Description of Device Parameters

Proservo NMS80

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

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

 электро защита (PE)
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

 ключ
Phillips head screwdriver

 ключ
Flat blade screwdriver
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**
  1, 2, 3
  Series of steps

- **Result of a step**

- **Visual inspection**

- **Operation via operating tool**

- **Write-protected parameter**
  1, 2, 3, ...
  Item numbers

- **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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‣ Self check

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*Endress+Hauser*
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### Direct access

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**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

Locking status

Navigation  

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.

Description

'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'.

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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.

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Access status display

Navigation  

Prerequisite

The device has a local display.

Description

Indicates access authorization to parameters via local display.

Additional information

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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  

Description

Shows the access authorization to the parameters via the operating tool

Additional information

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Enter access code

**Navigation**

Expert → Ent. access code (0003)

**Description**

Enter access code to disable write protection of parameters.

**Additional information**

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3.1 "System" submenu

Navigation

Expert → System

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3.1.1 "Display" submenu

**Navigation**  
Expert → System → Display

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**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

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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"

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- 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

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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.

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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
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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

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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
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

### 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.
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**
| Read access | Operator |
| Write access | Maintenance |

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**
| Read access | Operator |
| Write access | Operator |

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**
| Read access | Operator |
| Write access | Operator |
3.1.2  "System units" submenu

Navigation   Expert → System → System units

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<td>Decimal places temperature</td>
</tr>
<tr>
<td>Decimal places density</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></th>
<th>Operator</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write access</td>
<td></td>
<td></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**
- **SI units**
  - m
  - mm
  - cm
- **US units**
  - ft
  - in
  - ft-in-16
  - ft-in-8

**Factory setting**
mm

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

### Pressure unit

**Navigation**
- Expert → System → System units → Pressure unit (0564)

**Selection**
- **SI units**
  - bar
  - Pa
  - kPa
  - MPa
  - mbar a
- **US units**
  - psi
- **Other units**
  - inH2O
  - inH2O (68°F)
  - ftH2O (68°F)
  - mmH2O
  - mmHg

**Factory setting**
bar

**Additional information**
<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</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**
- **SI units**
  - °C
  - K
- **US units**
  - °F
  - °R

**Factory setting**
°C

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

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Other units</th>
</tr>
</thead>
<tbody>
<tr>
<td>g/cm³</td>
<td>lb/ft³</td>
<td>°API</td>
</tr>
<tr>
<td>g/ml</td>
<td>lb/gal (us)</td>
<td>SGU</td>
</tr>
<tr>
<td>g/l</td>
<td>lb/in³</td>
<td></td>
</tr>
<tr>
<td>kg/l</td>
<td>STon/yd³</td>
<td></td>
</tr>
<tr>
<td>kg/dm³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kg/m³</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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</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.xxxxx |

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.
Selection

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

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 temperature

Navigation

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

Description

Number of decimal places for temperature values.

Selection

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

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.

Decimal places density

Navigation

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

Description

Number of decimal places for density values.

Selection

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

Factory setting

x.x
The 'Expert' menu

Proservo NMS80

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.
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 \( \leftarrow \) to terminate the wizard.

3. If the displayed value is not correct: Press \( \checkmark \) to edit it.
   - The current value of the **Year** parameter is displayed.

4. If the displayed value is correct: Press \( \checkmark \) to go to the next value.

5. If the displayed value is incorrect: Press \( \leftarrow \) and enter the correct value. Confirm the new value by pressing \( \checkmark \).

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 \( \checkmark \).

8. Quit the wizard by pressing \( \checkmark \) 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>► Date / time</th>
<th>➔ 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/time</td>
<td></td>
</tr>
<tr>
<td>► Set date</td>
<td>➔ 53</td>
</tr>
<tr>
<td>Date/time</td>
<td>➔ 53</td>
</tr>
<tr>
<td>Year</td>
<td>➔ 53</td>
</tr>
<tr>
<td>Month</td>
<td>➔ 53</td>
</tr>
<tr>
<td>Day</td>
<td>➔ 53</td>
</tr>
<tr>
<td>Hour</td>
<td>➔ 53</td>
</tr>
<tr>
<td>Minute</td>
<td>➔ 54</td>
</tr>
<tr>
<td>Set date</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>► Date / time</th>
<th>➔ 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/time</td>
<td></td>
</tr>
<tr>
<td>Set date</td>
<td>➔ 50</td>
</tr>
<tr>
<td>Year</td>
<td>➔ 50</td>
</tr>
<tr>
<td>Month</td>
<td>➔ 51</td>
</tr>
<tr>
<td>Day</td>
<td>➔ 51</td>
</tr>
<tr>
<td>Hour</td>
<td>➔ 51</td>
</tr>
<tr>
<td>Minute</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>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<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>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<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>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>

