Description of Device Parameters

Proservo NMS81

Tank Gauging
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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 operating menu.

1.2  Symbols

1.2.1  Safety symbols

⚠️ DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠️ WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

⚠️ CAUTION
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

⚠️ NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2  Electrical symbols

∼
Alternating current

∼∼
Direct current and alternating current

−−−−
Direct current

⁻⁻⁻⁻
Ground connection
A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

⚡ Protective earth (PE)
Ground terminals that must be connected to ground prior to establishing any other connections.

The ground terminals are located on the interior and exterior of the device:
● Interior ground terminal: protective earth is connected to the mains supply.
● Exterior ground terminal: device is connected to the plant grounding system.

1.2.3  Tool symbols

🛠️ Phillips head screwdriver

🧰 Flat blade screwdriver
Torx screwdriver

Allen key

Open-ended wrench

1.2.4 Symbols for certain types of information and graphics

Permitted
Procedures, processes or actions that are permitted

Preferred
Procedures, processes or actions that are preferred

Forbidden
Procedures, processes or actions that are forbidden

Tip
Indicates additional information

Reference to documentation

Reference to graphic

Notice or individual step to be observed

Series of steps

Result of a step

Visual inspection

Operation via operating tool

Write-protected parameter

1, 2, 3, ...
Item numbers

A, B, C, ...
Views

Safety instructions
Observe the safety instructions contained in the associated Operating Instructions

Temperature resistance of the connection cables
Specifies the minimum value of the temperature resistance of the connection cables
1.3  Documentation

The following documentation types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads):

For an overview of the scope of the associated Technical Documentation, refer to the following:
- W@M Device Viewer (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- Endress+Hauser Operations App: Enter the serial number from the nameplate or scan the matrix code on the nameplate

1.3.1  Technical Information (TI)

Planning aid
The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.

1.3.2  Brief Operating Instructions (KA)

Guide that takes you quickly to the 1st measured value
The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

1.3.3  Operating Instructions (BA)

The Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

It also contains a detailed explanation of each individual parameter in the operating menu (except the Expert menu). The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.

1.3.4  Description of Device Parameters (GP)

The Description of Device Parameters provides a detailed explanation of each individual parameter in the 2nd part of the operating menu: the Expert menu. It contains all the device parameters and allows direct access to the parameters by entering a specific code. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.

1.3.5  Safety Instructions (XA)

Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.

The nameplate indicates the Safety Instructions (XA) that are relevant to the device.

1.3.6  Installation instructions (EA)

Installation Instruction are used to replace a faulty unit with a functioning unit of the same type.
2 Overview of the operating menu

- The following table lists all parameters the "Expert" menu may contain. The page number refers to where a description of the parameter can be found.
- Depending on the device version and parametrization some parameters will not be available in a given situation. For details on the conditions refer to the "Prerequisite" category in the description of the respective parameter.
- The representation essentially corresponds to the menu seen when using an operating tool (e.g. FieldCare). On the local display there may be minor differences in the menu structure. Details are mentioned in the description of the respective submenu.

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**System**

**Display**

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- **Self check**

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- **GP values**
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**Direct access**

**Navigation**  

- Expert → Direct access (0106)

**User entry**  

0 to 65 535

**Factory setting**  

0

**Additional information**

Enter the access code of a parameter in order to access this parameter directly (i.e. without navigation).

- The direct access code consists of a five digit number and an optional channel code, which specifies an input or output channel, e.g. 00353-2
  - Leading zeros need not to be entered.
  - If the channel code is not entered, channel 1 is automatically selected.
  - In order to access a different channel: Enter the direct access code with the channel code.

- In this document, the direct access code is added in brackets after the parameter name in the Navigation category.
The 'Expert' menu

Proservo NMS81

Locking status

**Navigation**

Expert → Locking status (0004)

**Description**

Indicates the type of locking.

'Hardware locked' (HW)
The device is locked by the 'WP' switch on the main electronics module. To unlock, set the switch into the OFF position.

'WHG locked' (SW)
Unlock the device by entering the appropriate access code in 'Enter access code'.

'SIL locked' (SW)
Unlock the device by entering the appropriate access code in 'Enter access code'.

'Temporarily locked' (SW)
The device is temporarily locked by processes in the device (e.g. data upload/download, reset). The device will automatically be unlocked after completion of these processes.

**Additional information**

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| Write access | -        |

Access status display

**Navigation**

Expert → Access stat.disp (0091)

**Prerequisite**

The device has a local display.

**Description**

Indicates access authorization to parameters via local display.

**Additional information**

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| Write access | -        |

- The access authorization can be changed via the Enter access code parameter (→ 33).
- If an additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the Locking status parameter (→ 32).

User role

**Navigation**

Expert → User role (0005)

**Description**

Shows the access authorization to the parameters via the operating tool

**Additional information**

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| Write access | -        |
Enter access code

Navigation

Displayed: Expert → Ent. access code (0003)

Description

Enter access code to disable write protection of parameters.

Additional information

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▶ Expert → System

▶ System

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3.1.1 "Display" submenu

Navigation  

Expert → System → Display

Language  

Format display  

Value 1 to 4 display  

Decimal places 1 to 4  

Separator  

Number format  

Header  

Header text  

Display interval  

Display damping  

Backlight  

Contrast display

Language

Navigation  

Expert → System → Display → Language (0104)

Prerequisite  
The device has a local display.

Description  
Set display language.

Selection  

- English  
- Deutsch  
- русский язык (Russian)  
- 日本語 (Japanese)  
- Español  
- 中文 (Chinese)

Factory setting  
English
The 'Expert' menu

Proservo NMS81

Additional information

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Format display

Navigation

Expert → System → Display → Format display (0098)

Prerequisite

The device has a local display.

Description

Select how measured values are shown on the display.

Selection

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

Factory setting

2 values

Additional information

1  "Format display" = "1 value, max. size"

2  "Format display" = "1 bargraph + 1 value"

3  "Format display" = "2 values"
The "Expert" menu

4. "Format display" = "1 value large + 2 values"

5. "Format display" = "4 values"

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Operator</td>
</tr>
</tbody>
</table>

- The Value 1 to 4 display (→ 37) parameters specify which measured values are shown on the display and in which order.
- If more measured values are specified than the current display mode permits, the values alternate on the device display. The display time until the next change is configured in the Display interval parameter (→ 40).

Value 1 to 4 display

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

Prerequisite
The device has a local display.

Description
Select the measured value that is shown on the local display.

Selection
- None 1)
- Tank level
- Measured level
- Level linearized
- Tank level %
- Water level 1)
- Liquid temperature 1)
- Vapor temperature 1)
- Air temperature 1)
- Tank ullage
- Tank ullage %
- Observed density value 1)
- P1 (bottom) 1)
- P2 (middle) 1)
- P3 (top) 1)

1) not available for the Value 1 display parameter
The "Expert" menu

- GP 1 value
- GP 2 value
- GP 3 value
- GP 4 value
- Gauge command
- Gauge status
- AIO B1-3 value
- AIO B1-3 value mA
- AIO B1-3 value %
- AIO C1-3 value
- AIO C1-3 value mA
- AIO C1-3 value %
- AIP B4-8 value
- AIP B4-8 value mA
- AIP B4-8 value %
- AIP C4-8 value
- AIP C4-8 value mA
- AIP C4-8 value %

Factory setting

Depending on device version

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Decimal places 1 to 4

Navigation

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

Prerequisite

The device has a local display.

Description

This selection does not affect the measurement and calculation accuracy of the device.

Selection

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

Factory setting

x.x

Additional information

The setting does not affect the measuring or computational accuracy of the device.

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
Separator

Navigation

Expert → System → Display → Separator (0101)

Prerequisite

The device has a local display.

Description

Select decimal separator for displaying numerical values.

Selection

- .
- ,

Factory setting

.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Number format

Navigation

Expert → System → Display → Number format (0099)

Prerequisite

The device has a local display.

Description

Choose number format for the display.

Selection

- Decimal
- ft-in-1/16''

Factory setting

Decimal

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The ft-in-1/16'' option is only valid for distance values.

Header

Navigation

Expert → System → Display → Header (0097)

Prerequisite

The device has a local display.

Description

Select header contents on local display.

Selection

- Device tag
- Free text

Factory setting

Device tag
The "Expert" menu

Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Meaning of the options

- **Device tag**
  The header contents is defined in the **Device tag** parameter (→ 207).

- **Free text**
  The header contents is defined in the **Header text** parameter (→ 40).

Header text

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

Prerequisite  
Header (→ 39) = Free text

Description  
Enter display header text.

User entry  
Character string comprising numbers, letters and special characters (11)

Factory setting  
TG-Platform

Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Display interval

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

Description  
Set time measured values are shown on display if display alternates between values.

User entry  
1 to 10 s

Factory setting  
5 s

Additional information  
This parameter is only relevant if the number of selected measuring values exceeds the number of values the selected display format can display simultaneously.

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</td>
<td>Operator</td>
</tr>
</tbody>
</table>
Display damping

**Navigation**  
Expert → System → Display → Display damping (0094)

**Prerequisite**  
The device has a local display.

**Description**  
Set display reaction time to fluctuations in the measured value.

**User entry**  
0.0 to 999.9 s

**Factory setting**  
0.0 s

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Backlight

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

**Prerequisite**  
The device has a local display.

**Description**  
Switch the local display backlight on and off.

**Selection**  
- Disable
- Enable

**Factory setting**  
Enable

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Operator</td>
</tr>
</tbody>
</table>

Contrast display

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

**Prerequisite**  
The device has a local display.

**Description**  
Adjust local display contrast setting to ambient conditions (e.g. lighting or reading angle)

**User entry**  
20 to 80 %

**Factory setting**  
30 %

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Operator</td>
</tr>
</tbody>
</table>
3.1.2 "System units" submenu

Navigation  
Expert → System → System units

<table>
<thead>
<tr>
<th>Units preset</th>
<th>→ 42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance unit</td>
<td>→ 43</td>
</tr>
<tr>
<td>Pressure unit</td>
<td>→ 43</td>
</tr>
<tr>
<td>Temperature unit</td>
<td>→ 43</td>
</tr>
<tr>
<td>Density unit</td>
<td>→ 44</td>
</tr>
<tr>
<td>Decimal places length</td>
<td>→ 44</td>
</tr>
<tr>
<td>Decimal places pressure</td>
<td>→ 44</td>
</tr>
<tr>
<td>Decimal places temperature</td>
<td>→ 45</td>
</tr>
<tr>
<td>Decimal places density</td>
<td>→ 45</td>
</tr>
</tbody>
</table>

Units preset

Navigation  
Expert → System → System units → Units preset (0605)

Description  
Defines a set of units for length, pressure and temperature.

Selection  
- mm, bar, °C
- m, bar, °C
- mm, PSI, °C
- ft, PSI, °F
- ft-in-16, PSI, °F
- ft-in-8, PSI, °F
- Customer value

Factory setting  
mm, bar, °C

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

If the Customer value option is selected, the units are defined in the following parameters. In any other case these are read-only parameters used to indicate the respective unit:
- Distance unit (→ 43)
- Pressure unit (→ 43)
- Temperature unit (→ 43)
Distance unit

**Navigation**

Expert → System → System units → Distance unit (0551)

**Description**

Select distance unit.

**Selection**

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>ft</td>
</tr>
<tr>
<td>mm</td>
<td>in</td>
</tr>
<tr>
<td>cm</td>
<td>ft-in-16</td>
</tr>
<tr>
<td></td>
<td>ft-in-8</td>
</tr>
</tbody>
</table>

**Factory setting**

mm

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance (if Units preset → 42 = Customer value)</td>
</tr>
</tbody>
</table>

Pressure unit

**Navigation**

Expert → System → System units → Pressure unit (0564)

**Selection**

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Other units</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar</td>
<td>psi</td>
<td>inH2O</td>
</tr>
<tr>
<td>Pa</td>
<td></td>
<td>inH2O (68°F)</td>
</tr>
<tr>
<td>kPa</td>
<td></td>
<td>ftH2O (68°F)</td>
</tr>
<tr>
<td>MPa</td>
<td></td>
<td>mmH2O</td>
</tr>
<tr>
<td>mbar a</td>
<td></td>
<td>mmHg</td>
</tr>
</tbody>
</table>

**Factory setting**

bar

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance (if Units preset → 42 = Customer value)</td>
</tr>
</tbody>
</table>

Temperature unit

**Navigation**

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

**Description**

Select temperature unit.

**Selection**

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>K</td>
<td>°R</td>
</tr>
</tbody>
</table>

**Factory setting**

°C

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance (if Units preset → 42 = Customer value)</td>
</tr>
</tbody>
</table>
Density unit

**Navigation**
Expert → System → System units → Density unit (0555)

**Description**
Select density unit.

**Selection**
- **SI units**
  - g/cm³
  - g/ml
  - g/l
  - kg/l
  - kg/dm³
  - kg/m³
- **US units**
  - lb/ft³
  - lb/gal (us)
  - lb/in³
  - STon/yd³
- **Other units**
  - °API
  - SGU

**Factory setting**
kg/m³

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance (if Units preset → 42 = Customer value)</td>
</tr>
</tbody>
</table>

Decimal places length

**Navigation**
Expert → System → System units → Decimal length (0573)

**Description**
Number of decimal places for length values.

**Selection**
- x
- x.x
- x.xxx
- x.xxx
- x.xxxx

**Factory setting**
x.x

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The setting does not affect the accuracy of the measurement or the calculations.

Decimal places pressure

**Navigation**
Expert → System → System units → Decimal pressure (0608)

**Description**
Number of decimal places for pressure values.
### Decimal places temperature

**Navigation**

- Expert → System → System units → Decimal temp. (0614)

**Description**

Number of decimal places for temperature values.

<table>
<thead>
<tr>
<th>Selection</th>
<th>x</th>
<th>x.x</th>
<th>x.xx</th>
<th>x.xxx</th>
<th>x.xxxx</th>
</tr>
</thead>
</table>

**Factory setting**

- x.xxx

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The setting does not affect the accuracy of the measurement or the calculations.

---

### Decimal places density

**Navigation**

- Expert → System → System units → Decimal density (0609)

**Description**

Number of decimal places for density values.

<table>
<thead>
<tr>
<th>Selection</th>
<th>x</th>
<th>x.x</th>
<th>x.xx</th>
<th>x.xxx</th>
<th>x.xxxx</th>
</tr>
</thead>
</table>

**Factory setting**

- x.x

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The setting does not affect the accuracy of the measurement or the calculations.
### Additional information

<table>
<thead>
<tr>
<th>Access</th>
<th>Authority</th>
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</thead>
<tbody>
<tr>
<td>Read</td>
<td>Operator</td>
</tr>
<tr>
<td>Write</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The setting does not affect the accuracy of the measurement or the calculations.
3.1.3 "Date / time" submenu

The Date / time submenu is used to set the real-time clock of the device.

Setting the real-time clock via the display and operating module

1. Navigate to Expert → System → Date / time → Set date.
   ➤ The current value of the real-time clock is displayed.

2. If the displayed value is correct: Press ➤ to terminate the wizard.

3. If the displayed value is not correct: Press ➤ to edit it.
   ➤ The current value of the Year parameter is displayed.

4. If the displayed value is correct: Press ➤ to go to the next value.

5. If the displayed value is incorrect: Press ➤ and enter the correct value. Confirm the new value by pressing ➤.

6. Repeat the last two steps for the following parameters: Month, Day, Hour, Minute.
   ➤ The new value of the real-time clock is displayed.

7. Confirm the new value of the real-time clock by pressing ➤.

8. Quit the wizard by pressing ➤ again.
Setting the real-time clock via an operating tool (e.g. FieldCare)

1. Navigate to: Expert → System → Date / time

2. Go to the Set date parameter (→ 50) and select the Start option.

3. Use the following parameters to set the date and time: Year, Month, Day, Hour, Minutes.

4. Go to the Set date parameter (→ 50) and select the Confirm time option.

The real-time clock is set to the current date and time.
Structure of the submenu on the display and operating module

*Navigation*  
> Expert → System → Date / time

<table>
<thead>
<tr>
<th>Menu</th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/time</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Set date</td>
<td>53</td>
</tr>
<tr>
<td>Date/time</td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>Month</td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>Day</td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>Hour</td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>Minute</td>
<td></td>
<td>54</td>
</tr>
<tr>
<td>Set date</td>
<td></td>
<td>54</td>
</tr>
</tbody>
</table>

Structure of the submenu in an operating tool (e.g. FieldCare)

*Navigation*  
> Expert → System → Date / time

<table>
<thead>
<tr>
<th>Menu</th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/time</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Set date</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Month</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>Day</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>Hour</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>Minute</td>
<td></td>
<td>52</td>
</tr>
</tbody>
</table>
Description of parameters

**Navigation**

Expert → System → Date / time

---

**Date/time**

**Navigation**

Expert → System → Date / time → Date/time (0790)

**Description**

Displays the device internal real-time clock.

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

---

**Set date**

**Navigation**

Expert → System → Date / time → Set date (0792)

**Description**

Controls the setting of the real-time clock.

**Selection**

- Please select
- Abort
- Start
- Confirm time

**Factory setting**

Please select

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Meaning of the options**

- **Please select**
  
  Prompts the user to select an action.

- **Abort**
  
  Discards the entered date and time.

- **Start**
  
  Starts the setting of the real-time clock.

- **Confirm time**
  
  Sets the real-time clock to the entered date and time.

---

**Year**

**Navigation**

Expert → System → Date / time → Year (0782)

**Prerequisite**

Set date (→ 50) = Start
### Description
Enter the current year.

### User entry
2016 to 2079

### Factory setting
2016

### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

---

### Month

#### Navigation
充分
Expert → System → Date / time → Month (0787)

#### Prerequisite
Set date (→ ☐ 50) = Start

#### Description
Enter the current month.

#### User entry
1 to 12

#### Factory setting
1

#### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

---

### Day

#### Navigation
充分
Expert → System → Date / time → Day (0788)

#### Prerequisite
Set date (→ ☐ 50) = Start

#### Description
Enter the current day.

#### User entry
1 to 31

#### Factory setting
1

#### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

---

### Hour

#### Navigation
充分
Expert → System → Date / time → Hour (0789)

#### Prerequisite
Set date (→ ☐ 50) = Start
The 'Expert' menu

**Description**
Enter the current hour.

**User entry**
0 to 23

**Factory setting**
0

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Minute**

**Navigation**

<table>
<thead>
<tr>
<th>Expert → System → Date / time → Minute (0791)</th>
</tr>
</thead>
</table>

**Prerequisite**

Set date (→ 50) = Start

**Description**
Enter the current minute.

**User entry**
0 to 59

**Factory setting**
0

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
The "Set date" wizard

Navigation Expert → System → Date / time → Set date

Date/time

Navigation Expert → System → Date / time → Set date → Date/time (0790)
Description → 50

Year

Navigation Expert → System → Date / time → Set date → Year (0782)
Description → 50

Month

Navigation Expert → System → Date / time → Set date → Month (0787)
Description → 51

Day

Navigation Expert → System → Date / time → Set date → Day (0788)
Description → 51

Hour

Navigation Expert → System → Date / time → Set date → Hour (0789)
Description → 51
Minute

Navigation  
Expert → System → Date / time → Set date → Minute (0791)

Description  
→  52

Set date

Navigation  
Expert → System → Date / time → Set date → Set date

Description  
Confirm the displayed new value of the real-time clock by pressing .
3.1.4 "Administration" submenu

Structure of the submenu on the display and operating module

Navigation  
Expert → System → Administration

Structure of the submenu in an operating tool (e.g. FieldCare)

Navigation  
Expert → System → Administration
Description of parameters

*Navigation*  
Expert → System → Administration

**Define access code**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Administration → Def. access code (0093)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Define release code for write access to parameters.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>0 to 9999</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Read access</td>
</tr>
<tr>
<td></td>
<td>Write access</td>
</tr>
</tbody>
</table>

- If the factory setting is not changed or 0 is defined as the access code, the parameters are not write-protected and the configuration data of the device can then always be modified. The user is logged on in the *Maintenance* role.
- The write protection affects all parameters marked with the symbol in this document.
- 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 (→ 33).

**Activate SW option**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Administration → Activate SW opt. (0029)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Enter the application package code or code of another re-ordered functionality to enable it</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>Positive integer</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Read access</td>
</tr>
<tr>
<td></td>
<td>Write access</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><strong>Description</strong></td>
<td>Reset the device configuration - either entirely or in part - to a defined state</td>
</tr>
</tbody>
</table>
Selection
- Cancel
- To factory defaults
- Restart device

Factory setting
Cancel

Additional information
Meaning of the options
- Cancel
  No action
- To factory defaults
  All parameters are reset to the order-code specific factory setting.
- Restart device
  The restart resets every parameter which is stored in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

’Define access code’ wizard

Navigation  
Expert → System → Administration → Def. access code

Define access code

Description  
→ 56

Confirm access code

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

Description  
Confirm the entered access code.

User entry  
0 to 9999

Factory setting  
0

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
3.2 "Sensor" submenu

Navigation  
Expert → Sensor

Gauge command  
→ 58

Description  
Gauge operation command to choose the measurement mode of the device.

Selection  
- Stop *
- Level
- Up *
- Bottom level *
- Upper I/F level *
- Lower I/F level *
- Upper density *
- Middle density *
- Lower density *
- Repeatability
- Water dip
- Release overtension *
- Tank profile *
- Interface profile *
- Manual profile *
- Level standby *
- Offset standby *

Factory setting  
Stop

* Visibility depends on order options or device settings
**Gauge status**

**Navigation**

Expert → Sensor → Gauge status (8081)

**Description**
Indicates the current status of the device gauge command.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Distance**

**Navigation**

Expert → Sensor → Distance (8103)

**Description**
Shows measured distance from reference position.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>
3.2.1 "Information" submenu

The Information submenu (→ 60) comprises all display parameters which give information about the current state of the measurement.

Description of parameters

*Navigation*  
Expert → Sensor → Information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross weight</td>
<td></td>
</tr>
<tr>
<td>Net weight</td>
<td></td>
</tr>
<tr>
<td>Gauge status</td>
<td></td>
</tr>
<tr>
<td>Active gauge command</td>
<td></td>
</tr>
<tr>
<td>Balance flag</td>
<td></td>
</tr>
<tr>
<td>Displacer status</td>
<td></td>
</tr>
<tr>
<td>Motor status</td>
<td></td>
</tr>
<tr>
<td>One-time command status</td>
<td></td>
</tr>
<tr>
<td>Sensor temperature</td>
<td></td>
</tr>
<tr>
<td>Detector temperature</td>
<td></td>
</tr>
</tbody>
</table>

**Gross weight**

*Navigation*  
Expert → Sensor → Information → Gross weight (8080)

*Description*  
Shows non-compensated measured weight from detector.

*Additional information*  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Net weight**

*Navigation*  
Expert → Sensor → Information → Net weight (8007)

*Description*  
Shows the corrected weight data from the detector, as compensated by the drum table. This weight is used for measurement.
### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Gauge status

**Navigation**

*Expert → Sensor → Information → Gauge status (8081)*

**Description**

Indicates the current status of the device gauge command.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Active gauge command

**Navigation**

*Expert → Sensor → Information → Active gauge cmd (8073)*

**Description**

Indicates the currently executed Gauge Command.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Balance flag

**Navigation**

*Expert → Sensor → Information → Balance flag (8006)*

**Description**

Indicates the validity of the Measurement. If balanced, corresponding Value (Liquid Level, Upper Interface, Lower Interface, Tank Bottom) is updated.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Displacer status

**Navigation**

*Expert → Sensor → Information → Displacer status (8160)*

**Description**

Shows the current moving and balancing status of the displacer.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
Motor status

**Navigation**

Expert → Sensor → Information → Motor status (8118)

**Description**

Shows the current moving Direction of the Motor.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

One-time command status

**Navigation**

Expert → Sensor → Information → One-time Cmd (8201)

**Description**

Indicates the status of the last executed one-time gauge command.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

- One-time command is available for all gauge commands, excepting Level, Stop, Up, and Interface.

