The unit is taken from the Conductivity unit parameter (→ 46)

Temperature

**Navigation**

**Prerequisite**
The Internal temperature sensor option or the External value option is selected in the Temperature source parameter (→ 68).

**Description**
Displays the temperature that is currently calculated.

**User interface**
Positive floating-point number

**Additional information**
*Dependency*
- The unit is taken from the Temperature unit parameter (→ 47)

Density

**Navigation**

**Description**
Displays the current fixed density or density read in from an external device.

**User interface**
Signed floating-point number

**Additional information**
*Dependency*
- The unit is taken from the Density unit parameter (→ 48)
"Totalizer" submenu

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

<table>
<thead>
<tr>
<th>Totalizer</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Out value 1 to n (3827–1 to n)</td>
<td>→ 43</td>
</tr>
<tr>
<td>Totalizer status (Hex) 1 to n (3825–1 to n)</td>
<td>→ 43</td>
</tr>
<tr>
<td>Totalizer status 1 to n (3826–1 to n)</td>
<td>→ 44</td>
</tr>
</tbody>
</table>

**Out value 1 to n**

**Navigation**
Expert → Sensor → Measured val. → Totalizer → Out value 1 to n (3827–1 to n)

**Prerequisite**
The **Auto** option is selected in the **Target mode** parameter (→ 151).

**Description**
Displays the current reading for totalizer 1-3.

**User interface**
Signed floating-point number

**Additional information**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the event of an error, the totalizer adopts the mode defined in the <strong>Failure mode</strong> parameter (→ 149).</td>
</tr>
</tbody>
</table>

**User interface**
The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Totalizer operation mode** parameter (→ 148).

**Dependency**
The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 146).

**Totalizer status (Hex) 1 to n**

**Navigation**
Expert → Sensor → Measured val. → Totalizer → Status (Hex) 1 to n (3825–1 to n)

**Prerequisite**
In **Target mode** parameter (→ 151), the **Auto** option is selected.

**Description**
Displays the status value (hex) of the particular totalizer.

**User interface**
0 to 0xFF
Totalizer status 1 to n

**Navigation**

Expert → Sensor → Measured val. → Totalizer → Tot. status 1 to n (3826–1 to n)

**Description**

Displays the status of the particular totalizer.

**User interface**

- Good
- Uncertain
- Bad

---

3.2.2 "System units" submenu

**Navigation**

Expert → Sensor → System units

<table>
<thead>
<tr>
<th>System units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow unit (0553)</td>
</tr>
<tr>
<td>Volume unit (0563)</td>
</tr>
<tr>
<td>Conductivity unit (0582)</td>
</tr>
<tr>
<td>Temperature unit (0557)</td>
</tr>
<tr>
<td>Mass flow unit (0554)</td>
</tr>
<tr>
<td>Mass unit (0574)</td>
</tr>
<tr>
<td>Density unit (0555)</td>
</tr>
<tr>
<td>Corrected volume flow unit (0558)</td>
</tr>
<tr>
<td>Corrected volume unit (0575)</td>
</tr>
<tr>
<td>Date/time format (2812)</td>
</tr>
</tbody>
</table>

---

Volume flow unit

**Navigation**

Expert → Sensor → System units → Volume flow unit (0553)

**Description**

Use this function to select the unit for the volume flow.
### Proline Promag 400 PROFIBUS DP

#### Description of device parameters

<table>
<thead>
<tr>
<th>Selection</th>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• cm³/s</td>
<td>• af/s</td>
<td>• gal/s (imp)</td>
</tr>
<tr>
<td></td>
<td>• cm³/min</td>
<td>• af/min</td>
<td>• gal/min (imp)</td>
</tr>
<tr>
<td></td>
<td>• cm³/h</td>
<td>• af/h</td>
<td>• gal/h (imp)</td>
</tr>
<tr>
<td></td>
<td>• cm³/d</td>
<td>• af/d</td>
<td>• gal/d (imp)</td>
</tr>
<tr>
<td></td>
<td>• dm³/s</td>
<td>• ft³/s</td>
<td>• Mgal/s (imp)</td>
</tr>
<tr>
<td></td>
<td>• dm³/min</td>
<td>• ft³/min</td>
<td>• Mgal/min (imp)</td>
</tr>
<tr>
<td></td>
<td>• dm³/h</td>
<td>• ft³/h</td>
<td>• Mgal/h (imp)</td>
</tr>
<tr>
<td></td>
<td>• dm³/d</td>
<td>• ft³/d</td>
<td>• Mgal/d (imp)</td>
</tr>
<tr>
<td></td>
<td>• m³/s</td>
<td>• kft³/s</td>
<td>• bbl/s (imp;beer)</td>
</tr>
<tr>
<td></td>
<td>• m³/min</td>
<td>• kft³/min</td>
<td>• bbl/min (imp;beer)</td>
</tr>
<tr>
<td></td>
<td>• m³/h</td>
<td>• kft³/h</td>
<td>• bbl/h (imp;beer)</td>
</tr>
<tr>
<td></td>
<td>• m³/d</td>
<td>• kft³/d</td>
<td>• bbl/d (imp;beer)</td>
</tr>
<tr>
<td></td>
<td>• l/s</td>
<td>• fl oz/s (us)</td>
<td>• bbl/s (imp;oil)</td>
</tr>
<tr>
<td></td>
<td>• l/min</td>
<td>• fl oz/min (us)</td>
<td>• bbl/min (imp;oil)</td>
</tr>
<tr>
<td></td>
<td>• l/h</td>
<td>• fl oz/h (us)</td>
<td>• bbl/h (imp;oil)</td>
</tr>
<tr>
<td></td>
<td>• l/d</td>
<td>• fl oz/d (us)</td>
<td>• bbl/d (imp;oil)</td>
</tr>
<tr>
<td></td>
<td>• hl/s</td>
<td>• gal/s (us)</td>
<td>• bbl/s (us;liq.)</td>
</tr>
<tr>
<td></td>
<td>• hl/min</td>
<td>• gal/min (us)</td>
<td>• bbl/min (us;liq.)</td>
</tr>
<tr>
<td></td>
<td>• hl/h</td>
<td>• gal/h (us)</td>
<td>• bbl/h (us;liq.)</td>
</tr>
<tr>
<td></td>
<td>• hl/d</td>
<td>• gal/d (us)</td>
<td>• bbl/d (us;liq.)</td>
</tr>
<tr>
<td></td>
<td>• Ml/s</td>
<td>• Mgal/s (us)</td>
<td>• bbl/s (us;beer)</td>
</tr>
<tr>
<td></td>
<td>• Ml/min</td>
<td>• Mgal/min (us)</td>
<td>• bbl/min (us;beer)</td>
</tr>
<tr>
<td></td>
<td>• Ml/h</td>
<td>• Mgal/h (us)</td>
<td>• bbl/h (us;beer)</td>
</tr>
<tr>
<td></td>
<td>• Ml/d</td>
<td>• Mgal/d (us)</td>
<td>• bbl/d (us;beer)</td>
</tr>
<tr>
<td></td>
<td>• l/h</td>
<td>• gal/s (us)</td>
<td>• bbl/s (us;oil)</td>
</tr>
<tr>
<td></td>
<td>• gal/min (us)</td>
<td></td>
<td>• bbl/min (us;oil)</td>
</tr>
</tbody>
</table>

#### Factory setting

- **Country-specific:**
  - • l/h
  - • gal/min (us)
Volume unit

Navigation

Expert → Sensor → System units → Volume unit (0563)

Description

Use this function to select the unit for the volume.

Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>cm³</td>
<td>ft³</td>
<td>gal (imp)</td>
</tr>
<tr>
<td>dm³</td>
<td>Mft³</td>
<td>Mgal (imp)</td>
</tr>
<tr>
<td>m³</td>
<td>Mft³</td>
<td>bbl (imp;beer)</td>
</tr>
<tr>
<td>ml</td>
<td>fl oz (us)</td>
<td>bbl (imp;oil)</td>
</tr>
<tr>
<td>l</td>
<td>gal (us)</td>
<td>bbl (us;oil)</td>
</tr>
<tr>
<td>hl</td>
<td>kgal (us)</td>
<td>bbl (us;liq.)</td>
</tr>
<tr>
<td>Ml Mega</td>
<td>Mgal (us)</td>
<td>bbl (us;beer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>bbl (us;tank)</td>
</tr>
</tbody>
</table>

Factory setting

Country-specific:
- m³
- gal (us)

Additional information

Selection

For an explanation of the abbreviated units: →  192

Conductivity unit

Navigation

Expert → Sensor → System units → Conductiv. unit (0582)

Prerequisite

The On option is selected in the Conductivity measurement parameter (→  55) parameter.

Description

Use this function to select the unit for the conductivity.
Selection

- SI units
  - nS/cm
  - µS/cm
  - µS/m
  - µS/mm
  - mS/m
  - mS/cm
  - S/cm
  - S/m
  - kS/m
  - MS/m

Factory setting

- µS/cm

Additional information

**Effect**

The selected unit applies for:
- Conductivity parameter (→  41)

**Selection**

For an explanation of the abbreviated units: →  192

---

**Temperature unit**

**Navigation**

Expert → Sensor → System units → Temperature unit (0557)

**Description**

Use this function to select the unit for the temperature.

**Selection**

- SI units
  - °C
  - K

- US units
  - °F
  - °R

**Factory setting**

Country-specific:
- °C
- °F

**Additional information**

**Effect**

The selected unit applies for:
- Maximum value parameter (→  175)
- Minimum value parameter (→  175)

**Selection**

For an explanation of the abbreviated units: →  192

---

**Mass flow unit**

**Navigation**

Expert → Sensor → System units → Mass flow unit (0554)

**Description**

Use this function to select the unit for the mass flow.
### Description of device parameters

**Proline Promag 400 PROFIBUS DP**

---

#### Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>g/s</td>
<td>oz/s</td>
</tr>
<tr>
<td>g/min</td>
<td>oz/min</td>
</tr>
<tr>
<td>g/h</td>
<td>oz/h</td>
</tr>
<tr>
<td>g/d</td>
<td>oz/d</td>
</tr>
<tr>
<td>kg/s</td>
<td>lb/s</td>
</tr>
<tr>
<td>kg/min</td>
<td>lb/min</td>
</tr>
<tr>
<td>kg/h</td>
<td>lb/h</td>
</tr>
<tr>
<td>kg/d</td>
<td>lb/d</td>
</tr>
<tr>
<td>t/s</td>
<td>STon/s</td>
</tr>
<tr>
<td>t/min</td>
<td>STon/min</td>
</tr>
<tr>
<td>t/h</td>
<td>STon/h</td>
</tr>
<tr>
<td>t/d</td>
<td>STon/d</td>
</tr>
</tbody>
</table>

**Factory setting**

Country-specific:
- kg/h
- lb/min

**Additional information**

*Effect*

The selected unit applies for:
- **Mass flow** parameter (→ 41)

*Selection*

For an explanation of the abbreviated units: → 192

---

#### Mass unit

**Navigation**

Row → Sensor → System units → Mass unit (0574)

**Description**

Use this function to select the unit for the mass.

**Selection**

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>g</td>
<td>oz</td>
</tr>
<tr>
<td>kg</td>
<td>lb</td>
</tr>
<tr>
<td>t</td>
<td>STon</td>
</tr>
</tbody>
</table>

**Factory setting**

Country-specific:
- kg
- lb

**Additional information**

*Selection*

For an explanation of the abbreviated units: → 192

---

#### Density unit

**Navigation**

Row → Sensor → System units → Density unit (0555)

**Description**

Use this function to select the unit for the density.
Selection

SI units
- g/cm³
- g/m³
- kg/l
- kg/dm³
- kg/m³
- SD4°C
- SD15°C
- SD20°C
- SG4°C
- SG15°C
- SG20°C

US units
- lb/ft³
- lb/gal (us)
- lb/bbl (us; liq.)
- lb/bbl (us; beer)
- lb/bbl (us; oil)
- lb/bbl (us; tank)

Imperial units
- lb/gal (imp)
- lb/bbl (imp; beer)
- lb/bbl (imp; oil)

Factory setting
Country-specific:
- kg/l
- lb/ft³

Additional information

Effect
The selected unit applies for:
- **External density** parameter (→ 67)
- **Fixed density** parameter (→ 68)

Selection
- SD = specific density
  The specific density is the ratio of the medium density to the water density at a water temperature of +4 °C (+39 °F), +15 °C (+59 °F), +20 °C (+68 °F).
- SG = specific gravity
  The specific gravity is the ratio of the medium density to the water density at a water temperature of +4 °C (+39 °F), +15 °C (+59 °F), +20 °C (+68 °F).

For an explanation of the abbreviated units: → 192

Corrected volume flow unit

Navigation
Expert → Sensor → System units → Cor.volflow unit (0558)

Description
Use this function to select the unit for the corrected volume flow.
Description of device parameters

Proline Promag 400 PROFIBUS DP

**Selection**

*SI units*
- Nl/s
- Nl/min
- Nl/h
- Nl/d
- Nhl/s
- Nhl/min
- Nhl/h
- Nhl/d
- Nm³/s
- Nm³/min
- Nm³/h
- Nm³/d
- Sl/s
- Sl/min
- Sl/h
- Sl/d
- Sm³/s
- Sm³/min
- Sm³/h
- Sm³/d

*US units*
- Sft³/s
- Sft³/min
- Sft³/h
- Sft³/d
- MSft³/s
- MSft³/min
- MSft³/h
- MSft³/D
- MMSft³/s
- MMSft³/min
- MMSft³/h
- MMSft³/d

*Imperial units*
- Sgal/s (imp)
- Sgal/min (imp)
- Sgal/h (imp)
- Sgal/d (imp)

**Factory setting**

Country-specific:
- Nl/h
- Sft³/h

**Additional information**

*Selection*

For an explanation of the abbreviated units: → 192

**Corrected volume unit**

*Navigation*

Expert → Sensor → System units → Corr. vol. unit (0575)

*Description*

Use this function to select the unit for the corrected volume.

*Selection*

*SI units*
- Nl
- Nhl
- Nm³
- Sl
- Sm³

*US units*
- Sft³
- MSft³
- MMSft³
- Sgal (us)
- Sbbl (us;liq.)
- Sbbl (us;oil)

*Imperial units*
- Sgal (imp)
- Sgal (us)
- Sbbl (us;liq.)

*Factory setting*

Country-specific:
- Nm³
- Sft³

Endress+Hauser
Date/time format

Navigation
Expert → Sensor → System units → Date/time format (2812)

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

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

Factory setting
dd.mm.yy hh:mm

Additional information
Selection
For an explanation of the abbreviated units: →  192

3.2.3 "Process parameters" submenu

Navigation

Process parameters
- Filter options (6710)
- Flow damping (6661)
- Flow override (1839)
- Conductivity measurement (6514)
- Conductivity damping (1803)
- Conductivity temperature coefficient (1891)
- Temperature damping (1886)
- Reference density (1885)
- Low flow cut off
Filter options

**Navigation**
Expert → Sensor → Process param. → Filter options (6710)

**Description**
Use this function to select a filter option.

**Selection**
- Adaptive
- Adaptive CIP on
- Dynamic
- Dynamic CIP on
- Binomial
- Binomial CIP on

**Factory setting**
Binomial

**Additional information**
Description
The user can choose from a range of filter combinations which can optimize the measurement result depending on the application. Each change in the filter setting affects
the output signal of the measuring device. The response time of the output signal increases as the filter depth increases.

**Selection**

- **Standard**
  - Strong flow damping with a short output signal response time.
  - Some time is needed before a stable output signal can be generated.
  - Not suitable for pulsating flow as the average flow can be different here.

- **Dynamic**
  - Average flow damping with a delayed output signal response time.
  - The average flow is displayed correctly over a measuring interval determined over a long period.

- **Binomial**
  - Weak flow damping with a short output signal response time.
  - The average flow is displayed correctly over a measuring interval determined over a long period.

- **CIP**
  - This filter makes the **Standard** and **Dynamic** filter options additionally available.
  - If the CIP filter has detected a change in the medium (abrupt increase in the noise level, e.g. quickly changing medium conductivity values during CIP cleaning), flow damping is greatly increased and the raw value (before flow damping) is limited by the mean value (delimiter). This eliminates extremely high measured errors (up to several 100 m/s).
  - If the CIP filter is enabled, the response time of the entire measuring system increases and the output signal is delayed accordingly.

**Examples**

*Possible applications for the filters*

<table>
<thead>
<tr>
<th>Application</th>
<th>Standard</th>
<th>Standard CIP</th>
<th>Dynamic</th>
<th>Dynamic CIP</th>
<th>Binomial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulsating flow (flow is negative intermittently)</td>
<td>----</td>
<td>----</td>
<td>++</td>
<td>--</td>
<td>++</td>
</tr>
<tr>
<td>Flow changes frequently (flow is dynamic)</td>
<td>--</td>
<td>--</td>
<td>++</td>
<td>--</td>
<td>++</td>
</tr>
<tr>
<td>Clear signal, fast control loop (&lt; 1 s)</td>
<td>--</td>
<td>--</td>
<td>++ 1)</td>
<td>--</td>
<td>++</td>
</tr>
<tr>
<td>Poor signal, slow control loop (response time of a few seconds)</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Permanently bad signal</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Short and severe signal distortion after a while</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Replacement of a Promag 50/53: system damping Promag 400 = 0.5 * system damping Promag 50/53</td>
<td>++</td>
<td>++</td>
<td></td>
<td>+++</td>
<td></td>
</tr>
<tr>
<td>Replacement of a Promag 10: system damping Promag 400 = system damping Promag 10 + 2</td>
<td>+++</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For a stable flow signal (no other requirements)</td>
<td>+++</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Value of flow damping < 6
Flow damping

Description
Use this function to enter a value for flow damping. Reduction of the variability of the flow measured value (in relation to interference). For this purpose, the depth of the flow filter is adjusted: when the filter setting increases, the reaction time of the device also increases.

User entry
0 to 15

Factory setting
4

Additional information
Input range 0 to 15
- Value = 0: no damping
- Value = 1: minor damping
- Value = 15: strong damping

- The damping depends on the measuring period and the filter type selected.
- An increase or decrease in the damping depends on the application.

Effect
The damping affects the following variables of the device:
- Outputs
- Low flow cut off → 57
- Totalizers → 145

Flow override

Description
Use this function to select whether to interrupt the evaluation of measured values. This is useful for the cleaning processes of a pipeline, for example.

Selection
- Off
- On

Factory setting
Off

Additional information
Result
This setting affects all the functions and outputs of the measuring device.

Description
Flow override is active
- The 453 Flow override diagnostic message is output.
- Output values
  - Output: value at zero flow
  - Temperature: continues to be output
  - Totalizers 1-3: stop being totalized

The Flow override option can also be activated in the Status input submenu: Assign status input parameter.
### Conductivity measurement

**Navigation**


**Prerequisite**

The **On** option is selected in the **Conductivity measurement** parameter (→ 55) parameter.

**Description**

Use this function to enable and disable conductivity measurement.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

*Description*

For conductivity measurement to work, the medium must have a minimum conductivity of 5 µS/cm.

### Conductivity damping

**Navigation**


**Prerequisite**

The **On** option is selected in the **Conductivity measurement** parameter (→ 55).

**Description**

Use this function to enter a time constant for conductivity damping (PT1 element).

**User entry**

0 to 999.9 s

**Factory setting**

0 s

**Additional information**

*Description*

The damping is performed by a PT1 element.

*User entry*

- Value = 0: no damping
- Value > 0: damping is increased

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

---

2) Proportional behavior with first-order lag
**Conductivity temperature coefficient**

**Navigation**

[online manual link]

**Prerequisite**

The **Internal temperature sensor** option or the **External value** option is selected in the **Temperature source** parameter (→ 68).

**Description**

Use this function to enter the temperature coefficient for the conductivity.

**User entry**

Signed floating-point number

**Factory setting**

2.1 %/K

---

**Temperature damping**

**Navigation**

[online manual link]

**Prerequisite**

The **Internal temperature sensor** option or the **External value** option is selected in the **Temperature source** parameter (→ 68).

**Description**

Use this function to enter the time constant for temperature damping.

**User entry**

0 to 999.9 s

**Factory setting**

0 s

---

**Reference density**

**Navigation**

[online manual link]

**Description**

Use this function to enter a fixed value for the reference density.

**User entry**

Positive floating-point number

**Factory setting**

Country-specific:
- 1 kg/l
- 1 lb/ft³

**Additional information**

*Dependency*

[icon]

The unit is taken from the **Density unit** parameter (→ 48)
"Low flow cut off" submenu


Assign process variable (1837) →  ⚖️ 57
On value low flow cutoff (1805) →  ⚖️ 57
Off value low flow cutoff (1804) →  ⚖️ 58
Pressure shock suppression (1806) →  ⚖️ 58

Assign process variable


Description
Use this function to select the process variable for low flow cutoff detection.

Selection
- Off
- Volume flow
- Mass flow
- Corrected volume flow

Factory setting
Volume flow

On value low flow cutoff


Prerequisite
A process variable is selected in the Assign process variable parameter (→  ⚖️ 57).

Description
Use this function to enter a switch-on value for low flow cutoff. Low flow cutoff is activated if the value entered is not equal to 0 →  ⚖️ 58.

User entry
Positive floating-point number

Factory setting
Depends on country and nominal diameter→  ⚖️ 188

Additional information
Dependency
The unit depends on the process variable selected in the Assign process variable parameter (→  ⚖️ 57).
Off value low flow cutoff

Navigation
Expert → Sensor → Process param. → Low flow cut off → Off value (1804)

Prerequisite
A process variable is selected in the Assign process variable parameter (→  57).

Description
Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value  57.

User entry
0 to 100.0 %

Factory setting
50 %

Additional information
Example

Pressure shock suppression

Navigation

Prerequisite
A process variable is selected in the Assign process variable parameter (→  57).

Description
Use this function to enter the time interval for signal suppression (= active pressure shock suppression).

User entry
0 to 100 s

Factory setting
0 s

Additional information
Description
Pressure shock suppression is enabled
• Prerequisite:
  Flow rate < on-value of low flow cut off
• Output values
  • Flow displayed: 0
  • Totalizer: the totalizers are pegged at the last correct value
Pressure shock suppression is disabled

- Prerequisite: the time interval set in this function has elapsed.
- If the flow also exceeds the switch-off value for low flow cut off, the device starts processing the current flow value again and displays it.

Example

When closing a valve, momentarily strong fluid movements may occur in the pipeline, which are registered by the measuring system. These totalized flow values lead to a false totalizer status, particularly during batching processes.

![Diagram of flow and time]  

Q  Flow  
3  Time  
A  Drip  
B  Pressure shock  
C  Pressure shock suppression active as per the time entered  
D  Pressure shock suppression inactive  
1  Valve closes  
2  Flow falls below the on-value of the low flow cut off; pressure shock suppression is activated  
3  The time entered has elapsed; pressure shock suppression is deactivated  
4  The actual flow value is processed again and output  
5  On-value for low flow cut off  
6  Off-value for low flow cut off

"Empty pipe detection" submenu

Navigation  

- Empty pipe detection
  Assign process variable (1860)  →  60
  Switch point empty pipe detection (6562)  →  60
## Description of device parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response time empty pipe detection (1859)</td>
<td>60</td>
</tr>
<tr>
<td>New adjustment (6560)</td>
<td>61</td>
</tr>
<tr>
<td>Progress (6571)</td>
<td>61</td>
</tr>
<tr>
<td>Empty pipe adjust value (6527)</td>
<td>61</td>
</tr>
<tr>
<td>Full pipe adjust value (6548)</td>
<td>62</td>
</tr>
<tr>
<td>Measured value EPD (6559)</td>
<td>62</td>
</tr>
</tbody>
</table>

### Assign process variable

**Navigation**


**Description**

Use this function to switch empty pipe detection on and off.

**Selection**

- Off
- On

**Factory setting**

Off

### Switch point empty pipe detection

**Navigation**

- Expert → Sensor → Process param. → Empty pipe det. → Switch point EPD (6562)

**Prerequisite**

The **On** option is selected in the **Empty pipe detection** parameter (→ 60).

**Description**

Use this function to enter the percentage threshold value of the resistance in relation to the adjustment values.

**User entry**

0 to 100 %

**Factory setting**

50 %

### Response time empty pipe detection

**Navigation**


**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→ 60).
Description
Use this function to enter the minimum length of time (debouncing time) the signal must be present for the ΔS862 Pipe empty diagnostic message to be triggered if the measuring pipe is empty or partially full.

User entry
0 to 100 s

Factory setting
1 s

New adjustment

Navigation

Prerequisite
The On option is selected in the Empty pipe detection parameter (→ 60).

Description
For selecting whether to perform an empty pipe or full pipe adjustment.

Selection
- Cancel
- Empty pipe adjust
- Full pipe adjust

Factory setting
Cancel

Progress

Navigation

Prerequisite
The On option is selected in the Empty pipe detection parameter (→ 60).

Description
Use this function to view the progress.

User interface
- Ok
- Busy
- Not ok

Empty pipe adjust value

Navigation
Expert → Sensor → Process param. → Empty pipe det. → Empty pipe value (6527)

Prerequisite
- In the Empty pipe detection parameter (→ 60), the On option is selected.
- Adjustment value > full pipe value.

Description
Displays the adjustment value when the measuring pipe is empty.

User interface
Positive floating-point number
**Full pipe adjust value**

**Navigation**

**Prerequisite**
- In the Empty pipe detection parameter (→ 60), the On option is selected.
- Adjustment value < empty pipe value.

**Description**
Displays the adjustment value when the measuring pipe is full.

**User interface**
Positive floating-point number

---

**Measured value EPD**

**Navigation**

**Prerequisite**
In the Empty pipe detection parameter (→ 60), the On option is selected.

**Description**
Displays the current measured value.

**User interface**
Positive floating-point number

---

**“Electrode cleaning circuit” submenu**

**Navigation**
Expert → Sensor → Process param. → ECC

---

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<th><strong>Electrode cleaning circuit</strong></th>
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<tr>
<td>ECC polarity (6631)</td>
<td>→ 64</td>
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</table>
Electrode cleaning circuit

Navigation

Expert → Sensor → Process param. → ECC → ECC (6528)

Prerequisite

For the following order code:
"Application package", option EC "ECC electrode cleaning"

Description

Use this function to enable and disable cyclic electrode cleaning.

Selection

- Off
- On

Factory setting

Off

Additional information

Conductive deposits on the electrodes and on the walls of the measuring tube (e.g. magnetite) can falsify measurement values. The Electrode Cleaning Circuitry (ECC) was developed to prevent such conductive deposits developing in the vicinity of the electrodes. ECC functions as described above for all available electrode materials except tantalum. If tantalum is used as the electrode material, the ECC protects the electrode surface only against oxidation.

ECC duration

Navigation

Expert → Sensor → Process param. → ECC → ECC duration (6555)

Prerequisite

For the following order code:
"Application package", option EC "ECC electrode cleaning"

Description

Use this function to enter the duration of electrode cleaning in seconds.

User entry

0.01 to 30 s

Factory setting

2 s

ECC recovery time

Navigation

Expert → Sensor → Process param. → ECC → ECC recov. time (6556)

Prerequisite

For the following order code:
"Application package", option EC "ECC electrode cleaning"

Description

Use this function to enter the recovery time after electrode cleaning to prevent signal output interference. The current output values are frozen in the meanwhile.

User entry

1 to 600 s

Factory setting

5 s
ECC cleaning cycle

**Navigation**

Expert → Sensor → Process param. → ECC → ECC clean. cycle (6557)

**Prerequisite**

For the following order code:

*Application package*, option EC *ECC electrode cleaning*

**Description**

Use this function to enter the pause duration until the next electrode cleaning.

**User entry**

0.5 to 168 h

**Factory setting**

0.7 h

ECC polarity

**Navigation**

Expert → Sensor → Process param. → ECC → ECC polarity (6631)

**Prerequisite**

For the following order code:

*Application package*, option EC *ECC electrode cleaning*

**Description**

Displays the polarity of the electrode cleaning circuit.

**User interface**

- Positive
- Negative

**Factory setting**

Depends on the electrode material:

- Tantalum: **Negative** option
- Platinum, Alloy C22, stainless steel: **Positive** option

"Coating detection" submenu

Build-up detection is only available:

- In conjunction with the Promag W sensor
- In the compact device version (transmitter and sensor form a mechanical unit)
- For detailed information on build-up detection: see the Special Documentation for the **Heartbeat Verification + Monitoring** application package → 7

**Navigation**


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<tr>
<td>Build-up index</td>
<td>→ 65</td>
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</table>
**Build-up detection**

**Navigation**

Expert → Sensor → Process param. → Build-up index → Build-up detect. (6734)

**Description**

Select mode for build-up index.

**Selection**

- Off
- Slow
- Standard
- Fast

**Factory setting**

Off

**Build-up detection damping**

**Navigation**

Expert → Sensor → Process param. → Build-up index → Build-up damping (6840)

**Description**

Enter damping value for build-up index.

Damping value:

- 0 = minimum damping
- 15 = maximum damping

The damping value should only be increased if the measured value is unstable.

**User entry**

0 to 15

**Factory setting**

0

**Build-up index**

**Navigation**

Expert → Sensor → Process param. → Build-up index → Build-up index (12111)

**Description**

Shows current build-up measured value.

**User interface**

0.0 to 100.0 %

**Factory setting**

0.0 %

**Additional information**

The formation of build-up is output as a percentage in the Build-up index value (→ 65) parameter. The higher the percentage, the thicker the build-up.
Build-up index value (→ 65) = 0%
- No build-up present
- Measuring tube as-delivered state (initial value)
- Measuring tube was cleaned thoroughly after formation of build-up

Build-up index value (→ 65) = 100%
- Value for the maximum measurable build-up thickness
- The thickness of the build-up at 100% varies depending on the process
- A value of 100% should not be equated with a blocked measuring tube

The percentage indicated in the Build-up index value (→ 65) parameter does not provide direct information about the absolute thickness or the composition of the build-up. Therefore, to make optimum use of the build-up detection function, it is necessary to first compare the formation of build-up in the process, as known from experience, with the associated Build-up index value (→ 65). The aim is to determine the Build-up index value (→ 65) at the time the cleaning is usually performed.

On the basis of the Build-up index value (→ 65) during cleaning, it is possible to make a valid assessment of the condition inside the measuring tube and to plan the cleaning using the build-up limit and build-up detection hysteresis parameters.

In addition, conclusions about possible effects on neighboring processes can be drawn from the Build-up index value (→ 65).

### Build-up limit

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<tr>
<td>Description</td>
<td>Enter limit value for the build-up index.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 100 %</td>
</tr>
<tr>
<td>Factory setting</td>
<td>50 %</td>
</tr>
</tbody>
</table>

### Build-up limit hysteresis

<table>
<thead>
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<tbody>
<tr>
<td>Description</td>
<td>Enter hysteresis for build-up limit value. If the value for build-up detection hysteresis is higher than the Build-up limit (→ 66), the &quot;Build-up detected&quot; diagnostic information is not reset until the measuring tube has been cleaned and a restart has been performed.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 100 %</td>
</tr>
<tr>
<td>Factory setting</td>
<td>20 %</td>
</tr>
</tbody>
</table>
### 3.2.4 "External compensation" submenu

**Navigation**

#### Density source

**Navigation**
Expert → Sensor → External comp. → Density source (6615)

**Description**
Use this function to select the density source.

**Selection**
- Fixed density
- External density

**Factory setting**
Fixed density

#### External density

**Navigation**
Expert → Sensor → External comp. → External density (6630)

**Prerequisite**
The **External density** option is selected in the **Density source** parameter (→ 67).

**Description**
Displays the density read in from the external device.

**User entry**
Positive floating-point number

**Additional information**
**Dependency**
- The unit is taken from the **Density unit** parameter (→ 48)
Fixed density

Navigation  
Expert → Sensor → External comp. → Fixed density (6623)

Prerequisite  
The Fixed density option is selected in the Density source parameter (→ 67).

Description  
Use this function to enter a fixed value for the density.

User entry  
Positive floating-point number

Factory setting  
Depends on country:
- 1000 kg/m³
- 62 lb/ft³

Additional information  
Dependency

The unit is taken from the Density unit parameter (→ 48)

Temperature source

Navigation  
Expert → Sensor → External comp. → Temp. source (6712)

Description  
Use this function to select the temperature source.

Selection  
- Internal temperature sensor *
- Off
- External value

Factory setting  
Off

External temperature

Navigation  

Prerequisite  
The External value option is selected in the Temperature source parameter (→ 68).

Description  
Displays the temperature read in from the external device.

User entry  
Floating point number with sign

Additional information  
Dependency

The unit is taken from the Temperature unit parameter (→ 47)

* Visibility depends on order options or device settings
Reference temperature

Navigation  
Expert → Sensor → External comp. → Ref. temperature (1816)

Prerequisite  
The Fixed density option or External density option are selected in the Density source parameter (→ 67).

Description  
Use this function to enter a reference temperature for calculating the reference density.

User interface  
-273.15 to 99 999 °C

Factory setting  
Country-specific:
- +20 °C
- +68 °F

Additional information  
Dependency
The unit is taken from the Temperature unit parameter (→ 47)

Reference density calculation

\[ \rho_n = \rho \cdot (1 + \alpha \cdot \Delta t + \beta \cdot \Delta t^2) \]

- \( \rho_n \): reference density
- \( \rho \): fluid density currently measured
- \( t \): fluid temperature currently measured
- \( t_N \): reference temperature at which the reference density is calculated (e.g. 20 °C)
- \( \Delta t \): \( t - t_N \)
- \( \alpha \): linear expansion coefficient of the fluid, unit = [1/K]; K = Kelvin
- \( \beta \): square expansion coefficient of the fluid, unit = [1/K²]

3.2.5 "Sensor adjustment" submenu

Navigation  

Sensor adjustment

- Installation direction (1809)  
  → 70

- Integration time (6533)  
  → 70

- Measuring period (6536)  
  → 70

- Process variable adjustment  
  → 70
Installation direction

**Navigation**

Expert → Sensor → Sensor adjustm. → Install. direct. (1809)

**Description**

Use this function to change the sign of the medium flow direction.

**Selection**

- Forward flow
- Reverse flow

**Factory setting**

Forward flow

**Additional information**

*Description*

Before changing the sign: ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor nameplate.

Integration time

**Navigation**

Expert → Sensor → Sensor adjustm. → Integration time (6533)

**Description**

Displays the duration of the integration time.

*Additional information*

The duration of the measuring period should always be longer than the duration of the integration time.

**User interface**

1 to 65 ms

Measuring period

**Navigation**

Expert → Sensor → Sensor adjustm. → Measuring period (6536)

**Description**

Display the time of a full measuring period.

*Additional information*

The duration of the measuring period should always be longer than the duration of the integration time.

**User interface**

2 to 1000 ms

"Process variable adjustment" submenu

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust

**Process variable adjustment**

*Volume flow offset (1831)*
Volume flow factor

**Navigation**

Navigation: 

**Description**

Use this function to enter a quantity factor (without time) for the volume flow. This multiplication factor is applied over the volume flow range.

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

Description

Corrected value = (factor × value) + offset
### Volume flow offset

**Navigation**


**Description**

Use this function to enter the zero point shift for the volume flow trim. The volume flow unit on which the shift is based is m³/s.

**User entry**

Signed floating-point number

**Factory setting**

0 m³/s

**Additional information**

Description

Corrected value = (factor × value) + offset

### Mass flow factor

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Mass flow factor (1846)

**Description**

Use this function to enter a quantity factor (without time) for the mass flow. This multiplication factor is applied over the mass flow range.

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

Description

Corrected value = (factor × value) + offset

### Mass flow offset

**Navigation**


**Description**

Use this function to enter the zero point shift for the mass flow trim. The mass flow unit on which the shift is based is kg/s.

**User entry**

Signed floating-point number

**Factory setting**

0 kg/s

**Additional information**

Description

Corrected value = (factor × value) + offset
**Conductivity offset**

**Navigation**
- Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. offset (1848)

**Prerequisite**
The **On** option is selected in the **Conductivity measurement** parameter (→ 55).

**Description**
Use this function to enter the zero point shift for the conductivity trim. The conductivity unit on which the shift is based is S/m.

**User entry**
Signed floating-point number

**Factory setting**
0 S/m

**Additional information**
- **Description**
  
  Corrected value = (factor × value) + offset

**Conductivity factor**

**Navigation**
- Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. factor (1849)

**Prerequisite**
The **On** option is selected in the **Conductivity measurement** parameter (→ 55).

**Description**
Use this function to enter a quantity factor for the conductivity. This multiplication factor is applied over the conductivity range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**
- **Description**
  
  Corrected value = (factor × value) + offset

**Corrected volume flow offset**

**Navigation**

**Description**
Use this function to enter the zero point shift for the corrected volume flow trim. The corrected volume flow unit on which the shift is based is 1 Nm³/s.