Sensor temperature

**Navigation**

Expert → Sensor → Information → Sensor temp. (8066)

**Description**

Shows the temperature of sensor module electronics.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Detector temperature

**Navigation**

Expert → Sensor → Information → Detector temp. (8090)

**Description**

Shows the temperature of the detector unit.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
### 3.2.2 "Measured values" submenu

**Navigation**

Expert → Sensor → Measured values

<table>
<thead>
<tr>
<th>Measured values</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>64</td>
</tr>
<tr>
<td>Displacer position</td>
<td>64</td>
</tr>
<tr>
<td>Liquid level</td>
<td>65</td>
</tr>
<tr>
<td>Upper interface level</td>
<td>65</td>
</tr>
<tr>
<td>Upper interface level timestamp</td>
<td>65</td>
</tr>
<tr>
<td>Lower interface level</td>
<td>65</td>
</tr>
<tr>
<td>Lower interface level timestamp</td>
<td>66</td>
</tr>
<tr>
<td>Bottom level</td>
<td>66</td>
</tr>
<tr>
<td>Bottom level timestamp</td>
<td>66</td>
</tr>
<tr>
<td><strong>Spot density</strong></td>
<td>67</td>
</tr>
<tr>
<td><strong>Profile density</strong></td>
<td>69</td>
</tr>
</tbody>
</table>
6 Terms concerning NMS8x installation

A Liquid level
B Upper interface
C Lower interface
1 Displacer pos
2 Upper I/F level
3 Lower I/F level
4 Datum plate
5 Distance

Distance

Navigation  Expert → Sensor → Measured values → Distance (8103)

Description  Shows measured distance from reference position.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Displacer position

Navigation  Expert → Sensor → Measured values → Displacer pos (8130)

Description  Shows measured displacer position from zero position (tank bottom or datum plate). Value is always updated when displacer moves.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>
Liquid level

**Navigation**

Expert → Sensor → Measured values → Liquid level (8072)

**Description**

Shows measured level from zero position (tank bottom or datum plate). Value is updated when device generates a valid level measurement.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Upper interface level

**Navigation**

Expert → Sensor → Measured values → Upper I/F level (8127)

**Description**

Shows measured interface level from zero position (tank bottom or datum plate). Value is updated when device generates a valid Interface measurement.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Upper interface level timestamp

**Navigation**

Expert → Sensor → Measured values → Up I/F timestamp (8055)

**Description**

Shows timestamp for the last measured upper interface level.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Lower interface level

**Navigation**

Expert → Sensor → Measured values → Lower I/F level (8128)

**Description**

Shows measured interface level from zero position (tank bottom or datum plate). Value is updated when device generates a valid interface measurement.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>
### Lower interface level timestamp

**Navigation**

- Expert → Sensor → Measured values → Lowl/F timestamp (8061)

**Description**

Shows timestamp of the last measured lower interface level.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

### Bottom level

**Navigation**

- Expert → Sensor → Measured values → Bottom level (8129)

**Description**

Shows measured bottom level. Value is updated after a successfull tank bottom gauge command.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

### Bottom level timestamp

**Navigation**

- Expert → Sensor → Measured values → BotLev timestamp (8048)

**Description**

Shows the timestamp for measured bottom level.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>
"Spot density" submenu

Navigation  
Expert → Sensor → Measured values → Spot density

<table>
<thead>
<tr>
<th>Measured upper density</th>
<th>→ 67</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper density timestamp</td>
<td>→ 67</td>
</tr>
<tr>
<td>Measured middle density</td>
<td>→ 67</td>
</tr>
<tr>
<td>Middle Density Timestamp</td>
<td>→ 68</td>
</tr>
<tr>
<td>Measured lower density</td>
<td>→ 68</td>
</tr>
<tr>
<td>Lower density timestamp</td>
<td>→ 68</td>
</tr>
</tbody>
</table>

Measured upper density

Navigation  
Expert → Sensor → Measured values → Spot density → Meas upper dens. (8164)

Description  
Shows the Measured Upper Density Value.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
</tr>
</tbody>
</table>

Upper density timestamp

Navigation  
Expert → Sensor → Measured values → Spot density → UpDens timestamp (8067)

Description  
Shows timestamp of the last measured upper density.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
</tr>
</tbody>
</table>

Measured middle density

Navigation  
Expert → Sensor → Measured values → Spot density → Meas middle dens (8165)

Description  
Shows the Measured Middle Density Value.
### Middle Density Timestamp

**Navigation**

Expert → Sensor → Measured values → Spot density → MidDensTimestamp (8011)

**Description**

Shows the timestamp of the last measured middle density.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
<th>Write access</th>
</tr>
</thead>
</table>

### Measured lower density

**Navigation**

Expert → Sensor → Measured values → Spot density → Meas lower dens. (8166)

**Description**

Shows the Measured Lower Density Value.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
<th>Write access</th>
</tr>
</thead>
</table>

### Lower density timestamp

**Navigation**

Expert → Sensor → Measured values → Spot density → LowerDensTimestamp (8122)

**Description**

Shows timestamp of last measured lower density.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
<th>Write access</th>
</tr>
</thead>
</table>
### "Profile density" submenu

**Navigation**  

[Expert → Sensor → Measured values → Profile density](#)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Profile density</strong></td>
<td></td>
</tr>
<tr>
<td>Profile point</td>
<td>→ 69</td>
</tr>
<tr>
<td>Profile average density</td>
<td>→ 69</td>
</tr>
<tr>
<td>Profile density timestamp</td>
<td>→ 69</td>
</tr>
<tr>
<td><strong>Density table</strong></td>
<td>→ 70</td>
</tr>
</tbody>
</table>

### Profile point

**Navigation**  

[Expert → Sensor → Measured values → Profile density → Profile point](#) (8170)

**Description**  

Shows actual number of Density Points measured so far in current operation, and the total Number of Points after Density Profile Operation is complete.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Read access</strong></td>
<td>Operator</td>
</tr>
<tr>
<td><strong>Write access</strong></td>
<td>-</td>
</tr>
</tbody>
</table>

### Profile average density

**Navigation**  

[Expert → Sensor → Measured values → Profile density → Profile avg dens](#) (8175)

**Description**  

Shows the average density calculated after a profile density measurement is complete.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Read access</strong></td>
<td>Operator</td>
</tr>
<tr>
<td><strong>Write access</strong></td>
<td>-</td>
</tr>
</tbody>
</table>

### Profile density timestamp

**Navigation**  

[Expert → Sensor → Measured values → Profile density → Profil dens time](#) (8114)

**Description**  

Shows the timestamp when the last average density profile was finished.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Read access</strong></td>
<td>Operator</td>
</tr>
<tr>
<td><strong>Write access</strong></td>
<td>-</td>
</tr>
</tbody>
</table>
The "Density table" submenu

**Navigation**  
Expert → Sensor → Measured values → Profile density → Density table

---

**Density table**

**Navigation**  
Expert → Sensor → Measured values → Profile density → Density table

**Description**  
Shows measured density table of profile density.
3.2.3  "Sensor diag" submenu

Navigation  

Expert → Sensor → Sensor diag

"Start self check" submenu

Navigation  

Expert → Sensor → Sensor diag → Start self check

Status self check

Navigation  

Expert → Sensor → Sensor diag → Start self check → Status (8192)

Description  
 Shows the status of the self check of the sensor module.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

"Self check" wizard

Navigation  

Expert → Sensor → Sensor diag → Start self check → Self check

Self check

Navigation  

Expert → Sensor → Sensor diag → Start self check → Self check → Self check

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
Gauge status

Navigation

Expert → Sensor → Sensor diag → Start self check → Self check → Gauge status (8081)

Description
 Indicates the current status of the device gauge command.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Status self check

Navigation

Expert → Sensor → Sensor diag → Start self check → Self check → Status (8192)

Description
 Shows the status of the self check of the sensor module.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
### 3.2.4 "Sensor config" submenu

**Navigation**

> Expert → Sensor → Sensor config → Post gauge cmd (8163)

<table>
<thead>
<tr>
<th>▶ Sensor config</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post gauge command</td>
</tr>
<tr>
<td>▶ Displacer</td>
</tr>
<tr>
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</tbody>
</table>

---

**Post gauge command**

**Navigation**

> Expert → Sensor → Sensor config → Post gauge cmd (8163)

**Description**

Defines the gauge command that will be executed after a one-time gauge command has finished.

**Selection**

- Stop
- Level
- Up
- Upper I/F level
- Lower I/F level
- None

**Factory setting**

Level

**Additional information**

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</table>
"Displacer" submenu

**Navigation**

Expert → Sensor → Sensor config → Displacer → Displacer type (8071)

**Description**

Chooses the type of displacer used.

**Selection**

- Custom diameter
- Diameter 30 mm
- Diameter 50 mm
- Diameter 70 mm
- Diameter 110 mm

**Factory setting**

Dependent on the device version

**Additional information**

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</table>

**Displacer diameter**

**Navigation**

Expert → Sensor → Sensor config → Displacer → Displacer diamet (8014)

**Prerequisite**

Displacer type (→ 74) = Custom diameter

**Description**

Sets the diameter of the cylindrical part of displacer.
### Displacer weight

**User entry**
0 to 999.9 mm

**Factory setting**
See label on the device.

**Additional information**

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**Navigation**
Expert → Sensor → Sensor config → Displacer → Displacer weight (8010)

**Description**
Set the weight of the displacer in air. Indicated on the displacer in grams.

**User entry**
10 to 999.9 g

**Factory setting**
See label on the device.

**Additional information**

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### Displacer volume

**User entry**
10 to 999.9 ml

**Factory setting**
See label on the device.

**Additional information**

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**Navigation**
Expert → Sensor → Sensor config → Displacer → Displacer volume (8008)

**Description**
Displacer volume indicated on displacer in milliliter.

### Displacer balance volume

**User entry**
10 to 999.9 ml

**Factory setting**
See label on the device.

**Description**
Defines the balance volume of the displacer as the lower part of displacer immersed in liquid. Units in milliliters. Indicated on displacer.
The 'Expert' menu

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Displacer height

Navigation

Expert → Sensor → Sensor config → Displacer → Displacer height (8195)

Description
Sets the displacer height in mm. Used for density measurement as minimum distance between last profile point and liquid level.

User entry
10 to 300 mm

Factory setting
Dependent on the device version

Additional information

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Immersion depth

Navigation

Expert → Sensor → Sensor config → Displacer → Immersion depth (8070)

Description
Defines distance (mm) from displacer bottom to balancing line defined by balanced volume. Value is needed for correct bottom level measurement.

User entry
0 to 99.9 mm

Factory setting
Dependent on the device version

Additional information

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"Wiredrum" submenu

**Navigation**

Expert → Sensor → Sensor config → Wiredrum

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**Drum circumference**

**Navigation**

Expert → Sensor → Sensor config → Wiredrum → Drum circumference (8082)

**Description**

Sets the circumference of the wire drum. Indicated in Label.

**User entry**

100 to 999.9 mm

**Factory setting**

See label on the device.

**Additional information**

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**Wire weight**

**Navigation**

Expert → Sensor → Sensor config → Wiredrum → Wire weight (8040)

**Description**

Defines the weight of the measuring wire in g/10m. Indicated on Label.

**User entry**

0 to 999.9 g

**Factory setting**

See label on the device.

**Additional information**

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"Safety settings" submenu

Navigation

Expert → Sensor → Sensor config → Safety settings

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High stop level

**Navigation**

Expert → Sensor → Sensor config → Safety settings → High stop level (8135)

**Description**

Position of the displacer high stop as measured from defined zero position (tank bottom or datum plate).

**User entry**

–999 999.9 to 999 999.9 mm

**Factory setting**

20 000 mm

**Additional information**

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Low stop level

**Navigation**

Expert → Sensor → Sensor config → Safety settings → Low stop level (8069)

**Description**

Position of the displacer low stop as measured from defined zero position (tank bottom or datum plate).

**User entry**

–999 999.9 to 999 999.9 mm

**Factory setting**

0 mm

**Additional information**

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</table>
## Slow hoist zone

**Navigation**

- **Expert** → **Sensor** → **Sensor config** → **Safety settings** → **Slow hoist zone (8084)**

**Description**

Defines the interval in millimeters, measured down from the Reference Position, in which the Displacer reduces moving speed.

**User entry**

10 to 999,999.9 mm

**Factory setting**

70 mm

**Additional information**

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## Overtension weight

**Navigation**

- **Expert** → **Sensor** → **Sensor config** → **Safety settings** → **Overtension wgt (8097)**

**Description**

Sets the minimum Weight in grams when Overtension Alarm will be set.

**User entry**

100 to 999.9 g

**Factory setting**

350 g

**Additional information**

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</table>

## Undertension weight

**Navigation**

- **Expert** → **Sensor** → **Sensor config** → **Safety settings** → **Undertension wgt (8098)**

**Description**

Defines the undertension error weight. Undertension error will be issued if displacer weight is below this value longer than 7 seconds.

**User entry**

0 to 300 g

**Factory setting**

10 g

**Additional information**

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The "Expert" menu

Expert → Sensor → Sensor config → Safety settings → Output out range (8218)

Description
Selection of behavior between Alarm or Last valid value when displacer reached HighStopLevel, LowStopLevel or ReferencePosition.

Selection
- Last valid value
- Alarm
- None

Factory setting
Last valid value

Additional information
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"Level settings" submenu

**Navigation**

Expert → Sensor → Sensor config → Level settings → Upper density (8113)

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**Upper density**

**Navigation**

Expert → Sensor → Sensor config → Level settings → Upper density (8113)

**Description**

Sets the density of the upper phase of the liquid.

**User entry**

50 to 2,000 kg/m³

**Factory setting**

800 kg/m³

**Additional information**

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**Middle density**

**Navigation**

Expert → Sensor → Sensor config → Level settings → Middle density (8041)

**Description**

Sets Density of Middle Phase in the Tank if three Phases are available. Otherwise used for the Lower Phase in the Tank if two Phases are available.

**User entry**

50 to 2,000 kg/m³

**Factory setting**

1,000 kg/m³

**Additional information**

<table>
<thead>
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The 'Expert' menu

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Lower density

Navigation  
Expert → Sensor → Sensor config → Level settings → Lower density (8042)

Description  
Sets the density of the lower Phase in the tank if three phases are available.

User entry  
50 to 2000 kg/m³

Factory setting  
1200 kg/m³

Additional information

<table>
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</table>

Process condition

Navigation  
Expert → Sensor → Sensor config → Level settings → Process cond. (8001)

Description  
Select the liquid condition of the tank.

Selection

- Universal
- Calm surface
- Turbulent surface

Factory setting  
Universal

Additional information

For W&M, setting to option Calm surface is recommended.

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</table>

Standby level

Navigation  
Expert → Sensor → Sensor config → Level settings → Standby level (8194)

Description  
Defines the position in the tank where the displacer waits for the liquid level to rise during standby level gauge command.

User entry  
-999999.9 to 999999.9 mm

Factory setting  
0 mm

Additional information

<table>
<thead>
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<tbody>
<tr>
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</table>
Offset standby distance

**Navigation**

Expert → Sensor → Sensor config → Level settings → Offset distance (8107)

**Description**

Defines the distance from the current position where the displacer waits for the liquid level to rise during offset standby gauge command.

**User entry**

0 to 999999.9 mm

**Factory setting**

500 mm
Additional information

Diagram with a label:

- $\text{8 } a$: Offset standby distance
"Balance settings" submenu

**Navigation**

Expert → Sensor → Sensor config → Balance settings

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<tr>
<td>Weight tolerance</td>
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</table>

The parameter ‘Process condition’ does a pre-set of the major balancing parameters. For the most applications it’s enough to set the correct ‘Process condition’ parameter which affects the balancing parameter settings automatically.

**Level measurement mode**

**Navigation**

Expert → Sensor → Sensor config → Balance settings → Level meas mode (8056)

**Description**

Chooses the measurement mode used for level measurement.

**Selection**

- Normal measure mode
- Compensation mode
- Non hysteresis mode

**Factory setting**

Non hysteresis mode

**Additional information**

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The 'Expert' menu

Proservo NMS81

Navigation

Expert → Sensor → Sensor config → Balance settings → Interface mode (8064)

Description

Chooses the measurement mode used for interface level measurements.

Selection

- Non hysteresis mode
- Normal measure mode

Factory setting

Non hysteresis mode

Additional information

<table>
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Balancing waiting time

Navigation

Expert → Sensor → Sensor config → Balance settings → Bal waiting time (8205)

Description

Set the waiting time in seconds, after which the balance flag is turned on if level measurement is balanced (motor has stopped).

User entry

0 to 255 s

Factory setting

4 s
Additional information

| Read access | Operator |
| Write access | Maintenance |

Seek delay

Navigation

Expert → Sensor → Sensor config → Balance settings → Seek delay (8162)

Description
When displacer is balanced, this parameter sets the Delay Time (seconds) before displacer starts to track Level again.

User entry
1 to 255 s

Factory setting
2 s

Additional information

| Read access | Operator |
| Write access | Maintenance |

Weight tolerance

Navigation

Expert → Sensor → Sensor config → Balance settings → Weight tolerance (8213)

Description
Defines balance weight tolerance in grams, in which the displacer is in balance status.

User entry
0.1 to 100 g

Factory setting
1.6 g

Additional information

| Read access | Operator |
| Write access | Maintenance |

10 Balancing parameter
"Spot density" submenu

Navigation

Expert → Sensor → Sensor config → Spot density

- **Upper density offset**
  - Description: Defines an offset value which is added to the measured upper density value.
  - User entry: −999.99 to 999.99 kg/m³
  - Factory setting: 0 kg/m³
  - Additional information:
    - Read access: Operator
    - Write access: Maintenance

- **Middle density offset**
  - Description: Defines an Offset Value which is added to the measured Middle Density Value.
  - User entry: −999.99 to 999.99 kg/m³
  - Factory setting: 0 kg/m³
  - Additional information:
    - Read access: Operator
    - Write access: Maintenance
### Lower density offset

**Navigation**

Expert → Sensor → Sensor config → Spot density → Low dens. offset (8178)

**Description**

Defines an offset value which is added to the measured lower density value.

**User entry**

-999.99 to 999.99 kg/m³

**Factory setting**

0 kg/m³

**Additional information**

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</table>

### Submersion depth

**Navigation**

Expert → Sensor → Sensor config → Spot density → Submersion depth (8169)

**Description**

Sets the displacer submersion depth (mm) for spot density operations.

**User entry**

50 to 99999.9 mm

**Factory setting**

150 mm

**Additional information**

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"Profile density" submenu

**Navigation**  
Expert → Sensor → Sensor config → Profile density

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**Density measurement mode**

**Navigation**  
Expert → Sensor → Sensor config → Profile density → Density mode (8186)

**Description**  
In normal measure mode, measures at specified positions. In compensation mode measures using next integer value of drum turns to improve accuracy.

**Selection**  
- Normal measure mode
- Compensation mode

**Factory setting**  
Normal measure mode

**Additional information**  

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In normal mode, measures spot densities at requested positions. In compensation mode the Proservo measures the spot densities at multiples of the wiredrum circumference (e.g. every ~ 150 mm (5.91 in))

**Manual profile level**

**Navigation**  
Expert → Sensor → Sensor config → Profile density → Man profile lvl (8182)

**Description**  
Sets the level position in the tank where the manual profile density operation starts.

**User entry**  
-999999.9 to 999999.9 mm

**Factory setting**  
1000 mm
Profile density offset distance

Navigation  
Expert → Sensor → Sensor config → Profile density → Dens offset dist (8185)

Description  
Profile density offset distance [mm] is the distance between start point and first measurement point.

User entry  
0 to 999999.9 mm

Factory setting  
500 mm

Profile density interval

Navigation  
Expert → Sensor → Sensor config → Profile density → Density interval (8174)

Description  
Sets the interval between two measurement points in profile density operation.

User entry  
1 to 100000 mm

Factory setting  
1000 mm

Profile density offset

Navigation  
Expert → Sensor → Sensor config → Profile density → Prof dens offset (8173)

Description  
Defines an offset value which is added to the measured profile density value.

User entry  
−999.99 to 999.99 kg/m³

Factory setting  
0 kg/m³
### 3.2.5 "Calibration" submenu

**Navigation**

Expert → Sensor → Calibration

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## "Move displacer" wizard

**Navigation**

Expert → Sensor → Calibration → Move displacer

### Move displacer

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</tbody>
</table>

### Distance

**Navigation**

Expert → Sensor → Calibration → Move displacer → Distance (8103)

**Description**

Shows measured distance from reference position.

### Additional information

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**Endress+Hauser**

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### Move displacer

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• Move down  
• Move up |
| Factory setting | Stop |
| Additional information |  |  |
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### Motor status

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</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Shows the current moving Direction of the Motor.</td>
</tr>
<tr>
<td>Additional information</td>
<td></td>
</tr>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

---

### Move displacer

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Calibration → Move displacer → Move displacer</th>
</tr>
</thead>
</table>
| Selection | • No  
• Yes |
| Factory setting | No |
| Additional information |  |  |
| Read access | Operator |
| Write access | Maintenance |
"Sensor calibration" wizard

Navigation

\[ \text{Expert} \rightarrow \text{Sensor} \rightarrow \text{Calibration} \rightarrow \text{Sensor cal.} \]

Sensor calibration

- Offset weight
- Span weight
- Zero calibration
- Calibration status
- Offset calibration
- Span calibration

Description

This sequence calibrates the sensor of the servo.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Offset weight

Navigation

\[ \text{Expert} \rightarrow \text{Sensor} \rightarrow \text{Calibration} \rightarrow \text{Sensor cal.} \rightarrow \text{Offset wgt. (8095)} \]

Description

Sets the weight that is used for the lower point sensor calibration. Changing the value will delete the calibration data.

User entry

0 to 150 g

Factory setting

Dependent on the device version

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

For density measurement application, it is recommended to apply 50 g.
The 'Expert' menu

**Span weight**

**Navigation**


**Description**

Sets the weight that is used for the middle point sensor calibration. Changing the value will delete the calibration data.

**User entry**

10 to 999.9 g

**Factory setting**

Dependent on the device version

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Zero calibration**

**Navigation**


**Description**

In this step the sensor calibration zero weight will be done.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Calibration status**

**Navigation**

Expert → Sensor → Calibration → Sensor cal. → Status (8031)

**Description**

Gives feedback on the latest status of the calibration process.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Offset calibration**

**Navigation**


**Description**

In this step the sensor calibration with offset weight will be done.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
### Span calibration

#### Navigation

![Navigation](image)

**Expert → Sensor → Calibration → Sensor cal. → Span calibration**

#### Description

In this step the sensor calibration with span weight will be done.

#### Additional information

<table>
<thead>
<tr>
<th>Access</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
"Reference calibration" wizard


<table>
<thead>
<tr>
<th>➕ Reference calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference calibration</td>
</tr>
<tr>
<td>Reference position</td>
</tr>
<tr>
<td>Progress</td>
</tr>
<tr>
<td>Calibration status</td>
</tr>
</tbody>
</table>

**Reference calibration**


**Description**
This sequence will move the displacer to the mechanical stop and set the reference position.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Reference position**

**Navigation**  ➕ ➕ Expert → Sensor → Calibration → Reference cal. → Ref. position (8046)

**Description**
Defines in mm, during reference calibration, the distance between mechanical stop inside the drum housing and the middle of the wire ring.

**User entry**
0 to 9 999.9 mm

**Factory setting**
Dependent on the device version

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Progress**

**Navigation**  ➕ ➕ Expert → Sensor → Calibration → Reference cal. → Progress

**Description**
Gives feedback on the latest status of the reference calibration process.
### Additional information

<table>
<thead>
<tr>
<th>Access</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read</td>
<td>Operator</td>
</tr>
<tr>
<td>Write</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### Calibration status

**Navigation**

Expert → Sensor → Calibration → Reference cal. → Status (8031)

**Description**

Gives feedback on the latest status of the calibration process.

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read</td>
<td>Operator</td>
</tr>
<tr>
<td>Write</td>
<td>-</td>
</tr>
</tbody>
</table>
"Drum calibration" wizard

**Navigation**


<table>
<thead>
<tr>
<th>Drum calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make sure to have</td>
</tr>
<tr>
<td>Drum calibration</td>
</tr>
<tr>
<td>Calibration time</td>
</tr>
<tr>
<td>Set high weight</td>
</tr>
<tr>
<td>Make drum table</td>
</tr>
<tr>
<td>Drum table point</td>
</tr>
<tr>
<td>Calibration status</td>
</tr>
<tr>
<td>Make low table</td>
</tr>
<tr>
<td>Set low weight</td>
</tr>
</tbody>
</table>

**Make sure to have**

**Navigation**

Expert → Sensor → Calibration → Drum cal. → Make sure

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Drum calibration**

**Navigation**


**Description**

This sequence will perform a drum calibration.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
**Calibration time**

**Navigation**

Expert → Sensor → Calibration → Drum cal. → Time

**Description**

Time until drum calibration is finished.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Set high weight**

**Navigation**

Expert → Sensor → Calibration → Drum cal. → Set high weight (8116)

**Description**

High weight that is used for a drum calibration (normally it is the displacer weight).

**User entry**

10 to 999.9 g

**Factory setting**

Dependent on the device version

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Make drum table**

**Navigation**

Expert → Sensor → Calibration → Drum cal. → Make drum table

**Description**

This will perform a drum calibration.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Drum table point**

**Navigation**

Expert → Sensor → Calibration → Drum cal. → Drum table point

**Description**

Shows the currently measured point of the drum calibration. Maximum number of measured points is 50.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
The 'Expert' menu
Proservo NMS81

Calibration status

**Navigation**
Expert → Sensor → Calibration → Drum cal. → Status (8031)

**Description**
Gives feedback on the latest status of the calibration process.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Make low table

**Navigation**
Expert → Sensor → Calibration → Drum cal. → Make low table

**Description**
For additional accuracy it is possible to perform a second drum calibration with low weight. Choose 'Yes' or 'No' to start/stop calibration.

**Selection**
- No
- Yes

**Factory setting**
No

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Set low weight

**Navigation**
Expert → Sensor → Calibration → Drum cal. → Set low weight (8115)

**Description**
Set weight for additional drum calibration sequence.

**User entry**
10 to 999.9 g

**Factory setting**
Dependent on the device version

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
"Calibration parameters" submenu

Navigation  ➔  Expert → Sensor → Calibration → Calib parameters

<table>
<thead>
<tr>
<th>Calibration parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set high weight</td>
</tr>
<tr>
<td>Set low weight</td>
</tr>
<tr>
<td>Reference position</td>
</tr>
<tr>
<td>Offset weight</td>
</tr>
<tr>
<td>Span weight</td>
</tr>
<tr>
<td>Calibration status</td>
</tr>
</tbody>
</table>

Set high weight

Navigation  ➔  Expert → Sensor → Calibration → Calib parameters → Set high weight (8116)

Description
High weight that is used for a drum calibration (normally it is the displacer weight).

User entry
10 to 999.9 g

Factory setting
Dependent on the device version

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Set low weight

Navigation  ➔  Expert → Sensor → Calibration → Calib parameters → Set low weight (8115)

Description
Set weight for additional drum calibration sequence.

User entry
10 to 999.9 g

Factory setting
Dependent on the device version

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
Reference position

Navigation
Expert → Sensor → Calibration → Calib parameters → Ref. position (8046)

Description
Defines in mm, during reference calibration, the distance between mechanical stop inside the drum housing and the middle of the wire ring.

User entry
0 to 9999.9 mm

Factory setting
Dependent on the device version

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Offset weight

Navigation
Expert → Sensor → Calibration → Calib parameters → Offset wgt. (8095)

Description
Sets the weight that is used for the lower point sensor calibration. Changing the value will delete the calibration data.

User entry
0 to 150 g

Factory setting
Dependent on the device version

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Information
For density measurement application, it is recommended to apply 50 g.