**User entry**
Signed floating-point number

**Factory setting**
0 Nm³/s

**Additional information**
- **Description**
  
  Corrected value = (factor × value) + offset
**Corrected volume flow factor**

**Navigation**

**Description**
Use this function to enter a quantity factor (without time) for the corrected volume flow. This multiplication factor is applied over the corrected volume flow range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**
Description
Corrected value = (factor × value) + offset

---

**Temperature offset**

**Navigation**

**Prerequisite**
The temperature is read into the flowmeter from an external device.

**Description**
Use this function to enter the zero point shift for the temperature trim. The temperature unit on which the shift is based is 1 K.

**User entry**
Signed floating-point number

**Factory setting**
0 K

**Additional information**
Description
Corrected value = (factor × value) + offset

---

**Temperature factor**

**Navigation**

**Prerequisite**
The temperature is read into the flowmeter from an external device.

**Description**
Use this function to enter a quantity factor (without time) for the temperature. This multiplication factor is applied over the temperature range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**
Description
Corrected value = (factor × value) + offset
### Corrected conductivity offset

**Navigation**


**Prerequisite**

The On option is selected in the Conductivity measurement parameter (→ 55) parameter.

**Description**

Use this function to enter the zero point shift to trim the corrected conductivity. The conductivity unit on which the shift is based is μS/cm.

**User entry**

Signed floating-point number

**Factory setting**

0 S/m

**Additional information**

**Description**

Corrected value = \((factor \times value) + offset\)

---

### Corrected conductivity factor

**Navigation**


**Prerequisite**

The On option is selected in the Conductivity measurement parameter (→ 55) parameter.

**Description**

Use this function to enter a quantity factor for the corrected conductivity. In each case, this factor refers to the conductivity in μS/cm.

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

**Description**

Corrected value = \((factor \times value) + offset\)

---

### Flow velocity offset

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Flow vel. offset (1879)

**Description**

Use this function to enter the zero point shift for the flow velocity trim. The flow velocity unit on which the shift is based is m/s.

**User entry**

Signed floating-point number

**Factory setting**

0 m/s
**Description of device parameters**

**Additional information**

*Description*

Corrected value = (factor × value) + offset

---

**Flow velocity factor**

**Navigation**  

**Description**  
Use this function to enter a quantity factor (without time) for the flow velocity. This multiplication factor is applied over the flow velocity range.

**User entry**  
Positive floating-point number

**Factory setting**  
1

**Additional information**

*Description*

Corrected value = (factor × value) + offset

---

### 3.2.6 "Calibration" submenu

**Navigation**  
Expert → Sensor → Calibration

![Calibration menu]

- Nominal diameter (2807) → 76
- Calibration factor (6522) → 77
- Zero point (6546) → 77
- Conductivity calibration factor (6718) → 77

---

**Nominal diameter**

**Navigation**  
Expert → Sensor → Calibration → Nominal diameter (2807)

**Description**  
Displays the nominal diameter of the sensor.

**User interface**  
DNxx / x'

**Factory setting**  
Depends on the size of the sensor
Additional information

The value is also specified on the sensor nameplate.

Calibration factor

Navigation

Expert → Sensor → Calibration → Cal. factor (6522)

Description

Displays the current calibration factor for the sensor.

User interface

Positive floating-point number

Factory setting

Depends on nominal diameter and calibration.

Zero point

Navigation

Expert → Sensor → Calibration → Zero point (6546)

Description

This function shows the zero point correction value for the sensor.

User interface

Signed floating-point number

Factory setting

Depends on nominal diameter and calibration

Conductivity calibration factor

Navigation

Expert → Sensor → Calibration → Cond. cal. fact. (6718)

Prerequisite

The On option is selected in the Conductivity measurement parameter (→ 55) parameter.

Description

Displays the calibration factor for the conductivity measurement.

User interface

0.01 to 10000
3.3 "Communication" submenu

Navigation  
Expert → Communication

- PROFIBUS DP configuration  → 78
- PROFIBUS DP info  → 80
- Physical block  → 82
- Address shifting configuration  → 91
- Web server  → 91
- WLAN settings  → 95

3.3.1 "PROFIBUS DP configuration" submenu

Navigation  
Expert → Communication → PROFIBUS DP conf

- PROFIBUS DP configuration
  - Address mode (1468)  → 78
  - Device address (1462)  → 79
  - Ident number selector (1461)  → 79

Address mode

Navigation  
Expert → Communication → PROFIBUS DP conf → Address mode (1468)

Description  
Displays the configured address mode.

User interface
- Hardware
- Software

Factory setting  
Software

Additional information  
Description  
For detailed information, see the "Setting the device address" section of the Operating Instructions.
### Device address

<table>
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<th>Navigation</th>
<th>专家 → 通信 → PROFIBUS DP 设置 → 设备地址 (1462)</th>
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<tr>
<td>Description</td>
<td>使用此功能输入设备地址。</td>
</tr>
<tr>
<td>User entry</td>
<td>0 到 126</td>
</tr>
<tr>
<td>Factory setting</td>
<td>126</td>
</tr>
</tbody>
</table>
| Additional information | **Description**  
  设备地址必须总是为 PROFIBUS 设备配置。有效的地址范围是 1 到 126。在 PROFIBUS 网络中，每个地址只能分配一次。如果地址配置不正确，设备将不被主设备识别。所有测量设备出厂时都设置为地址 126，并带有软件地址方法。  
  显示配置的地址模式：**地址模式** 参数 (→ 78) |

### Ident number selector

<table>
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<th>Navigation</th>
<th>专家 → 通信 → PROFIBUS DP 设置 → 设备标识符选择 (1461)</th>
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</thead>
<tbody>
<tr>
<td>Description</td>
<td>使用此功能选择设备主文件 (GSD)。</td>
</tr>
</tbody>
</table>
| Selection |  - 自动模式  
  - 制造商  
  - Promag 50 (0x1546)  
  - Promag 53 (0x1526)  
  - Proﬁle  
  - 1 AI，1 Totalizer (0x9740)  
  - 2 AI，1 Totalizer (0x9741) |
| Factory setting | 自动模式 |
| Additional information | **Description**  
  为了将现场设备集成到总线系统中，PROFIBUS 系统需要设备参数的描述，如输出数据、输入数据、数据格式、数据量和支持的传输速率。这些数据在设备主文件 (GSD) 中提供，当通信系统被委派时，会提供给 PROFIBUS 主设备。  

### Bus termination

<table>
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<tr>
<th>Navigation</th>
<th>专家 → 通信 → PROFIBUS DP 设置 → 总线终止 (1431)</th>
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</table>
| User interface |  - 关  
  - 开 |

---

**Endress+Hauser**

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3.3.2 "PROFIBUS DP info" submenu

**Navigation**

Expert → Communication → PROFIBUS DP info

| **Status PROFIBUS Master Config (1465)** | ▶ | 80 |
| **PROFIBUS ident number (1464)** | ▶ | 80 |
| **Profile version (1463)** | ▶ | 81 |
| **Baudrate (1504)** | ▶ | 81 |
| **Master availability (1517)** | ▶ | 81 |

**Status PROFIBUS Master Config**

**Navigation**

Expert → Communication → PROFIBUS DP info → Stat Master Conf (1465)

**Description**

For displaying the status of the PROFIBUS Master configuration.

**User interface**

- Active
- Not active

**Factory setting**

Not active

**PROFIBUS ident number**

**Navigation**

Expert → Communication → PROFIBUS DP info → Ident number (1464)

**Description**

For displaying the PROFIBUS identification number.

**User interface**

0 to FFFF

**Factory setting**

0x1562
### Profile version

**Navigation**

Expert → Communication → PROFIBUS DP info → Profile version (1463)

**Description**

Displays the profile version.

**User interface**

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

**Factory setting**

3.02

### Baudrate

**Navigation**

Expert → Communication → PROFIBUS DP info → Baudrate (1504)

**Description**

Displays the transmission rate.

**User interface**

- Not available
- 9.6 kBaud
- 19.2 kBaud
- 45.45 kBaud
- 93.75 kBaud
- 187.5 kBaud
- 500 kBaud
- 1.5 MBaud
- 3 MBaud
- 6 MBaud
- 12 MBaud

**Factory setting**

9.6 kBaud

### Master availability

**Navigation**

Expert → Communication → PROFIBUS DP info → Master avail. (1517)

**Description**

Displays whether or not a PROFIBUS master is present in the network.

**User interface**

- No
- Yes

**Factory setting**

No
### 3.3.3 "Physical block" submenu

**Navigation**

>| Expert | Communication | Physical block |

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<td>Strategy (1494)</td>
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<td>Hardware revision (1479)</td>
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<tr>
<td>Manufacturer ID (1502)</td>
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<td>Diagnostics (1482)</td>
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<td>Device install date (1491)</td>
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</tbody>
</table>
### Device tag

**Navigation**
- Expert → Communication → Physical block → Device tag (1496)

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

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

**Factory setting**
Promag 400 DP

---

### Static revision

**Navigation**
- Expert → Communication → Physical block → Static revision (1495)

**Description**
Displays the event counter: every write access to a static block parameter is counted.

**User interface**
0 to FFFF

**Additional information**
*Description*

Static parameters are parameters that are not changed by the process.

---

### Strategy

**Navigation**
- Expert → Communication → Physical block → Strategy (1494)

**Description**
Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

**User entry**
0 to FFFF

**Factory setting**
0
### Alert key

**Navigation**

Expert → Communication → Physical block → Alert key (1473)

**Description**

Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

**User entry**

0 to 0xFF

**Factory setting**

0

### Target mode

**Navigation**

Expert → Communication → Physical block → Target mode (1497)

**Description**

Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

**User interface**

- Auto
- Out of service

### Mode block actual

**Navigation**

Expert → Communication → Physical block → Mode block act (1472)

**Description**

Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 84).

**User interface**

- Auto
- Out of service

**Additional information**

*Description*

A comparison of the current mode with the target mode (Target mode parameter (→ 84)) indicates whether it was possible to reach the target mode.

### Mode block permitted

**Navigation**

Expert → Communication → Physical block → Mode block perm (1493)

**Description**

Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 84) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.
**Mode block normal**

**Navigation**

Expert → Communication → Physical block → Mode blk norm (1492)

**Description**
Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

**User interface**
- Auto
- Out of service

---

**Alarm summary**

**Navigation**

Expert → Communication → Physical block → Alarm summary (1474)

**Description**
Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

**User interface**
- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

**Additional information**

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Physical Block function block.

**User interface**
- Discrete alarm
  - Alarm or warning message with a discrete value.
- Alarm state HiHi limit
  - Upper alarm limit
- Alarm state Hi limit
  - Upper warning limit
- Alarm state LoLo limit
  - Lower alarm limit
- Alarm state Lo limit
  - Lower warning limit
- Update Event

This option constitutes a special alarm that is triggered if a static parameter is changed. If such a parameter is modified, the associated bit is set in the Alarm summary parameter (→ 85), the output of the block switches to ‘GOOD (NC) Active Update Event’ (if the current status has a lower priority than this), and the block remains in this state for a duration of 10 s. The block then reverts to the normal state (the output has the last status and the Update Event option bit in the Alarm summary parameter (→ 85) is deleted again).
## Software revision

**Navigation**  
Expert → Communication → Physical block → Software rev. (1478)

**Description**  
Displays the firmware version of the measuring device.

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

## Hardware revision

**Navigation**  
Expert → Communication → Physical block → Hardware rev. (1479)

**Description**  
Displays the hardware revision of the measuring device.

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

## Manufacturer ID

**Navigation**  
Expert → Communication → Physical block → Manufacturer ID (1502)

**Description**  
Displays the manufacturer ID with which the measuring device has been registered with the PNO (PROFIBUS User Organization).

**User interface**  
0 to FFFF

**Factory setting**  
0x11

## Device ID

**Navigation**  
Expert → Communication → Physical block → Device ID (1480)

**Description**  
Displays the device ID for identifying the measuring device in a PROFIBUS network.

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

**Factory setting**  
Promag 400 DP
Serial number

**Navigation**

Expert → Communication → Physical block → Serial number (1481)

**Description**

Displays the serial number of the measuring device. It can also be found on the nameplate of the sensor and transmitter.

**User interface**

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

**Additional information**

**Description**

Uses of the serial number

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

Diagnostics

**Navigation**

Expert → Communication → Physical block → Diagnostics (1482)

**Description**

Displays the diagnostic messages.

**User interface**

- Hardware failure electronics
- Hardware failure mechanics
- Temperature motor
- Electronic temperature
- Memory checksum error
- Measurement error
- Device not initialized
- Initialization error
- Zero point error
- Power supply
- Configuration invalid
- On warmstart
- On coldstart
- Maintenance required
- Characterization invalid
- Ident number violation
- More information available
- Maintenance alarm
- Maintenance demanded
- Function check or simulation
- Invalid process condition

Diagnostics mask

**Navigation**

Expert → Communication → Physical block → Diagnostics mask (1484)

**Description**

Displays the diagnostic messages supported by the measuring device.
User interface

- Hardware failure electronics
- Hardware failure mechanics
- Temperature motor
- Electronic temperature
- Memory checksum error
- Measurement error
- Device not initialized
- Initialization error
- Zero point error
- Power supply
- Configuration invalid
- On warmstart
- On coldstart
- Maintenance required
- Characterization invalid
- Ident number violation
- More information available
- Maintenance alarm
- Maintenance demanded
- Function check or simulation
- Invalid process condition

Device certification

Navigation

Expert → Communication → Physical block → Device certific. (1486)

Description
Displays certificates of the measuring device, e.g. Ex certificate.

User interface

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

Factory reset

Navigation

Expert → Communication → Physical block → Factory reset (1488)

Description
Use this function to reset a certain set of parameters in a block.

Selection

- to defaults *
- warmstart device
- reset bus address
- Cancel

Factory setting

Cancel

* Visibility depends on order options or device settings
Descriptor

Navigation

Expert → Communication → Physical block → Descriptor (1489)

Description
Use this function to enter a user-specific string to describe the device within the application.

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

Device message

Navigation

Expert → Communication → Physical block → Device message (1490)

Description
Use this function to enter a user-definable message (a string) to describe the device within the application or in the plant.

User entry
Max. 32 Zeichen wie Buchstaben, Zahlen oder Sonderzeichen (z.B. @, %, /).

Device install date

Navigation

Expert → Communication → Physical block → Device inst.date (1491)

Description
Use this function to enter the date of installation of the device.

User entry
Max. 16 Zeichen wie Buchstaben, Zahlen oder Sonderzeichen (z.B. @, %, /).

Ident number selector

Navigation

Expert → Communication → Physical block → Ident num select (1461)

Description
Use this function to select the device master file (GSD).

Selection
- Automatic mode
- Manufacturer
- Promag 50 (0x1546)
- Promag 53 (0x1526)
- Profile
- 1 AI, 1 Totalizer (0x9740)
- 2 AI, 1 Totalizer (0x9741)

Factory setting
Automatic mode

Additional information

In order to integrate the field devices into the bus system, the PROFIBUS system needs a description of the device parameters, such as output data, input data, data format, data...
volume and supported transmission rate. These data are available in the device master file (GSD) which is provided to the PROFIBUS Master when the communication system is commissioned.

### Hardware lock

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → Physical block → Hardware lock (1499)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the hardware write protection.</td>
</tr>
</tbody>
</table>
| User interface | • Unprotected  
                 • Protected                                       |

**Additional information**

*Description*

Indicates whether it is possible to write-access the measuring device via PROFIBUS (acyclic data transmission, e.g. via the “FieldCare” operating program).

ℹ️ For detailed information on hardware write protection, see the 'Write protection via write protection switch' section of the Operating Instructions.

*User interface*

- **Unprotected**
  - Write access via PROFIBUS is possible (acyclic data transmission).
- **Protected**
  - Write access via PROFIBUS is locked (acyclic data transmission).

### Feature supported

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → Physical block → Feature support (1477)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the PROFIBUS features that are supported by the measuring device.</td>
</tr>
</tbody>
</table>
| User interface | • Condensed status  
                 • Classic status diagnosis  
                 • Data exchange broadcast  
                 • MS1 application relationship  
                 • PROFIsafe communication |

### Feature enabled

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → Physical block → Feature enabled (1476)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the PROFIBUS features that are enabled in the measuring device.</td>
</tr>
</tbody>
</table>
**User interface**
- Condensed status
- Classic status diagnosis
- Data exchange broadcast
- MS1 application relationship
- PROFIsafe communication

**Condensed status diagnostic**

**Navigation**
Expert → Communication → Physical block → Condensed status (1500)

**Description**
Use this function to switch the condensed status diagnostic on and off.

**Selection**
- Off
- On

**Factory setting**
On

### 3.3.4 "Address shifting configuration" submenu

For detailed information on acyclic communication, see the "System integration" – "Address shifting configuration" section of the Operating Instructions for the device → 7

**Navigation**
Expert → Communication → Addr.shift conf.

- **Address shifting configuration**
  - Slot shifting 1...16
  - Index shifting 1...16

### 3.3.5 "Web server" submenu

**Navigation**
Expert → Communication → Web server

- **Web server**
  - Web server language (7221) → 92
  - MAC address (7214) → 92
  - DHCP client (7212) → 93
  - IP address (7209) → 93
**Web server language**

**Navigation**

Expert → Communication → Web server → Webserv.language (7221)

**Description**

Use this function to select the Web server language setting.

**Selection**

- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- العربية (Arabic)*
- Bahasa Indonesia
- ภาษาไทย (Thai)*
- tiếng Việt (Vietnamese)
- čeština (Czech)

**Factory setting**

English

---

**MAC address**

**Navigation**

Expert → Communication → Web server → MAC Address (7214)

**Description**

Displays the MAC 3) address of the measuring device.

**User interface**

Unique 12-digit character string comprising letters and numbers

**Factory setting**

Each measuring device is given an individual address.

---

* Visibility depends on order options or device settings
3) Media Access Control
Additional information

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

DHCP client

Navigation
Expert → Communication → Web server → DHCP client (7212)

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

Selection
- Off
- On

Factory setting
On

Additional information

Effect
If the DHCP client functionality of the web server is selected, the IP address (→ 93), Subnet mask (→ 93) and Default gateway (→ 94) are set automatically.

- Identification is via the MAC address of the measuring device.
- The IP address (→ 93) in the IP address parameter (→ 93) is ignored as long as the DHCP client parameter (→ 93) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ 93) in the parameter of the same name is only used if the DHCP client parameter (→ 93) is inactive.

IP address

Navigation
Expert → Communication → Web server → IP address (7209)

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 (7211)

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 (7210) |
| Description | Display or enter the Default gateway (→ 94). |
| User entry | 4 octet: 0 to 255 (in the particular octet) |
| Factory setting | 0.0.0.0 |

Web server functionality

| Navigation | Expert → Communication → Web server → Webserver funct. (7222) |
| Description | Use this function to switch the Web server on and off. |
| Selection | Off, On |
| Factory setting | On |

Additional information

Once disabled, the Web server functionality can only be re-enabled via or the operating tool FieldCare.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>The web server is completely disabled. Port 80 is locked.</td>
</tr>
<tr>
<td>On</td>
<td>The complete functionality of the web server 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.</td>
</tr>
</tbody>
</table>

Login page

| Navigation | Expert → Communication → Web server → Login page (7273) |
| Description | Use this function to select the format of the login page. |
| Selection | Without header, With header |
| Factory setting | With header |
### 3.3.6 "WLAN settings" wizard

**Navigation**  
[Expert → Communication → WLAN settings]

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<th>Page</th>
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<tr>
<td>WLAN mode (2717)</td>
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<tr>
<td>SSID name (2714)</td>
<td>96</td>
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<tr>
<td>Network security (2705)</td>
<td>96</td>
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<td>User name (2715)</td>
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<td>WLAN password (2716)</td>
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<td>WLAN MAC address (2703)</td>
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<td>WLAN passphrase (2706)</td>
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<tr>
<td>WLAN MAC address (2703)</td>
<td>98</td>
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<td>Assign SSID name (2708)</td>
<td>99</td>
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<tr>
<td>SSID name (2707)</td>
<td>99</td>
</tr>
<tr>
<td>2.4 GHz WLAN channel (2704)</td>
<td>99</td>
</tr>
<tr>
<td>Select antenna (2713)</td>
<td>100</td>
</tr>
<tr>
<td>Connection state (2722)</td>
<td>100</td>
</tr>
<tr>
<td>Received signal strength (2721)</td>
<td>100</td>
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<td>WLAN IP address (2711)</td>
<td>98</td>
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<td>Gateway IP address (2719)</td>
<td>101</td>
</tr>
<tr>
<td>IP address domain name server (2720)</td>
<td>101</td>
</tr>
</tbody>
</table>
Description of device parameters

**WLAN**

**Navigation**
Expert → Communication → WLAN settings → WLAN (2702)

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

**Selection**
- Disable
- Enable

**Factory setting**
Enable

**WLAN mode**

**Navigation**
Expert → Communication → WLAN settings → WLAN mode (2717)

**Description**
Use this function to select the WLAN mode.

**Selection**
WLAN access point

**Factory setting**
WLAN access point

**SSID name**

**Navigation**
Expert → Communication → WLAN settings → SSID name (2714)

**Prerequisite**
The client is activated.

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

**User entry**
-

**Factory setting**
-

**Network security**

**Navigation**
Expert → Communication → WLAN settings → Network security (2705)

**Description**
Use this function to select the type of security for the WLAN interface.
Selection

- Unsecured
- WPA2-PSK
- EAP-PEAP with MSCHAPv2 *
- EAP-PEAP MSCHAPv2 no server authentic. *
- EAP-TLS *

Factory setting

WPA2-PSK

Additional information

Selection

- Unsecured
  Access the WLAN connection without identification.
- WPA2-PSK
  Access the WLAN connection with a network key.

Security identification

Navigation

Expert → Communication → WLAN settings → Sec. identific. (2718)

Description

Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).

User interface

- Trusted issuer certificate
- Device certificate
- Device private key

User name

Navigation

Expert → Communication → WLAN settings → User name (2715)

Description

Use this function to enter the username of the WLAN network.

User entry

–

Factory setting

–

WLAN password

Navigation

Expert → Communication → WLAN settings → WLAN password (2716)

Description

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

User entry

–

Factory setting

–

* Visibility depends on order options or device settings
### WLAN IP address

**Navigation**  
Expert → Communication → WLAN settings → WLAN IP address (2711)

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

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

**Factory setting**  
192.168.1.212

### WLAN MAC address

**Navigation**  
Expert → Communication → WLAN settings → WLAN MAC address (2703)

**Description**  
Displays the MAC address of the measuring device.

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

**Factory setting**  
Each measuring device is given an individual address.

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

### WLAN subnet mask

**Navigation**  
Expert → Communication → WLAN settings → WLAN subnet mask (2709)

**Description**  
Use this function to enter the subnet mask.

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

**Factory setting**  
255.255.255.0

### WLAN passphrase

**Navigation**  
Expert → Communication → WLAN settings → WLAN passphrase (2706)

**Prerequisite**  
The WPA2-PSK option is selected in the Security type parameter (→ 96).

**Description**  
Use this function to enter the network key.

---

4) Media Access Control
Proline Promag 400 PROFIBUS DP

**User entry**
8 to 32-digit character string comprising numbers, letters and special characters (without spaces)

**Factory setting**
Serial number of the measuring device (e.g. L100A802000)

---

**Assign SSID name**

**Navigation**
Expert → Communication → WLAN settings → Assign SSID name (2708)

**Description**
Use this function to select which name is used for the SSID.

**Selection**
- Device tag
- User-defined

**Factory setting**
User-defined

**Additional information**

- **Selection**
  - Device tag
    - The device tag name is used as the SSID.
  - User-defined
    - A user-defined name is used as the SSID.

---

**SSID name**

**Navigation**
Expert → Communication → WLAN settings → SSID name (2707)

**Prerequisite**
- The **User-defined** option is selected in the Assign SSID name parameter (→ 99).
- The **WLAN access point** option is selected in the **WLAN mode** parameter (→ 96).

**Description**
Use this function to enter a user-defined SSID name.

**User entry**
Max. 32-digit character string comprising numbers, letters and special characters

**Factory setting**

---

**2.4 GHz WLAN channel**

**Navigation**
Expert → Communication → WLAN settings → WLAN channel (2704)

**Description**
Use this function to enter the 2.4 GHz WLAN channel.

**User entry**
1 to 11

**Factory setting**
6

---

5) Service Set Identifier
Additional information

Description

- It is only necessary to enter a 2.4 GHz WLAN channel if multiple WLAN devices are in use.
- If just one measuring device is in use, it is recommended to keep the factory setting.

Select antenna

Navigation

Expert → Communication → WLAN settings → Select antenna (2713)

Description

Use this function to select whether the external or internal antenna is used for reception.

Selection

- External antenna
- Internal antenna

Factory setting

Internal antenna

Connection state

Navigation

Expert → Communication → WLAN settings → Connection state (2722)

Description

The connection status is displayed.

User interface

- Connected
- Not connected

Factory setting

Not connected

Received signal strength

Navigation

Expert → Communication → WLAN settings → Rec.sig.strength (2721)

Description

Displays the signal strength received.

User interface

- Low
- Medium
- High

Factory setting

High
**Gateway IP address**

**Navigation**

Expert → Communication → WLAN settings → Gateway IP addr. (2719)

**Description**

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

**User interface**

Character string comprising numbers, letters and special characters

**Factory setting**

192.168.1.212

---

**IP address domain name server**

**Navigation**

Expert → Communication → WLAN settings → IP address DNS (2720)

**Description**

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

**User interface**

Character string comprising numbers, letters and special characters

**Factory setting**

192.168.1.212

---

### 3.4 "Analog inputs" submenu

**Navigation**

Expert → Analog inputs

![Analog inputs](#)

---

### 3.4.1 "Analog input 1 to n" submenu

**Navigation**

Expert → Analog inputs → Analog input 1 to n

![Analog input 1 to n](#)

- Channel (1561–1 to n)
- PV filter time (1524–1 to n)
- Fail-safe type (1525–1 to n)
- Fail-safe value (1526–1 to n)
- Out value (1552–1 to n)
Out status (1564–1 to n)  →  104
Out status (1549–1 to n)  →  104

Channel

Navigation
Expert → Analog inputs → Analog input 1 to n → Channel (1561–1 to n)

Description
For selecting the process variable.

Selection
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature
- Electronics temperature
- Noise
- Coil current shot time
- Reference electrode potential against PE
- Build-up index
- Test point 1
- Test point 2
- Test point 3

Factory setting
Volume flow

PV filter time

Navigation
Expert → Analog inputs → Analog input 1 to n → PV filter time (1524–1 to n)

Description
Use this function to enter a time to suppress signal peaks. During the specified time the Analog input does not respond to an erratic increase in the process variable.

User entry
Positive floating-point number

Factory setting
0

* Visibility depends on order options or device settings
**Fail-safe type**

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Fail-safe type (1525–1 to n)

**Description**
Use this function to select the failure mode.

**Selection**
- Fail-safe value
- Fallback value
- Off

**Factory setting**
Off

**Additional information**
*Selection*
If an input or simulation value has the status BAD, the function block uses this predefined failure value:
- Fail-safe value
  A substitute value is used. This is specified in the **Fail-safe value** parameter (→ 103).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

**Fail-safe value**

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Fail-safe value (1526–1 to n)

**Prerequisite**
In **Fail-safe type** parameter (→ 103), the **Fail-safe value** option is selected.

**Description**
Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 103)) in the event of an error.

**User entry**
Signed floating-point number

**Factory setting**
0

**Out value**

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Out value (1552–1 to n)

**Prerequisite**
In **Target mode** parameter (→ 105), the **Auto** option is selected.

**Description**
Displays the analog value which is calculated when the function is executed.

**User interface**
Signed floating-point number
### Description of device parameters

#### Out status

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Out status (1564–1 to n)

**Description**
Displays the current output status (Good, Bad, Uncertain).

**User interface**
- Good
- Uncertain
- Bad

---

#### Prerequisite

**In** **Target mode** parameter (→ 105), the **Auto** option is selected.

**Description**
Displays the current output status (hex value).

**User interface**
0 to 0xFF

---

#### Tag description

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Tag description (1562–1 to n)

**Description**
Use this function to enter a string to identify the block.

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

---

#### Static revision

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Static revision (1560–1 to n)

**Description**
Displays the event counter: every write access to a static block parameter is counted.

**User interface**
0 to FFFF

**Additional information**
*Description*
- Static parameters are parameters that are not changed by the process.
### Strategy

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog inputs → Analog input 1 to n → Strategy (1559–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to FFFF</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

### Alert key

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog inputs → Analog input 1 to n → Alert key (1522–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 0xFF</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

### Target mode

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog inputs → Analog input 1 to n → Target mode (1563–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.</td>
</tr>
</tbody>
</table>
| User interface | - Auto  
- Man  
- Out of service |

### Mode block actual

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog inputs → Analog input 1 to n → Mode block act (1521–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 105).</td>
</tr>
</tbody>
</table>
| User interface | - Auto  
- Man  
- Out of service |
### Description of device parameters

#### Proline Promag 400 PROFIBUS DP

---

### Additional information

**Description**

A comparison of the current mode with the target mode (Target mode parameter (→ 105)) indicates whether it was possible to reach the target mode.

---

<table>
<thead>
<tr>
<th>Mode block permitted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>User interface</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mode block normal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
| **User interface**   | • Auto  
• Man  
• Out of service |

<table>
<thead>
<tr>
<th>Alarm summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
| **User interface**   | • Discrete alarm  
• Alarm state HiHi limit  
• Alarm state Hi limit  
• Alarm state LoLo limit  
• Alarm state Lo limit  
• Update Event |

---

### Additional information

**Description**

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Analog Inputs function block.
**Batch ID**

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Batch ID (1533–1 to n)

**Description**
Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

**User entry**
Positive integer

---

**Batch operation**

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Batch operation (1534–1 to n)

**Description**
Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

**User entry**
0 to 65535

**Factory setting**
0

---

**Batch phase**

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Batch phase (1535–1 to n)

**Description**
Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

**User entry**
0 to 65535

**Factory setting**
0

---

**Batch Recipe Unit Procedure**

**Navigation**
- Expert → Analog inputs → Analog input 1 to n → Batch Recipe (1536–1 to n)

**Description**
Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

**User entry**
0 to 65535

**Factory setting**
0
### Additional information

**Description**

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

### PV scale lower range

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog inputs → Analog input 1 to n → PVscale lo range (1554–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the lower value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0</td>
</tr>
</tbody>
</table>

### PV scale upper range

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog inputs → Analog input 1 to n → PVscale up range (1555–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the upper value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Out scale lower range

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog inputs → Analog input 1 to n → Out scale low (1548–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the lower value range for the output value in system units.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0</td>
</tr>
</tbody>
</table>

### Out scale upper range

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog inputs → Analog input 1 to n → Out scale up (1551–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the upper value range for the output value in system units.</td>
</tr>
</tbody>
</table>
### Lin type

| **User entry** | Signed floating-point number |
| **Factory setting** | 100.0 |

#### Navigation
Expert → Analog inputs → Analog input 1 to n → Lin type (1523–1 to n)

#### Description
Use this function to switch off the linearization type for the input value.

#### Selection
Off

#### Factory setting
Off

### Out unit

| **User entry** | 0 to 65535 |
| **Factory setting** | 1997 |

#### Navigation
Expert → Analog inputs → Analog input 1 to n → Out unit (1550–1 to n)

#### Description
Use this function to enter a numerical code (hex) for the system unit.

### Out decimal point

| **User entry** | 0 to 7 |
| **Factory setting** | 0 |

#### Navigation
Expert → Analog inputs → Analog input 1 to n → Out dec_point (1547–1 to n)

#### Description
Use this function to enter the maximum number of decimal places that are displayed for the output value.

### Alarm hysteresis

| **User entry** | Signed floating-point number |

#### Navigation
Expert → Analog inputs → Analog input 1 to n → Alarm hysteresis (1527–1 to n)

#### Description
Use this function to enter the hysteresis value for the upper and lower warning or alarm limit values.
Hi Hi Lim

Navigation
Expert → Analog inputs → Analog input 1 to n → Hi Hi Lim (1528–1 to n)

Description
Use this function to enter the value for the upper alarm limit (Hi Hi alarm value parameter (→ 111)).

User entry
Signed floating-point number

Factory setting
Positive floating-point number

Additional information

Description
If the output value Out value (→ 103) exceeds this limit value, the Hi Hi alarm state parameter (→ 112) is output.

User entry
The value is entered in the defined units (Out unit parameter (→ 109)) and must be in the range defined in the Out scale lower range parameter (→ 108) and Out scale upper range parameter (→ 108).

Hi Lim

Navigation
Expert → Analog inputs → Analog input 1 to n → Hi Lim (1529–1 to n)

Description
Use this function to enter the value for the upper warning limit (Hi alarm value parameter (→ 112)).

User entry
Signed floating-point number

Factory setting
Positive floating-point number

Additional information

Description
If the output value Out value (→ 103) exceeds this limit value, the Hi alarm state parameter (→ 112) is output.

User entry
The value is entered in the defined units (Out unit parameter (→ 109)) and must be in the range defined in the Out scale lower range parameter (→ 108) and Out scale upper range parameter (→ 108).
Lo Lim

**Navigation**

Expert → Analog inputs → Analog input 1 to n → Lo Lim (1530–1 to n)

**Description**

Use this function to enter the value for the lower warning limit (Lo alarm value parameter (→ 112)).

**User entry**

Signed floating-point number

**Factory setting**

Negative floating-point number

**Additional information**

If the output value Out value (→ 103) exceeds this limit value, the Lo alarm state parameter (→ 113) is output.

**User entry**

The value is entered in the defined units (Out unit parameter (→ 109)) and must be in the range defined in the Out scale lower range parameter (→ 108) and Out scale upper range parameter (→ 108).

Lo Lo Lim

**Navigation**

Expert → Analog inputs → Analog input 1 to n → Lo Lo Lim (1531–1 to n)

**Description**

Use this function to enter the value for the lower alarm limit (Lo Lo alarm value parameter (→ 113)).

**User entry**

Signed floating-point number

**Factory setting**

Negative floating-point number

**Additional information**

If the output value Out value (→ 103) exceeds this limit value, the Lo Lo alarm state parameter (→ 113) is output.

**User entry**

The value is entered in the defined units (Out unit parameter (→ 109)) and must be in the range defined in the Out scale lower range parameter (→ 108) and Out scale upper range parameter (→ 108).

Hi Hi alarm value

**Navigation**

Expert → Analog inputs → Analog input 1 to n → HiHi alarm value (1541–1 to n)

**Description**

Displays the alarm value for the upper alarm limit value (Hi Hi Lim parameter (→ 110)).
**Hi Hi alarm state**

**Navigation**

Expert → Analog inputs → Analog input 1 to n → HiHi alarm state (1540–1 to n)

**Description**

Displays the status for the upper alarm limit value (Hi Hi Lim parameter (→ 110)).

**User interface**

- No alarm
- Alarm state HiHi limit

**Additional information**

*User interface*

The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

---

**Hi alarm value**

**Navigation**

Expert → Analog inputs → Analog input 1 to n → Hi alarm value (1539–1 to n)

**Description**

Displays the alarm value for the upper warning limit value (Hi Lim parameter (→ 110)).

**User interface**

Signed floating-point number

---

**Hi alarm state**

**Navigation**

Expert → Analog inputs → Analog input 1 to n → Hi alarm state (1538–1 to n)

**Description**

Displays the status for the upper warning limit value (Hi Lim parameter (→ 110)).

**User interface**

- No warning
- Alarm state Hi limit

**Additional information**

*User interface*

The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

---

**Lo alarm value**

**Navigation**

Expert → Analog inputs → Analog input 1 to n → Lo alarm value (1543–1 to n)

**Description**

Displays the alarm value for the lower warning limit value (Lo Lim parameter (→ 111)).
### User interface
Signed floating-point number

### Lo alarm state

**Navigation**
Expert → Analog inputs → Analog input 1 to n → Lo alarm state (1542–1 to n)

**Description**
Displays the status for the lower warning limit value ([Lo Lim](#) parameter (→ 111)).

**User interface**
- No warning
- Alarm state Lo limit

**Additional information**
*User interface*
The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

### Lo Lo alarm value

**Navigation**
Expert → Analog inputs → Analog input 1 to n → LoLo alarm value (1545–1 to n)

**Description**
Displays the alarm value for the lower alarm limit value ([Lo Lo Lim](#) parameter (→ 111)).

**User interface**
Signed floating-point number

### Lo Lo alarm state

**Navigation**
Expert → Analog inputs → Analog input 1 to n → LoLo alarm state (1544–1 to n)

**Description**
Displays the status for the lower alarm limit value ([Lo Lo Lim](#) parameter (→ 111)).

**User interface**
- No alarm
- Alarm state LoLo limit

**Additional information**
*User interface*
The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

### Simulate enabled

**Navigation**
Expert → Analog inputs → Analog input 1 to n → Simulate enabled (1556–1 to n)

**Description**
Use this function to enable or disable block simulation.
Selection

- Disable
- Enable

Factory setting

Disable

Additional information

Description

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

Simulate value

Navigation

Expert → Analog inputs → Analog input 1 to n → Simulate value (1558–1 to n)

Description

Use this function to enter a simulation value for the block.