Span weight

Navigation
Expert → Sensor → Calibration → Calib parameters → Span wgt. (8096)

Description
Sets the weight that is used for the middle point sensor calibration. Changing the value will delete the calibration data.

User entry
10 to 999.9 g

Factory setting
Dependent on the device version

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
Calibration status

Navigation  

Expert → Sensor → Calibration → Calib parameters → Status (8031)

Description  

Gives feedback on the latest status of the calibration process.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
3.3 "Input/output" submenu

Navigation

- Expert → Input/output

- Input/output
  - HART devices → 107
  - Analog IP → 138
  - Analog I/O → 147
  - Digital Xx-x → 160
  - Digital input mapping → 166
3.3.1 "HART devices" submenu

*Navigation*  
Expert → Input/output → HART devices

---

**Number of devices**

*Navigation*  
Expert → Input/output → HART devices → Number devices (13051)

*Description*  
Shows the number of devices on the HART bus.

*Additional information*  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Read</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Write access</th>
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</tr>
</thead>
</table>
**“HART Device(s)” submenu**

There is a **HART Device(s)** submenu for each HART slave device found on the HART loop.

**Navigation**

- Expert → Input/output → HART devices → HART Device(s)

| **Device name** | → | **109** |
| **Polling address** | → | **109** |
| **Device tag** | → | **109** |
| **Operating mode** | → | **109** |
| **Communication status** | → | **110** |
| **Status signal** | → | **110** |
| **#blank# (PV - designation dependent on device)** | → | **111** |
| **#blank# (SV - designation dependent on device)** | → | **111** |
| **#blank# (TV - designation dependent on device)** | → | **111** |
| **#blank# (QV - designation dependent on device)** | → | **111** |
| **HART device PV mA** | → | **112** |
| **HART device PV %** | → | **112** |
| **Output pressure** | → | **112** |
| **Output density** | → | **113** |
| **Output temperature** | → | **113** |
| **Output vapor temperature** | → | **113** |
| **Output level** | → | **114** |

- **HART device information**
  - → **115**

- **Element values**
  - → **121**
Device name

Navigation
Expert → Input/output → HART devices → HART Device(s) → Device name (14722)

Description
Shows the name of the transmitter.

Additional information

<table>
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<tr>
<th>Read access</th>
<th>Operator</th>
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</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Polling address

Navigation
Expert → Input/output → HART devices → HART Device(s) → Polling address (14712)

Description
Shows the polling address of the transmitter.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Device tag

Navigation
Expert → Input/output → HART devices → HART Device(s) → Device tag (14713)

Description
Shows the device tag of the transmitter.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Operating mode

Navigation
Expert → Input/output → HART devices → HART Device(s) → Operating mode (14745)

Prerequisite
Not available if the HART device is a Prothermo NMT.
The "Expert" menu

Proservo NMS81

Description
Selection of the operation mode PV only or PV,SV,TV,QV. Determines which values are polled from the connected HART Device.

Selection
- PV only
- PV,SV,TV & QV
- Level 1
- Measured level 2

Factory setting
PV,SV,TV & QV

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Communication status

Navigation
Expert → Input/output → HART devices → HART Device(s) → Comm. status (14710)

Description
Shows the operating status of the transmitter.

User interface
- Operating normally
- Device offline

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Status signal

Navigation
Expert → Input/output → HART devices → HART Device(s) → Status signal (14760)

Description
Indicates the current device status in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107.

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

Factory setting
---

2) only visible if the connected device is a Micropilot
**#blank# (HART PV - designation dependent on device)**

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → #blank# (14716)

**Description**
Shows the first HART variable (PV).

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**#blank# (HART SV - designation dependent on device)**

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → #blank# (14705)

**Prerequisite**
For HART devices other than NMT: Operating mode (→ 109) = PV,SV,TV & QV

**Description**
Shows the second HART variable (SV).

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**#blank# (HART TV - designation dependent on device)**

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → #blank# (14706)

**Prerequisite**
For HART devices other than NMT: Operating mode (→ 109) = PV,SV,TV & QV

**Description**
Shows the third HART variable (TV).

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**#blank# (HART QV - designation dependent on device)**

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → #blank# (14716)

**Prerequisite**
For HART devices other than NMT: Operating mode (→ 109) = PV,SV,TV & QV

**Description**
Shows the fourth HART variable (QV).

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
The 'Expert' menu

**HART device PV mA**

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → HARTDEV PV mA

**Prerequisite**

Not available for Micropilot S FMR5xx and Prothermo 53x.

**Description**

Shows the first HART variable (PV) in mA.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**HART device PV %**

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → HARTDEV PV %

**Prerequisite**

Not available for Micropilot S FMR5xx and Prothermo 53x.

**Description**

Shows the first HART variable (PV) in percentage.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Output pressure**

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → Output pressure

**Prerequisite**

Not available for Micropilot S FMR5xx, Prothermo NMT53x and Prothermo NMT8x. In these cases the measured variables are allocated automatically.

**Description**

Defines which HART variable is the pressure.

**Selection**

- No value
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)

**Factory setting**

No value

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tr>
</tbody>
</table>
Output density

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → Output density (14720)

**Prerequisite**
Not available for Micropilot S FMR5xx, Prothermo NMT53x and Prothermo NMT8x. In these cases the measured variables are allocated automatically.

**Description**
Defines which HART variable is the density.

**Selection**
- No value
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)

**Factory setting**
No value

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
<td></td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
<td></td>
</tr>
</tbody>
</table>

Output temperature

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → Output temp. (14721)

**Prerequisite**
Not available for Micropilot S FMR5xx, Prothermo NMT53x and Prothermo NMT8x. In these cases the measured variables are allocated automatically.

**Description**
Defines which HART variable is the temperature.

**Selection**
- No value
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)

**Factory setting**
No value

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
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</tr>
<tr>
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</tr>
</tbody>
</table>

Output vapor temperature

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → Output vapor tmp (14726)

**Prerequisite**
Not available for Micropilot S FMR5xx, Prothermo NMT53x and Prothermo NMT8x. In these cases the measured variables are allocated automatically.
**Description**
Defines which HART variable is the vapor temperature.

**Selection**
- No value
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)

**Factory setting**
No value

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Output level**

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → Output level (14718)

**Prerequisite**
Not available for Micropilot S FMR5xx, Prothermo NMT53x and Prothermo NMT8x. In these cases the measured variables are allocated automatically.

**Description**
Defines which HART variable is the level.

**Selection**
- No value
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)

**Factory setting**
No value

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
### HART device information submenu

**Navigation**

![Expert → Input/output → HART devices → HART Device(s) → HART device info](Expert → Input/output → HART devices → HART Device(s) → HART device info)

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<th>Page</th>
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</thead>
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<tr>
<td>Level source</td>
<td>117</td>
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<td>117</td>
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<tr>
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<td>118</td>
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<tr>
<td>HART bus</td>
<td>118</td>
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<td>Device type</td>
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<tr>
<td>Device ID</td>
<td>118</td>
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<tr>
<td>Device date</td>
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<tr>
<td>Device description</td>
<td>119</td>
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<td>Device message</td>
<td>119</td>
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<tr>
<td>Software version</td>
<td>119</td>
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<tr>
<td>Firmware CRC</td>
<td>120</td>
</tr>
<tr>
<td>Custody transfer</td>
<td>120</td>
</tr>
</tbody>
</table>

**Pressure**

**Navigation**

![Expert → Input/output → HART devices → HART Device(s) → HART device info → Pressure (14723)](Expert → Input/output → HART devices → HART Device(s) → HART device info → Pressure (14723))

**Prerequisite**

Output pressure (→ 112) = No value
Description: Shows the pressure value measured by the connected HART device.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Density

**Navigation**: Expert → Input/output → HART devices → HART Device(s) → HART device info → Density (14724)

**Prerequisite**: Output density (→ 113) ≠ No value

**Description**: Shows the density value measured by the connected HART device.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Temperature

**Navigation**: Expert → Input/output → HART devices → HART Device(s) → HART device info → Temperature (14725)

**Prerequisite**: Output temperature (→ 113) ≠ No value

**Description**: Shows the temperature measured by the connected HART device.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Vapor temperature

**Navigation**: Expert → Input/output → HART devices → HART Device(s) → HART device info → Vapor temp. (14727)

**Prerequisite**: Output vapor temperature (→ 113) ≠ No value

**Description**: Shows the temperature value of the vapor phase measured by the connected HART device.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
Water level

Navigation

Expert → Input/output → HART devices → HART Device(s) → HART device info → Water level (14717)

Prerequisite

Output level (→ 114) ≠ No value

Description

Shows the water level value measured by the connected HART device.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Level source

Navigation

Expert → Input/output → HART devices → HART Device(s) → HART device info → Level source (14749)

Prerequisite

Prothermo NMT53x

Description

Shows which source should be used for level reference sent to NMT to determine liquid/vapour temperature. Tank level or manual level.

Selection

- Manual value
- Tank level

Factory setting

Tank level

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>-</td>
</tr>
</tbody>
</table>

Tank level to NMT

Navigation

Expert → Input/output → HART devices → HART Device(s) → HART device info → Tank lvl to NMT (14750)

Prerequisite

Prothermo NMT53x with level measurement

Description

Shows the level transferred to NMT.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>-</td>
</tr>
</tbody>
</table>
The 'Expert' menu

Proservo NMS81

Manual value

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → HART device info → Manual value (14746)

**Prerequisite**
Prothermo NMT53x with level measurement

**Description**
Shows the manual set level.

**User entry**
Signed floating-point number

**Factory setting**
0 mm

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

HART bus

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → HART device info → HART bus (14711)

**Description**
Information about the used IO-Slot.

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Device type

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → HART device info → Device type (14701)

**Description**
Shows the device type with which the measuring device is registered with the HART Communication Foundation.

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Device ID

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → HART device info → Device ID (14702)

**Description**
Shows the device ID of the connected HART device.
Additional information

<table>
<thead>
<tr>
<th>Read access</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Device date

Navigation

Expert → Input/output → HART devices → HART Device(s) → HART device info → Device date (14707)

Description

Shows the date of the connected HART device. (e.g.: the last configuration change).

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
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</tbody>
</table>

Device description

Navigation

Expert → Input/output → HART devices → HART Device(s) → HART device info → Device descrip. (14704)

Description

Shows a user defined HART descriptor of the connected device.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Device message

Navigation

Expert → Input/output → HART devices → HART Device(s) → HART device info → Device message (14703)

Description

Shows a user defined HART message of the connected device.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tr>
</tbody>
</table>

Software version

Navigation

Expert → Input/output → HART devices → HART Device(s) → HART device info → Software version (14747)

Prerequisite

Prothermo NMT53x

Description

Shows the software version of the NMT device.
## The 'Expert' menu

<table>
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### Firmware CRC

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<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → HART device info → Firmware CRC (14758)</th>
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</thead>
<tbody>
<tr>
<td>User interface</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
<tr>
<td>Additional information</td>
<td>Read access: Maintenance; Write access: -</td>
</tr>
</tbody>
</table>

### Custody transfer

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → HART device info → Custody transfer (14748)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>Prothermo NMT53x with temperature measurement</td>
</tr>
<tr>
<td>Description</td>
<td>Shows information about hardware lock of NMT device. Off -&gt; NMT parameter can be changed. On -&gt; NMT parameter can not be changed.</td>
</tr>
<tr>
<td>Additional information</td>
<td>Read access: Maintenance; Write access: -</td>
</tr>
</tbody>
</table>
“Element values” submenu

This submenu is only available for Prothermo NMT53x.

Navigation

Expert → Input/output → HART devices → HART Device(s) → Element values

“Element temperature” submenu

Navigation

Expert → Input/output → HART devices → HART Device(s) → Element values → Element temp.

Element temperature 1 to 24

Navigation

Expert → Input/output → HART devices → HART Device(s) → Element values → Element temp. → Element temp 1 to 24 (14984–1 to 24)

Description

Shows the temperature of an element in the NMT.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
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</tbody>
</table>

“Element position” submenu

Navigation

Expert → Input/output → HART devices → HART Device(s) → Element values → Element position

Element position 1 to 24

Navigation

Expert → Input/output → HART devices → HART Device(s) → Element values → Element position → Element pos. 1 to 24 (15014–1 to 24)

Description

Shows the position of the selected element in the NMT.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
"Diagnostics" submenu

This submenu is only available for Prothermo NMT53x.

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → Diagnostics

<table>
<thead>
<tr>
<th>► Diagnostics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic code</td>
</tr>
<tr>
<td>Last diagnostic</td>
</tr>
<tr>
<td>Reference 0</td>
</tr>
<tr>
<td>Reference 17</td>
</tr>
</tbody>
</table>

### Diagnostic code

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Diagnostic code (14739)

**Description**

Shows the current diagnostic code of NMT. Check NMT manual for details.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
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</tbody>
</table>

### Last diagnostic

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Last Diagnostic (14742)

**Description**

Shows the previous diagnostic code of NMT. Check NMT manual for details.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Reference 0

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Reference 0 (14740)

**Prerequisite**

Prothermo NMT53x with temperature measurement.
Description
Shows the temperature of internal reference element 0.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Reference 17

Navigation
Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Reference 17 (14741)

Prerequisite
Prothermo NMT53x with temperature measurement.

Description
Shows the temperature of internal reference element 17.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

'Diagnostics' submenu
This submenu is only available for Prothermo NMT8x.

Navigation
Expert → Input/output → HART devices → HART Device(s) → Diagnostics

Active diagnostics

Navigation
Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Active diagnos. (14754)

User interface
Character string comprising numbers, letters and special characters

Factory setting
### Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operator</strong></td>
<td>Operator</td>
<td></td>
</tr>
<tr>
<td><strong>-</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Previous diagnostics

#### Navigation

Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Prev.diagnostics (14755)

#### User interface

Character string comprising numbers, letters and special characters

#### Factory setting

### Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operator</strong></td>
<td>Operator</td>
<td></td>
</tr>
<tr>
<td><strong>-</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Test resistance

#### Navigation

Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Test resistance (14752)

#### User interface

Signed floating-point number

#### Factory setting

0 Ohm

### Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operator</strong></td>
<td>Operator</td>
<td></td>
</tr>
<tr>
<td><strong>-</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### WB frequency ratio

#### Navigation

Expert → Input/output → HART devices → HART Device(s) → Diagnostics → WB freq. ratio (14753)

#### User interface

Signed floating-point number

#### Factory setting

0

### Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operator</strong></td>
<td>Operator</td>
<td></td>
</tr>
<tr>
<td><strong>-</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
"NMT device config" submenu

This submenu is only present if the connected HART device is a Prothermo NMT5xx.

Navigation

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config

Configure device?

→ 125

Access code

→ 126

Total no. element

→ 126

Bottom point

→ 127

Temperature element short

→ 127

Temperature element open

→ 127

Output at error

→ 128

Gain adjust

→ 128

Kind of interval

→ 128

Element interval

→ 129

Update water level

→ 129

Element setup

→ 130

Select element

→ 130

Zero adjust

→ 130

Element temperature

→ 131

Element position

→ 131

Description

Enable NMT device configuration.
Selection
  - No
  - Yes

Factory setting
  No

Additional information
  Meaning of the options
  - No
    Not configurable
  - Yes
    Configurable

<table>
<thead>
<tr>
<th>Access code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Navigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access code</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure device? (→ 125) = Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shows the access code to configure the NMT device. Code is read from NMT device at start up.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 65 535</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access Operator</td>
</tr>
<tr>
<td>Write access Maintenance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total no. element</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Navigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access code</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shows the total amount of configurable temperature elements.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access Operator</td>
</tr>
<tr>
<td>Write access -</td>
</tr>
</tbody>
</table>
### Bottom point

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Bottom point (14729)

**Description**

Shows the bottom clearance from the end of temperature probe or WB probe.

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### Temperature element short

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Temp elem. short (14731)

**Description**

Sets the displayed temperature if element is broken (shorten).

**User entry**

Signed floating-point number

**Factory setting**

0 °C

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### Temperature element open

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Temp. elem. open (14732)

**Description**

Sets the displayed temperature if element is not connected (open).

**User entry**

Signed floating-point number

**Factory setting**

0 °C

**Additional information**

<table>
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</thead>
<tbody>
<tr>
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</tbody>
</table>
Output at error

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Output at error (14733)

**Description**
Off -> Defective element will not be used in average calculation. On -> Defective element generate error at output value.

**Selection**
- Off
- On

**Factory setting**
Off

**Additional information**
<table>
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</tbody>
</table>

Gain adjust

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Gain adjust (14736)

**Description**
Adjustment of all shown temperature elements. Also reference elements 0 and 17. e.g. 0.8 -> 80% 1.0 -> 100% of factory calibration 1.2 -> 120%.

**User entry**
Signed floating-point number

**Factory setting**
0

**Additional information**
<table>
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</tbody>
</table>

Kind of interval

**Navigation**
Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Kind of interval (14744)

**Description**
Determines how the element positions are defined.

**Selection**
- Even
- Not even

**Factory setting**
Even
Additional information Meaning of the options

- **Even**
  First position bottom point + element interval for every next element.
- **Not even**
  Position of elements can be set manually.

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</tbody>
</table>

Element interval

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element interval (14743)

**Prerequisite**

Kind of interval (→ 128) = Even

**Description**

Shows the distance between the temperature elements used if kind of interval parameter is set to even.

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

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</tbody>
</table>

Update water level

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Water level upd. (14751)

**Description**

Select if water level value is transferred to NMT or not.

**Selection**

- **Enabled**
- **Disabled**

**Factory setting**

Disabled

**Additional information**

- **Enabled**: Water level value is transferred
- **Disabled**: Water level value is not transferred

The NMT delivers the average liquid temperature value in a tank by picking up the value of all temperature elements which are covered by liquid and calculating the average value. To select the submerged temperature elements, the NMT receives level information from a tank gauging device. If the water bottom temperature shall be excluded from the measurement, the water level value is used to exclude the temperature elements which are submerged in water.
"Element setup" submenu

Navigation

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup

Select element

<table>
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<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Select element (14734)</th>
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</thead>
<tbody>
<tr>
<td>Description</td>
<td>Chooses the temperature element to be configured manually.</td>
</tr>
<tr>
<td>User entry</td>
<td>1 to 24</td>
</tr>
<tr>
<td>Factory setting</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional information

<table>
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</table>

Zero adjust

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Zero adjust (14735)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Adjusts the offset of the selected temperature element.</td>
</tr>
<tr>
<td>User interface</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 None</td>
</tr>
</tbody>
</table>

Additional information

<table>
<thead>
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</tr>
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<tbody>
<tr>
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</table>
Element temperature

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Element temp. (14737)

**Description**

Shows the temperature of the element.

**Additional information**

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<tbody>
<tr>
<td>Operator</td>
<td>-</td>
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</tbody>
</table>

Element position

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Element position (14738)

**Description**

Shows the position of the temperature element.

**User interface**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

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<tr>
<td>Operator</td>
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</table>

*NMT device config* submenu

This submenu is only present if the connected HART device is a Prothermo NMT8x.

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config

- Configure device?
- Total no. element
- Bottom point
- No element in phase
- Water bottom level offset
The 'Expert' menu

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Update water level → 134

Element setup → 134

Select element → 134

Zero adjust → 135

Element temperature → 135

Element position → 135

Configure device?

Navigation
Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Config. device? (14728)

Description
Enable NMT device configuration.

Selection
- No
- Yes

Factory setting
No

Additional information
Meaning of the options
- No
  Not configurable
- Yes
  Configurable

Read access
Operator

Write access
Maintenance

Total no. element

Navigation
Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Total elements (14730)

Description
Shows the total amount of configurable temperature elements.

Additional information
Read access
Operator

Write access
-
**Bottom point**

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Bottom point (14729)

**Description**

Shows the bottom clearance from the end of temperature probe or WB probe.

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

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</tbody>
</table>

**No element in phase**

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → No elm. in phase (14756)

**Selection**

- Alarm
- Warning
- Logbook entry only

**Factory setting**

Alarm

**Additional information**

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</table>

**Water bottom level offset**

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → WB level offset (14757)

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

<table>
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<tbody>
<tr>
<td>Write access</td>
<td>Operator</td>
</tr>
</tbody>
</table>
Update water level

Navigation

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Water level upd. (14751)

Description

Select if water level value is transferred to NMT or not.

Selection

- Enabled
- Disabled

Factory setting

Disabled

Additional information

- Enabled: Water level value is transferred
- Disabled: Water level value is not transferred

The NMT delivers the average liquid temperature value in a tank by picking up the value of all temperature elements which are covered by liquid and calculating the average value. To select the submerged temperature elements, the NMT receives level information from a tank gauging device. If the water bottom temperature shall be excluded from the measurement, the water level value is used to exclude the temperature elements which are submerged in water.

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</table>

"Element setup" submenu

Navigation

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup

Select element

Select element → 134

Zero adjust

Zero adjust → 135

Element temperature

Element temperature → 135

Element position

Element position → 135

Select element

Navigation

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Select element (14734)

Description

Chooses the temperature element to be configured manually.
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The "Expert" menu

User entry 1 to 24

Factory setting 1

Additional information

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<tr>
<td>Write access</td>
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</table>

Zero adjust

Navigation  
Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Zero adjust (14759)

User interface Signed floating-point number

Factory setting 0 °C

Additional information

<table>
<thead>
<tr>
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<tr>
<td>Write access</td>
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</tbody>
</table>

Element temperature

Navigation  
Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Element temp. (14737)

Description Shows the temperature of the element.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

Element position

Navigation  
Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Element position (14738)

Description Shows the position of the temperature element.

User interface Signed floating-point number

Factory setting 0 mm

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
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<tbody>
<tr>
<td>Write access</td>
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</table>

Endress+Hauser
"Forget device" wizard

This submenu is only available if there is at least one unlocked device at the bus.

Navigation  Expert → Input/output → HART devices → Forget device

Forget device

Description
With this function an offline device can be deleted from the device list.

Selection
- HART Device 1
- HART Device 2
- HART Device 3
- HART Device 4
- HART Device 5
- HART Device 6
- HART Device 7
- HART Device 8
- HART Device 9
- HART Device 10
- HART Device 11
- HART Device 12
- HART Device 13
- HART Device 14
- HART Device 15
- None

Factory setting
None

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
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<tbody>
<tr>
<td>Write access</td>
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</table>

HART Bus interface

Navigation  Expert → Input/output → HART devices → #blank#

Operating mode

Current

* Visibility depends on order options or device settings
Operating mode

Navigation

Expert → Input/output → HART devices → #blank# → Operating mode (14453)

Description
Shows the operation mode of this HART bus.

User interface
- None
- Disable
- HART master
- HART slave +4..20mA output
- HART tunnel

Factory setting
None

Additional information

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Operator</td>
<td>-</td>
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</table>

Current

Navigation

Expert → Input/output → HART devices → #blank# → Current (14457)

Description
Shows the actual current on this HART bus.

User interface
0 to 100 000 mA

Factory setting
0 mA

Additional information

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Operator</td>
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</tbody>
</table>
3.3.2 "Analog IP" submenu

There is an Analog IP submenu (→ 138) for each Analog I/O module of the device. This submenu refers to terminals 4 to 8 of this module (the analog input). They are primarily used to connect an RTD. For terminals 1 to 3 (analog input or output) refer to → 147.

![Diagram of terminals 4 to 8 for Analog IP](image)

**Navigation**

Expert → Input/output → Analog IP

- Operating mode → 139
- RTD type → 139
- Ohms offset → 140
- Thermocouple type → 140
- RTD connection type → 141
- Process value → 141
- Process variable → 141
- 0 % value → 142
- 100 % value → 142
- Input value percent → 142
- Input value → 143
- Temperature offset after conversion → 143
Operating mode

**Navigation**

Expert → Input/output → Analog IP → Operating mode (14014)

**Description**

Defines the operating mode of the analog input.

**Selection**

- Disabled
- RTD temperature input
- Gauge power supply

**Factory setting**

Disabled

**Additional information**

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<thead>
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</table>

RTD type

**Navigation**

Expert → Input/output → Analog IP → RTD type (14021)

**Prerequisite**

Operating mode (→ 139) = RTD temperature input

**Description**

Defines the type of the connected RTD.

**Selection**

- Cu50 (w=1.428, GOST)
- Cu53 (w=1.426, GOST)
- Cu90; 0°C (w=1.4274, GOST)
- Cu100; 25°C (w=1.4274, GOST)
- Cu100; 0°C (w=1.4274, GOST)
- Pt46 (w=1.391, GOST)
- Pt50 (w=1.391, GOST)
- Pt100(385) (a=0.00385, IEC751)
- Pt100(389) (a=0.00389, Canadian)
- Pt100(391) (a=0.003916, JIS1604)
The 'Expert' menu

- Pt100 (w=1.391, GOST)
- Pt500(385) (a=0.00385, IEC751)
- Pt1000(385) (a=0.00385, IEC751)
- Ni100(617) (a=0.00617, DIN43760)
- Ni120(672) (a=0.00672, DIN43760)
- Ni1000(617) (a=0.00617, DIN43760)

Factory setting

Pt100(385) (a=0.00385, IEC751)

Additional information

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</table>

Ohms offset

Description

Defines a offset for the resistance. This value is added to the measured resistance before the calculation of the temperature.

User entry

-10.0 to 10.0 Ohm

Factory setting

0 Ohm

Additional information

The value entered in this parameter is added to the measured resistance before the calculation of the temperature.

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</table>

Thermocouple type

Description

Defines the type of the connected thermocouple.

Selection

- N type
- B type
- C type
- D type
- J type
- K type
- L type
- LGOST type
- R type
- S type
- T type
- U type
### RTD connection type

**Navigation**

Expert → Input/output → Analog IP → RTD connect type (14022)

**Prerequisite**

Operating mode → RTD temperature input

**Description**

Defines the connection type of the RTD.