User entry

Signed floating-point number

Factory setting

0

Additional information

Description

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.

Simulate status

Navigation

Expert → Analog inputs → Analog input 1 to n → Simulate status (1557–1 to n)

Description

Use this function to enter a simulation status for the block.

User entry

0 to 255

Factory setting

0

Additional information

Description

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

Out unit text

Navigation

Expert → Analog inputs → Analog input 1 to n → Out unit text (1532–1 to n)

Description

Use this function to enter the out unit text: if a specific out unit does not appear in the code list, the user can enter the specific text. The unit code is then equivalent to the definition provided here.
User entry
Max. 16 characters such as letters, numbers or special characters (e.g. @, %, /).

Factory setting
NoUnit

3.5 "Discrete inputs" submenu

Navigation
Expert → Discrete inputs

3.5.1 "Discrete input 1 to n" submenu

Navigation
Expert → Discrete inputs → Discrete input 1 to n

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<tr>
<td>Invert 2188–1 to n</td>
<td>116</td>
</tr>
<tr>
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<td>116</td>
</tr>
<tr>
<td>Fail-safe value 2190–1 to n</td>
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</tr>
<tr>
<td>Out value 2194–1 to n</td>
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<tr>
<td>Out status 2203–1 to n</td>
<td>117</td>
</tr>
<tr>
<td>Out status 2193–1 to n</td>
<td>117</td>
</tr>
</tbody>
</table>

Channel

Navigation
Expert → Discrete inputs → Discrete input 1 to n → Channel (2187–1 to n)

Description
Use this function to assign a measured variable to the particular function block.

Selection
- Empty pipe detection
- Low flow cut off
- Verification status *
- Build-up detection *

* Visibility depends on order options or device settings
**Factory setting**

Empty pipe detection

---

**Invert**

**Navigation**

Expert → Discrete inputs → Discrete input 1 to n → Invert (2188–1 to n)

**Description**

Use this function to invert the input signal.

**Selection**

- Off
- On

**Factory setting**

Off

---

**Fail-safe type**

**Navigation**

Expert → Discrete inputs → Discrete input 1 to n → Fail-safe type (2189–1 to n)

**Description**

Use this function to select the failure mode.

**Selection**

- Fail-safe value
- Fallback value
- Off

**Factory setting**

Off

**Additional information**

Selection

If an input or simulation value has the status BAD, the function block uses this predefined failure value:

- Fail-safe value
  
  A substitute value is used. This is specified in the **Fail-safe value** parameter (→ 116).

- Fallback value
  
  If the value was good at one point, then this last valid value is used.

- Off
  
  The system continues to use the bad value.

---

**Fail-safe value**

**Navigation**

Expert → Discrete inputs → Discrete input 1 to n → Fail-safe value (2190–1 to n)

**Prerequisite**

In **Fail-safe type** parameter (→ 116), the **Fail-safe value** option is selected.

**Description**

Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 117)) in the event of an error.

**User entry**

0 to 255
Factory setting

Out value

Navigation

Prerequisite

Description

User interface

Out status

Navigation

Target mode parameter (→ 118), the Auto option is selected.

Description

User interface

Out status

Navigation

Target mode parameter (→ 118), the Auto option is selected.

Description

User interface

Tag description

Navigation

Description

User entry

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

**Navigation**  
Expert → Discrete inputs → Discrete input 1 to n → Static revision (2200–1 to n)

**Description**  
Displays the event counter: every write access to a static block parameter is counted.

**User interface**  
0 to FFFF

**Additional information**  
*Description*  
Static parameters are parameters that are not changed by the process.

### Strategy

**Navigation**  
Expert → Discrete inputs → Discrete input 1 to n → Strategy (2199–1 to n)

**Description**  
Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

**User entry**  
0 to FFFF

**Factory setting**  
0

### Alert key

**Navigation**  
Expert → Discrete inputs → Discrete input 1 to n → Alert key (2182–1 to n)

**Description**  
Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

**User entry**  
0 to 0xFFF

**Factory setting**  
0

### Target mode

**Navigation**  
Expert → Discrete inputs → Discrete input 1 to n → Target mode (2202–1 to n)

**Description**  
Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

**User interface**  
- Auto
- Man
- Out of service
Proline Promag 400 PROFIBUS DP

Description of device parameters

Mode block actual

Navigation  
Expert → Discrete inputs → Discrete input 1 to n → Mode block act (2181–1 to n)

Description  
Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 118).

User interface  
• Auto  
• Man  
• Out of service

Additional information  
Description  
A comparison of the current mode with the target mode (Target mode parameter (→ 118)) indicates whether it was possible to reach the target mode.

Mode block permitted

Navigation  
Expert → Discrete inputs → Discrete input 1 to n → Mode block perm (2195–1 to n)

Description  
Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 118) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface  
0 to 255

Mode block normal

Navigation  
Expert → Discrete inputs → Discrete input 1 to n → Mode blk norm (2192–1 to n)

Description  
Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface  
• Auto  
• Man  
• Out of service

Alarm summary

Navigation  
Expert → Discrete inputs → Discrete input 1 to n → Alarm summary (2191–1 to n)

Description  
Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.
Description of device parameters

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User interface

- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

Additional information

Description

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Discrete Inputs function block.

Batch ID

Navigation

Expert → Discrete inputs → Discrete input 1 to n → Batch ID (2183–1 to n)

Description

Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

User entry

Positive integer

Batch operation

Navigation

Expert → Discrete inputs → Discrete input 1 to n → Batch operation (2184–1 to n)

Description

Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

User entry

0 to 65535

Factory setting

0

Batch phase

Navigation

Expert → Discrete inputs → Discrete input 1 to n → Batch phase (2185–1 to n)

Description

Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

User entry

0 to 65535

Factory setting

0
### Batch Recipe Unit Procedure

**Navigation**  
Expert → Discrete inputs → Discrete input 1 to n → Batch Recipe (2186–1 to n)

**Description**  
Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

**User entry**  
0 to 65535

**Factory setting**  
0

**Additional information**  
*Description*  
The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

### Simulate enabled

**Navigation**  
Expert → Discrete inputs → Discrete input 1 to n → Simulate enabled (2196–1 to n)

**Description**  
Use this function to enable or disable block simulation.

**Selection**  
- Disable
- Enable

**Factory setting**  
Disable

**Additional information**  
*Description*  
The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

### Simulate value

**Navigation**  
Expert → Discrete inputs → Discrete input 1 to n → Simulate value (2198–1 to n)

**Description**  
Use this function to enter a simulation value for the block.

**User entry**  
0 to 255

**Factory setting**  
0

**Additional information**  
*Description*  
The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.
**Simulate status**

**Navigation**

Expert → Discrete inputs → Discrete input 1 to n → Simulate status (2197–1 to n)

**Description**

Use this function to enter a simulation status for the block.

**User entry**

0 to 255

**Factory setting**

0

**Additional information**

*Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

### 3.6 "Analog outputs" submenu

**Navigation**

Expert → Analog outputs

#### 3.6.1 "Analog output 1 to n" submenu

**Navigation**

Expert → Analog outputs → Analog output 1 to n

- Set point value (1661–1 to n) → 123
- Set point status (1660–1 to n) → 123
- Fail-safe time (1635–1 to n) → 123
- Fail-safe type (1636–1 to n) → 124
- Fail-safe value (1637–1 to n) → 124
- Out value (1647–1 to n) → 124
- Out status (1669–1 to n) → 125
- Out status (1645–1 to n) → 125
### Set point value

<table>
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<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 to n → Set point val (1661–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter an analog set point.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

### Set point status

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 to n → Set point status (1660–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter a status for the analog set point.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 255</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

### Fail-safe time

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 to n → Fail-safe time (1635–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter a time span within which the criteria for an error must be met continuously before an error message or notice message is generated.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 999.0</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

**Additional information**

*User entry*

**NOTE!**

If this parameter is used, error messages and notice messages are delayed by the set time before being relayed to the higher-level controller (DCS, etc.).

- Check in advance to ensure that the safety-specific requirements of the process would permit this.
- If the error and notice messages may not be suppressed, a value of 0 seconds must be configured here.
**Fail-safe type**

**Navigation**
Expert → Analog outputs → Analog output 1 to n → Fail-safe type (1636–1 to n)

**Description**
Use this function to select the failure mode.

**Selection**
- Fail-safe value
- Fallback value
- Off

**Factory setting**
Fallback value

**Additional information**
*Selection*
If an input or simulation value has the status BAD, the function block uses this predefined failure value:
- Fail-safe value
  A substitute value is used. This is specified in the **Fail-safe value** parameter (→ 124).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

**Fail-safe value**

**Navigation**
Expert → Analog outputs → Analog output 1 to n → Fail-safe value (1637–1 to n)

**Prerequisite**
In **Fail-safe type** parameter (→ 124), the **Fallback value** option is selected.

**Description**
Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 124)) in the event of an error.

**User entry**
Signed floating-point number

**Factory setting**
0

**Out value**

**Navigation**
Expert → Analog outputs → Analog output 1 to n → Out value (1647–1 to n)

**Prerequisite**
In **Target mode** parameter (→ 126), the **Auto** option is selected.

**Description**
Displays the analog value which is calculated when the function is executed.

**User interface**
Signed floating-point number
### Out status

**Navigation**

Expert → Analog outputs → Analog output 1 to n → Out status (1669–1 to n)

**Description**

Displays the current output status (Good, Bad, Uncertain).

**User interface**

- Good
- Uncertain
- Bad

---

### Out status

**Navigation**

Expert → Analog outputs → Analog output 1 to n → Out status (1645–1 to n)

**Prerequisite**

In **Target mode** parameter (→ 126), the **Auto** option is selected.

**Description**

Displays the current output status (hex value).

**User interface**

0 to 0xFF

---

### Tag description

**Navigation**

Expert → Analog outputs → Analog output 1 to n → Tag description (1667–1 to n)

**Description**

Use this function to enter a string to identify the block.

**User entry**

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

---

### Static revision

**Navigation**

Expert → Analog outputs → Analog output 1 to n → Static revision (1666–1 to n)

**Description**

Displays the event counter: every write access to a static block parameter is counted.

**User interface**

0 to FFFF

**Additional information**

*Description*

Static parameters are parameters that are not changed by the process.
Description of device parameters

Proline Promag 400 PROFIBUS DP

---

**Strategy**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 to n → Strategy (1665–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to FFFF</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

**Alert key**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 to n → Alert key (1632–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 0xFF</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

**Target mode**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 to n → Target mode (1668–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.</td>
</tr>
</tbody>
</table>
| User interface | - Auto  
- Local override  
- Man  
- Out of service  
- Remote Cascaded |

**Mode block actual**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 to n → Mode block act (1631–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 126).</td>
</tr>
</tbody>
</table>
User interface

- Auto
- Local override
- Man
- Out of service
- Remote Cascaded

Additional information

Description

A comparison of the current mode with the target mode (Target mode parameter (→ 126)) indicates whether it was possible to reach the target mode.

Mode block permitted

Navigation

Expert → Analog outputs → Analog output 1 to n → Mode block perm (1648–1 to n)

Description

Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 126) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface

0 to 255

Mode block normal

Navigation

Expert → Analog outputs → Analog output 1 to n → Mode blk norm (1643–1 to n)

Description

Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface

- Auto
- Local override
- Man
- Out of service
- Remote Cascaded

Alarm summary

Navigation

Expert → Analog outputs → Analog output 1 to n → Alarm summary (1642–1 to n)

Description

Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface

- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event
Description of device parameters

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Additional information

Description

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Analog Outputs function block.

Batch ID

Navigation

Expert → Analog outputs → Analog output 1 to n → Batch ID (1633–1 to n)

Description

Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

User entry

Positive integer

Batch operation

Navigation

Expert → Analog outputs → Analog output 1 to n → Batch operation (1639–1 to n)

Description

Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

User entry

0 to 65535

Factory setting

0

Batch phase

Navigation

Expert → Analog outputs → Analog output 1 to n → Batch phase (1640–1 to n)

Description

Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

User entry

0 to 65535

Factory setting

0

Batch Recipe Unit Procedure

Navigation

Expert → Analog outputs → Analog output 1 to n → Batch Recipe (1641–1 to n)

Description

Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).
**PV scale lower range**

**Navigation**
Expert → Analog outputs → Analog output 1 to n → PVscale lo range (1651–1 to n)

**Description**
Use this function to enter the lower value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.

**User entry**
Signed floating-point number

**Factory setting**
0

**PV scale upper range**

**Navigation**
Expert → Analog outputs → Analog output 1 to n → PVscale up range (1652–1 to n)

**Description**
Use this function to enter the upper value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.

**User entry**
Signed floating-point number

**Factory setting**
100.0

**Readback value**

**Navigation**
Expert → Analog outputs → Analog output 1 to n → Readback value (1659–1 to n)

**Description**
Displays the readback value. The readback value indicates the current position of the control element within the travel range (between the open and close position) in PV scale units.

**User interface**
Signed floating-point number
<table>
<thead>
<tr>
<th><strong>Readback status</strong></th>
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<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>User interface</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>RCAS in value</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>RCAS in status</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Input channel</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Selection</strong></td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
</tbody>
</table>
### Output channel

**Navigation**

- Expert → Analog outputs → Analog output 1 to n → Output channel (1671–1 to n)

**Description**

Use this function to select the output channel. The number of logical hardware channels to the converter that is connected to this I/O block.

**Selection**

- External temperature
- External density

**Factory setting**

- External density

---

### RCAS out value

**Navigation**

- Expert → Analog outputs → Analog output 1 to n → RCAS out value (1657–1 to n)

**Description**

Displays the RCAS out value. Displays the set point of the block which is made available to the higher-level host for monitoring/back calculation and which makes it possible to take action under certain conditions or in a different mode.

**User interface**

- Signed floating-point number

---

### RCAS out status

**Navigation**

- Expert → Analog outputs → Analog output 1 to n → RCAS out status (1656–1 to n)

**Description**

Displays the RCAS out status. Displays the status of the set point.

**User interface**

- 0 to 0xFF

---

### Position value

**Navigation**

- Expert → Analog outputs → Analog output 1 to n → Pos value (1650–1 to n)

**Description**

Displays the current value of the positioner.

**User interface**

- 0 to 255
Description of device parameters

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Position status

**Navigation**

Expert → Analog outputs → Analog output 1 to n → Position status (1649–1 to n)

**Description**

Displays the current status of the positioner.

**User interface**

0 to 255

Setpoint deviation

**Navigation**

Expert → Analog outputs → Analog output 1 to n → Setp. deviation (1653–1 to n)

**Description**

Displays the deviation between the set point (Set point value parameter (→ 123)) and the actual value (Readback value parameter (→ 129)).

**User interface**

Signed floating-point number

Simulate enabled

**Navigation**

Expert → Analog outputs → Analog output 1 to n → Simulate enabled (1662–1 to n)

**Description**

Use this function to enable or disable block simulation.

**Selection**

- Disable
- Enable

**Factory setting**

Disable

**Additional information**

Description

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

Simulate value

**Navigation**

Expert → Analog outputs → Analog output 1 to n → Simulate value (1664–1 to n)

**Description**

Use this function to enter a simulation value.

**User entry**

Signed floating-point number

**Factory setting**

0
### Additional information

*Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.

---

### Simulate status

**Navigation**

- Expert → Analog outputs → Analog output 1 to n → Simulate status (1663–1 to n)

**Description**

Use this function to enter a simulation status for the block.

**User entry**

0 to 255

**Factory setting**

0

*Additional information*

*Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

---

### Increase close

**Navigation**

- Expert → Analog outputs → Analog output 1 to n → Increase close (1638–1 to n)

**Description**

Use this function to enter the effective direction of the positioner in automatic mode.

**User entry**

0 to 255

**Factory setting**

0

---

### Out scale upper range

**Navigation**

- Expert → Analog outputs → Analog output 1 to n → Out scale up (1646–1 to n)

**Description**

Use this function to enter the upper value range for the output value in system units.

**User entry**

Signed floating-point number

**Factory setting**

100.0
### Out scale lower range

**Navigation**
- Expert → Analog outputs → Analog output 1 to n → Out scale low (1644–1 to n)

**Description**
Use this function to enter the lower value range for the output value in system units.

**User entry**
Signed floating-point number

**Factory setting**
0

### 3.7 "Discrete outputs" submenu

**Navigation**
- Expert → Discrete outputs

#### 3.7.1 "Discrete output 1 to n" submenu

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n

- Set point value (1715–1 to n)
- Set point status (1714–1 to n)
- Invert (1692–1 to n)
- Fail-safe time (1697–1 to n)
- Fail-safe type (1696–1 to n)
- Fail-safe value (1693–1 to n)
- Out value (1704–1 to n)
- Out status (1723–1 to n)
- Out status (1703–1 to n)
### Set point value

**Navigation**
Expert → Discrete outputs → Discr. out. 1 to n → Set point val (1715–1 to n)

**Description**
Use this function to enter an analog set point.

**User entry**
0 to 255

**Factory setting**
0

### Set point status

**Navigation**
Expert → Discrete outputs → Discr. out. 1 to n → Set point status (1714–1 to n)

**Description**
Use this function to enter a status for the analog set point.

**User entry**
0 to 255

**Factory setting**
0

### Invert

**Navigation**
Expert → Discrete outputs → Discr. out. 1 to n → Invert (1692–1 to n)

**Description**
Use this function to switch inversion on and off. Specifies whether the set point should be inverted before the value is set as the output value or the RCAS value (in the automatic mode).

**Selection**
- Off
- On

**Factory setting**
Off

### Fail-safe time

**Navigation**
Expert → Discrete outputs → Discr. out. 1 to n → Fail-safe time (1697–1 to n)

**Description**
Use this function to enter a time span within which the criteria for an error must be met continuously before an error message or notice message is generated.

**User entry**
Signed floating-point number

**Factory setting**
0
**Additional information**  
*User entry*

**NOTE!**

*If this parameter is used, error messages and notice messages are delayed by the set time before being relayed to the higher-level controller (DCS, etc.).*

- Check in advance to ensure that the safety-specific requirements of the process would permit this.
- If the error and notice messages may not be suppressed, a value of 0 seconds must be configured here.

---

**Fail-safe type**

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to n → Fail-safe type (1696–1 to n)

**Description**  
Use this function to select the failure mode.

**Selection**

- Fail-safe value
- Fallback value
- Off

**Factory setting**  
Fallback value

**Additional information**  
*Selection*

If an input or simulation value has the status BAD, the function block uses this predefined failure value:

- Fail-safe value
  
  A substitute value is used. This is specified in the Fail-safe value parameter (→ 136).
- Fallback value
  
  If the value was good at one point, then this last valid value is used.
- Off
  
  The system continues to use the bad value.

---

**Fail-safe value**

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to n → Fail-safe value (1693–1 to n)

**Prerequisite**  
In Fail-safe type parameter (→ 136), the Fail-safe value option is selected.

**Description**  
Use this function to enter a failure value. The value entered is displayed as the output value (Out value parameter (→ 137)) in the event of an error.

**User entry**  
0 to 255

**Factory setting**  
0
### Out value

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to n → Out value (1704–1 to n)

**Prerequisite**

In Target mode parameter (→ 138), the Auto option is selected.

**Description**

Displays the analog value which is calculated when the function is executed.

**User interface**

0 to 255

### Out status

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to n → Out status (1723–1 to n)

**Description**

Displays the current output status (Good, Bad, Uncertain).

**User interface**

- Good
- Uncertain
- Bad

### Out status

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to n → Out status (1703–1 to n)

**Prerequisite**

In Target mode parameter (→ 138), the Auto option is selected.

**Description**

Displays the current output status (hex value).

**User interface**

0 to 0xFF

### Tag description

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to n → Tag description (1721–1 to n)

**Description**

Use this function to enter a string to identify the block.

**User entry**

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

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n → Static revision (1720–1 to n)

**Description**
Displays the event counter: every write access to a static block parameter is counted.

**User interface**
0 to FFFF

**Additional information**
- *Description*
  - Static parameters are parameters that are not changed by the process.

### Strategy

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n → Strategy (1719–1 to n)

**Description**
Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

**User entry**
0 to FFFF

**Factory setting**
0

### Alert key

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n → Alert key (1694–1 to n)

**Description**
Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

**User entry**
0 to 0xFF

**Factory setting**
0

### Target mode

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n → Target mode (1722–1 to n)

**Description**
Displays the Target mode: The target mode specifies which mode of operation is used for this function block. This mode is generally set by a control application.
**User interface**

- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

**Mode block actual**

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to n → Mode block act (1691–1 to n)

**Description**

Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 138).

**User interface**

- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

**Additional information**

Description

A comparison of the current mode with the target mode (Target mode parameter (→ 138)) indicates whether it was possible to reach the target mode.

**Mode block permitted**

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to n → Mode block perm (1705–1 to n)

**Description**

Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 138) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

**User interface**

0 to 255

**Mode block normal**

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to n → Mode blk norm (1702–1 to n)

**Description**

Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.
Description of device parameters

User interface
- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

Alarm summary

Navigation
Expert → Discrete outputs → Discr. out. 1 to n → Alarm summary (1701–1 to n)

Description
Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface
- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

Additional information
Description
Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Discrete Outputs function block.

Batch ID

Navigation
Expert → Discrete outputs → Discr. out. 1 to n → Batch ID (1695–1 to n)

Description
Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

User entry
Positive integer

Batch operation

Navigation
Expert → Discrete outputs → Discr. out. 1 to n → Batch operation (1698–1 to n)

Description
Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

User entry
0 to 65535

Factory setting
0
### Batch phase

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to n → Batch phase (1699–1 to n)

**Description**  
Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

**User entry**  
0 to 65535

**Factory setting**  
0

### Batch Recipe Unit Procedure

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to n → Batch Recipe (1700–1 to n)

**Description**  
Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

**User entry**  
0 to 65535

**Factory setting**  
0

**Additional information**  
*Description*  
The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

### Readback value

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to n → Readback value (1713–1 to n)

**Description**  
Displays the readback value. The readback value indicates the current position of the control element and the element's sensors.

**User interface**  
0 to 255

### Readback status

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to n → Readback status (1712–1 to n)

**Description**  
Displays the readback status. Displays the status of the readback value.

**User interface**  
0 to 255
### RCAS in value

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n → RCAS in value (1707–1 to n)

**Description**
Use this function to enter the RCAS (Remote Cascade) in value. The block set point is set by a control application via the remote cascade **RCAS in value** parameter (→ 142). The normal algorithm calculates the output value of the block on the basis of this set point.

**User entry**
0 to 255

**Factory setting**
0

### RCAS in status

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n → RCAS in status (1706–1 to n)

**Description**
Use this function to enter the RCAS (Remote Cascade) in status. Defines the status for the **RCAS in value** (→ 142).

**User entry**
0 to 255

**Factory setting**
0

### Input channel

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n → Input channel (1724–1 to n)

**Description**
Use this function to select the input channel. The number of logical hardware channels from the converter that is connected to this I/O block.

**Selection**
None

**Factory setting**
None

### Output channel

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to n → Output channel (1725–1 to n)

**Description**
Use this function to select the output channel. The number of logical hardware channels to the converter that is connected to this I/O block.

**Selection**
- Flow override
- Start verification *

* Visibility depends on order options or device settings
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<th>Flow override</th>
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**RCAS out value**

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<tr>
<th><strong>Navigation</strong></th>
<th>Expert → Discrete outputs → Discr. out. 1 to n → RCAS out value (1711–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Displays the RCAS out value. Displays the set point of the block which is made available to the higher-level host for monitoring/back calculation and which makes it possible to take action under certain conditions or in a different mode.</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>0 to 255</td>
</tr>
</tbody>
</table>

**RCAS out status**

<table>
<thead>
<tr>
<th><strong>Navigation</strong></th>
<th>Expert → Discrete outputs → Discr. out. 1 to n → RCAS out status (1708–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Displays the RCAS out status. Displays the status of the set point.</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>0 to 255</td>
</tr>
</tbody>
</table>

**Simulate enabled**

<table>
<thead>
<tr>
<th><strong>Navigation</strong></th>
<th>Expert → Discrete outputs → Discr. out. 1 to n → Simulate enabled (1716–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enable or disable block simulation.</td>
</tr>
</tbody>
</table>
| **Selection** | • Disable  
  • Enable |
| **Factory setting** | Disable |
| **Additional information** | *Description*  
  The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation. |

**Simulate value**

<table>
<thead>
<tr>
<th><strong>Navigation</strong></th>
<th>Expert → Discrete outputs → Discr. out. 1 to n → Simulate value (1718–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter a simulation value.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>0 to 255</td>
</tr>
</tbody>
</table>
Description of device parameters

<table>
<thead>
<tr>
<th>Factory setting</th>
<th>0</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.</td>
</tr>
</tbody>
</table>

### Simulate status

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete outputs → Discr. out. 1 to n → Simulate status (1717–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter a simulation status for the block.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 255</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.</td>
</tr>
</tbody>
</table>

### 3.8 "Application" submenu

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>▶ Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Reset all totalizers (2806)</td>
</tr>
<tr>
<td>▶ Totalizer 1 to n</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reset all totalizers</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Reset all tot. (2806)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to reset all totalizers to the value 0 and restart the totaling process. This deletes all the flow values previously totalized.</td>
</tr>
</tbody>
</table>
| Selection | • Cancel  
• Reset + totalize |
| Factory setting | Cancel |
### Additional information  

**Selection**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>Reset + totalize</td>
<td>Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totalized.</td>
</tr>
</tbody>
</table>

#### 3.8.1 "Totalizer 1 to n" submenu

**Navigation**  

Expert → Application → Totalizer 1 to n

<table>
<thead>
<tr>
<th>▶ Totalizer 1 to n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable (3808–1 to n)</td>
</tr>
<tr>
<td>Unit totalizer (3835–1 to n)</td>
</tr>
<tr>
<td>Control Totalizer 1 to n (3830–1 to n)</td>
</tr>
<tr>
<td>Preset value 1 to n (3829–1 to n)</td>
</tr>
<tr>
<td>Totalizer operation mode (3823–1 to n)</td>
</tr>
<tr>
<td>Failure mode (3810–1 to n)</td>
</tr>
<tr>
<td>Out value 1 to n (3827–1 to n)</td>
</tr>
<tr>
<td>Totalizer status 1 to n (3826–1 to n)</td>
</tr>
<tr>
<td>Totalizer status (Hex) 1 to n (3825–1 to n)</td>
</tr>
</tbody>
</table>

---

**Assign process variable**  

**Navigation**  

Expert → Application → Totalizer 1 to n → Assign variable (3808–1 to n)

**Description**  

Use this function to select a process variable for Totalizer 1 to n.

**Selection**  

- Volume flow
- Mass flow
- Corrected volume flow

**Factory setting**  

Volume flow
Additional information

Description

If the option selected is changed, the device resets the totalizer to 0.

Unit totalizer

Navigation

Expert → Application → Totalizer 1 to n → Unit totalizer (3835–1 to n)

Prerequisite

One of the following options is selected in the Assign process variable parameter (→ 145):

- Volume flow
- Mass flow

Description

Use this function to select the process variable of a totalizer.

The unit is selected separately for each totalizer. It is independent of the selection made in the System units submenu (→ 44).

Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>g*</td>
<td>oz*</td>
</tr>
<tr>
<td>kg*</td>
<td>lb*</td>
</tr>
<tr>
<td>t*</td>
<td>STon*</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

or

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>cm³*</td>
<td>af*</td>
</tr>
<tr>
<td>dm³*</td>
<td>ft³*</td>
</tr>
<tr>
<td>m³*</td>
<td>Mft³*</td>
</tr>
<tr>
<td>ml*</td>
<td>ml*</td>
</tr>
<tr>
<td>l*</td>
<td>fl oz (us)*</td>
</tr>
<tr>
<td>hl*</td>
<td>gal (us)*</td>
</tr>
<tr>
<td>Ml Mega*</td>
<td>kgal (us)*</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

or

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nl*</td>
<td>Sft³*</td>
</tr>
<tr>
<td>Nhl*</td>
<td>MSft³*</td>
</tr>
<tr>
<td>Nm³*</td>
<td>MMSft³*</td>
</tr>
<tr>
<td>Sl*</td>
<td>Sgal (us)*</td>
</tr>
<tr>
<td>Sm³*</td>
<td>Sbbl (us;liq.)*</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

or

<table>
<thead>
<tr>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>gal (imp)*</td>
</tr>
<tr>
<td>Mgal (imp)*</td>
</tr>
<tr>
<td>bbl (imp;beer)*</td>
</tr>
<tr>
<td>bbl (imp;oil)*</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
**Factory setting**

Country-specific:
- m³
- ft³

**Additional information**

*Selection*

The selection is independent of the process variable selected in the Assign process variable parameter (→ 145).

*Dependency*

The following parameters depend on the option selected:
- Alarm hysteresis parameter (→ 154)
- Hi Hi Lim parameter (→ 154)
- Hi Lim parameter (→ 155)
- Lo Lim parameter (→ 155)
- Lo Lo Lim parameter (→ 156)
- Totalizer value parameter (→ 43)
- Preset value parameter (→ 148)

---

### Control Totalizer 1 to n

**Navigation**

Expert → Application → Totalizer 1 to n → Control Tot. 1 to n (3830–1 to n)

**Prerequisite**

One of the following options is selected in the Assign process variable parameter (→ 145):
- Volume flow
- Mass flow
- Corrected volume flow

**Description**

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

**Selection**

- Totalize
- Reset + hold
- Preset + hold

**Factory setting**

Totalize

**Additional information**

*Options*

- Totalize
  The totalizer is started or continues totalizing with the current counter reading.
- Reset + hold
  The totaling process is stopped and the totalizer is reset to 0.
- Preset + hold
  The totaling process is stopped and the totalizer is set to its defined start value from the Preset value parameter.
Preset value 1 to n

**Navigation**

> Expert → Application → Totalizer 1 to n → Preset value 1 to n (3829–1 to n)

**Prerequisite**

One of the following options is selected in the Assign process variable parameter (→ 145):
- Volume flow
- Mass flow

**Description**

Use this function to enter an initial value for the specific totalizer.

**User entry**

Signed floating-point number

**Factory setting**

Country-specific:
- m³
- ft³

**Additional information**

*User entry*

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 146).

*Example*

This configuration is suitable for applications such as iterative filling processes with a fixed batch quantity.

Totalizer operation mode

**Navigation**

> Expert → Application → Totalizer 1 to n → Operation mode (3823–1 to n)

**Prerequisite**

In the Assign process variable parameter (→ 145), one of the following options is selected:
- Volume flow
- Mass flow

**Description**

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

**Selection**

- Net flow total
- Forward flow total
- Reverse flow total
- Last valid value

**Factory setting**

Net flow total
### Failure mode

**Navigation**

Expert → Application → Totalizer 1 to n → Failure mode (3810–1 to n)

**Prerequisite**

In the Assign process variable parameter (→ 145), one of the following options is selected:

- Volume flow
- Mass flow

**Description**

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

**Selection**

- Stop
- Actual value
- Last valid value

**Factory setting**

Actual value

**Additional information**

Description

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

Selection

- Stop
  Totalizing is stopped when a device alarm occurs.
- Actual value
  The totalizer continues to count based on the current measured value; the device alarm is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the device alarm occurred.

### Out value 1 to n

**Navigation**

Expert → Application → Totalizer 1 to n → Out value 1 to n (3827–1 to n)

**Prerequisite**

The Auto option is selected in the Target mode parameter (→ 151).

**Description**

Displays the current reading for totalizer 1-3.
User interface
Signed floating-point number

Additional information
Description

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

User interface
The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Totalizer operation mode** parameter (→ § 148).

Dependency

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ § 146).

**Totalizer status 1 to n**

Navigation

Expert → Application → Totalizer 1 to n → Tot. status 1 to n (3826–1 to n)

Description
Displays the status of the particular totalizer.

User interface
- Good
- Uncertain
- Bad

**Totalizer status (Hex) 1 to n**

Navigation

Expert → Application → Totalizer 1 to n → Status (Hex) 1 to n (3825–1 to n)

Prerequisite
In **Target mode** parameter (→ § 151), the **Auto** option is selected.

Description
Displays the status value (hex) of the particular totalizer.

User interface
0 to 0xFF

**Tag description**

Navigation

Expert → Application → Totalizer 1 to n → Tag description (3833–1 to n)

Description
Use this function to enter a string to identify the block.

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

Navigation: Expert → Application → Totalizer 1 to n → Static revision (3832–1 to n)
Description: Displays the event counter: every write access to a static block parameter is counted.
User interface: 0 to FFFF
Additional information:

Static parameters are parameters that are not changed by the process.

Strategy

Navigation: Expert → Application → Totalizer 1 to n → Strategy (3831–1 to n)
Description: Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.
User entry: 0 to FFFF
Factory setting: 0

Alert key

Navigation: Expert → Application → Totalizer 1 to n → Alert key (3803–1 to n)
Description: Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.
User entry: 0 to 0xFF
Factory setting: 0

Target mode

Navigation: Expert → Application → Totalizer 1 to n → Target mode (3834–1 to n)
Description: Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.
User interface:
- Auto
- Man
- Out of service
Mode block actual

**Navigation**

Expert → Application → Totalizer 1 to n → Mode block act (3801–1 to n)

**Description**
Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 151).

**User interface**
- Auto
- Man
- Out of service

**Additional information**

Description
A comparison of the current mode with the target mode (Target mode parameter (→ 151)) indicates whether it was possible to reach the target mode.

Mode block permitted

**Navigation**

Expert → Application → Totalizer 1 to n → Mode block perm (3828–1 to n)

**Description**
Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 151) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

**User interface**
0 to 255

Mode block normal

**Navigation**

Expert → Application → Totalizer 1 to n → Mode blk norm (3824–1 to n)

**Description**
Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

**User interface**
- Auto
- Man
- Out of service

Alarm summary

**Navigation**

Expert → Application → Totalizer 1 to n → Alarm summary (3809–1 to n)

**Description**
Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.
User interface

- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

Additional information

Description

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Totalizer function block.

**Batch ID**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to n → Batch ID (3804–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.</td>
</tr>
<tr>
<td>User entry</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

**Batch operation**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to n → Batch operation (3805–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

**Batch phase**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to n → Batch phase (3806–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>
**Batch Recipe Unit Procedure**

**Navigation**
- Expert → Application → Totalizer 1 to n → Batch Recipe (3807–1 to n)

**Description**
Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

**User entry**
0 to 65535

**Factory setting**
0

**Additional information**
- **Description**
  - The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

**Alarm hysteresis**

**Navigation**
- Expert → Application → Totalizer 1 to n → Alarm hysteresis (3802–1 to n)

**Description**
Use this function to enter the hysteresis value for the upper and lower warning or alarm limit values.

**User entry**
Signed floating-point number

**Factory setting**
0 m³

**Additional information**
- **User entry**
  - The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 146).

**Hi Hi Lim**

**Navigation**
- Expert → Application → Totalizer 1 to n → Hi Hi Lim (3815–1 to n)

**Description**
Use this function to enter the value for the upper alarm limit of the totalizer (Hi Hi alarm value parameter (→ 156)).

**User entry**
Signed floating-point number

**Factory setting**
Positive floating-point number
Additional information

**Description**

If the output value Out value (→ 103) exceeds this limit value, the **Hi alarm state** parameter (→ 157) is output.

**User entry**

The value is entered in the defined units (Out unit parameter (→ 109)) and must be in the range defined in the **Out scale lower range** parameter (→ 108) and **Out scale upper range** parameter (→ 108).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 146).

### Hi Lim

**Navigation**

Expert → Application → Totalizer 1 to n → Hi Lim (3816–1 to n)

**Description**

Use this function to enter the value for the upper warning limit of the totalizer (**Hi alarm value** parameter (→ 157)).

**User entry**

Signed floating-point number

**Factory setting**

Positive floating-point number

**Additional information**

**Description**

If the output value Out value (→ 103) exceeds this limit value, the **Hi alarm state** parameter (→ 157) is output.

**User entry**

The value is entered in the defined units (Out unit parameter (→ 109)) and must be in the range defined in the **Out scale lower range** parameter (→ 108) and **Out scale upper range** parameter (→ 108).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 146).

### Lo Lim

**Navigation**

Expert → Application → Totalizer 1 to n → Lo Lim (3819–1 to n)

**Description**

Use this function to enter the value for the lower warning limit of the totalizer (**Lo alarm value** parameter (→ 157)).

**User entry**

Signed floating-point number

**Factory setting**

Negative floating-point number
### Additional information

#### Description

If the output value Out value (→ 103) exceeds this limit value, the **Lo alarm state** parameter (→ 158) is output.