**Selection**

- 4 wire RTD connection
- 2 wire RTD connection
- 3 wire RTD connection

**Factory setting**

4 wire RTD connection

**Additional information**

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### Process value

**Navigation**

Expert → Input/output → Analog IP → Process value (14003)

**Prerequisite**

Operating mode → Disabled

**Description**

Shows the measured value received via the analog input.

**Additional information**

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### Process variable

**Navigation**

Expert → Input/output → Analog IP → Process variable (14016)

**Prerequisite**

Operating mode → RTD temperature input

**Description**

Determines type of measured value.

**Selection**

- Level linearized
- Temperature
- Pressure
- Density

**Factory setting**

Level linearized
The 'Expert' menu

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</table>

0 % value

**Navigation**  
瀛| Expert → Input/output → Analog IP → 0 % value (14001)

**Prerequisite**  
Operating mode (→ 139) = 4..20mA input

**Description**  
Defines the value represented by a current of 4mA.

**User entry**  
Signed floating-point number

**Factory setting**  
0 mm

**Additional information**  
Read access | Operator
Write access | Maintenance

100 % value

**Navigation**  
瀛| Expert → Input/output → Analog IP → 100 % value (14013)

**Prerequisite**  
Operating mode (→ 139) = 4..20mA input

**Description**  
Defines the value represented by a current of 20mA.

**User entry**  
Signed floating-point number

**Factory setting**  
0 mm

**Additional information**  
Read access | Operator
Write access | Maintenance

Input value percent

**Navigation**  
瀛| Expert → Input/output → Analog IP → Input value [%] (14002)

**Prerequisite**  
Operating mode (→ 139) = 4..20mA input

**Description**  
Shows the input value in percent.
0% corresponds to 4 mA.
100% corresponds to 20 mA.
Proservo NMS81

The "Expert" menu

Additional information

- 0% corresponds to 4 mA
- 100% corresponds to 20 mA

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Input value

Navigation

Expert → Input/output → Analog IP → Input value (14015)

Prerequisite

Operating mode (→ 139) ≠ Disabled

Description

Shows the value received via the analog input.

Additional information

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</table>

Temperature offset after conversion

Navigation

Expert → Input/output → Analog IP → Temp. offset (14025)

Prerequisite

Operating mode (→ 139) = RTD temperature input

Description

Defines an offset for the measured temperature. The offset is applied after the resistance of the RTD has been converted to a temperature.

User entry

-20 to 20 °C

Factory setting

0 °C

Additional information

The offset defined in this parameter is applied after the resistance of the RTD has been converted to a temperature.

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Minimum probe temperature

Navigation

Expert → Input/output → Analog IP → Min. probe temp (14010)

Prerequisite

Operating mode (→ 139) = RTD temperature input

Description

Minimum approved temperature of the connected probe. If the temperature falls below this value, the W&M status will be 'invalid'.
The 'Expert' menu

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Maximum probe temperature

<table>
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<th>−213 to 927 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory setting</td>
<td>−100 °C</td>
</tr>
<tr>
<td>Additional information</td>
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<tr>
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</tbody>
</table>

Navigation

Expert → Input/output → Analog IP → Max. probe temp (14011)

Prerequisite

Operating mode (→ 139) = RTD temperature input

Description

Maximum approved temperature of the connected probe. If the temperature rises above this value, the W&M status will be 'invalid'.

User entry

−213 to 927 °C

Factory setting

250 °C

Additional information

Read access | Operator
Write access | Maintenance

Probe position

Navigation

Expert → Input/output → Analog IP → Probe position (14009)

Prerequisite

Operating mode (→ 139) = RTD temperature input

Description

Position of the temperature probe, measured from zero position (tank bottom or datum plate). This parameter, in conjunction with the measured level, determines whether the temperature probe is still covered by the product. If this is no longer the case, the status of the temperature value will be 'invalid'.

User entry

−5000 to 30000 mm

Factory setting

5000 mm

Additional information

Read access | Operator
Write access | Maintenance
### Calibration type AIP

**Navigation**
Expert → Input/output → Analog IP → Cal type AIP (14018)

**Prerequisite**
Operating mode (→ 139) ≠ Disabled

**Description**
Select calibration state of the analog input or output.

**Selection**
- User calibration
- Factory calibration

**Factory setting**
Factory calibration

**Additional information**
**Meaning of the options**
- Not calibrated
  This is a display option only. It can not be selected. It is shown if the analog input is not in a calibrated state.
- User calibration
  Activates a user calibration. The user calibration itself is defined in the User calibration wizard.
- Factory calibration
  Activates the factory calibration which is permanently stored in the device.

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</tbody>
</table>

### Active calibration

**Navigation**
Expert → Input/output → Analog IP → Act. calibration (14012)

**Prerequisite**
Operating mode (→ 139) ≠ Disabled

**Description**
Shows calibration state of the analog input.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Damping factor

**Navigation**
Expert → Input/output → Analog IP → Damping factor (14004)

**Prerequisite**
Operating mode (→ 139) ≠ Disabled

**Description**
Defines the damping constant (in seconds).

**User entry**
0 to 999.9 s
The 'Expert' menu

**Factory setting**

0 s

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

---

**Gauge current**

**Navigation**

Expert → Input/output → Analog IP → Gauge current (14027)

**Prerequisite**

Operating mode (→ 139) = Gauge power supply

**Description**

Shows the current on the power supply line for the connected device.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
3.3.3 "Analog I/O" submenu

There is a Analog I/O submenu (→ 147) for each Analog I/O module of the device. This submenu refers to terminals 1 to 3 of this module (an analog input or output). For terminals 4 to 8 (always an analog input) refer to → 138.

Navigation  
Expert → Input/output → Analog I/O

- Operating mode  
- Current span  
- Fixed current  
- Analog input source  
- Failure mode  
- Error value  
- Output out of range  
- Error on event  
- Input value  
- 0 % value  
- 100 % value  
- Input value %
The "Expert" menu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output value</td>
<td>154</td>
</tr>
<tr>
<td>Readback value</td>
<td>154</td>
</tr>
<tr>
<td>Feedback threshold</td>
<td>155</td>
</tr>
<tr>
<td>Process variable</td>
<td>155</td>
</tr>
<tr>
<td>Analog input 0% value</td>
<td>155</td>
</tr>
<tr>
<td>Analog input 100% value</td>
<td>156</td>
</tr>
<tr>
<td>Error event type</td>
<td>156</td>
</tr>
<tr>
<td>Process value</td>
<td>156</td>
</tr>
<tr>
<td>Input value in mA</td>
<td>157</td>
</tr>
<tr>
<td>Input value percent</td>
<td>157</td>
</tr>
<tr>
<td>Damping factor</td>
<td>157</td>
</tr>
<tr>
<td>Calibration</td>
<td>158</td>
</tr>
<tr>
<td>Active calibration</td>
<td>158</td>
</tr>
<tr>
<td>Used for SIL/WHG</td>
<td>158</td>
</tr>
</tbody>
</table>

**Navigation**

Expert → Input/output → Analog I/O → Operating mode (13958)

**Description**

Defines the operating mode of the analog I/O module.

**Selection**

- Disabled
- 4..20mA input
- HART master+4..20mA input
- HART master
- 4..20mA output
- HART slave +4..20mA output

**Factory setting**

Disabled

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
**Meaning of the options**

<table>
<thead>
<tr>
<th>Operating mode (→  148)</th>
<th>Direction of signal</th>
<th>Type of signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabled</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4..20mA input</td>
<td>Input from 1 external device</td>
<td>Analog (4...20mA)</td>
</tr>
</tbody>
</table>
| HART master+4..20mA input| Input from 1 external device | • Analog (4...20mA)  
  • HART |
| HART master              | Input from up to 6 external devices | HART |
| 4..20mA output           | Output to higher-level unit | Analog (4...20mA) |
| HART slave +4..20mA output| Output to higher-level unit | • Analog (4...20mA)  
  • HART |

Depending on the terminals used, the Analog I/O module is used in the passive or active mode.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Terminals of the I/O module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive (power supply from external source)</td>
<td>1</td>
</tr>
<tr>
<td>Active (power supplied by the device itself)</td>
<td>not used</td>
</tr>
</tbody>
</table>

In the active mode the following conditions must be met:
- Maximum current consumption of the connected HART devices: 24 mA (i.e. 4 mA per device if 6 devices are connected).
- Output voltage of the Ex-d module: 17.0 V@4 mA to 10.5 V@22 mA
- Output voltage of the Ex-ia module: 18.5 V@4 mA to 12.5 V@22 mA

**Current span**

**Navigation**
Expert → Input/output → Analog I/O → Current span (13987)

**Prerequisite**
Operating mode parameter (→  148) ≠ Disabled option or HART master option

**Description**
Defines the current range for the measured value transmission.

**Selection**
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
  * Fixed value

**Factory setting**
4...20 mA NE (3.8...20.5 mA)

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
### Meaning of the options

<table>
<thead>
<tr>
<th>Option</th>
<th>Current range for process variable</th>
<th>Minimum value</th>
<th>Lower alarm signal level</th>
<th>Upper alarm signal level</th>
<th>Maximum value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4...20 mA (4...20.5 mA)</td>
<td>4 to 20.5 mA</td>
<td>3.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
<td>22.6 mA</td>
</tr>
<tr>
<td>4...20 mA NE (3.8...20.5 mA)</td>
<td>3.8 to 20.5 mA</td>
<td>3.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
<td>22.6 mA</td>
</tr>
<tr>
<td>4...20 mA US (3.9...20.8 mA)</td>
<td>3.9 to 20.8 mA</td>
<td>3.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
<td>22.0 mA</td>
</tr>
<tr>
<td>Fixed current</td>
<td>Constant current, defined in the Fixed current parameter (→  150).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the case of an error, the output current assumes the value defined in the Failure mode parameter (→  151).

### Fixed current

<table>
<thead>
<tr>
<th>Navigation</th>
<th>专家 → 输入/输出 → 模拟 I/O → 固定电流 (13989)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td><strong>Current span (→  149) = Fixed current</strong></td>
</tr>
<tr>
<td>Description</td>
<td>Defines the fixed output current.</td>
</tr>
<tr>
<td>User entry</td>
<td>4 to 22.5 mA</td>
</tr>
<tr>
<td>Factory setting</td>
<td>4 mA</td>
</tr>
<tr>
<td>Additional info</td>
<td><strong>Read access</strong> Operator  <strong>Write access</strong> Maintenance</td>
</tr>
</tbody>
</table>

### Analog input source

<table>
<thead>
<tr>
<th>Navigation</th>
<th>专家 → 输入/输出 → 模拟 I/O → 模拟源 (13974)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>• Operating mode (→  148) = 4..20mA output or HART slave +4..20mA output  • Current span (→  149) = Fixed current</td>
</tr>
<tr>
<td>Description</td>
<td>Defines the process variable transmitted via the AIO.</td>
</tr>
<tr>
<td>Selection</td>
<td>• None  • Tank level  • Tank level %  • Tank ullage  • Tank ullage %  • Measured level  • Distance  • Displacer position  • Water level</td>
</tr>
</tbody>
</table>
- Upper interface level
- Lower interface level
- Bottom level
- Tank reference height
- Liquid temperature
- Vapor temperature
- Air temperature
- Observed density value
- Average profile density
- Upper density
- Middle density
- Lower density
- P1 (bottom)
- P2 (middle)
- P3 (top)
- GP 1...4 value
- AIO B1-3 value
- AIO B1-3 value mA
- AIO C1-3 value
- AIO C1-3 value mA
- AIP B4-8 value
- AIP C4-8 value
- Element temperature 1...24
- HART device 1...15 PV
- HART device 1...15 PV mA
- HART device 1...15 PV %
- HART device 1...15 SV
- HART device 1...15 TV
- HART device 1...15 QV

Factory setting

Tank level

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Failure mode

Navigation

Expert → Input/output → Analog I/O → Failure mode (13988)

Prerequisite

Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output

Description

Defines the output behavior in case of an error.

Selection

- Min.
- Max.
- Last valid value
- Actual value
- Defined value

Factory setting

Max.

Visibility depends on order options or device settings
**Error value**

**Navigation**  
Expert → Input/output → Analog I/O → Error value (13972)

**Prerequisite**  
Failure mode (→ 151) = Defined value

**Description**  
Defines the output value in case of an error.

**User entry**  
3.4 to 22.6 mA

**Factory setting**  
22 mA

**Output out of range**

**Navigation**  
Expert → Input/output → Analog I/O → Output out range (13971)

**Prerequisite**  
Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output

**Description**  
Behavior of current output if the value is out of allowed range.

**Selection**  
- Last valid value
- Alarm
- None

**Factory setting**  
Alarm

**Error on event**

**Navigation**  
Expert → Input/output → Analog I/O → Error on event (13967)

**Prerequisite**  
Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output

**Description**  
Defines to which type of event (alarm or warning) the output responds.
Selection
- Output related error
- Any error
- Any error or warning

Factory setting
Output related error

Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Input value

Navigation
Expert → Input/output → Analog I/O → Input value (13979)

Prerequisite
- Operating mode (→ 4..20mA output or HART slave +4..20mA output
- Current span (→ ≠ Fixed current

Description
Shows the input value of the analog I/O module.

Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

0 % value

Navigation
Expert → Input/output → Analog I/O → 0 % value (13954)

Prerequisite
- Operating mode (→ 4..20mA output or HART slave +4..20mA output
- Current span (→ ≠ Fixed current

Description
Value corresponding to an output current of 0% (4mA).

User entry
Signed floating-point number

Factory setting
0 Unitless

Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

100 % value

Navigation
Expert → Input/output → Analog I/O → 100 % value (13968)

Prerequisite
- Operating mode (→ 4..20mA output or HART slave +4..20mA output
- Current span (→ ≠ Fixed current

Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
### Input value %

**Description**
Value corresponding to an output current of 100% (20mA).

**User entry**
Signed floating-point number

**Factory setting**
0 Unitless

**Additional information**
<table>
<thead>
<tr>
<th>Access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Prerequisite**
- Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output
- Current span (→ 149) ≠ Fixed current

**Description**
Shows the output value as a percentage of the complete 4...20mA range.

**Additional information**
<table>
<thead>
<tr>
<th>Access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Output value

**Navigation**
Expert → Input/output → Analog I/O → Output value (13969)

**Prerequisite**
- Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output

**Description**
Shows the output value in mA.

**Additional information**
<table>
<thead>
<tr>
<th>Access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Readback value

**Navigation**
Expert → Input/output → Analog I/O → Readback value (13957)

**Prerequisite**
- Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output

**Description**
Shows the measured (feedback) current at the output.

**User interface**
0 to 65 535 µA

**Factory setting**
0 µA
### Feedback threshold

**Navigation**

Expert → Input/output → Analog I/O → Feedback thresh. (13956)

**Prerequisite**

Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output

**Description**

Shows the feedback threshold.

### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Process variable

**Navigation**

Expert → Input/output → Analog I/O → Process variable (13964)

**Prerequisite**

Operating mode (→ 148) = 4..20mA input or HART master+4..20mA input

**Description**

Defines the type of measuring variable.

**Selection**

- Level linearized
- Temperature
- Pressure
- Density

**Factory setting**

Level linearized

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### Analog input 0% value

**Navigation**

Expert → Input/output → Analog I/O → AI 0% value (13977)

**Prerequisite**

Operating mode (→ 148) = 4..20mA input or HART master+4..20mA input

**Description**

Value corresponding to an input current of 0% (4mA).

**User entry**

Signed floating-point number

**Factory setting**

0 mm
The 'Expert' menu

Proservo NMS81

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Analog input 100% value

Navigation

Expert → Input/output → Analog I/O → AI 100% value (13965)

Prerequisite

Operating mode (→ 148) = 4..20mA input or HART master+4..20mA input

Description

Value corresponding to an input current of 100% (20mA).

User entry

Signed floating-point number

Factory setting

0 mm

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Error event type

Navigation

Expert → Input/output → Analog I/O → Error event type (13953)

Prerequisite

Operating mode (→ 148) ≠ Disabled or HART master

Description

Defines the type of event message (alarm/warning) in case of an error or output out of range in the analog I/O module.

Selection

- None
- Warning
- Alarm

Factory setting

Warning

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Process value

Navigation

Expert → Input/output → Analog I/O → Process value (13963)

Prerequisite

Operating mode (→ 148) = 4..20mA input or HART master+4..20mA input

Description

Shows the input value scaled to customer units.
### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Input value in mA

**Navigation**: Expert → Input/output → Analog I/O → Input val. in mA (13970)

**Prerequisite**: Operating mode (→ 148) = 4..20mA input or HART master+4..20mA input

**Description**: Shows the input value in mA.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Input value percent

**Navigation**: Expert → Input/output → Analog I/O → Input value [%] (13978)

**Prerequisite**: Operating mode (→ 148) = 4..20mA input or HART master+4..20mA input

**Description**: Shows the input value as a percentage of the complete 4...20mA current range.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Damping factor

**Navigation**: Expert → Input/output → Analog I/O → Damping factor (13951)

**Prerequisite**: Operating mode (→ 148) ≠ Disabled or HART master

**Description**: Defines the damping constant (in seconds).

**User entry**: 0 to 999.9 s

**Factory setting**: 0 s

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
Calibration

Navigation  
Expert → Input/output → Analog I/O → Calibration (13966)

Prerequisite  
Operating mode (→ 148) ≠ Disabled or HART master

Description  
Select calibration state of the analog input or output.

Selection  
- User calibration
- Factory calibration

Factory setting  
Factory calibration

Additional information  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
<th>Write access</th>
<th>Maintenance</th>
</tr>
</thead>
</table>

Active calibration

Navigation  
Expert → Input/output → Analog I/O → Act. calibration (13981)

Prerequisite  
Operating mode (→ 148) ≠ Disabled or HART master

Description  
Indicates the calibration status of the Analog I/O module.

Additional information  
Meaning of the options
- **User calibration**
  The calibration entered by the user is active.
- **Factory calibration**
  The calibration stored permanently in the device is active.

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
<th>Write access</th>
<th></th>
</tr>
</thead>
</table>

Used for SIL/WHG

Navigation  
Expert → Input/output → Analog I/O → Used for SIL/WHG (13980)

Prerequisite  
- Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output
- The device has a SIL approval.

Description  
Determines whether the discrete I/O module is in SIL/WHG mode.

Selection  
- Enabled
- Disabled

Factory setting  
Disabled
### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### Expected SIL/WHG chain

#### Navigation

Expert → Input/output → Analog I/O → SIL/WHG chain (13952)

#### Prerequisite

- Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output
- The device has a SIL approval.

#### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
### 3.3.4 "Digital Xx-x" submenu

- In the operating menu, each digital input or output is designated by the respective slot of the terminal compartment and two terminals within this slot. A1-2, for example, denotes terminals 1 and 2 of slot A. The same is valid for slots B, C and D if they contain a Digital IO module.
- In this document, Xx-x designates any of these submenus. The structure of all these submenus is the same.

![Designation of the digital inputs or outputs (examples)](image)

**Navigation**  
Expert → Input/output → Digital Xx-x → Operating mode (13911)

- Operating mode
- Digital input source
- Input value
- Contact type
- Output simulation
- Output value
- Readback value
- Error on event
- Damping factor
- Used for SIL/WHG
Operating mode

Navigation

Expert → Input/output → Digital Xx-x → Operating mode (13911)

Description
Defines the operating mode of the discrete I/O module.

Selection
- Disabled
- Output passive
- Input passive
- Input active

Factory setting
Disabled

Additional information

![Diagram of operating modes](image.png)

14 Operating modes of the Digital I/O module

A Input passive
B Input active
C Output passive

<table>
<thead>
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</tr>
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</tbody>
</table>

Digital input source

Navigation

Expert → Input/output → Digital Xx-x → Digital source (13907)

Prerequisite

Operating mode (→ 161) = Output passive

Description
Defines which device state is indicated by the digital output.

Selection
- None
- Alarm x any
- Alarm x High
- Alarm x HighHigh
- Alarm x High or HighHigh
- Alarm x Low
- Alarm x LowLow
- Alarm x Low or LowLow
- Digital Xx-x
- Primary Modbus x
- Secondary Modbus x

Factory setting
None
Additional information

Meaning of the options
- Alarm x any, Alarm x High, Alarm x HighHigh, Alarm x High or HighHigh, Alarm x Low, Alarm x LowLow, Alarm x Low or LowLow
  The digital output indicates if the selected alarm is currently active. The alarms themselves are defined in the Alarm 1 to 4 submenus.
- Digital Xx-x
  The digital signal present at the digital input Xx-x is passed through to the digital output.
- Modbus A1-4 Discrete x
  Modbus B1-4 Discrete x
  Modbus C1-4 Discrete x
  Modbus D1-4 Discrete x
  The digital value written by the Modbus Master device to the Modbus discrete x parameter 5) is passed to the digital output. For details refer to Special Documentation SD02066G.

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</tr>
</tbody>
</table>

Input value

Navigation
Expert → Input/output → Digital Xx-x → Input value (13901)

Prerequisite
Operating mode (→ 161) = "Input passive" option or "Input active" option

Description
Shows the digital input value.

Additional information

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</thead>
<tbody>
<tr>
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<td>-</td>
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</tbody>
</table>

Contact type

Navigation
Expert → Input/output → Digital Xx-x → Contact type (13912)

Prerequisite
Operating mode (→ 161) = Disabled

Description
Determines the switching behavior of the input or output.

Selection
- Normally open
- Normally closed

Factory setting
Normally open

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

4) Only present if "Operating mode (→ 161)" = 'Input passive' or 'Input active' for the respective Digital I/O module.
5) Expert → Communication → Modbus Xx-x → Modbus discrete x
Output simulation

Navigation

Expert → Input/output → Digital Xx-x → Output sim (13909)

Prerequisite

Operating mode (→ 161) = Output passive

Description

Sets the output to a specific simulated value.

Selection

- Disable
- Simulating active
- Simulating inactive
- Fault 1
- Fault 2

Factory setting

Disable

Additional information

<table>
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</tbody>
</table>

The digital output consists of two relays connected in series:

The switching state of these relays is defined by the Output simulation parameter as follows:

<table>
<thead>
<tr>
<th>Output simulation</th>
<th>State of relay 1</th>
<th>State of relay 2</th>
<th>Expected result on the terminals of the I/O module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulating active</td>
<td>Closed</td>
<td>Closed</td>
<td>Closed</td>
</tr>
<tr>
<td>Simulating inactive</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Fault 1</td>
<td>Closed</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Fault 2</td>
<td>Open</td>
<td>Closed</td>
<td>Open</td>
</tr>
</tbody>
</table>

The Fault 1 and Fault 2 options can be used to check the correct switching behavior of the two relays.
Output value

**Navigation**

[Expert → Input/output → Digital Xx-x → Output value (13902)]

**Prerequisite**

Operating mode (→ 161) = Output passive

**Description**

Shows the digital output value.

**Additional information**

<table>
<thead>
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<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

---

Readback value

**Navigation**

[Expert → Input/output → Digital Xx-x → Readback value (13903)]

**Prerequisite**

Operating mode (→ 161) = Output passive

**Description**

Shows the value read back from the output.

**Additional information**

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<tr>
<th>Read access</th>
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</thead>
<tbody>
<tr>
<td>Write access</td>
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</tr>
</tbody>
</table>

---

Error on event

**Navigation**

[Expert → Input/output → Digital Xx-x → Error on event (13916)]

**Prerequisite**

Operating mode (→ 161) = Output passive

**Description**

Defines to which type of events (error or warning) the output responds. Choice: only output related or all.

**Selection**

- Output related error
- Any error
- Any error or warning

**Factory setting**

Output related error

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
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<tr>
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</tbody>
</table>
### Damping factor

- **Navigation**
  
  Expert → Input/output → Digital Xx-x → Damping factor (13904)

- **Prerequisite**
  
  Operating mode (→ 161) = Disabled

- **Description**
  
  Defines the damping constant.

- **User entry**
  
  1 to 10 s

- **Factory setting**
  
  5 s

- **Additional information**
  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
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<tbody>
<tr>
<td>Write access</td>
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</tr>
</tbody>
</table>

### Used for SIL/WHG

- **Navigation**
  
  Expert → Input/output → Digital Xx-x → Used for SIL/WHG (13910)

- **Prerequisite**
  
  - Operating mode (→ 161) = Output passive
  - The device has a SIL certificate.

- **Description**
  
  Determines whether the discrete I/O module is in SIL/WHG mode.

- **Selection**
  
  - Enabled
  - Disabled

- **Factory setting**
  
  Disabled

- **Additional information**
  
<table>
<thead>
<tr>
<th>Read access</th>
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</thead>
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<tr>
<td>Write access</td>
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</tbody>
</table>
3.3.5 "Digital input mapping" submenu

**Navigation**

> Expert → Input/output → DI mapping

---

### Digital input source 1

**Navigation**

> Expert → Input/output → DI mapping → Digital source 1 (8147)

**Description**

Selects the source of digital input #1 (for gauge command).

**Selection**

- None
- Digital A1-2 *
- Digital A3-4 *
- Digital B1-2 *
- Digital B3-4 *
- Digital C1-2 *
- Digital C3-4 *
- Digital D1-2 *
- Digital D3-4 *

**Factory setting**

None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

---

### Digital input source 2

**Navigation**

> Expert → Input/output → DI mapping → Digital source 2 (8148)

**Description**

Selects the source of digital input #2 (for gauge command).

---

* Visibility depends on order options or device settings
Selection

- None
- Digital A1-2 *
- Digital A3-4 *
- Digital B1-2 *
- Digital B3-4 *
- Digital C1-2 *
- Digital C3-4 *
- Digital D1-2 *
- Digital D3-4 *

Factory setting

None

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
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<td>Write access</td>
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</tbody>
</table>

Gauge command 0

Navigation

Expert → Input/output → DI mapping → Gauge command 0 (8149)

Prerequisite

Digital input source 1 (→ 166) ≠ None

Description

Gauge command assigned to digital input combination 0 (DI2=0, DI1=0).

Selection

- Stop *
- Level
- Up *
- Bottom level *
- Upper I/F level *
- Lower I/F level *
- Upper density *
- Middle density
- Lower density *
- Repeatability *
- Water dip
- Release overtension *
- Tank profile *
- Interface profile *
- Manual profile *
- Level standby *
- Offset standby *

Factory setting

Level

Additional information

<table>
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<tbody>
<tr>
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</table>

* Visibility depends on order options or device settings
**Gauge command 1**

**Navigation**

Expert → Input/output → DI mapping → Gauge command 1 (8150)

**Prerequisite**

Digital input source 1 (➔ 166) ≠ None

**Description**

Gauge command assigned to digital input combination 1 (DI2=0, DI1=1).

**Selection**

- Stop *
- Level
- Up *
- Bottom level *
- Upper I/F level *
- Lower I/F level *
- Upper density *
- Middle density *
- Lower density *
- Repeatability *
- Water dip
- Release overtension *
- Tank profile *
- Interface profile *
- Manual profile *
- Level standby *
- Offset standby *

**Factory setting**

Up

**Additional information**

<table>
<thead>
<tr>
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</tbody>
</table>

**Gauge command 2**

**Navigation**

Expert → Input/output → DI mapping → Gauge command 2 (8151)

**Prerequisite**

- Digital input source 1 (➔ 166) ≠ None
- Digital input source 2 (➔ 166) ≠ None

**Description**

Gauge command assigned to digital input combination 2 (DI2=1, DI1=0).

**Selection**

- Stop *
- Level
- Up *
- Bottom level *
- Upper I/F level *
- Lower I/F level *
- Upper density *
- Middle density *
- Lower density *
- Repeatability *

* Visibility depends on order options or device settings
The "Expert" menu

- Water dip *
- Release overtension *
- Tank profile *
- Interface profile *
- Manual profile *
- Level standby *
- Offset standby *

Factory setting
Stop

Additional information

<table>
<thead>
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<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

Gauge command 3

Navigation
Expert → Input/output → DI mapping → Gauge command 3 (8152)

Prerequisite
- Digital input source 1 (→ 166) ≠ None
- Digital input source 2 (→ 166) ≠ None

Description
Gauge command assigned to digital input combination 3 (DI2=1, DI1=1).

Selection
- Stop *
- Level
- Up *
- Bottom level *
- Upper I/F level *
- Lower I/F level *
- Upper density *
- Middle density *
- Lower density *
- Repeatability *
- Water dip
- Release overtension *
- Tank profile *
- Interface profile *
- Manual profile *
- Level standby *
- Offset standby *

Factory setting
Upper I/F level

Additional information

<table>
<thead>
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<th>Read access</th>
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</table>

* Visibility depends on order options or device settings
3.4 "Communication" submenu

This menu contains a submenu for each digital communication interface of the device. The communication interfaces are designated by "X1-4" where "X" specifies the slot in the terminal compartment and "1-4" the terminals within this slot.

16 Designation of the 'Modbus' or 'V1' modules (examples); depending on the device version these modules may also be in slot B or C.

Navigation  Expert → Communication
3.4.1 "Modbus Xx-x" or "V1 Xx-x" submenu

This submenu is only present for devices with MODBUS and/or V1 communication interface. There is one submenu of this type for each communication interface.

**Navigation**

Expert → Communication → Modbus Xx-x / V1 Xx-x

---

### Modbus Xx-x

- Communication interface protocol → 171
- Modbus value 1 to 4 → 172
- Modbus discrete 1 to 4 → 172

- **Configuration** → 173

- **Integer conversion** → 178

- **User value source** → 183

- **GP values** → 184

- **Discrete selector** → 187

---

### V1 Xx-x

- Communication interface protocol → 171

- **Configuration** → 188

- **V1 input selector** → 191

---

**Communication interface protocol**

**Navigation**

Expert → Communication → Modbus X1-4 / V1 X1-4 / WM550 X1-4 → Commu I/F protoc (13201)

**Description**

Shows the type of communication protocol.

**Additional information**

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</table>
The "Expert" menu

**Modbus value 1 to 4**

**Navigation**

Expert → Communication → Modbus Xx-x → Modbus value 1 to 4 (13206–1 to 4)

**Prerequisite**

Communication interface protocol (→ 171) = MODBUS

**Description**

Shows the respective floating point value written by the host system.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
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<td>-</td>
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</tbody>
</table>

The Modbus interface provides four floating point values which can be written to by the Host system. These values can be linked to specific functions (e.g. providing the air temperature value).

**Modbus discrete 1 to 4**

**Navigation**

Expert → Communication → Modbus Xx-x → Modbus discr. 1 to 4 (13240–1 to 4)

**Prerequisite**

Communication interface protocol (→ 171) = MODBUS

**Description**

Shows the integer value written by the host-system.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
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<tr>
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</table>

The Modbus interface provides four discrete (integer) registers which can be written to by the Host system. These values can be linked to specific functions (e.g. controlling a discrete output).

In the device these values are converted into the following discrete state values:

- Unknown (integer value 0)
- Inactive (integer value 1)
- Active (integer value 2)
- Invalid (integer value >= 3)
"Configuration" submenu (Modbus)

Only visible for devices with a Modbus I/O module.

**Navigation**

Expert → Communication → Modbus Xx-x → Configuration

**Baudrate**

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<td>Parity</td>
<td>→ 174</td>
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<tr>
<td>Modbus address</td>
<td>→ 174</td>
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<tr>
<td>Float swap mode</td>
<td>→ 174</td>
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<tr>
<td>Invalid data</td>
<td>→ 175</td>
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<tr>
<td>Word type</td>
<td>→ 175</td>
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<tr>
<td>CRC seed</td>
<td>→ 176</td>
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<tr>
<td>Old TSM mode</td>
<td>→ 176</td>
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<tr>
<td>Bus termination</td>
<td>→ 176</td>
</tr>
<tr>
<td>Compatibility mode</td>
<td>→ 177</td>
</tr>
</tbody>
</table>

**Prerequisite**

Communication interface protocol ( → 171) = MODBUS

**Description**

Defines the baud rate of the communication.

**Selection**

- 600 BAUD
- 1200 BAUD
- 2400 BAUD
- 4800 BAUD
- 9600 BAUD *
- 19200 BAUD *

**Factory setting**

9600 BAUD

* Visibility depends on order options or device settings
The 'Expert' menu

Parity

Navigation  

Prerequisite  

Description  

Selection  

Factory setting  None / 1 stop bit

Additional information

Modbus address

Navigation  

Prerequisite  

Description  

User entry  1 to 247

Factory setting  1

Additional information

Float swap mode

Navigation  

Prerequisite  

Description  

User entry

Factory setting

Additional information

Read access  Operator

Write access  Maintenance
**Description**
Sets the format of how the floating point value is transferred on Modbus.

**Selection**
- Normal 3-2-1-0
- Swap 0-1-2-3
- WW Swap 1-0-3-2

**Factory setting**
Swap 0-1-2-3

**Additional information**

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</table>

**Invalid data**

**Navigation**
Expert → Communication → Modbus Xx-x → Configuration → Invalid data (13243)

**Prerequisite**
Communication interface protocol (→ 171) = MODBUS

**Description**
Sets what byte is sent in a message that contains invalid data.

**Selection**
- 0x00
- 0xFF

**Factory setting**
0x00

**Additional information**

<table>
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</table>

**Word type**

**Navigation**
Expert → Communication → Modbus Xx-x → Configuration → Word type (13208)

**Prerequisite**
Communication interface protocol (→ 171) = MODBUS

**Description**
Selects if the integer value has the range 0 to +65535 or -32768 to +32767.

**Selection**
- Unsigned
- Signed

**Factory setting**
Unsigned

**Additional information**

<table>
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</tbody>
</table>
**CRC seed**

**Navigation**  
Expert → Communication → Modbus Xx-x → Configuration → CRC seed (13248)

**Prerequisite**  
Communication interface protocol (→ 171) = MODBUS

**Description**  
CRC seed value selection used for all communication CRC calculations.

**Selection**  
- 0x0000
- 0xFFFF

**Factory setting**  
0xFFFF

**Additional information**

<table>
<thead>
<tr>
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</table>

**Old TSM mode**

**Navigation**  
Expert → Communication → Modbus Xx-x → Configuration → Old TSM mode (13213)

**Prerequisite**  
Communication interface protocol (→ 171) = MODBUS

**Description**  
Selects the type of value available at the NRF590 SW vers.1 compatible modbus map (Address 3000-3195) addresses.

**Selection**  
- Float values
- Integer values

**Factory setting**  
Float values

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
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</tbody>
</table>

**Bus termination**

**Navigation**  
Expert → Communication → Modbus X1-4 → Configuration → Bus termination (13249)

**Prerequisite**  
Communication interface protocol (→ 171) = MODBUS

**Description**  
Activates or deactivates the bus termination at the device. Should only be activated on the last device in a loop.

**Selection**  
- Off
- On
**Compatibility mode**

**Navigation**

Expert → Communication → Modbus Xx-x / V1 Xx-x → Configuration → Comp. mode (13281)

**Description**

Defines the compatibility mode.

**Selection**

- Nxx5xx
- Nxx8x

**Factory setting**

Nxx8x

**Additional information**

In **NMS5x** mode: Only values which have also existed on NMS5x Gauge status are output on the bus.

In **NMS8x** mode: All Gauge status are available at this parameter.

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</tbody>
</table>
"Integer conversion" submenu

Only visible for devices with a Modbus I/O module.

Navigation

Expert → Communication → Modbus Xx-x → Integer convers → Level 0% (13214)

Description

Defines the level that represents 0% on the integer value scale.

User entry

Signed floating-point number

Factory setting

0.00 mm

Additional information

<table>
<thead>
<tr>
<th></th>
<th>Operator</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Write access</td>
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<td></td>
</tr>
</tbody>
</table>

Level 0%

Navigation

Expert → Communication → Modbus Xx-x → Integer convers → Level 0% (13214)
Level 100%

**Navigation**
Expert → Communication → Modbus Xx-x → Integer convers → Level 100% (13250)

**Description**
Defines the level that represents 100% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
30.0 mm

**Additional information**

<table>
<thead>
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</tbody>
</table>

Temperature 0%

**Navigation**
Expert → Communication → Modbus Xx-x → Integer convers → Temperature 0% (13215)

**Description**
Defines the temperature that represents 0% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
233.15 °C

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
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</thead>
<tbody>
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<td>Write access</td>
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</tbody>
</table>

Temperature 100%

**Navigation**
Expert → Communication → Modbus Xx-x → Integer convers → Temperature 100% (13216)

**Description**
Defines the temperature that represents 100% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
373.15 °C

**Additional information**

<table>
<thead>
<tr>
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</tbody>
</table>
Pressure 0%

**Navigation**

Expert → Communication → Modbus Xx-x → Integer converters → Pressure 0% (13217)

**Description**

Defines the pressure that represents 0% on the integer value scale.

**User entry**

Signed floating-point number

**Factory setting**

0 bar

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
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<tr>
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</tbody>
</table>

Pressure 100%

**Navigation**

Expert → Communication → Modbus Xx-x → Integer converters → Pressure 100% (13251)

**Description**

Defines the pressure that represents 100% on the integer value scale.

**User entry**

Signed floating-point number

**Factory setting**

25,000 bar

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Density 0%

**Navigation**

Expert → Communication → Modbus Xx-x → Integer converters → Density 0% (13252)

**Description**

Defines the density that represents 0% on the integer value scale.

**User entry**

Signed floating-point number

**Factory setting**

0 kg/m³

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
Density 100%

Navigation
Expert → Communication → Modbus Xx-x → Integer converters → Density 100%
(13218)

Description
Defines the density that represents 100% on the integer value scale.

User entry
Signed floating-point number

Factory setting
1 000 kg/m³

Additional information
| Read access | Operator |
| Write access | Maintenance |

User 0%

Navigation
Expert → Communication → Modbus Xx-x → Integer converters → User 0% (13221)

Description
Defines the value of the user selected variable that represents 0% on the integer value scale.

User entry
Signed floating-point number

Factory setting
0

Additional information
| Read access | Operator |
| Write access | Maintenance |

User 100%

Navigation
Expert → Communication → Modbus Xx-x → Integer converters → User 100% (13222)

Description
Defines the value of the user selected variable that represents 100% on the integer value scale.

User entry
Signed floating-point number

Factory setting
0

Additional information
| Read access | Operator |
| Write access | Maintenance |
### Percent 0%

**Navigation**  
Expert → Communication → Modbus Xx-x → Integer convers → Percent 0% (13202)

**Description**  
Defines the percentage of the measured value that represents 0% on the integer value scale.

**User entry**  
-200 to +400 %

**Factory setting**  
0.00 %

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### Percent 100%

**Navigation**  
Expert → Communication → Modbus Xx-x → Integer convers → Percent 100% (13234)

**Description**  
Defines the percentage of the measured value that represents 100% on the integer value scale.

**User entry**  
-200 to +400 %

**Factory setting**  
100 %

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
"User value source" submenu

Only visible for devices with a Modbus I/O module.

Navigation

Expert → Communication → Modbus Xx-X → UserVal source → UserVal 1 source (13209)

User value 1 to 8 source

Navigation

Expert → Communication → Modbus Xx-X → UserVal source → UserVal 1 to 8 source (13209–1 to 8)

Description

Selects which parameter shall be transmitted as User value x.

Selection

- None
- Tank ullage
- Distance
- Upper interface level
- Lower interface level
- Bottom level
- Average profile density 6)
- Vapor density
- Manual density
- P1 position
- P3 position
- GP 1...4 value
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value
- HART device 1...15 PV
- HART device 1...15 PV mA
- HART device 1...15 PV %
- HART device 1...15 SV
- HART device 1...15 TV
- HART device 1...15 QV

Factory setting

None

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

6) Visibility depends on order options or device settings
"GP values" submenu

**Navigation**

Expert → Communication → Modbus Xx-x → GP values → GP 1 value 0% (13223)

<table>
<thead>
<tr>
<th>GP values</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GP 1 value 0%</td>
<td>184</td>
</tr>
<tr>
<td>GP 1 value 100%</td>
<td>184</td>
</tr>
<tr>
<td>GP 2 value 0%</td>
<td>185</td>
</tr>
<tr>
<td>GP 2 value 100%</td>
<td>185</td>
</tr>
<tr>
<td>GP 3 value 0%</td>
<td>185</td>
</tr>
<tr>
<td>GP 3 value 100%</td>
<td>186</td>
</tr>
<tr>
<td>GP 4 value 0%</td>
<td>186</td>
</tr>
<tr>
<td>GP 4 value 100%</td>
<td>186</td>
</tr>
</tbody>
</table>

**GP 1 value 0%**

**Navigation**

Expert → Communication → Modbus Xx-x → GP values → GP 1 value 0% (13223)

**Description**
Defines the GP1 value that represents 0% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
0 Unitless

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**GP 1 value 100%**

**Navigation**

Expert → Communication → Modbus Xx-x → GP values → GP 1 value 100% (13224)

**Description**
Defines the GP1 value that represents 100% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
0 Unitless
**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**GP 2 value 0%**

**Navigation**

Expert → Communication → Modbus Xx-x → GP values → GP 2 value 0% (13257)

**Description**

Defines the GP2 value that represents 0% on the integer value scale.

**User entry**

Signed floating-point number

**Factory setting**

0 None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**GP 2 value 100%**

**Navigation**

Expert → Communication → Modbus Xx-x → GP values → GP 2 value 100% (13258)

**Description**

Defines the GP2 value that represents 100% on the integer value scale.

**User entry**

Signed floating-point number

**Factory setting**

0 None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**GP 3 value 0%**

**Navigation**

Expert → Communication → Modbus Xx-x → GP values → GP 3 value 0% (13259)

**Description**

Defines the GP3 value that represents 0% on the integer value scale.

**User entry**

Signed floating-point number

**Factory setting**

0 Unitless

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
**GP 3 value 100%**

**Navigation**
Expert → Communication → Modbus Xx-x → GP values → GP 3 value 100% (13226)

**Description**
Defines the GP3 value that represents 100% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
0 Unitless

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**GP 4 value 0%**

**Navigation**
Expert → Communication → Modbus Xx-x → GP values → GP 4 value 0% (13225)

**Description**
Defines the GP4 value that represents 0% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
0 Unitless

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**GP 4 value 100%**

**Navigation**
Expert → Communication → Modbus Xx-x → GP values → GP 4 value 100% (13227)

**Description**
Defines the GP4 value that represents 100% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
0 Unitless

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
**"Discrete selector" submenu**

*Navigation*  
Expert → Communication → Modbus Xx-x → Discreteselect

<table>
<thead>
<tr>
<th>Discrete 1 selector</th>
<th></th>
</tr>
</thead>
</table>

| **Navigation** |  
Expert → Communication → WM550 X1-4 → Discreteselect → Discrete 1select (13260) |
|-----------------|---|

<table>
<thead>
<tr>
<th><strong>Description</strong></th>
<th>Determines the input source which is transferred as Alarm bit [n] value in the corresponding WM550 tasks.</th>
</tr>
</thead>
</table>

| **Selection** |  
None  
**Balance flag** optionVisibility depends on order options or device settings  
Alarm 1...4 any  
Alarm 1...4 HighHigh  
Alarm 1...4 High or HighHigh  
Alarm 1...4 High  
Alarm 1...4 Low  
Alarm 1...4 Low or LowLow  
Alarm 1...4 LowLow  
Digital Xx-x |
|-----------------|---|

<table>
<thead>
<tr>
<th><strong>Factory setting</strong></th>
<th>None</th>
</tr>
</thead>
</table>

| **Additional information** |  
Read access Operator  
Write access Maintenance |
|---------------------------|---|
"Configuration" submenu (V1)

Only visible for devices with a V1 I/O module.

Navigation  

Expert → Communication → V1 Xx-x → Configuration

---

### Communication interface protocol variant

**Description**
Determines which variant of the V1 protocol is used.

**User interface**
- None
- V1

**Factory setting**
None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**V1 address**

**Navigation**
Expert → Communication → V1 Xx-x → Configuration → V1 address (13235)

**Prerequisite**
Communication interface protocol variant (→ 188) = V1

**Description**
Identifier of the device for the V1 communication.

**User entry**
0 to 99

*Visibility depends on order options or device settings*
**V1 address**

**Navigation**
Expert → Communication → V1 Xx-x → Configuration → V1 address (13236)

**Prerequisite**
Communication interface protocol variant (→ 188)

**Description**
Identifier of the previous device for V1 communication.

**User entry**
0 to 255

**Factory setting**
1

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

---

**Level mapping**

**Navigation**
Expert → Communication → V1 Xx-x → Configuration → Level mapping (13268)

**Prerequisite**
Communication interface protocol (→ 171) = V1

**Description**
Determines the transmittable range of levels.

**Selection**
- +ve
- +ve & -ve

**Factory setting**
+ve

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

In V1, the level is always represented by a number in the range from 0 to 999 999. This number corresponds to a level as follows:

"Level mapping" = "+ve"

<table>
<thead>
<tr>
<th>Number</th>
<th>Corresponding level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0 mm</td>
</tr>
<tr>
<td>999 999</td>
<td>999 999.9 mm</td>
</tr>
</tbody>
</table>
"Level mapping" = "+ve & -ve"

<table>
<thead>
<tr>
<th>Number</th>
<th>Corresponding level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0 mm</td>
</tr>
<tr>
<td>50000</td>
<td>50000.0 mm</td>
</tr>
<tr>
<td>500001</td>
<td>-0.1 mm</td>
</tr>
<tr>
<td>999999</td>
<td>-49999.9 mm</td>
</tr>
</tbody>
</table>

Line impedance

Navigation
Expert → Communication → V1 Xx-x → Configuration → Line impedance (13266)

Prerequisite
Communication interface protocol (→ 171) = V1

Description
Adjusts the impedance of the communication line.

User entry
0 to 15

Factory setting
15

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The line impedance affects the voltage difference between a logical 0 and a logical 1 on the message of the device to the bus. The default setting is suitable for most applications.

Compatibility mode

Navigation
Expert → Communication → Modbus Xx-x / V1 Xx-x → Configuration → Comp. mode (13281)

Description
Defines the compatibility mode.

Selection
- Nxx5xx
- Nxx8x

Factory setting
Nxx8x

Additional information
In NMS5x mode: Only values which have also existed on NMS5x Gauge status are output on the bus.
In NMS8x mode: All Gauge status are available at this parameter.

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
“V1 input selector” submenu (V1)

Only visible for devices with a V1 I/O module.

Navigation

Expert → Communication → V1 Xx-x → V1 input select.

<table>
<thead>
<tr>
<th>V1 input selector</th>
</tr>
</thead>
<tbody>
<tr>
<td>User value 1 to 8 source → 191</td>
</tr>
<tr>
<td>Alarm 1 input source → 192</td>
</tr>
<tr>
<td>Alarm 2 input source → 192</td>
</tr>
<tr>
<td>Alarm 3 input source → 193</td>
</tr>
<tr>
<td>Alarm 4 input source → 193</td>
</tr>
<tr>
<td>SP 1 value selector → 194</td>
</tr>
<tr>
<td>SP 2 value selector → 194</td>
</tr>
<tr>
<td>SP 3 value selector → 195</td>
</tr>
<tr>
<td>SP 4 value selector → 195</td>
</tr>
<tr>
<td>Value percent selector → 196</td>
</tr>
</tbody>
</table>

User value 1 to 8 source

Navigation

Expert → Communication → V1 Xx-x → V1 input select. → UserVal 1 to 8 source (13209–1 to 8)

Description

Selects which parameter shall be transmitted as User value x.

Selection

- None
- Tank ullage
- Distance
- Upper interface level
- Lower interface level
- Bottom level
- Average profile density 7)
- Vapor density
- Manual density
- P1 position
- P3 position
- GP 1...4 value

7) Visibility depends on order options or device settings
The 'Expert' menu

Proservo NMS81

- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value
- HART device 1...15 PV
- HART device 1...15 PV mA
- HART device 1...15 PV %
- HART device 1...15 SV
- HART device 1...15 TV
- HART device 1...15 QV

Factory setting  None

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Alarm 1 input source

Navigation    Expert → Communication → V1 Xx-x → V1 input select. → Alarm1 input src (13270)

Description  Determines which discrete value will be transmitted as V1 alarm 1 status.

Selection
- None
- Alarm 1-4 any
- Alarm 1-4 HighHigh
- Alarm 1-4 High or HighHigh
- Alarm 1-4 High
- Alarm 1-4 Low
- Alarm 1-4 Low or LowLow
- Alarm 1-4 LowLow

Factory setting  None

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Alarm 2 input source

Navigation    Expert → Communication → V1 Xx-x → V1 input select. → Alarm2 input src (13271)

Description  Determines which discrete value will be transmitted as V1 alarm 2 status.

Selection
- None
- Alarm 1-4 any
- Alarm 1-4 HighHigh
- Alarm 1-4 High or HighHigh
- Alarm 1-4 High
• Alarm 1-4 Low
• Alarm 1-4 Low or LowLow
• Alarm 1-4 LowLow

Factory setting
None

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Alarm 3 input source

Navigation
Expert → Communication → V1 Xx-x → V1 input select. → Alarm3 in-source (13283)

Description
Determines which discrete value will be transmitted as V1 alarm 3 status in Z0 and Z1 message.

Selection
• None
• Alarm 1-4 any
• Alarm 1-4 HighHigh
• Alarm 1-4 High or HighHigh
• Alarm 1-4 High
• Alarm 1-4 Low
• Alarm 1-4 Low or LowLow
• Alarm 1-4 LowLow

Factory setting
None

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Alarm 4 input source

Navigation
Expert → Communication → V1 Xx-x → V1 input select. → Alarm4 in-source (13284)

Description
Determines which discrete value will be transmitted as V1 alarm 4 status in Z0 and Z1 message.

Selection
• None
• Alarm 1-4 any
• Alarm 1-4 HighHigh
• Alarm 1-4 High or HighHigh
• Alarm 1-4 High
• Alarm 1-4 Low
• Alarm 1-4 Low or LowLow
• Alarm 1-4 LowLow

Factory setting
None
The 'Expert' menu

SP 1 value selector

**Navigation**

Expert → Communication → V1 → V1 input select. → SP1 value select (13274)

**Description**

Selects which discrete value will be transmitted as V1 External Status bit 1 in Z0/Z1 message.

**Selection**

- None
- Digital A1-2 *
- Digital A3-4 *
- Digital B1-2 *
- Digital B3-4 *
- Digital C1-2 *
- Digital C3-4 *
- Digital D1-2 *
- Digital D3-4 *

**Factory setting**

None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

SP 2 value selector

**Navigation**

Expert → Communication → V1 → V1 input select. → SP2 value select (13275)

**Description**

Selects which discrete value will be transmitted as V1 External Status bit 2 in Z0/Z1 message.

**Selection**

- None
- Digital A1-2 *
- Digital A3-4 *
- Digital B1-2 *
- Digital B3-4 *
- Digital C1-2 *
- Digital C3-4 *
- Digital D1-2 *
- Digital D3-4 *

**Factory setting**

None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
SP 3 value selector

Navigation
Expert → Communication → V1 → V1 input select. → SP3 value select (13276)

Description
Selects which discrete value will be transmitted as V1 external status bit 3 in Z0/Z1 message.

Selection
- None
- Digital A1-2 *
- Digital A3-4 *
- Digital B1-2 *
- Digital B3-4 *
- Digital C1-2 *
- Digital C3-4 *
- Digital D1-2 *
- Digital D3-4 *

Factory setting
None

Additional information
| Read access | Operator |
| Write access | Maintenance |

SP 4 value selector

Navigation
Expert → Communication → V1 → V1 input select. → SP4 value select (13277)

Description
Selects which discrete value will be transmitted as V1 external status bit 4 in Z0/Z1 message.