#### User entry

The value is entered in the defined units (**Out unit** parameter (→ 109)) and must be in the range defined in the **Out scale lower range** parameter (→ 108) and **Out scale upper range** parameter (→ 108).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 146).

---

### Lo Lo Lim

<table>
<thead>
<tr>
<th>Navigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert → Application → Totalizer 1 to n → Lo Lo Lim (3822–1 to n)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use this function to enter the value for the lower alarm limit of the totalizer (<strong>Lo Lo alarm value</strong> parameter (→ 158)).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative floating-point number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the output value Out value (→ 103) exceeds this limit value, the <strong>Lo alarm state</strong> parameter (→ 158) is output.</td>
</tr>
</tbody>
</table>

#### User entry

The value is entered in the defined units (**Out unit** parameter (→ 109)) and must be in the range defined in the **Out scale lower range** parameter (→ 108) and **Out scale upper range** parameter (→ 108).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 146).

---

### Hi Hi alarm value

<table>
<thead>
<tr>
<th>Navigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert → Application → Totalizer 1 to n → HiHi alarm value (3814–1 to n)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays the alarm value for the upper alarm limit value (<strong>Hi Hi Lim</strong> parameter (→ 154)).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>
**Hi Hi alarm state**

**Navigation**

Expert → Application → Totalizer 1 to n → HiHi alarm state (3813–1 to n)

**Description**

Displays the status for the upper alarm limit value (Hi Hi Lim parameter (→ 154)).

**User interface**

- No alarm
- Alarm state HiHi limit

**Additional information**

User interface

The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

---

**Hi alarm value**

**Navigation**

Expert → Application → Totalizer 1 to n → Hi alarm value (3812–1 to n)

**Description**

Displays the warning value for the upper warning limit value (Hi Lim parameter (→ 155)).

**User interface**

Signed floating-point number

---

**Hi alarm state**

**Navigation**

Expert → Application → Totalizer 1 to n → Hi alarm state (3811–1 to n)

**Description**

Displays the status for the upper warning limit value (Hi Lim parameter (→ 155)).

**User interface**

- No warning
- Alarm state Hi limit

**Additional information**

User interface

The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

---

**Lo alarm value**

**Navigation**

Expert → Application → Totalizer 1 to n → Lo alarm value (3818–1 to n)

**Description**

Displays the warning value for the lower warning limit value (Lo Lim parameter (→ 155)).

**User interface**

Signed floating-point number
Lo alarm state

Navigation
Expert → Application → Totalizer 1 to n → Lo alarm state (3817–1 to n)

Description
Displays the status for the lower warning limit value (Lo Lim parameter (→ 155)).

User interface
• No warning
• Alarm state Lo limit

Additional information
User interface

Lo Lo alarm value

Navigation
Expert → Application → Totalizer 1 to n → LoLo alarm value (3821–1 to n)

Description
Displays the alarm value for the lower alarm limit value (Lo Lo Lim parameter (→ 156)).

User interface
Signed floating-point number

Lo Lo alarm state

Navigation
Expert → Application → Totalizer 1 to n → LoLo alarm state (3820–1 to n)

Description
Displays the status for the lower alarm limit value (Lo Lo Lim parameter (→ 156)).

User interface
• No alarm
• Alarm state LoLo limit

Additional information
User interface

3.9 "Diagnostics" submenu

Navigation
Expert → Diagnostics

Actual diagnostics (0691)
Actual diagnostics

Navigation

Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite

A diagnostic event has occurred.

Description

Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Display

Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→ 161).

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
### Description of device parameters

**Proline Promag 400 PROFIBUS DP**

### Timestamp

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Timestamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the operating time when the current diagnostic message occurred.</td>
</tr>
<tr>
<td>User interface</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
<tr>
<td>Additional information</td>
<td>Display</td>
</tr>
</tbody>
</table>

- The diagnostic message can be viewed via the **Actual diagnostics** parameter (→ 159).

**Example**
- For the display format:
  - 24d12h13m00s

### Previous diagnostics

<table>
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<th>Navigation</th>
<th>Expert → Diagnostics → Prev.diagnostics (0690)</th>
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</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>Symbol for diagnostic behavior, diagnostic code and short message.</td>
</tr>
<tr>
<td>Additional information</td>
<td>Display</td>
</tr>
</tbody>
</table>

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

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

### Timestamp

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Timestamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the operating time when the last diagnostic message before the current message occurred.</td>
</tr>
<tr>
<td>User interface</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
</tbody>
</table>
Additional information

Display

The diagnostic message can be viewed via the Previous diagnostics parameter (→ 160).

Example

For the display format:
24d12h13m00s

Operating time from restart

Navigation

Expert → Diagnostics → Time fr. restart (0653)

Description

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

User interface

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

Operating time

Navigation

Expert → Diagnostics → Operating time (0652)

Description

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

User interface

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

Additional information

User interface

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

3.9.1 "Diagnostic list" submenu

Navigation

Expert → Diagnostics → Diagnostic list

<table>
<thead>
<tr>
<th>Diagnostic list</th>
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</thead>
<tbody>
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<td>Diagnostics 1 (0692) → 162</td>
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<tr>
<td>Diagnostics 2 (0693) → 162</td>
</tr>
<tr>
<td>Diagnostics 3 (0694) → 163</td>
</tr>
<tr>
<td>Diagnostics 4 (0695) → 164</td>
</tr>
<tr>
<td>Diagnostics 5 (0696) → 165</td>
</tr>
</tbody>
</table>
### Diagnostics 1

**Navigation**

Expert → Diagnostics → Diagnostic list → Diagnostics 1 (0692)

**Description**

Displays the current diagnostics message with the highest priority.

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

*Display*

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

*Examples*

For the display format:

- ΔS442 Frequency output
- ▼F276 I/O module failure

### Timestamp

**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 (→  162).

*Example*

For the display format:

24d12h13m00s

### Diagnostics 2

**Navigation**

Expert → Diagnostics → Diagnostic list → Diagnostics 2 (0693)

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.
**Additional information**  
*Display*

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

*Examples*

For the display format:
- △S442 Frequency output
- ✖F276 I/O module failure

### Timestamp 2

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

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

**User interface**

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

**Additional information**  
*Display*

The diagnostic message can be viewed via the Diagnostics 2 parameter (→  ▶ 162).

*Example*

For the display format:
24d12h13m00s

### Diagnostics 3

**Navigation**

Expert → Diagnostics → Diagnostic list → Diagnostics 3 (0694)

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**  
*Display*

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

*Examples*

For the display format:
- △S442 Frequency output
- ✖F276 I/O module failure
## Timestamp 3

**Navigation**

₁ Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

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

**User interface**

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

**Additional information**

*Display*

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 163).

*Example*

For the display format:

24d12h13m00s

## Diagnostics 4

**Navigation**

₁₁ Expert → Diagnostics → Diagnostic list → Diagnostics 4 (0695)

**Description**

Displays the current diagnostics message with the fourth-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:

-  \(△S442\) Frequency output
-  \(△F276\) I/O module failure

## Timestamp 4

**Navigation**

₁₁ 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*

1. The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ § 164).

*Example*

For the display format:

24d12h13m00s

**Diagnostics 5**

**Navigation**

[ ] Expert → Diagnostics → Diagnostic list → Diagnostics 5 (0696)

**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*

1. 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:

- ![S442 Frequency output](image)
- ![F276 I/O module failure](image)

**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*

1. The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ § 165).

*Example*

For the display format:

24d12h13m00s
3.9.2  "Event logbook" submenu

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

Navigation  ▶  Expert → Diagnostics → Event logbook

Filter options

<table>
<thead>
<tr>
<th>Filter options (0705)</th>
<th>→  166</th>
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</thead>
</table>

| Event list |  →  166 |

Filter options

Navigation  ▶  Expert → Diagnostics → Event logbook → Filter options (0705)

Description
Use this function to select the category whose event messages are displayed in the event
list 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

"Event list" submenu

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

Expert → Diagnostics → Event logbook → Event list

Description
Displays the history of event messages of the category selected in the Filter options parameter (→ 166).

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

Additional information
Description
A maximum of 20 event messages are displayed in chronological order.
The following symbols indicate whether an event has occurred or has ended:
- ☐: Occurrence of the event
- ☐: End of the event

Examples
For the display format:
- 11091 Configuration modified
  ☐ 24d12h13m00s
- $S442 Frequency output
  ☐ 01d04h12min30s

Additional information, such as remedial measures, can be retrieved via the key.

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

To order the Extended HistoROM application package, see the "Application packages" section of the "Technical Information" document.
3.9.3 "Device information" submenu

**Navigation**  
Expert → Diagnostics → Device info

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<th>168</th>
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</thead>
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<td>Device tag (0011)</td>
<td></td>
<td>→</td>
<td>168</td>
</tr>
<tr>
<td>Serial number (0009)</td>
<td>→</td>
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<td></td>
</tr>
<tr>
<td>Firmware version (0010)</td>
<td>→</td>
<td>169</td>
<td></td>
</tr>
<tr>
<td>Device name (0013)</td>
<td>→</td>
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<td></td>
</tr>
<tr>
<td>Order code (0008)</td>
<td>→</td>
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<td></td>
</tr>
<tr>
<td>Extended order code 1 (0023)</td>
<td>→</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>Extended order code 2 (0021)</td>
<td>→</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>Extended order code 3 (0022)</td>
<td>→</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>ENP version (0012)</td>
<td>→</td>
<td>171</td>
<td></td>
</tr>
</tbody>
</table>

**Device tag**

**Navigation**  
Expert → Diagnostics → Device info → Device tag (0011)

**Description**  
Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

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

**Factory setting**  
- none -

**Additional information**  
*User interface*

1  
*Position of the header text on the display*

The number of characters displayed depends on the characters used.
### Serial number

**Navigation**

Expert → Diagnostics → Device info → Serial number (0009)

**Description**

Displays the serial number of the measuring device.

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

**User interface**

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

**Additional information**

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 info → Firmware version (0010)

**Description**

Displays the device firmware version installed.

**User interface**

Character string in the format xx.yy.zz

**Additional information**

Display

The Firmware version is also located:

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

### Device name

**Navigation**

Expert → Diagnostics → Device info → Device name (0013)

**Description**

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

**User interface**

Max. 32 characters such as letters or numbers.

**Factory setting**

Promag 400 DP

### Order code

**Navigation**

Expert → Diagnostics → Device info → Order code (0008)

**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 info → Ext. order cd. 1 (0023)

Description

Displays the first part of the extended order code.

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

User interface

Character string

Additional information

Description

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

The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.

Extended order code 2

Navigation

Expert → Diagnostics → Device info → Ext. order cd. 2 (0021)

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 (→ 170)

Extended order code 3

Navigation

Expert → Diagnostics → Device info → Ext. order cd. 3 (0022)

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 (→ 170)

ENP version

Navigation

Expert → Diagnostics → Device info → ENP version (0012)

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.

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

Navigation

Expert → Diagnostics → Mainboard module

Main electronic module

Software revision  →  171
Build no. software  →  172
Bootloader revision  →  172

Software revision

Navigation

Expert → Diagnostics → Main elec. mod. → Software rev. (0072)

Description

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

User interface

Positive integer
### Build no. software

**Navigation**

 Expert → Diagnostics → Main elec. mod. → Build no. softw. (0079)

**Description**

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

**User interface**

Positive integer

### Bootloader revision

**Navigation**

 Expert → Diagnostics → Main elec. mod. → Bootloader rev. (0073)

**Description**

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

**User interface**

Positive integer

### "Sensor electronic module (ISEM)" submenu

**Navigation**

 Expert → Diagnostics → Sens. electronic

![Sensor electronic module (ISEM)](image)

- **Software revision**
  - (0072) → 172
- **Build no. software**
  - (0079) → 173
- **Bootloader revision**
  - (0073) → 173

### Software revision

**Navigation**

 Expert → Diagnostics → Sens. electronic → Software rev. (0072)

**Description**

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

**User interface**

Positive integer
Build no. software

**Navigation**

Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)

**Description**

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

**User interface**

Positive integer

Bootloader revision

**Navigation**

Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

**Description**

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

**User interface**

Positive integer

3.9.6 "Display module" submenu

**Navigation**

Expert → Diagnostics → Display module

<table>
<thead>
<tr>
<th>▶ Display module</th>
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<td>Software revision (0072) → 173</td>
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<tr>
<td>Build no. software (0079) → 174</td>
</tr>
<tr>
<td>Bootloader revision (0073) → 174</td>
</tr>
</tbody>
</table>

Software revision

**Navigation**

Expert → Diagnostics → Display module → Software rev. (0072)

**Description**

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

**User interface**

Positive integer
Description of device parameters

**Build no. software**

**Navigation**
нос Expert → Diagnostics → Display module → Build no. softw. (0079)

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

**User interface**
Positive integer

**Bootloader revision**

**Navigation**
нос Expert → Diagnostics → Display module → Bootloader rev. (0073)

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

**User interface**
Positive integer

### 3.9.7 "Min/max values" submenu

**Navigation**
нос Expert → Diagnostics → Min/max val.

**"Main electronics temperature" submenu**

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

**Minimum value**
→ 175

**Maximum value**
→ 175
Proline Promag 400 PROFIBUS DP

Description of device parameters

Minimum value

Navigation

Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (6547)

Description
Displays the lowest previously measured temperature value of the main electronics module.

User interface
Signed floating-point number

Additional information
Dependency

The unit is taken from the Temperature unit parameter (→ 47)

Maximum value

Navigation

Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (6545)

Description
Displays the highest previously measured temperature value of the main electronics module.

User interface
Signed floating-point number

Additional information
Dependency

The unit is taken from the Temperature unit parameter (→ 47)

"Medium temperature" submenu

Navigation

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

Minimum value

Expert → Diagnostics → Min/max val. → Medium temp. → Minimum value (6681)

Description
Displays the lowest previously measured medium temperature value.

Endress+Hauser

175
Description of device parameters

**Proline Promag 400 PROFIBUS DP**

### User interface
Signed floating-point number

### Additional information
**Dependency**

> The unit is taken from the *Temperature unit* parameter (→ 47)

### Maximum value

**Navigation**

> Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (6680)

**Description**
Displays the highest previously measured medium temperature value.

**User interface**
Signed floating-point number

**Additional information**
**Dependency**

> The unit is taken from the *Temperature unit* parameter (→ 47)

---

### 3.9.8 "Data logging" submenu

**Navigation**

> Expert → Diagnostics → Data logging

#### Data logging

- Assign channel 1 (0851) → 177
- Assign channel 2 (0852) → 178
- Assign channel 3 (0853) → 178
- Assign channel 4 (0854) → 178
- Logging interval (0856) → 179
- Clear logging data (0855) → 179
- Data logging (0860) → 180
- Logging delay (0859) → 180
- Data logging control (0857) → 180
- Data logging status (0858) → 181
- Entire logging duration (0861) → 181
Assign channel 1

Navigation

Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

Prerequisite

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 39).

Description

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

Selection

- Off
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature
- Electronics temperature
- Noise
- Coil current shot time
- Reference electrode potential against PE
- Build-up measured value
- Test point 1
- Test point 2
- Test point 3

Factory setting

Off

Additional information

Description

A total of 1000 measured values can be logged. This means:
- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

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

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

* Visibility depends on order options or device settings
### Assign channel 2

**Navigation**

Expert → Diagnostics → Data logging → Assign chan. 2 (0852)

**Prerequisite**

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 39).

**Description**

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

**Selection**

For the picklist, see the **Assign channel 1** parameter (→ 177)

**Factory setting**

Off

### Assign channel 3

**Navigation**

Expert → Diagnostics → Data logging → Assign chan. 3 (0853)

**Prerequisite**

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 39).

**Description**

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

**Selection**

For the picklist, see the **Assign channel 1** parameter (→ 177)

**Factory setting**

Off

### Assign channel 4

**Navigation**

Expert → Diagnostics → Data logging → Assign chan. 4 (0854)

**Prerequisite**

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 39).

**Description**

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

**Selection**

For the picklist, see the **Assign channel 1** parameter (→ 177)

**Factory setting**

Off
Logging interval

Navigation

Expert → Diagnostics → Data logging → Logging interval (0856)

Prerequisite

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 39).

Description

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

User entry

0.1 to 3600.0 s

Factory setting

1.0 s

Additional information

Description

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

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

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

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

Example

If 1 logging channel is used:

- \( T_{log} = 1000 \times 1 \text{ s} = 1000 \text{ s} \approx 15 \text{ min} \)
- \( T_{log} = 1000 \times 10 \text{ s} = 10000 \text{ s} \approx 3 \text{ h} \)
- \( T_{log} = 1000 \times 80 \text{ s} = 80000 \text{ s} \approx 1 \text{ d} \)
- \( T_{log} = 1000 \times 3600 \text{ s} = 3600000 \text{ s} \approx 41 \text{ d} \)

Clear logging data

Navigation

Expert → Diagnostics → Data logging → Clear logging (0855)

Prerequisite

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 39).

Description

Use this function to clear the entire logging data.

Selection

- Cancel
- Clear data

Factory setting

Cancel
**Data logging**

- **Navigation**: Expert → Diagnostics → Data logging → Data logging (0860)
- **Description**: Use this function to select the data logging method.
- **Selection**
  - Overwriting
  - Not overwriting
- **Factory setting**: Overwriting
- **Additional information**
  - **Selection**
    - Overwriting
      - The device memory applies the FIFO principle.
    - Not overwriting
      - Data logging is canceled if the measured value memory is full (single shot).

**Logging delay**

- **Navigation**: Expert → Diagnostics → Data logging → Logging delay (0859)
- **Prerequisite**: In the Data logging parameter (→ 180), 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 measured value logging has been started with the Data logging control parameter (→ 180), the device does not save any data for the duration of the time delay entered.

**Data logging control**

- **Navigation**: Expert → Diagnostics → Data logging → Data log.control (0857)
- **Prerequisite**: In the Data logging parameter (→ 180), 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**
- None
- Initial measured value logging status.
- Delete + start
  All the measured values recorded for all the channels are deleted and measured value logging starts again.
- Stop
  Measured value logging is stopped.

---

### Data logging status

**Navigation**

Expert → Diagnostics → Data logging → Data log. status (0858)

**Prerequisite**
In the Data logging parameter (→ 180), the Not overwriting option is selected.

**Description**
Displays the measured value logging status.

**User interface**
- 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.

---

### Entire logging duration

**Navigation**

Expert → Diagnostics → Data logging → Logging duration (0861)

**Prerequisite**
In the Data logging parameter (→ 180), the Not overwriting option is selected.

**Description**
Displays the total logging duration.
User interface | Positive floating-point number

Factory setting | 0 s

"Display channel 1" submenu

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

Display channel 1

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

Prerequisite

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 39).

One of the following options is selected in the Assign channel 1 parameter (→ 177):

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature
- Electronics temperature

Description

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

Additional information

Description

Chart of a measured value trend

Visibility depends on order options or device settings
x-axis: depending on the number of channels selected displays 250 to 1000 measured values of a process variable.

y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.

"Display channel 2" submenu

Navigation  

Expert → Diagnostics → Data logging → Displ.channel 2

Display channel 2

Prerequisite  

A process variable is defined in the Assign channel 2 parameter.

Description  

See the Display channel 1 parameter →  182

"Display channel 3" submenu

Navigation  

Expert → Diagnostics → Data logging → Displ.channel 3

Display channel 3

Prerequisite  

A process variable is defined in the Assign channel 3 parameter.

Description  

See the Display channel 1 parameter →  182
"Display channel 4" submenu

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

Display channel 4

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

Description  
See the Display channel 1 parameter → 182

3.9.9 "Heartbeat" submenu

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

Navigation  
Expert → Diagnostics → HBT

Heartbeat Technology

3.9.10 "Simulation" submenu

Navigation  
Expert → Diagnostics → Simulation

Simulation

Assign simulation process variable (1810) → 185

Process variable value (1811) → 185

Device alarm simulation (0654) → 186

Diagnostic event category (0738) → 186

Diagnostic event simulation (0737) → 186
Assign simulation process variable

Navigation
[Expert → Diagnostics → Simulation → Assign proc.var. (1810)]

Description
Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the “Function check” category (C) while simulation is in progress.

Selection
- Off
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature

Factory setting
Off

Additional information
- Description
  The simulation value of the process variable selected is defined in the Process variable value parameter (→ 185).

Process variable value

Navigation
[Expert → Diagnostics → Simulation → Proc. var. value (1811)]

Prerequisite
A process variable is selected in the Assign simulation process variable parameter (→ 185).

Description
Use this function to enter a simulation value for the selected process variable. Subsequent measured value processing and the signal output use this simulation value. In this way, users can verify whether the measuring device has been configured correctly.

User entry
Depends on the process variable selected

Factory setting
0

Additional information
- User entry
  The unit of the displayed measured value is taken from the System units submenu (→ 44).

* Visibility depends on order options or device settings
### Device alarm simulation

**Navigation**

Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

**Description**

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

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

Description

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

### Diagnostic event category

**Navigation**

Expert → Diagnostics → Simulation → Event category (0738)

**Description**

Use this function to select the category of the diagnostic events that are displayed for the simulation in the Diagnostic event simulation parameter (→ 186).

**Selection**

- Sensor
- Electronics
- Configuration
- Process

**Factory setting**

Process

### Diagnostic event simulation

**Navigation**

Expert → Diagnostics → Simulation → Diag. event sim. (0737)

**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 (→ 186).
4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

<table>
<thead>
<tr>
<th>Volume flow</th>
<th>l/h option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>m³ option</td>
</tr>
<tr>
<td>Conductivity</td>
<td>µS/cm</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C option</td>
</tr>
<tr>
<td>Mass flow</td>
<td>kg/h option</td>
</tr>
<tr>
<td>Mass</td>
<td>kg option</td>
</tr>
<tr>
<td>Density</td>
<td>kg/l option</td>
</tr>
</tbody>
</table>

4.1.2 Full scale values

The factory settings apply to the following parameters:

100% bar graph value 1

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v ~ 2.5 m/s) [dm³/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>32</td>
<td>125</td>
</tr>
<tr>
<td>40</td>
<td>200</td>
</tr>
<tr>
<td>50</td>
<td>300</td>
</tr>
<tr>
<td>65</td>
<td>500</td>
</tr>
<tr>
<td>80</td>
<td>750</td>
</tr>
<tr>
<td>100</td>
<td>1200</td>
</tr>
<tr>
<td>125</td>
<td>1850</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v ~ 2.5 m/s) [m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td>300</td>
<td>750</td>
</tr>
<tr>
<td>350</td>
<td>1000</td>
</tr>
<tr>
<td>375</td>
<td>1200</td>
</tr>
<tr>
<td>400</td>
<td>1200</td>
</tr>
<tr>
<td>500</td>
<td>2000</td>
</tr>
<tr>
<td>600</td>
<td>2500</td>
</tr>
<tr>
<td>700</td>
<td>3500</td>
</tr>
<tr>
<td>750</td>
<td>4000</td>
</tr>
<tr>
<td>800</td>
<td>4500</td>
</tr>
</tbody>
</table>
### Country-specific factory settings

**Nominal diameter**

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v \approx 2.5) m/s [m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>900</td>
<td>6000</td>
</tr>
<tr>
<td>1000</td>
<td>7000</td>
</tr>
<tr>
<td>1200</td>
<td>10000</td>
</tr>
<tr>
<td>1400</td>
<td>14000</td>
</tr>
<tr>
<td>1600</td>
<td>18000</td>
</tr>
<tr>
<td>1800</td>
<td>23000</td>
</tr>
<tr>
<td>2000</td>
<td>28500</td>
</tr>
<tr>
<td>2200</td>
<td>34000</td>
</tr>
<tr>
<td>2400</td>
<td>40000</td>
</tr>
<tr>
<td>2600</td>
<td>48000</td>
</tr>
<tr>
<td>2800</td>
<td>55500</td>
</tr>
<tr>
<td>3000</td>
<td>63500</td>
</tr>
</tbody>
</table>

#### 4.1.3 Switch-on point low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v \approx 0.04) m/s [dm³/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
</tr>
<tr>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>65</td>
<td>8</td>
</tr>
<tr>
<td>80</td>
<td>12</td>
</tr>
<tr>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>125</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v \approx 0.04) m/s [m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>2.5</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
</tr>
<tr>
<td>250</td>
<td>7.5</td>
</tr>
<tr>
<td>300</td>
<td>10</td>
</tr>
<tr>
<td>350</td>
<td>15</td>
</tr>
<tr>
<td>375</td>
<td>20</td>
</tr>
<tr>
<td>400</td>
<td>20</td>
</tr>
<tr>
<td>450</td>
<td>25</td>
</tr>
<tr>
<td>500</td>
<td>30</td>
</tr>
<tr>
<td>600</td>
<td>40</td>
</tr>
<tr>
<td>700</td>
<td>50</td>
</tr>
<tr>
<td>750</td>
<td>60</td>
</tr>
<tr>
<td>800</td>
<td>75</td>
</tr>
</tbody>
</table>
### 4.2 US units

Only valid for USA and Canada.

#### 4.2.1 System units

<table>
<thead>
<tr>
<th>Volume flow</th>
<th>gal/min (us) option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>gal (us) option</td>
</tr>
<tr>
<td>Temperature</td>
<td>°F option</td>
</tr>
<tr>
<td>Mass flow</td>
<td>lb/min option</td>
</tr>
<tr>
<td>Mass</td>
<td>lb option</td>
</tr>
<tr>
<td>Density</td>
<td>lb/ft³ option</td>
</tr>
</tbody>
</table>

#### 4.2.2 Full scale values

The factory settings apply to the following parameters: 100% bar graph value 1

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v ~ 0.04 m/s) [m³/h]</th>
<th>(v ~ 2.5 m/s) [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>900</td>
<td>100</td>
<td>18</td>
</tr>
<tr>
<td>1000</td>
<td>125</td>
<td>50</td>
</tr>
<tr>
<td>1200</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>1400</td>
<td>225</td>
<td>200</td>
</tr>
<tr>
<td>1600</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>1800</td>
<td>350</td>
<td>500</td>
</tr>
<tr>
<td>2000</td>
<td>450</td>
<td>600</td>
</tr>
<tr>
<td>2200</td>
<td>540</td>
<td>800</td>
</tr>
<tr>
<td>2400</td>
<td>650</td>
<td>1000</td>
</tr>
<tr>
<td>2600</td>
<td>775</td>
<td>1200</td>
</tr>
<tr>
<td>2800</td>
<td>875</td>
<td>1500</td>
</tr>
<tr>
<td>3000</td>
<td>1025</td>
<td>1800</td>
</tr>
</tbody>
</table>
### Country-specific factory settings

**Proline Promag 400 PROFIBUS DP**

#### Nominal diameter [in]  
\( (v \approx 2.5 \text{ m/s}) \)  
\( \text{[gal/min]} \)

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v ~ 2.5 m/s) [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4800</td>
</tr>
<tr>
<td>18</td>
<td>6000</td>
</tr>
<tr>
<td>20</td>
<td>7500</td>
</tr>
<tr>
<td>24</td>
<td>10500</td>
</tr>
<tr>
<td>28</td>
<td>13500</td>
</tr>
<tr>
<td>30</td>
<td>16500</td>
</tr>
<tr>
<td>32</td>
<td>19500</td>
</tr>
<tr>
<td>36</td>
<td>24000</td>
</tr>
<tr>
<td>40</td>
<td>30000</td>
</tr>
<tr>
<td>42</td>
<td>33000</td>
</tr>
<tr>
<td>48</td>
<td>42000</td>
</tr>
</tbody>
</table>

#### Nominal diameter [in]  
\( (v \approx 2.5 \text{ m/s}) \)  
\( \text{[Mgal/d]} \)

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v ~ 2.5 m/s) [Mgal/d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>75</td>
</tr>
<tr>
<td>60</td>
<td>95</td>
</tr>
<tr>
<td>66</td>
<td>120</td>
</tr>
<tr>
<td>72</td>
<td>140</td>
</tr>
<tr>
<td>78</td>
<td>175</td>
</tr>
<tr>
<td>84</td>
<td>190</td>
</tr>
<tr>
<td>90</td>
<td>220</td>
</tr>
<tr>
<td>96</td>
<td>265</td>
</tr>
<tr>
<td>102</td>
<td>300</td>
</tr>
<tr>
<td>108</td>
<td>340</td>
</tr>
<tr>
<td>114</td>
<td>375</td>
</tr>
<tr>
<td>120</td>
<td>415</td>
</tr>
</tbody>
</table>

#### 4.2.3 Switch-on point low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

#### Nominal diameter [in]  
\( (v \approx 0.04 \text{ m/s}) \)  
\( \text{[gal/min]} \)

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v ~ 0.04 m/s) [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>1½</td>
<td>0.75</td>
</tr>
<tr>
<td>2</td>
<td>1.25</td>
</tr>
<tr>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>12</td>
<td>45</td>
</tr>
<tr>
<td>14</td>
<td>60</td>
</tr>
</tbody>
</table>
### Nominal Diameter [in] vs. Flow Rate [gal/min] (v ~ 0.04 m/s)

<table>
<thead>
<tr>
<th>Nominal Diameter [in]</th>
<th>Flow Rate [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>16</td>
<td>60</td>
</tr>
<tr>
<td>18</td>
<td>90</td>
</tr>
<tr>
<td>20</td>
<td>120</td>
</tr>
<tr>
<td>24</td>
<td>180</td>
</tr>
<tr>
<td>28</td>
<td>210</td>
</tr>
<tr>
<td>30</td>
<td>270</td>
</tr>
<tr>
<td>32</td>
<td>300</td>
</tr>
<tr>
<td>36</td>
<td>360</td>
</tr>
<tr>
<td>40</td>
<td>480</td>
</tr>
<tr>
<td>42</td>
<td>600</td>
</tr>
<tr>
<td>48</td>
<td>600</td>
</tr>
</tbody>
</table>

### Nominal Diameter [in] vs. Flow Rate [Mgal/d] (v ~ 0.04 m/s)

<table>
<thead>
<tr>
<th>Nominal Diameter [in]</th>
<th>Flow Rate [Mgal/d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>1.3</td>
</tr>
<tr>
<td>60</td>
<td>1.3</td>
</tr>
<tr>
<td>66</td>
<td>2.2</td>
</tr>
<tr>
<td>72</td>
<td>2.6</td>
</tr>
<tr>
<td>78</td>
<td>3.0</td>
</tr>
<tr>
<td>84</td>
<td>3.2</td>
</tr>
<tr>
<td>90</td>
<td>3.6</td>
</tr>
<tr>
<td>96</td>
<td>4.0</td>
</tr>
<tr>
<td>102</td>
<td>5.0</td>
</tr>
<tr>
<td>108</td>
<td>5.0</td>
</tr>
<tr>
<td>114</td>
<td>6.0</td>
</tr>
<tr>
<td>120</td>
<td>7.0</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>Density</td>
<td>g/cm³, g/m³</td>
<td>Gram/volume unit</td>
</tr>
<tr>
<td></td>
<td>kg/dm³, kg/l, kg/m³</td>
<td>Kilogram/volume unit</td>
</tr>
<tr>
<td>SD4°C, SD15°C, SD20°C</td>
<td>Specific density: The specific density is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).</td>
<td></td>
</tr>
<tr>
<td>SGA4°C, SG15°C, SG20°C</td>
<td>Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).</td>
<td></td>
</tr>
<tr>
<td>Conductivity</td>
<td>µS/mm</td>
<td>Microsiemens/length unit</td>
</tr>
<tr>
<td></td>
<td>nS/cm, µS/cm, mS/cm, S/cm</td>
<td>Nano-, Micro-, Milli-, Siemens/length unit</td>
</tr>
<tr>
<td></td>
<td>µS/m, mS/m, S/m, kS/m, MS/m</td>
<td>Micro-, Milli-, Siemens, Kilo-, Megasiemens/length unit</td>
</tr>
<tr>
<td>Mass</td>
<td>g, kg, t</td>
<td>Gram, kilogram, metric ton</td>
</tr>
<tr>
<td>Mass flow</td>
<td>g/s, g/min, g/h, g/d</td>
<td>Gram/time unit</td>
</tr>
<tr>
<td></td>
<td>kg/s, kg/min, kg/h, kg/d</td>
<td>Kilogram/time unit</td>
</tr>
<tr>
<td></td>
<td>t/s, t/min, t/h, t/d</td>
<td>Metric ton/time unit</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C, K</td>
<td>Celsius, Kelvin</td>
</tr>
<tr>
<td>Volume</td>
<td>cm³, dm³, m³</td>
<td>Cubic centimeter, cubic decimeter, cubic meter</td>
</tr>
<tr>
<td></td>
<td>ml, l, hl, MI Mega</td>
<td>Millilitre, liter, hectolitre, megalitre</td>
</tr>
<tr>
<td>Volume flow</td>
<td>cm³/s, cm³/min, cm³/h, cm³/d</td>
<td>Cubic centimeter/time unit</td>
</tr>
<tr>
<td></td>
<td>dm³/s, dm³/min, dm³/h, dm³/d</td>
<td>Cubic decimeter/time unit</td>
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<tr>
<td></td>
<td>m³/s, m³/min, m³/h, m³/d</td>
<td>Cubic meter/time unit</td>
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<tr>
<td></td>
<td>ml/s, ml/min, ml/h, ml/d</td>
<td>Millilitre/time unit</td>
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<tr>
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<td>l/s, l/min, l/h, l/d</td>
<td>Litre/time unit</td>
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<tr>
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<td>hl/s, hl/min, hl/h, hl/d</td>
<td>Hectolitre/time unit</td>
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<td>MI/s, MI/min, MI/h, MI/d</td>
<td>Megalitre/time unit</td>
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<td>Time</td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
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5.2  US units

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<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>Density</td>
<td>lb/ft³, lb/gal (us)</td>
<td>Pound/cubic foot, pound/gallon</td>
</tr>
<tr>
<td></td>
<td>lb/bbl (us;liq.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)</td>
<td>Pound/volume unit</td>
</tr>
<tr>
<td>Mass</td>
<td>oz, lb, STon</td>
<td>Ounce, pound, standard ton</td>
</tr>
<tr>
<td>Mass flow</td>
<td>oz/s, oz/min, oz/h, oz/d</td>
<td>Ounce/time unit</td>
</tr>
<tr>
<td></td>
<td>lb/s, lb/min, lb/h, lb/d</td>
<td>Pound/time unit</td>
</tr>
<tr>
<td></td>
<td>STon/s, STon/min, STon/h, STon/d</td>
<td>Standard ton/time unit</td>
</tr>
<tr>
<td>Temperature</td>
<td>°F, °R</td>
<td>Fahrenheit, Rankine</td>
</tr>
<tr>
<td>Volume</td>
<td>af</td>
<td>Acre foot</td>
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### Explanation of abbreviated units

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<th>Explanation</th>
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<tr>
<td>ft³</td>
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<td>Cubic foot</td>
</tr>
<tr>
<td>fl oz (us), gal (us), kgal (us), Mgal (us)</td>
<td>Fluid ounce, gallon, kilogallon, million gallon</td>
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</tr>
<tr>
<td>bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)</td>
<td>Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)</td>
<td></td>
</tr>
</tbody>
</table>

#### Volume flow
- ft³/s, ft³/min, ft³/h, ft³/d: Cubic foot/time unit
- fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us): Fluid ounce/time unit
- gal/s (us), gal/min (us), gal/h (us), gal/d (us): Gallon/time unit
- kgal/s (us), kgal/min (us), kgal/h (us), kgal/d (us): Kilogallon/time unit
- Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us): Million gallon/time unit
- bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.): Barrel/time unit (normal liquids)
- bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer): Barrel/time unit (beer)
- bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil): Barrel/time unit (petrochemicals)
- bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank): Barrel/time unit (filling tank)

#### Time
- s, m, h, d, y: Second, minute, hour, day, year
- am, pm: Ante meridiem (before midday), post meridiem (after midday)

### 5.3 Imperial units

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<th>Units</th>
<th>Explanation</th>
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</thead>
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<td>lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)</td>
<td>Pound/volume unit</td>
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<tr>
<td>Volume</td>
<td>gal (imp), Mgal (imp)</td>
<td>Gallon, mega gallon</td>
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<td>bbl (imp;beer), bbl (imp;oil)</td>
<td>Barrel (beer), barrel (petrochemicals)</td>
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<tr>
<td>Volume flow</td>
<td>gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)</td>
<td>Gallon/time unit</td>
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<td>Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)</td>
<td>Mega gallon/time unit</td>
</tr>
<tr>
<td></td>
<td>bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)</td>
<td>Barrel/time unit (beer)</td>
</tr>
<tr>
<td></td>
<td>Beer: 36.0 gal/bbl</td>
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</tr>
<tr>
<td></td>
<td>bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)</td>
<td>Barrel/time unit (petrochemicals)</td>
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<tr>
<td></td>
<td>Petrochemicals: 34.97 gal/bbl</td>
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</tr>
<tr>
<td>Time</td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
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<td>Ante meridiem (before midday), post meridiem (after midday)</td>
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