Selection
- None
- Digital A1-2 *
- Digital A3-4 *
- Digital B1-2 *
- Digital B3-4 *
- Digital C1-2 *
- Digital C3-4 *
- Digital D1-2 *
- Digital D3-4 *

Factory setting
None

Additional information
| Read access | Operator |
| Write access | Maintenance |

* Visibility depends on order options or device settings
Value percent selector

Navigation

Expert → Communication → V1 → V1 input select. → Value % select (13282)

Description

Selects which value shall be transmitted as a 0..100% value in the V1 Z0/Z1 message.

Selection

- None
- Tank level %
- Tank ullage %
- AIO B1-3 value % *
- AIO C1-3 value % *

Factory setting

None

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
3.4.2 "HART output" submenu

**Navigation**

Expert → Communication → HART output

- HART output
  - HART configuration → 198
  - Information → 206
"HART configuration" submenu

Navigation

Expert → Communication → HART output → HART config.

<table>
<thead>
<tr>
<th>System polling address</th>
<th>→ 198</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of preambles</td>
<td>→ 199</td>
</tr>
<tr>
<td>PV source</td>
<td>→ 199</td>
</tr>
<tr>
<td>Assign PV</td>
<td>→ 199</td>
</tr>
<tr>
<td>0 % value</td>
<td>→ 200</td>
</tr>
<tr>
<td>100 % value</td>
<td>→ 201</td>
</tr>
<tr>
<td>PV mA selector</td>
<td>→ 201</td>
</tr>
<tr>
<td>Primary variable (PV)</td>
<td>→ 201</td>
</tr>
<tr>
<td>Percent of range</td>
<td>→ 202</td>
</tr>
<tr>
<td>Assign SV</td>
<td>→ 202</td>
</tr>
<tr>
<td>Secondary variable (SV)</td>
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</tr>
<tr>
<td>Assign TV</td>
<td>→ 203</td>
</tr>
<tr>
<td>Tertiary variable (TV)</td>
<td>→ 204</td>
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<tr>
<td>Assign QV</td>
<td>→ 204</td>
</tr>
<tr>
<td>Quaternary variable (QV)</td>
<td>→ 205</td>
</tr>
</tbody>
</table>

System polling address

Navigation

Expert → Communication → HART output → HART config. → Polling address (0219)

Description
Device address for HART communication.

User entry
0 to 63

Factory setting
15
### No. of preambles

**Navigation**

Expert → Communication → HART output → HART config. → No. of preambles (0217)

**Description**

Defines the number of preambles in the HART telegram.

**User entry**

5 to 20

**Factory setting**

5

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### PV source

**Navigation**

Expert → Communication → HART output → HART config. → PV source (11634)

**Description**

Decides, if the PV configuration is according to an analog output (HART slave) or customized (in case of HART tunneling only).

**Selection**

- AIO B1-3 *
- AIO C1-3 *
- Custom

**Factory setting**

Custom

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Maintenance</th>
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</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### Assign PV

**Navigation**

Expert → Communication → HART output → HART config. → Assign PV (0234)

**Prerequisite**

PV source (→ 199) = Custom

**Description**

Assign a measured variable to the primary dynamic variable (PV).

Additional information:

The assigned measured variable is also used by the current output.

* Visibility depends on order options or device settings
Selection

- None
- Tank level
- Tank ullage
- Measured level
- Distance
- Displacer position
- Water level
- Upper interface level
- Lower interface level
- Bottom level
- Tank reference height
- Liquid temperature
- Vapor temperature
- Air temperature
- Observed density value
- Average profile density
- Upper density
- Middle density
- Lower density
- P1 (bottom)
- P2 (middle)
- P3 (top)
- GP 1 value
- GP 2 value
- GP 3 value
- GP 4 value

Factory setting

Tank level

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The Measured level option doesn't contain a unit. If a unit is needed, select the Tank level option.

0 % value

Navigation

Expert → Communication → HART output → HART config. → 0 % value (11632)

Prerequisite

PV source = Custom

Description

0% value of the primary variable (PV).

User entry

Signed floating-point number

Factory setting

0 mm

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
100 % value

**Navigation**

Expert → Communication → HART output → HART config. → 100 % value (11633)

**Prerequisite**

PV source = Custom

**Description**

100% value of the primary variable (PV).

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
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</tbody>
</table>

PV mA selector

**Navigation**

Expert → Communication → HART output → HART config. → PV mA selector (11631)

**Prerequisite**

PV source = Custom

**Description**

Assigns a current to the primary HART variable (PV).

**Selection**

- None
- AIO B1-3 value mA *
- AIO C1-3 value mA *

**Factory setting**

None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Primary variable (PV)

**Navigation**

Expert → Communication → HART output → HART config. → Primary var (PV) (0201)

**Description**

Shows the current measured value of the primary dynamic variable (PV)

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
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</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
Percent of range

**Navigation**

Expert → Communication → HART output → HART config. → Percent of range (0274)

**Description**

Shows the value of the primary variable (PV) as a percentage of the defined 0% to 100% range.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Assign SV

**Navigation**

Expert → Communication → HART output → HART config. → Assign SV (0235)

**Description**

Assign a measured variable to the second dynamic variable (SV).

**Selection**

- None
- Tank level
- Tank ullage
- Measured level
- Distance
- Displacer position
- Water level
- Upper interface level
- Lower interface level
- Bottom level
- Tank reference height
- Liquid temperature
- Vapor temperature
- Air temperature
- Observed density value
- Average profile density
- Upper density
- Middle density
- Lower density
- P1 (bottom)
- P2 (middle)
- P3 (top)
- GP 1 value
- GP 2 value
- GP 3 value
- GP 4 value

**Factory setting**

Liquid temperature

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
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</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The Measured level option doesn't contain a unit. If a unit is needed, select the Tank level option.
Secondary variable (SV)

**Navigation**

Expert → Communication → HART output → HART config. → Second.var(SV) (0226)

**Prerequisite**

Assign SV (→ 202) ≠ None

**Description**

Shows the current measured value of the secondary dynamic variable (SV)

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Assign TV

**Navigation**

Expert → Communication → HART output → HART config. → Assign TV (0236)

**Description**

Assign a measured variable to the tertiary dynamic variable (TV).

**Selection**

- None
- Tank level
- Tank ullage
- Measured level
- Distance
- Displacer position
- Water level
- Upper interface level
- Lower interface level
- Bottom level
- Tank reference height
- Liquid temperature
- Vapor temperature
- Air temperature
- Observed density value
- Average profile density
- Upper density
- Middle density
- Lower density
- P1 (bottom)
- P2 (middle)
- P3 (top)
- GP 1 value
- GP 2 value
- GP 3 value
- GP 4 value

**Factory setting**

Water level

**Additional information**

<table>
<thead>
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<th>Read access</th>
<th>Operator</th>
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</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

The Measured level option doesn’t contain a unit. If a unit is needed, select the Tank level option.
Tertiary variable (TV)

Navigation

Expert → Communication → HART output → HART config. → Tertiary var(TV) (0228)

Prerequisite

Assign TV (→ 203) ≠ None

Description

Shows the current measured value of the tertiary (third) dynamic variable (TV)

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Assign QV

Navigation

Expert → Communication → HART output → HART config. → Assign QV (0237)

Description

Assign a measured variable to the quaternary dynamic variable (QV).

Selection

- None
- Tank level
- Tank ullage
- Measured level
- Distance
- Displacer position
- Water level
- Upper interface level
- Lower interface level
- Bottom level
- Tank reference height
- Liquid temperature
- Vapor temperature
- Air temperature
- Observed density value
- Average profile density
- Upper density
- Middle density
- Lower density
- P1 (bottom)
- P2 (middle)
- P3 (top)
- GP 1 value
- GP 2 value
- GP 3 value
- GP 4 value

Factory setting

Observed density value
The measured level option doesn't contain a unit. If a unit is needed, select the tank level option.

**Quaternary variable (QV)**

**Navigation**

Expert → Communication → HART output → HART config. → Quaterna.var(QV) (0203)

**Prerequisite**

Assign QV (→ 204) ≠ None

**Description**

Shows the current measured value of the quaternary (fourth) dynamic variable (QV)

**Additional information**

<table>
<thead>
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<th>Read access</th>
<th>Operator</th>
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<td>Write access</td>
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</tbody>
</table>
"Information" submenu

Navigation  
Expert → Communication → HART output → Information

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<th>Information</th>
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</thead>
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<tr>
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<td>Device type  →  208</td>
</tr>
<tr>
<td>Manufacturer ID  →  208</td>
</tr>
<tr>
<td>HART revision  →  208</td>
</tr>
<tr>
<td>HART descriptor  →  209</td>
</tr>
<tr>
<td>HART message  →  209</td>
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</tr>
<tr>
<td>Software revision  →  210</td>
</tr>
<tr>
<td>HART date code  →  210</td>
</tr>
</tbody>
</table>

HART short tag

Navigation  
Expert → Communication → HART output → Information → HART short tag (0220)

Description  
Defines the short tag for the measuring point.

Maximum length: 8 characters
Allowed characters: A-Z, 0-9, certain special characters

User entry  
Character string comprising numbers, letters and special characters (8)

Factory setting  
NMS8x

Additional information  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
Device tag

**Navigation**

Expert → Communication → HART output → Information → Device tag (0215)

**Description**

Enter a unique name for the measuring point to identify the device quickly within the plant.

**User entry**

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

**Factory setting**

NMS8x

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

Device revision

**Navigation**

Expert → Communication → HART output → Information → Device revision (0204)

**Description**

Shows the device revision with which the device is registered with the HART Communication Foundation

**User interface**

0 to 255

**Factory setting**

6

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Device ID

**Navigation**

Expert → Communication → HART output → Information → Device ID (0221)

**Description**

Shows the device ID for identifying the device in a HART network

**User interface**

Positive integer

**Factory setting**

123456

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tr>
</tbody>
</table>
Device type

**Navigation**

Expert → Communication → HART output → Information → Device type (0209)

**Description**

Shows the device type with which the measuring device is registered with the HART Communication Foundation.

**User interface**

0 to 65535

**Factory setting**

4397

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Manufacturer ID

**Navigation**

Expert → Communication → HART output → Information → Manufacturer ID (0259)

**Description**

Shows the device's manufacturer ID registered with the HART Communication Foundation.

**User interface**

0 to 65535

**Factory setting**

17

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

HART revision

**Navigation**

Expert → Communication → HART output → Information → HART revision (0205)

**Description**

HART revision used by the device.

**User interface**

5 to 7

**Factory setting**

7

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>
**HART descriptor**

**Navigation**
erequisite menu: **Expert → Communication → HART output → Information → HART descriptor (0212)**

**Description**
Enter description for the measuring point

**User entry**
Character string comprising numbers, letters and special characters (16)

**Factory setting**
NMS8x

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**HART message**

**Navigation**
erequisite menu: **Expert → Communication → HART output → Information → HART message (0216)**

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

- Maximum length: 32 characters
- Allowed characters: A-Z, 0-9, certain special characters

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

**Factory setting**
NMS8x

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Hardware revision**

**Navigation**
erequisite menu: **Expert → Communication → HART output → Information → Hardware rev. (0206)**

**Description**
Hardware revision of the device.

**User interface**
0 to 30

**Factory setting**
1

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
Software revision

Navigation  
Expert → Communication → HART output → Information → Software rev. (0224)

Description  
Software revision of the device.

User interface  
0 to 255

Factory setting  
6

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
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</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

HART date code

Navigation  
Expert → Communication → HART output → Information → HART date code (0202)

Description  
Enter date of the last configuration change. Use this format yyyy-mm-dd

User entry  
Character string comprising numbers, letters and special characters (10)

Factory setting  
2009-07-20

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</table>
3.5 "Application" submenu

Navigation

Expert → Application

3.5.1 "Tank configuration" submenu

Navigation

Expert → Application → Tank config

Process condition

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<td>213</td>
</tr>
<tr>
<td>Temperature</td>
<td>217</td>
</tr>
<tr>
<td>Density</td>
<td>221</td>
</tr>
<tr>
<td>Pressure</td>
<td>225</td>
</tr>
<tr>
<td>GP values</td>
<td>233</td>
</tr>
</tbody>
</table>

Description
Select the liquid condition of the tank.

Selection
- Universal
- Calm surface
- Turbulent surface

Factory setting
Universal

Additional information
For W&M, setting to option Calm surface is recommended.
<table>
<thead>
<tr>
<th>Access Type</th>
<th>Access Level</th>
</tr>
</thead>
<tbody>
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<td>Operator</td>
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<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
"Level" submenu

**Navigation**  
Expert → Application → Tank config → Level

**Description**  
Defines the source of the level value.

**Selection**  
- No input value
- HART device 1 ... 15 level
- Level SR *
- Level *
- Displacer position *
- AIO B1-3 value *
- AIO C1-3 value *
- AIP B4-8 value *
- AIP C4-8 value *

**Factory setting**  
Dependent on the device version

**Additional information**  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
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</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
Empty

**Navigation**  
Expert → Application → Tank config → Level → Empty (14602)

**Description**  
Distance from reference point to zero position (tank bottom or datum plate).

**User entry**  
0 to 10000.00 mm

**Factory setting**  
Dependent on the device version

**Additional information**

<table>
<thead>
<tr>
<th>Accessibility</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

> The reference point is the reference line of the calibration window.

Tank reference height

**Navigation**  
Expert → Application → Tank config → Level → Tank ref height (14603)

**Description**  
Defines the distance from the dipping reference point to the zero position (tank bottom or datum plate).

**User entry**  
0 to 10000.00 mm

**Factory setting**  
Dependent on the device version

**Additional information**

<table>
<thead>
<tr>
<th>Accessibility</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Tank level

**Navigation**  
Expert → Application → Tank config → Level → Tank level (14655)

**Description**  
Shows the distance from the zero position (tank bottom or datum plate) to the product surface.
Set level

Navigation
Expert → Application → Tank config → Level → Set level (14604)

Description
If the level measured by the device does not match the actual level obtained by a manual dip, enter the correct level into this parameter.

User entry
0 to 10000.00 mm

Factory setting
0 mm

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
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</tbody>
</table>

The device adjusts the Empty parameter (→ 214) according to the entered value, such that the measured level will match the actual level.

Upper interface level

Navigation
Expert → Application → Tank config → Level → Upper I/F level (15003)

Description
Shows measured interface level from zero position (tank bottom or datum plate). Value is updated when device generates a valid Interface measurement.

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Lower interface level

Navigation
Expert → Application → Tank config → Level → Lower I/F level (15004)

Description
Shows measured interface level from zero position (tank bottom or datum plate). Value is updated when device generates a valid interface measurement.

Additional information
<table>
<thead>
<tr>
<th>Read access</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Water level source

Navigation
Expert → Application → Tank config → Level → Water level src (14971)

Description
Defines the source of the bottom water level.
Selection

- Manual value
- Bottom level
- HART device 1...15 level
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value

Factory setting

Manual value

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
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</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

Water level

Navigation

Expert → Application → Tank config → Level → Water level (14970)

Description

Shows the bottom water level.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

Manual water level

Navigation

Expert → Application → Tank config → Level → Man. water level (14959)

Prerequisite

Water level source (→ 215) = Manual value

Description

Defines the manual value of the bottom water level.

User entry

-2 000 to 5 000 mm

Factory setting

0 mm

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>
"Temperature" submenu

Navigation  Expert → Application → Tank config → Temperature → Liq temp source (14972)

**Description**
Defines source from which the liquid temperature is obtained.

**Selection**
- Manual value
- HART device 1 ... 15 temperature
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value

**Factory setting**
Manual value

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
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Manual liquid temperature

Navigation  
Expert → Application → Tank config → Temperature → Man. liquid temp (15015)

Prerequisite  
Liquid temp source (→ 217) = Manual value

Description  
Defines the manual value of the liquid temperature.

User entry  
−50 to 300 °C

Factory setting  
25 °C

Additional information

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Liquid temperature

Navigation  
Expert → Application → Tank config → Temperature → Liquid temp. (14978)

Description  
Shows the average or spot temperature of the measured liquid.

Additional information

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Air temperature source

Navigation  
Expert → Application → Tank config → Temperature → Air temp. source (14993)

Description  
Defines source from which the air temperature is obtained.

Selection

- Manual value
- HART device 1 ... 15 temperature
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value

Factory setting  
Manual value

Additional information

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</table>
**Manual air temperature**

**Navigation**

[Expert → Application → Tank config → Temperature → Manual air temp. (14961)]

**Prerequisite**

Air temperature source (→ 218) = Manual value

**Description**

Defines the manual value of the air temperature.

**User entry**

−50 to 300 °C

**Factory setting**

25 °C

**Additional information**

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</table>

**Air temperature**

**Navigation**

[Expert → Application → Tank config → Temperature → Air temp. (14986)]

**Description**

Shows the air temperature.

**Additional information**

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**Vapor temp source**

**Navigation**

[Expert → Application → Tank config → Temperature → Vapor temp src (14973)]

**Description**

Defines the source from which the vapor temperature is obtained.

**Selection**

- Manual value
- HART device 1 .. 15 vapor temp
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value

**Factory setting**

Manual value

**Additional information**

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</table>
### Manual vapor temperature

**Navigation**

Expert → Application → Tank config → Temperature → Man. vapor temp. (14960)

**Prerequisite**

Vapor temp source (→ 219) = Manual value

**Description**

Defines the manual value of the vapor temperature.

**User entry**

−50 to 300 °C

**Factory setting**

25 °C

**Additional information**

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### Vapor temperature

**Navigation**

Expert → Application → Tank config → Temperature → Vapor temp. (14985)

**Description**

Shows the measured vapor temperature.

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"Density" submenu

**Navigation**

Expert → Application → Tank config → Density

### Observed density source

**Description**
Determines how the density is obtained.

**Selection**
- HTG *
- HTMS *
- Average profile density *
- Upper density
- Middle density
- Lower density

**Factory setting**
Dependent on the device version

**Additional information**

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* Visibility depends on order options or device settings
The 'Expert' menu

Proservo NMS81

Observed density

Navigation  
Expert → Application → Tank config → Density → Observed density (13452)

Description  
Shows the measured or calculated density.

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Air density

Navigation  
Expert → Application → Tank config → Density → Air density (14980)

Description  
Defines the density of the air surrounding the tank.

User entry  
0.0 to 500.0 kg/m³

Factory setting  
1.2 kg/m³

Additional information

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Vapor density

Navigation  
Expert → Application → Tank config → Density → Vapor density (14981)

Description  
Defines the density of the gas phase in the tank.

User entry  
0.0 to 500.0 kg/m³

Factory setting  
1.2 kg/m³

Additional information

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Measured upper density

Navigation  
Expert → Application → Tank config → Density → Meas upper dens. (15001)

Description  
Shows the density of the upper phase.
Measured middle density

**Navigation**  
Expert → Application → Tank config → Density → Meas middle dens (14997)

**Description**  
Density of the middle phase.

**Additional information**

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Measured lower density

**Navigation**  
Expert → Application → Tank config → Density → Meas lower dens. (15002)

**Description**  
Density of the lower phase.

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Water density

**Navigation**  
Expert → Application → Tank config → Density → Water density (13757)

**Description**  
Density of the water in the tank.

**User entry**  
Signed floating-point number

**Factory setting**  
1000 kg/m³

**Additional information**

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Profile point

**Navigation**  
Expert → Application → Tank config → Density → Profile point (8170)

**Description**  
Shows actual number of Density Points measured so far in current operation, and the total Number of Points after Density Profile Operation is complete.
### Profile average density

#### Navigation

![Expert → Application → Tank config → Density → Profile avg dens (8175)](image)

#### Description

Shows the average density calculated after a profile density measurement is complete.

#### Additional information

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### Profile density timestamp

#### Navigation

![Expert → Application → Tank config → Density → Profil dens time (8114)](image)

#### Description

Shows the timestamp when the last average density profile was finished.

#### Additional information

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"Pressure" submenu

**Navigation**  
Expert → Application → Tank config → Pressure

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<td>P1 (bottom)</td>
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**P1 (bottom) source**

**Navigation**
Proservo NMS81

**Description**
Defines the source of the bottom pressure (P1).

**Selection**
- Manual value
- HART device 1 ... 15 pressure
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value

**Factory setting**
Manual value

**Additional information**

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**P1 (bottom)**

**Navigation**
Proservo NMS81

**Description**
Shows the pressure at the tank bottom.

**Additional information**

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**P1 (bottom) manual pressure**

**Navigation**
Proservo NMS81

**Prerequisite**
P1 (bottom) source (→ 226) = Manual value

**Description**
Defines the manual value of the bottom pressure (P1).

**User entry**
-25 to 25 bar

**Factory setting**
0 bar

**Additional information**

<table>
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</table>
### P1 position

**Navigation**  
Expert → Application → Tank config → Pressure → P1 position (14952)

**Description**  
Defines the position of the bottom pressure transmitter (P1), measured from zero position (tank bottom or datum plate).

**User entry**  
-10 000 to 100 000 mm

**Factory setting**  
5 000 mm

**Additional information**

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### P1 offset

**Navigation**  
Expert → Application → Tank config → Pressure → P1 offset (14953)

**Description**  
Offset for the bottom pressure (P1).  
The offset is added to the measured pressure prior to any tank calculation.

**User entry**  
-25 to 25 bar

**Factory setting**  
0 bar

**Additional information**

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</table>

### P1 absolute / gauge

**Navigation**  
Expert → Application → Tank config → Pressure → P1 absolut/gauge (14954)

**Description**  
Defines whether the connected pressure transmitter measures an absolute or a gauge pressure.

**Selection**

- Absolute
- Gauge

**Factory setting**  
Gauge

**Additional information**

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</table>
P2 (middle) source

Navigation

Expert → Application → Tank config → Pressure → P2 (mid) source (14995)

Description
Defines the source of the middle pressure (P2).

Selection
- Manual value
- HART device 1 ... 15 pressure
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value

Factory setting
Manual value

Additional information

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P2 (middle)

Navigation

Expert → Application → Tank config → Pressure → P2 (middle) (14987)

Description
Shows the pressure (P2) at the middle transmitter.

Additional information

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</table>

P2 (middle) manual pressure

Navigation

Expert → Application → Tank config → Pressure → P2 (mid) manual (14955)

Prerequisite

P2 (middle) source (→ 228) = Manual value

Description
Defines the manual value of the middle pressure (P2).

User entry
-25 to 25 bar

Factory setting
0 bar

Additional information

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P2 offset

**Navigation**

Expert → Application → Tank config → Pressure → P2 offset (14975)

**Description**

Defines the offset for the middle pressure (P2). The offset is added to the measured pressure prior to any tank calculation.

**User entry**

-25 to 2.5 bar

**Factory setting**

0 bar

**Additional information**

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P1-2 distance

**Navigation**

Expert → Application → Tank config → Pressure → P1-2 distance (14974)

**Description**

Defines the distance between the bottom and the middle pressure transmitter.

**User entry**

0 to 100,000 mm

**Factory setting**

2,000 mm

**Additional information**

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</table>

P2 absolute / gauge

**Navigation**

Expert → Application → Tank config → Pressure → P2 absolut/gauge (14976)

**Description**

Defines whether the connected pressure transmitter measures an absolute or a gauge pressure.

**Selection**

- Absolute
- Gauge

**Factory setting**

Gauge

**Additional information**

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**P3 (top) source**

**Navigation**
Expert → Application → Tank config → Pressure → P3 (top) source (14996)

**Description**
Defines the source of the top pressure (P3).

**Selection**
- Manual value
- HART device 1 ... 15 pressure
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value

**Factory setting**
Manual value

**Additional information**

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**P3 (top)**

**Navigation**
Expert → Application → Tank config → Pressure → P3 (top) (14988)

**Description**
Shows the pressure (P3) at the top transmitter.

**Additional information**

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**P3 (top) manual pressure**

**Navigation**
Expert → Application → Tank config → Pressure → P3 (top) manual (14977)

**Prerequisite**
P3 (top) source (→ 230) = Manual value

**Description**
Defines the manual value of the top pressure (P3).

**User entry**
-2.5 to 2.5 bar

**Factory setting**
0 bar

**Additional information**

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P3 position

**Navigation**
Expert → Application → Tank config → Pressure → P3 position (14956)

**Description**
Defines the position of the top pressure transmitter (P3), measured from zero position (tank bottom or datum plate).

**User entry**
0 to 100 000 mm

**Factory setting**
20 000 mm

**Additional information**

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P3 offset

**Navigation**
Expert → Application → Tank config → Pressure → P3 offset (14957)

**Description**
Offset for the top pressure (P3).
The offset is added to the measured pressure prior to any tank calculation.

**User entry**
–2.5 to 2.5 bar

**Factory setting**
0 bar

**Additional information**

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P3 absolute / gauge

**Navigation**
Expert → Application → Tank config → Pressure → P3 absolut/gauge (14958)

**Description**
Defines whether the connected pressure transmitter measures an absolute or a gauge pressure.

**Selection**
- Absolute
- Gauge

**Factory setting**
Gauge

**Additional information**

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</table>
Ambient pressure

Navigation
Expert → Application → Tank config → Pressure → Ambient pressure (14962)

Description
Defines the manual value of the ambient pressure.

User entry
0 to 2.5 bar

Factory setting
1 bar

Additional information

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“GP values” submenu

Navigation  ☞ ☞ Expert → Application → Tank config → GP values

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GP 1 to 4 source

Navigation  ☞ ☞ Expert → Application → Tank config → GP values → GP 1 to 4 source (14989–1 to 4)

Description  Source of the general purpose value 1 GP1.

Selection
- No input value
- SM S distance
- Average profile density
- Net weight
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value
- HART device 1...15 PV
- HART device 1...15 SV
- HART device 1...15 TV
- HART device 1...15 QV
- Modbus A1-4 Value 1...4
- Modbus B1-4 Value 1...4
- Modbus C1-4 Value 1...4
- Modbus D1-4 Value 1...4

Factory setting  No input value

Additional information

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</table>
GP 1 to 4 name

Navigation  
Expert → Application → Tank config → GP values → GP 1 name (14963)

Description  
Defines the label associated with the respective GP value.

User entry  
Character string comprising numbers, letters and special characters (15)

Factory setting  
GP Value 1

Additional information

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GP Value 1

Navigation  
Expert → Application → Tank config → GP values → GP Value 1 (14966)

Description  
Displays the value that will be used as general purpose value.

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GP Value 2

Navigation  
Expert → Application → Tank config → GP values → GP Value 2 (14967)

Description  
Displays the value that will be used as general purpose value.

Additional information

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<td>-</td>
</tr>
</tbody>
</table>

GP Value 3

Navigation  
Expert → Application → Tank config → GP values → GP Value 3 (14968)

Description  
Displays the value that will be used as general purpose value.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
GP Value 4

Navigation

Expert → Application → Tank config → GP values → GP Value 4 (14969)

Description

Displays the value that will be used as general purpose value.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Write access</th>
<th>-</th>
</tr>
</thead>
</table>

3.5.2 "Tank calculation" submenu

Navigation

Expert → Application → Tank calculation

Local gravity

Expert → Application → Tank calculation → Local gravity (14979)

Description

Shows the manually entered local gravity value.

User entry

9.0 to 10.0 m/s²

Factory setting

9.807 m/s²
"HyTD" submenu

Overview

Hydrostatic Tank Deformation can be used to compensate the vertical movement of the Gauge Reference Height (GRH) due to bulging of the tank shell caused by the hydrostatic pressure exerted by the liquid stored in the tank. The compensation is based on a linear approximation obtained from manual hand dips at several levels distributed over the full range of the tank.

![Correction of the hydrostatic tank deformation (HyTD)](image)

- A  "Distance" (level below $L_0 \rightarrow \text{HyTD correction value} = 0")
- B  Gauge Reference Height (GRH)
- C  HyTD correction value
- D  "Distance" (level above $L_0 \rightarrow \text{HyTD correction value} > 0")
**Linear approximation of the HyTD correction**

The real amount of deformation varies non-linearly with the level due to the construction of the tank. However, as the correction values are typically small compared to the measured level, a simple straight line method can be used with good results.

![Diagram of linear approximation](image)

8 Calculation of the HyTD correction

1. Linear correction according to "Deformation factor (→ § 239)"
2. Real correction
3. Starting level (→ § 238)
4. L: Measured level
5. H: HyTD correction value (→ § 238)

**Calculation of the HyTD correction**

\[
\begin{align*}
L < L_0 & \Rightarrow C_{\text{HyTD}} = 0 \\
L > L_0 & \Rightarrow C_{\text{HyTD}} = -(L - L_0) \times D
\end{align*}
\]

<table>
<thead>
<tr>
<th>L</th>
<th>Measured level</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₀</td>
<td>Starting level</td>
</tr>
<tr>
<td>C_{\text{HyTD}}</td>
<td>HyTD correction value</td>
</tr>
<tr>
<td>D</td>
<td>Deformation factor</td>
</tr>
</tbody>
</table>
Description of parameters

Navigation  ➡️ Expert → Application → Tank calculation → HyTD

HyTD correction value

Navigation  ➡️ Expert → Application → Tank calculation → HyTD → HyTD corr. value (13603)

Description  Shows the correction value from the Hydrostatic Tank Deformation.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

HyTD mode

Navigation  ➡️ Expert → Application → Tank calculation → HyTD → HyTD mode (14652)

Description  Activates or deactivates the calculation of the Hydrostatic Tank Deformation.

Selection  ● No
● Yes

Factory setting  No

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Starting level

Navigation  ➡️ Expert → Application → Tank calculation → HyTD → Starting level (13601)

Description  Defines the starting level for the Hydrostatic Tank Deformation. Levels below this value are not corrected.
### Deformation factor

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Tank calculation → HyTD → Deform factor (13602)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Defines the deformation factor for the HyTD (change of device position per change of level).</td>
</tr>
<tr>
<td>User entry</td>
<td>-1.0 to 1.0 %</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0.2 %</td>
</tr>
<tr>
<td>Additional information</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### User entry
0 to 5 000 mm

### Factory setting
500 mm

### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
"CTSh" submenu

Overview

CTSh (correction for the thermal expansion of the tank shell) compensates for effects on the Gauge Reference Height (GRH) and on the expansion or contraction of the measuring wire due to temperature effects on the tank shell or stilling well. The temperature effects are separated into two parts, respectively affecting the 'dry' and 'wetted' part of the tank shell or stilling well. The correction function is based on thermal expansion coefficients of steel and insulation factors for both the 'dry' and 'wet' parts of the wire and the tank shell. The temperatures used for the correction can be selected from on manual or measured values.

- This correction is recommended for the following situations:
  - if the operating temperature deviates considerably from the temperature during calibration \((\Delta T > 10 \, ^\circ C \, (18 \, ^\circ F))\)
  - for extremely high tanks
  - for refrigerated, cryogenic or heated applications

- As the use of this correction will influence the innage level reading, it is recommended to ensure the manual hand dip and level verification procedures are being conducted correctly before enabling this correction method.

- This mode cannot be used in conjunction with HTG because the level is not measured relative to the gauge reference height with HTG.
CTSh: Calculation of the wall temperature

Depending on the parameters Covered tank (→ 244) and Stilling well (→ 244), the temperatures \( T_W \) of the wetted and \( T_D \) of the dry part of the tank wall are calculated as follows:

<table>
<thead>
<tr>
<th>Covered tank (→ 244)</th>
<th>Stilling well (→ 244)</th>
<th>( T_W )</th>
<th>( T_D )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covered</td>
<td>Yes(^1)</td>
<td>( T_P )</td>
<td>( T_V )</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>((7/8) T_P + (1/8) T_A)</td>
<td>((1/2) T_V + (1/2) T_A)</td>
</tr>
<tr>
<td>Open top</td>
<td>Yes</td>
<td>( T_P )</td>
<td>( T_A )</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>((7/8) T_P + (1/8) T_A)</td>
<td>( T_A )</td>
</tr>
</tbody>
</table>

1) This option is also valid for insulated tanks without a stilling well. This is due to the temperature inside and outside of the tank shell being the same due to the insulation of the tank.
1 Covered tank (→ 244) = Covered; Stilling well (→ 244) = Yes
2 Covered tank (→ 244) = Covered; Stilling well (→ 244) = No
3 Covered tank (→ 244) = Open top; Stilling well (→ 244) = Yes
4 Covered tank (→ 244) = Open top; Stilling well (→ 244) = No
5 Insulated tank: Covered tank (→ 244) = Open top; Stilling well (→ 244) = Yes
CTSh: Calculation of the correction

\[
C_{CTSh} = \alpha_{tank} (TRH - L) (T_D - T_{cal}) + \alpha_{wire} L (T_W - T_{cal}) - \alpha_{wire} S_\theta (T_e - T_{cal})
\]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRH</td>
<td>Tank reference height</td>
</tr>
<tr>
<td>L</td>
<td>Level</td>
</tr>
<tr>
<td>T_D</td>
<td>Temperature of the dry part of the tank shell (calculated from T_P, T_V and T_A)</td>
</tr>
<tr>
<td>T_W</td>
<td>Temperature of the wetted part of the tank shell (calculated from T_P, T_V and T_A)</td>
</tr>
<tr>
<td>T_{cal}</td>
<td>Temperature at which the measurement has been calibrated</td>
</tr>
<tr>
<td>\alpha_{tank}</td>
<td>Linear expansion coefficient of tank</td>
</tr>
<tr>
<td>\alpha_{wire}</td>
<td>Linear expansion coefficient of wire</td>
</tr>
<tr>
<td>C_{CTSh}</td>
<td>CTSh correction value</td>
</tr>
</tbody>
</table>

**Description of parameters**

**Navigation**

Expert → Application → Tank calculation → CTSh

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTSh correction value</td>
<td>Shows the CTSh correction value.</td>
</tr>
<tr>
<td>CTSh mode</td>
<td></td>
</tr>
<tr>
<td>Covered tank</td>
<td></td>
</tr>
<tr>
<td>Stilling well</td>
<td></td>
</tr>
<tr>
<td>Calibration temperature</td>
<td></td>
</tr>
<tr>
<td>Linear expansion coefficient</td>
<td></td>
</tr>
<tr>
<td>Wire expansion coefficient</td>
<td></td>
</tr>
</tbody>
</table>

**CTSh correction value**

**Navigation**

Expert → Application → Tank calculation → CTSh → CTSh corr value (13651)

**Description**

Shows the CTSh correction value.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
CTSh mode

Navigation  Expert → Application → Tank calculation → CTSh → CTSh mode (14651)

Description  Activates or deactivates the CTSh.

Selection

- No
- Yes
- With wire *
- Only wire *

Factory setting  No

Additional information

<table>
<thead>
<tr>
<th>Access</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Covered tank

Navigation  Expert → Application → Tank calculation → CTSh → Covered tank (13654)

Description  Determines whether the tank is covered.

Selection

- Open top
- Covered

Factory setting  Open top

Additional information

<table>
<thead>
<tr>
<th>Access</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

The Covered option is only valid for fixed tank roofs. For a floating roof select Open top.

Stilling well

Navigation  Expert → Application → Tank calculation → CTSh → Stilling well (13653)

Description  Determines whether the device is mounted on a stilling well.

Selection

- No
- Yes

Factory setting  No

* Visibility depends on order options or device settings
Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Calibration temperature

Navigation

肥胖 Expert → Application → Tank calculation → CTSh → Calibration temp (13652)

Description
Specify temperature at which the measurement has been calibrated.

User entry
−50 to 250 °C

Factory setting
25 °C

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Linear expansion coefficient

Navigation

肥胖 Expert → Application → Tank calculation → CTSh → Linear exp coeff (13655)

Description
Defines the linear expansion coefficient of the tank shell material.

User entry
0 to 100 ppm

Factory setting
15 ppm

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Wire expansion coefficient

Navigation

肥胖 Expert → Application → Tank calculation → CTSh → Wire exp coeff (13656)

Description
Defines the expansion coefficient of the wire material of the drum. Value is programmed in factory.

User entry
0 to 100 ppm

Factory setting
15 ppm
"HTMS" submenu

Overview

The Hybrid Tank Measurement System (HTMS) is a method to calculate the density of a product in a tank based on both a (top mounted) level and at least one (bottom mounted) pressure measurement. An additional pressure sensor can be installed at the top of the tank to provide information about the vapor pressure and to make the density calculation more accurate. The calculation method also takes into account a possible level of water at the bottom of the tank to make density calculations as accurate as possible.

HTMS parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Navigation path</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 (Bottom pressure)</td>
<td>Setup → Advanced setup → Tank configuration → Pressure → P1 (bottom)</td>
</tr>
<tr>
<td>H_{P1} (Position of P1 transmitter)</td>
<td>Setup → Advanced setup → Tank configuration → Pressure → P1 position</td>
</tr>
<tr>
<td>P3 (Top pressure)</td>
<td>Setup → Advanced setup → Tank configuration → Pressure → P3 (top)</td>
</tr>
<tr>
<td>H_{P3} (Position of P3 transmitter)</td>
<td>Setup → Advanced setup → Tank configuration → Pressure → P3 position</td>
</tr>
</tbody>
</table>
| \( \rho_t \) (Density of the product \(^1\)) | • Measured value: Setup → Advanced setup → Calculation → HTMS → Density value (13753)  
• User-defined value: Setup → Advanced setup → Calculation → HTMS → Manual upper density (14998) |
| \( \rho_v \) (Vapor density) | Expert → Application → Tank configuration → Density → Vapor density |
| \( \rho_A \) (Ambient air temperature) | Setup → Advanced setup → Tank configuration → Density → Air density |
| g (Local gravity) | Expert → Application → Tank Calculation → Local gravity |
| L_p (Level of the product) | Operation → Tank level (14655) |
| L_{W} (Bottom water level) | Operation → Water level (14970) |
| V = L_{W} \cdot H_{P1} | |
| \( \Delta \rho = L_p - L_{W} - V \cdot g \) | |

\(^1\) Depending on the situation this parameter is measured or a user-defined value is used.
**HTMS modes**

Two HTMS modes can be selected in the HTMS mode parameter (→ 248). The mode determines whether one or two pressure values are used. Depending on the selected mode a number of additional parameters are required for the calculation of the product density. 

The HTMS P1+P3 option must be used in pressurized tanks in order to compensate for the pressure of the vapor phase.

<table>
<thead>
<tr>
<th>HTMS mode (→ 248)</th>
<th>Measured variables</th>
<th>Required additional parameters</th>
<th>Calculated variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTMS P1</td>
<td>• P₁</td>
<td>• g</td>
<td>ρP₁</td>
</tr>
<tr>
<td></td>
<td>• LP</td>
<td>• H₁</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lₜ/ₙ (optional)</td>
<td></td>
</tr>
<tr>
<td>HTMS P1+P3</td>
<td>• P₁</td>
<td>• P₃</td>
<td>ρP (more precise calculation for pressurized tanks)</td>
</tr>
<tr>
<td></td>
<td>• P₅</td>
<td>• P₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• LP</td>
<td>• ρV</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ρₖ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• H₁</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• H₃</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lₜ/ₙ (optional)</td>
<td></td>
</tr>
</tbody>
</table>

**Minimum level**

The density of the product can only be calculated if the product has a minimum thickness:

\[ ΔP ≥ ΔP_{min} \]

This is equivalent to the following condition for the product level:

\[ L_P - V ≥ ΔP_{min} + H_{P1} = L_{min} \]

Lₘₐᵟₜ is defined in the Minimum level parameter (→ 249). As can be seen from the formula it always must be bigger than Hₚ₁.

If Lₚ - V falls below this limit, the density is calculated as follows:
- If a previous calculated value is available, this value will be kept as long as no new calculation is possible.
- If no value was previously calculated, the manual value (defined in the Manual upper density parameter) will be used.

**Hysteresis**

The level of the product in a tank is not constant but slightly varies, due for example to filling disturbances. If the level oscillates around the changeover level (Minimum level (→ 249)), the algorithm will constantly switch between calculating the value and holding the previous result. To avoid this effect a positional hysteresis is defined around the changeover point.
**Description of parameters**

**Navigation**

Expert → Application → Tank calculation → HTMS

---

**HTMS mode**

**Navigation**

Expert → Application → Tank calculation → HTMS → HTMS mode (13751)

**Description**

Defines the HTMS mode. Depending on the mode one or two pressure transmitters are used.

**Selection**

- HTMS P1
- HTMS P1+P3

**Factory setting**

HTMS P1
Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Meaning of the options
- HTMS P1
  Only a bottom pressure transmitter (P1) is used.
- HTMS P1+P3
  A bottom (P1) and top (P3) pressure transmitter are used. This option should be selected for pressurized tanks.

Manual density

**Navigation**

Expert → Application → Tank calculation → HTMS → Manual density (15009)

**Description**

Defines the manual density.

**User entry**

0 to 3 000 kg/m³

**Factory setting**

800 kg/m³

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Density value

**Navigation**

Expert → Application → Tank calculation → HTMS → Density value (13753)

**Description**

Shows the calculated product density.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Minimum level

**Navigation**

Expert → Application → Tank calculation → HTMS → Min. level (13752)

**Description**

Defines the minimum product level for a HTMS calculation.

If Lp - V falls below the limit defined in this parameter, the density retains its last value or the manual value is used instead.

**User entry**

0 to 20 000 mm

**Factory setting**

7 000 mm
The 'Expert' menu

Proservo NMS81

Additional information

| Read access | Operator |
| Write access | Maintenance |

Minimum pressure

Navigation

Expert → Application → Tank calculation → HTMS → Min. pressure (13754)

Description
Defines the minimum pressure for a HTMS calculation.
If the pressure P1 (or the difference P1 - P3) falls below the limit defined in this parameter, the density retains its last value or the manual value is used instead.

User entry
0 to 100 bar

Factory setting
0.1 bar

Additional information

| Read access | Operator |
| Write access | Maintenance |

Safety distance

Navigation

Expert → Application → Tank calculation → HTMS → Safety distance (13756)

Description
Defines the minimum level which must be present above the bottom pressure sensor before its signal is used for the calculation.

User entry
0 to 10 000 mm

Factory setting
2 000 mm

Additional information

| Read access | Operator |
| Write access | Maintenance |

Hysteresis

Navigation

Expert → Application → Tank calculation → HTMS → Hysteresis (13755)

Description
Defines the hysteresis for the HTMS calculation. Prevents constant switching if the level is near the switch-over point.

User entry
0 to 2 000 mm

Factory setting
50 mm

250

Endress+Hauser
### Water density

**Navigation**

Expert → Application → Tank calculation → HTMS → Water density (13757)

**Description**

Density of the water in the tank.

**User entry**

Signed floating-point number

**Factory setting**

1 000 kg/m³

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
### 3.5.3 "Alarm" submenu

**Navigation**

![Expert → Application → Alarm](image)

#### "Alarm" submenu

**Navigation**

![Expert → Application → Alarm → Alarm](image)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Alarm mode" /></td>
<td><img src="image" alt="Alarm mode" /> → 253</td>
</tr>
<tr>
<td><img src="image" alt="Error value" /></td>
<td><img src="image" alt="Error value" /> → 254</td>
</tr>
<tr>
<td><img src="image" alt="Alarm value source" /></td>
<td><img src="image" alt="Alarm value source" /> → 255</td>
</tr>
<tr>
<td><img src="image" alt="Alarm value" /></td>
<td><img src="image" alt="Alarm value" /> → 256</td>
</tr>
<tr>
<td><img src="image" alt="HH alarm value" /></td>
<td><img src="image" alt="HH alarm value" /> → 256</td>
</tr>
<tr>
<td><img src="image" alt="H alarm value" /></td>
<td><img src="image" alt="H alarm value" /> → 256</td>
</tr>
<tr>
<td><img src="image" alt="L alarm value" /></td>
<td><img src="image" alt="L alarm value" /> → 257</td>
</tr>
<tr>
<td><img src="image" alt="LL alarm value" /></td>
<td><img src="image" alt="LL alarm value" /> → 257</td>
</tr>
<tr>
<td><img src="image" alt="HH alarm" /></td>
<td><img src="image" alt="HH alarm" /> → 257</td>
</tr>
<tr>
<td><img src="image" alt="H alarm" /></td>
<td><img src="image" alt="H alarm" /> → 258</td>
</tr>
<tr>
<td><img src="image" alt="HH+H alarm" /></td>
<td><img src="image" alt="HH+H alarm" /> → 258</td>
</tr>
<tr>
<td><img src="image" alt="L alarm" /></td>
<td><img src="image" alt="L alarm" /> → 258</td>
</tr>
<tr>
<td><img src="image" alt="LL alarm" /></td>
<td><img src="image" alt="LL alarm" /> → 258</td>
</tr>
<tr>
<td><img src="image" alt="LL+L alarm" /></td>
<td><img src="image" alt="LL+L alarm" /> → 259</td>
</tr>
<tr>
<td><img src="image" alt="Any error" /></td>
<td><img src="image" alt="Any error" /> → 259</td>
</tr>
<tr>
<td><img src="image" alt="Clear alarm" /></td>
<td><img src="image" alt="Clear alarm" /> → 259</td>
</tr>
<tr>
<td><img src="image" alt="Alarm hysteresis" /></td>
<td><img src="image" alt="Alarm hysteresis" /> → 260</td>
</tr>
<tr>
<td><img src="image" alt="Damping factor" /></td>
<td><img src="image" alt="Damping factor" /> → 260</td>
</tr>
</tbody>
</table>
### Alarm mode

**Navigation**

Expert → Application → Alarm → Alarm → Alarm mode (13864)

**Description**

Defines the alarm mode of the selected alarm.

**Selection**

- Off
- On
- Latching

**Factory setting**

Off

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

*Meaning of the options*

- **Off**
  No alarms are generated.

- **On**
  An alarm disappears if the alarm condition is no longer present (taking into consideration the hysteresis).

- **Latching**
  All alarms remain active until the user selects Clear alarm (→ 259) = Yes or the power is switched off and on.
22 Principle of the limit evaluation

A  Alarm mode (→ 253) = On
B  Alarm mode (→ 253) = Latching
1  HH alarm value (→ 256)
2  H alarm value (→ 256)
3  L alarm value (→ 257)
4  LL alarm value (→ 257)
5  HH alarm (→ 257)
6  H alarm (→ 258)
7  L alarm (→ 258)
8  LL alarm (→ 258)
9  "Clear alarm (→ 259)" = "Yes" or power off-on
10  Hysteresis (→ 260)

Error value

Navigation  Expert → Application → Alarm → Alarm → Error value (13851)
Prerequisite  Alarm mode (→ 253) ≠ Off

Description  Defines the alarm to be issued if the input value is invalid.

Selection
- No alarm
- HH+H alarm
- H alarm
- L alarm
- LL+L alarm
- All alarms

Factory setting  All alarms

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
Alarm value source

Navigation

Expert → Application → Alarm → Alarm → Alarm source (13866)

Prerequisite

Alarm mode (→ 253) = Off

Description

Determines the process variable to be monitored.

Selection

- Tank level
- Liquid temperature
- Vapor temperature
- Water level
- P1 (bottom)
- P2 (middle)
- P3 (top)
- Observed density value
- Volume
- Flow velocity
- Volume flow
- Vapor density
- Middle density
- Upper density
- Correction
- Tank level %
- GP 1...4 value
- Measured level
- P3 position
- Tank reference height
- Local gravity
- P1 position
- Manual density
- Tank ullage
- Average profile density
- Lower density
- Upper interface level
- Lower interface level
- Bottom level
- Displacer position
- HART device 1...15 PV
- HART device 1...15 SV
- HART device 1...15 TV
- HART device 1...15 QV
- HART device 1...15 PV mA
- HART device 1...15 PV %
- Element temperature 1...24
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value
- None

Factory setting

None

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
**Alarm value**

**Navigation**

Expert → Application → Alarm → Alarm → Alarm value (13863)

**Prerequisite**

Alarm mode (→ 253) ≠ Off

**Description**

Shows the current value of the process variable being monitored.

**User interface**

Signed floating-point number

**Factory setting**

0 None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**HH alarm value**

**Navigation**

Expert → Application → Alarm → Alarm → HH alarm value (13855)

**Prerequisite**

Alarm mode (→ 253) ≠ Off

**Description**

Defines the high-high(HH) limit value.

**User entry**

Signed floating-point number

**Factory setting**

0 None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**H alarm value**

**Navigation**

Expert → Application → Alarm → Alarm → H alarm value (13854)

**Prerequisite**

Alarm mode (→ 253) ≠ Off

**Description**

Defines the high(H) limit value.

**User entry**

Signed floating-point number

**Factory setting**

0 None

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
### L alarm value

**Navigation**  
Expert → Application → Alarm → Alarm → L alarm value (13853)

**Prerequisite**  
Alarm mode (→ 253) ≠ Off

**Description**  
Defines the low limit value.

**User entry**  
Signed floating-point number

**Factory setting**  
0 None

**Additional information**  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### LL alarm value

**Navigation**  
Expert → Application → Alarm → Alarm → LL alarm value (13852)

**Prerequisite**  
Alarm mode (→ 253) ≠ Off

**Description**  
Defines the low-low(LL) limit value.

**User entry**  
Signed floating-point number

**Factory setting**  
0 None

**Additional information**  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### HH alarm

**Navigation**  
Expert → Application → Alarm → Alarm → HH alarm (13857)

**Prerequisite**  
Alarm mode (→ 253) ≠ Off

**Description**  
Shows whether an HH alarm is currently active.

**Additional information**  
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
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H alarm

Navigation  ➤ Expert → Application → Alarm → Alarm → H alarm (13856)
Prerequisite  Alarm mode (→ 253) ≠ Off
Description  Shows whether an H alarm is currently active.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

HH+H alarm

Navigation  ➤ Expert → Application → Alarm → Alarm → HH+H alarm (13858)
Prerequisite  Alarm mode (→ 253) ≠ Off
Description  Shows whether an HH or H alarm is currently active.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

L alarm

Navigation  ➤ Expert → Application → Alarm → Alarm → L alarm (13859)
Prerequisite  Alarm mode (→ 253) ≠ Off
Description  Shows whether an L alarm is currently active.

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>-</td>
</tr>
</tbody>
</table>

LL alarm

Navigation  ➤ Expert → Application → Alarm → Alarm → LL alarm (13868)
Prerequisite  Alarm mode (→ 253) ≠ Off
Description  Shows whether an LL alarm is currently active.
Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
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</tbody>
</table>

**LL+L alarm**

Navigation

Expert → Application → Alarm → Alarm → LL+L alarm (13869)

Prerequisite

Alarm mode (→ 253) ≠ Off

Description

Shows whether an LL or L alarm is currently active.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
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<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

**Any error**

Navigation

Expert → Application → Alarm → Alarm → Any error (13867)

Prerequisite

Alarm mode (→ 253) ≠ Off

Description

Show whether any alarm is currently active.

User interface

- Unknown
- Inactive
- Active
- Error

Factory setting

Unknown

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
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<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

**Clear alarm**

Navigation

Expert → Application → Alarm → Alarm → Clear alarm (13861)

Prerequisite

Alarm mode (→ 253) = Latching

Description

Deletes an alarm which is still active although the alarm condition is no longer present.

Selection

- No
- Yes

Factory setting

No
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### Alarm hysteresis

**Navigation**
Expert → Application → Alarm → Alarm → Alarm hysteresis (13862)

**Prerequisite**
Alarm mode (→ 253) ≠ Off

**Description**
Defines the hysteresis for the limit values. The hysteresis prevents constant changes of the alarm state if the level is near one of the limit values.

**User entry**
Signed floating-point number

**Factory setting**
0.001

### Damping factor

**Navigation**
Expert → Application → Alarm → Alarm → Damping factor (13860)

**Description**
Defines the damping constant (in seconds).

**User entry**
0 to 999.9 s

**Factory setting**
0 s

### Additional information

<table>
<thead>
<tr>
<th></th>
<th>Read access</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>Maintenance</td>
</tr>
<tr>
<td></td>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Factory setting**
0 s
3.6  "Tank values" submenu

**Navigation**  
Expert → Tank values

<table>
<thead>
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<th>Tank values</th>
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</thead>
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<td>Net weight</td>
</tr>
<tr>
<td>Gauge status</td>
</tr>
<tr>
<td>Balance flag</td>
</tr>
<tr>
<td>Standby level</td>
</tr>
<tr>
<td>Offset standby distance</td>
</tr>
<tr>
<td>One-time command status</td>
</tr>
<tr>
<td>Level</td>
</tr>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>Density</td>
</tr>
<tr>
<td>Pressure</td>
</tr>
<tr>
<td>GP values</td>
</tr>
</tbody>
</table>

### Net weight

**Navigation**  
Expert → Tank values → Net weight (8007)

**Description**  
Shows the corrected weight data from the detector, as compensated by the drum table. This weight is used for measurement.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Gauge status

**Navigation**  
Expert → Tank values → Gauge status (8081)

**Description**  
Indicates the current status of the device gauge command.
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Additional information

<table>
<thead>
<tr>
<th>Read access</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tr>
</tbody>
</table>

Balance flag

Navigation

Expert → Tank values → Balance flag (8006)

Description
Indicates the validity of the Measurement. If balanced, corresponding Value (Liquid Level, Upper Interface, Lower Interface, Tank Bottom) is updated.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Standby level

Navigation

Expert → Tank values → Standby level (8194)

Description
Defines the position in the tank where the displacer waits for the liquid level to rise during standby level gauge command.

User entry

-999999.9 to 999999.9 mm

Factory setting

0 mm

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Displacer waiting for the liquid level to rise during standby level gauge command

1. Gauge reference height
2. Empty
3. Datum plate
4. Standby level
5. Standby distance
6. Reference position

Offset standby distance

Navigation

Expert → Tank values → Offset distance (8107)

Description

Defines the distance from the current position where the displacer waits for the liquid level to rise during offset standby gauge command.

User entry

0 to 999 999.9 mm

Factory setting

500 mm
One-time command status

Navigation

Expert → Tank values → One-time Cmd (8201)

Description

Indicates the status of the last executed one-time gauge command.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Additional information

One-time command is available for all gauge commands, excepting Level, Stop, Up, and Interface.

3.6.1 "Level" submenu

Navigation

Expert → Tank values → Level

<table>
<thead>
<tr>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank level → 265</td>
</tr>
<tr>
<td>Tank Level % → 265</td>
</tr>
<tr>
<td>Tank ullage → 266</td>
</tr>
<tr>
<td>Tank ullage % → 266</td>
</tr>
</tbody>
</table>
Tank level

Navigation

Expert → Tank values → Level → Tank level (14655)

Description
Shows the distance from the zero position (tank bottom or datum plate) to the product surface.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Tank Level %

Navigation

Expert → Tank values → Level → Tank Level % (14654)

Description
Shows the level as a percentage of the full measuring range.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
**Tank ullage**

**Navigation**

Expert → Tank values → Level → Tank ullage (14657)

**Description**

Shows the remaining empty space in the tank.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Tank ullage %**

**Navigation**

Expert → Tank values → Level → Tank ullage % (14658)

**Description**

Shows the remaining empty space in percentage related to parameter tank reference height.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Upper interface level**

**Navigation**

Expert → Tank values → Level → Upper I/F level (15003)

**Description**

Shows measured interface level from zero position (tank bottom or datum plate). Value is updated when device generates a valid Interface measurement.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Upper interface level timestamp**

**Navigation**

Expert → Tank values → Level → Up I/F timestamp (8055)

**Description**

Shows timestamp for the last measured upper interface level.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
Lower interface level

**Navigation**

Expert → Tank values → Level → Lower I/F level (15004)

**Description**

Shows measured interface level from zero position (tank bottom or datum plate). Value is updated when device generates a valid interface measurement.

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Lower interface level timestamp

**Navigation**

Expert → Tank values → Level → LowI/F timestamp (8061)

**Description**

Shows timestamp of the last measured lower interface level.

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Bottom level

**Navigation**

Expert → Tank values → Level → Bottom level (15018)

**Description**

Shows the bottom level.

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Bottom level timestamp

**Navigation**

Expert → Tank values → Level → BotLev timestamp (8048)

**Description**

Shows the timestamp for measured bottom level.

**Additional information**

<table>
<thead>
<tr>
<th>Access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
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</tr>
</tbody>
</table>
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**Water level**

**Navigation**
[code] Expert → Tank values → Level → Water level (14970) [/code]

**Description**
Shows the bottom water level.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Measured level**

**Navigation**
[code] Expert → Tank values → Level → Measured level (14653) [/code]

**Description**
Shows the measured level without any correction from the tank calculations.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Distance**

**Navigation**
[code] Expert → Tank values → Level → Distance (8103) [/code]

**Description**
Shows measured distance from reference position.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Displacer position**

**Navigation**
[code] Expert → Tank values → Level → Displacer pos (15019) [/code]

**Description**
Shows the displacer position.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
### 3.6.2 "Temperature" submenu

*Navigation*  
Expert → Tank values → Temperature

| ▶ Temperature |  
|---------------|---|
| Liquid temperature |  
| Vapor temperature |  
| Air temperature |  
| ▶ NMT element values |  
| ▶ Element temperature |  
| Element temperature 0 to 23 |  
| ▶ Element position |  
| Element position 0 to 23 |

#### Liquid temperature

*Navigation*  
Expert → Tank values → Temperature → Liquid temp. (14978)

*Description*  
Shows the average or spot temperature of the measured liquid.

*Additional information*

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

#### Vapor temperature

*Navigation*  
Expert → Tank values → Temperature → Vapor temp. (14985)

*Description*  
Shows the measured vapor temperature.

*Additional information*

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>
Air temperature

Navigation

Expert → Tank values → Temperature → Air temp. (14986)

Description
Shows the air temperature.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>

"NMT element values" submenu

Navigation

Expert → Tank values → Temperature → NMT elem. values

"Element temperature" submenu

Navigation

Expert → Tank values → Temperature → NMT elem. values → Element temp. → Element temp 0 to 23 (14984)

Element temperature 1 to 24

Navigation

Expert → Tank values → Temperature → NMT elem. values → Element temp. → Element temp 1 to 24 (14984–1 to 24)

Description
Shows the temperature of an element in the NMT.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

"Element position" submenu

Navigation

Expert → Tank values → Temperature → NMT elem. values → Element position

Element position 1 to 24

Navigation

Expert → Tank values → Temperature → NMT elem. values → Element position → Element pos. 1 to 24 (15014–1 to 24)

Description
Shows the position of the selected element in the NMT.
### Additional information

<table>
<thead>
<tr>
<th>Access</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
3.6.3 "Density" submenu

**Navigation**

Expert → Tank values → Density

- **Density**
  - Observed density
  - Observed density temperature
  - Vapor density
  - Air density
  - Measured upper density
  - Upper density timestamp
  - Measured middle density
  - Middle Density Timestamp
  - Measured lower density
  - Lower density timestamp
- **Profile density**
  - Profile density 0 to 49
  - Profile density position 0 to 49

---

**Observed density**

**Navigation**

Expert → Tank values → Density → Observed density (13451)

**Description**

Calculated density of the product.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

This value is calculated from different measured variables depending on the selected calculation method.
Observed density temperature

**Navigation**

Expert → Tank values → Density → Obs. dens. temp. (13453)

**Description**
Corresponding temperature of measured density. Can be used for reference density calculation.

**User interface**
Signed floating-point number

**Factory setting**
0 °C

Vapor density

**Navigation**

Expert → Tank values → Density → Vapor density (14981)

**Description**
Defines the density of the gas phase in the tank.

**User entry**
0.0 to 500.0 kg/m³

**Factory setting**
1.2 kg/m³

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Air density

**Navigation**

Expert → Tank values → Density → Air density (14980)

**Description**
Defines the density of the air surrounding the tank.

**User entry**
0.0 to 500.0 kg/m³

**Factory setting**
1.2 kg/m³

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Measured upper density

**Navigation**

Expert → Tank values → Density → Meas upper dens. (15001)

**Description**
Shows the density of the upper phase.
**Upper density timestamp**

**Navigation**

Expert → Tank values → Density → UpDens timestamp (8067)

**Description**

Shows timestamp of the last measured upper density.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Measured middle density**

**Navigation**

Expert → Tank values → Density → Meas middle dens (14997)

**Description**

Density of the middle phase.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Middle Density Timestamp**

**Navigation**

Expert → Tank values → Density → MidDensTimestamp (8011)

**Description**

Shows the timestamp of the last measured middle density.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**Measured lower density**

**Navigation**

Expert → Tank values → Density → Meas lower dens. (15002)

**Description**

Density of the lower phase.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
Lower density timestamp

**Navigation**

Expert → Tank values → Density → LowerDensTimestp (8122)

**Description**

Shows timestamp of last measured lower density.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

"Profile density" submenu

**Navigation**

Expert → Tank values → Density → Profile density

Profile density 0 to 49

**Navigation**

Expert → Tank values → Density → Profile density → Profile dens 0 to 49 (8068)

**Description**

Shows the density measurement at the corresponding profile density position.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

Profile density position 0 to 49

**Navigation**

Expert → Tank values → Density → Profile density → Profile pos 0 to 49 (8077)

**Description**

Shows the position where the corresponding density was measured.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>
3.6.4  "Pressure" submenu

**Navigation**  
Expert → Tank values → Pressure

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 (bottom)</td>
<td>276</td>
</tr>
<tr>
<td>P3 (top)</td>
<td>276</td>
</tr>
</tbody>
</table>

### P1 (bottom)

**Navigation**  
Expert → Tank values → Pressure → P1 (bottom) (14983)

**Description**  
Shows the pressure at the tank bottom.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### P3 (top)

**Navigation**  
Expert → Tank values → Pressure → P3 (top) (14988)

**Description**  
Shows the pressure (P3) at the top transmitter.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
3.6.5 "GP values" submenu

**Navigation**  
Expert → Tank values → GP values

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GP 1 to 4 name</td>
<td>277</td>
</tr>
<tr>
<td>GP Value 1</td>
<td>277</td>
</tr>
<tr>
<td>GP Value 2</td>
<td>277</td>
</tr>
<tr>
<td>GP Value 3</td>
<td>278</td>
</tr>
<tr>
<td>GP Value 4</td>
<td>278</td>
</tr>
</tbody>
</table>

**GP 1 to 4 name**

**Navigation**  
Expert → Tank values → GP values → GP 1 name (14963)

**Description**  
Defines the label associated with the respective GP value.

**User entry**  
Character string comprising numbers, letters and special characters (15)

**Factory setting**  
GP Value 1

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**GP Value 1**

**Navigation**  
Expert → Tank values → GP values → GP Value 1 (14966)

**Description**  
Displays the value that will be used as general purpose value.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**GP Value 2**

**Navigation**  
Expert → Tank values → GP values → GP Value 2 (14967)

**Description**  
Displays the value that will be used as general purpose value.
### GP Value 3

**Navigation**

Expert → Tank values → GP values → GP Value 3 (14968)

**Description**

Displays the value that will be used as general purpose value.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

### GP Value 4

**Navigation**

Expert → Tank values → GP values → GP Value 4 (14969)

**Description**

Displays the value that will be used as general purpose value.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>
### "Diagnostics" submenu

**Navigation**  
Expert → Diagnostics

#### Diagnostics
- Actual diagnostics
- Timestamp
- Previous diagnostics
- Timestamp
- Operating time from restart
- Operating time
- Date/time

#### Diagnostic list
- Diagnostics 1 to 5
- Timestamp 1 to 5

#### Event logbook

#### Simulation
- Device alarm simulation
- Diagnostic event simulation
- Simulation distance on
- Simulation distance
- Current output 1 to 2 simulation
- Simulation value

#### Device information
- Device tag
- Serial number
- Firmware version
The "Expert" menu

Firmware CRC → 290

Weight and measures configuration CRC → 290

Device name → 291

Order code → 291

Extended order code 1 to 3 → 291

ENP version → 291

Device type → 292

Module type → 292

Communication Slot → 292

Board info → 294

Date/time → 283

System temperature → 294

W&M lock switch → 294

Data logging → 296

Assign channel 1 to 4 → 297

Logging interval → 298

Clear logging data → 299

Device check → 301

Commissioning check → 302

Commissioning check → 302

Result drum check → 302

Step X / 11 → 302

Commissioning parameter → 303

Step X / 11 → 303
Actual diagnostics

Navigation

Expert → Diagnostics → Actual diagnos. (0691)

Description

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

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

The display consists of:
- Symbol for event behavior
- Code for diagnostic behavior
- Operating time of occurrence
- Event text

If several messages are active at the same time, the messages with the highest priority is displayed.

Information on what is causing the message, and remedy measures, can be viewed via the symbol on the display.

Timestamp

Navigation

Expert → Diagnostics → Timestamp (0667)

Description

Displays the timestamp for the currently active diagnostic message.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Previous diagnostics

Navigation

Expert → Diagnostics → Prev.diagnostics (0690)

Description

Displays the diagnostic message for the last diagnostic event that has ended.
The display consists of:
- Symbol for event behavior
- Code for diagnostic behavior
- Operating time of occurrence
- Event text

If several messages are active at the same time, the messages with the highest priority is displayed.

Information on what is causing the message, and remedy measures, can be viewed via the symbol on the display.

## Timestamp

### Navigation

Expert → Diagnostics → Timestamp (0672)

### Description

Displays the timestamp of the diagnostic message generated for the last diagnostic event that has ended.

### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

## Operating time from restart

### Navigation

Expert → Diagnostics → Time fr. restart (0653)

### Description

Indicates how long the device has been in operation since the last time the device was restarted.

### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

## Operating time

### Navigation

Expert → Diagnostics → Operating time (0652)

### Description

Indicates how long the device has been in operation.

### Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
Date/time

Navigation

Expert → Diagnostics → Date/time (0790)

Description
Displays the device internal real time clock.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
3.7.1 "Diagnostic list" submenu

**Navigation**  
Expert → Diagnostics → Diagnostic list

---

Diagnostics 1 to 5

**Navigation**  
Expert → Diagnostics → Diagnostic list → Diagnostics 1 to 5 (0692–1 to 5)

**Description**  
Displays the currently active diagnostic message with the highest priority.

**Additional information**  
The display consists of:
- Symbol for event behavior
- Code for diagnostic behavior
- Operating time of occurrence
- Event text

---

Timestamp 1 to 5

**Navigation**  
Expert → Diagnostics → Diagnostic list → Timestamp 1 to 5 (0683–1 to 5)

**Description**  
Timestamp of the diagnostic message.

**Additional information**  

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
3.7.2  "Event logbook" submenu

Structure of the submenu on the local display

Navigation

Expert → Diagnostics → Event logbook

Description of parameters

Navigation

Expert → Diagnostics → Event logbook
3.7.3 "Simulation" submenu

**Navigation**
Expert → Diagnostics → Simulation

<table>
<thead>
<tr>
<th>Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device alarm simulation</td>
</tr>
<tr>
<td>Diagnostic event simulation</td>
</tr>
<tr>
<td>Simulation distance on</td>
</tr>
<tr>
<td>Simulation distance</td>
</tr>
<tr>
<td>Current output 1 to 2 simulation</td>
</tr>
<tr>
<td>Simulation value</td>
</tr>
</tbody>
</table>

---

**Device alarm simulation**

**Navigation**
Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

**Description**
Switch the device alarm on and off.

**Selection**
- Off
- On

**Factory setting**
Off

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

---

**Diagnostic event simulation**

**Navigation**
Expert → Diagnostics → Simulation → Diag. event sim. (0737)

**Description**
Select a diagnostic event to simulate this event.

**Selection**
The diagnostic events of the device

**Factory setting**
Off
To terminate the simulation, select Off.

**Simulation distance on**

**Navigation**

Expert → Diagnostics → Simulation → Sim distance on (8002)

**Description**

Switches the distance simulation on or off.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Simulation distance**

**Navigation**

Expert → Diagnostics → Simulation → Sim distance (8003)

**Prerequisite**

Simulation distance on (→ 287) = On

**Description**

Defines the distance value to be simulated.

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

**Current output N simulation**

**Navigation**

Expert → Diagnostics → Simulation → Curr.outp N sim. (13985)

**Prerequisite**

- The device has an Analog I/O module.
- Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output

**Description**

Switches the simulation of the current on or off.
Selection

- Off
- On

Factory setting

Off

Additional information

| Read access | Operator |
| Write access | Maintenance |

Simulation value

Navigation

Expert → Diagnostics → Simulation → Simulation value (13976)

Prerequisite

Current output simulation (→ 287) = On

Description

Defines the current to be simulated.

User entry

3.4 to 23 mA

Factory setting

The current at the time the simulation was started.

Additional information

| Read access | Operator |
| Write access | Maintenance |
3.7.4 "Device information" submenu

**Navigation**

Expert → Diagnostics → Device info

### Device information

- **Device tag** → 289
- **Serial number** → 290
- **Firmware version** → 290
- **Firmware CRC** → 290
- **Weight and measures configuration CRC** → 290
- **Device name** → 291
- **Order code** → 291
- **Extended order code 1 to 3** → 291
- **ENP version** → 291
- **Device type** → 292
- **Module type** → 292
- **Communication Slot** → 292
- **Recovery state** → 292

### Board info

→ 294

---

**Device tag**

**Navigation**

Expert → Diagnostics → Device info → Device tag (0011)

**Description**

Shows the device tag.

**User interface**

Character string comprising numbers, letters and special characters

**Factory setting**

- none -

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Endress+Hauser
The 'Expert' menu

Serial number

**Navigation**  
Expert → Diagnostics → Device info → Serial number (0009)

**Description**  
The serial number is a unique alphanumerical code identifying the device. It is printed on the nameplate. In combination with the Operations app it allows to access all device related documentation.

**Additional information**

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Firmware version

**Navigation**  
Expert → Diagnostics → Device info → Firmware version (0010)

**Description**  
Displays the device firmware version installed.

**Additional information**

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Firmware CRC

**Navigation**  
Expert → Diagnostics → Device info → Firmware CRC (8563)

**Description**  
Result of the cyclic redundancy check of the firmware.

**Additional information**

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Weight and measures configuration CRC

**Navigation**  
Expert → Diagnostics → Device info → W&M config CRC (8564)

**Description**  
Result of the cyclic redundancy check of the weights and measure relevant parameters.

**Additional information**

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
Device name

Navigation  
Expert → Diagnostics → Device info → Device name (0013)

Description  
Use this function to display the device name. It can also be found on the nameplate.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Order code

Navigation  
Expert → Diagnostics → Device info → Order code (0008)

Description  
Shows the device order code.

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Service</td>
</tr>
</tbody>
</table>

Extended order code 1 to 3

Navigation  
Expert → Diagnostics → Device info → Ext. order cd. 1 (0023)

Description  
Display the three parts of the extended order code.

User interface  
Character string comprising numbers, letters and special characters

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Service</td>
</tr>
</tbody>
</table>

The extended order code indicates the selected option of all ordering features and thus uniquely identifies the device.

ENP version

Navigation  
Expert → Diagnostics → Device info → ENP version (0012)

Description  
Shows the version of the electronic nameplate (ENP).

Additional information

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
The 'Expert' menu

**Device type**

**Navigation**

Expert → Diagnostics → Device info → Device type (8561)

**Description**

Displays the device type.

**Additional information**

| Read access | Operator | Write access | - |

**Module type**

**Navigation**

Expert → Diagnostics → Device info → Module type (8526)

**Description**

Shows the type of installed IO module.

**Additional information**

| Read access | Operator | Write access | - |

**Communication Slot**

**Navigation**

Expert → Diagnostics → Device info → Comm. Slot (13285)

**Description**

Indicates which IOM slot contains the communication protocol interface board.

**Additional information**

| Read access | Operator | Write access | - |

**Recovery state**

**Navigation**

Expert → Diagnostics → Device info → Recovery state (8565)

**Description**

Indicate the state of the backup data process.

**User interface**

- Inactive
- distributing
- restoring
- Distribution done
- Distribution failed
- Operating normally
- Restore done
- Restore failed
Factory setting  Inactive
"Board info" submenu

**Navigation**
Expert → Diagnostics → Device info → Board info

**Date/time**

**Navigation**
Expert → Diagnostics → Device info → Board info → Date/time (0790)

**Description**
Displays the device internal real time clock.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

**System temperature**

**Navigation**
Expert → Diagnostics → Device info → Board info → System temp. (8553)

**Description**
Shows the electronic temperature of the main board.

**User interface**
Signed floating-point number

**Factory setting**
0 °C

**Additional information**

<table>
<thead>
<tr>
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**W&M lock switch**

**Navigation**
Expert → Diagnostics → Device info → Board info → W&M lock switch (8558)

**Description**
Shows the position of the weights and measure (WP) switch.

**User interface**
- Enabled
- Disabled
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3.7.5  "Data logging" submenu

Structure of the submenu on the local display

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Expert → Diagnostics → Data logging

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| ▶ Display channel 1 to 4 |

Structure of the submenu in an operating tool

_Navigation_  

Expert → Diagnostics → Data logging

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Description of parameters

Navigation

Expert → Diagnostics → Data logging

Assign channel 1 to 4

Navigation

Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

Description

Assign a process variable to logging channel.

Selection

- Off
- Tank level
- Measured level
- Tank level %
- Distance
- Water level
- Upper interface level
- Lower interface level
- Displacer position
- Upper density
- Middle density
- Lower density
- Bottom level
- Average profile density *
- Liquid temperature
- Vapor temperature
- Air temperature
- Tank ullage
- Tank ullage %
- Observed density value
- P1 (bottom)
- P2 (middle)
- P3 (top)
- GP 1 value
- GP 2 value
- GP 3 value
- GP 4 value
- AIO B1-3 value *
- AIO B1-3 value mA *
- AIO B1-3 value %
- AIO C1-3 value
- AIO C1-3 value mA *
- AIO C1-3 value %
- AIP B4-8 value *
- AIP C4-8 value *
- Absolute echo amplitude *
- Amplitude eval distance *
- DiffPhase *

Factory setting

Off

* Visibility depends on order options or device settings
Additional information
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

If 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 logged data are deleted if a new option is selected in this parameter.

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Logging interval

Description
Define the logging interval t_{log} for data logging. This value defines the time interval between the individual data points in the memory.

User entry
1.0 to 3 600.0 s

Factory setting
10.0 s

Additional information
This parameter 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 \cdot t_{log}
- If 2 logging channels are used: T_{log} = 500 \cdot t_{log}
- If 3 logging channels are used: T_{log} = 333 \cdot t_{log}
- If 4 logging channels are used: T_{log} = 250 \cdot 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 logged data are deleted if this parameter is changed.

Example
When using 1 logging channel
- T_{log} = 1000 \cdot 1 \text{ s} = 1000 \text{ s} \approx 16.5 \text{ min}
- T_{log} = 1000 \cdot 10 \text{ s} = 10000 \text{ s} \approx 2.75 \text{ h}
- T_{log} = 1000 \cdot 80 \text{ s} = 80000 \text{ s} \approx 22 \text{ h}
- T_{log} = 1000 \cdot 3 600 \text{ s} = 3 600000 \text{ s} \approx 41 \text{ d}

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Clear logging data

Navigation
- Expert → Diagnostics → Data logging → Clear logging (0855)
- Expert → Diagnostics → Data logging → Clear logging (0855)

Description
Clear the entire logging data.

Selection
- Cancel
- Clear data

Factory setting
Cancel

Additional information
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"Display channel 1 to 4" submenu

The Display channel 1 to 4 submenu is only available when operating via the local display. When operating via FieldCare, the diagram can be displayed in the "Event List / HistoROM" function.

The Display channel 1 to 4 submenu displays the measured value trend of the respective logging channel.

- x-axis: displays 125 to 500 measured values of a process variable (the number of values depending on the number of selected channels).
- y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.

To quit the diagram and to return to the operating menu, press ▼ and ▲ simultaneously.

Navigation ▲ Expert → Diagnostics → Data logging → Displ.channel 1 to 4
3.7.6  "Device check" submenu

Navigation  ➔  ➔  Expert → Diagnostics → Device check

[Device check]
"Commissioning check" wizard

Navigation  ➟ Expert ➔ Diagnostics ➔ Device check ➔ Commission check

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Commissioning check

Navigation  ➟ Expert ➔ Diagnostics ➔ Device check ➔ Commission check

Description  This sequence supports checking of the hardware on sensor side and correct installation of the sensor.

Additional information

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Result drum check

Navigation  ➟ Expert ➔ Diagnostics ➔ Device check ➔ Commission check ➔ Result drum chk (8155)

Description  Gives feedback on the latest status of the commissioning check.

Additional information

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Step X / 11

Navigation  ➟ Expert ➔ Diagnostics ➔ Device check ➔ Commission check ➔ Step X / 11 (8143)

Description  Indicates which step of the commissioning check is currently running.

Additional information

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"Commissioning parameter" submenu

|------------|--------------------------------------------------------|

**Step X / 11**

**Navigation** | Expert → Diagnostics → Device check → Commission para. → Step X / 11 (8143)
**Description** | Indicates which step of the commissioning check is currently running.
**Additional information**

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**Result drum check**

**Navigation** | Expert → Diagnostics → Device check → Commission para. → Result drum chk (8155)
**Description** | Gives feedback on the latest status of the commissioning check.
**Additional information**

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**Displacer weight tolerance**

**Navigation** | Expert → Diagnostics → Device check → Commission para. → DispWeightToler (8161)
**Description** | Sets the tolerance of the displacer weight verification during commissioning check.
**User interface** | 0 to 99.9 g
**Factory setting** | 5 g
**Reference calibration incomplete**

**Navigation**  
Expert → Diagnostics → Device check → Commission para. → Ref cal. incomp (8157)

**User interface**  
0 to 1

**Factory setting**  
0

**Additional information**

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