**Month**

**Navigation**

[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>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>

**Day**

**Navigation**

[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>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>

**Hour**

**Navigation**

[Expert → System → Date / time → Hour (0789)]

**Prerequisite**
Set date (→ 50) = Start
### Description
Enter the current hour.

### User entry
0 to 23

### 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>

### Minute

**Navigation**

Expert → System → Date / time → Minute (0791)

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

```plaintext
[Administration]  
  [Define access code]  
    Define access code  
    Confirm access code  
  Device reset  
  Activate SW option
```

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

**Navigation**  
Expert → System → Administration

```plaintext
[Administration]  
  Define access code  
  Activate SW option  
  Device reset
```
Description of parameters

**Navigation**  
Expert → System → Administration

---

**Define access code**

**Navigation**  
Expert → System → Administration → Def. access code (0093)

**Description**  
Define release code for write access to parameters.

**User entry**  
0 to 9 999

**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>

- 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**

**Navigation**  
Expert → System → Administration → Activate SW opt. (0029)

**Description**  
Enter the application package code or code of another re-ordered functionality to enable it

**User entry**  
Positive integer

**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>

---

**Device reset**

**Navigation**  
Expert → System → Administration → Device reset (0000)

**Description**  
Reset the device configuration - either entirely or in part - to a defined state
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>Access</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<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**

**Description**
Confirm the entered access code.

**User entry**
0 to 9999

**Factory setting**
0

**Additional information**

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

*Navigation*  
Expert → Sensor

<table>
<thead>
<tr>
<th>Menu Item</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge command</td>
<td>58</td>
</tr>
<tr>
<td>Gauge status</td>
<td>59</td>
</tr>
<tr>
<td>Distance</td>
<td>59</td>
</tr>
<tr>
<td>Information</td>
<td>60</td>
</tr>
<tr>
<td>Measured values</td>
<td>63</td>
</tr>
<tr>
<td>Sensor diag</td>
<td>71</td>
</tr>
<tr>
<td>Sensor config</td>
<td>73</td>
</tr>
<tr>
<td>Calibration</td>
<td>92</td>
</tr>
</tbody>
</table>

**Gauge command**

*Navigation*  
Expert → Sensor → Gauge command (8000)

**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>
</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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross weight</td>
<td>Shows non-compensated measured weight from detector.</td>
</tr>
<tr>
<td>Net weight</td>
<td>Shows the corrected weight data from the detector, as compensated by the drum table. This weight is used for measurement.</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>
### 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>

**Additional information**
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>Page</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>Spot density</td>
<td>67</td>
</tr>
<tr>
<td>Profile density</td>
<td>69</td>
</tr>
</tbody>
</table>
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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</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.

**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>

Bottom level

**Navigation**

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

**Description**

Shows measured bottom level. Value is updated after a successful tank bottom 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>

Bottom level timestamp

**Navigation**

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

**Description**

Shows the timestamp for measured bottom 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>
"Spot density" submenu

Navigation  ☁ ☁ Expert → Sensor → Measured values → Spot density

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

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

**Description**

Shows the Measured Lower Density 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>

### Lower density timestamp

**Navigation**

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

**Description**

Shows timestamp of last measured lower 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>
### "Profile density" submenu

**Navigation**

Expert → Sensor → Measured values → Profile density

<table>
<thead>
<tr>
<th>Item</th>
<th>Navigation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile point</td>
<td>Expert → Sensor →</td>
<td>Shows actual number of Density Points measured so far in current operation,</td>
</tr>
<tr>
<td></td>
<td>Measured values →</td>
<td>and the total Number of Points after Density Profile Operation is complete.</td>
</tr>
<tr>
<td></td>
<td>Profile density →</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Profile point</td>
<td></td>
</tr>
<tr>
<td>Profile average density</td>
<td>Expert → Sensor →</td>
<td>Shows the average density calculated after a profile density measurement</td>
</tr>
<tr>
<td></td>
<td>Measured values →</td>
<td>is complete.</td>
</tr>
<tr>
<td></td>
<td>Profile density →</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Profile avg dens</td>
<td></td>
</tr>
<tr>
<td>Profile density timestamp</td>
<td>Expert → Sensor →</td>
<td>Shows the timestamp when the last average density profile was finished.</td>
</tr>
<tr>
<td></td>
<td>Measured values →</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Profile density →</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Profil dens time</td>
<td></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.

**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>

### 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.

**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>

### 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.

**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>
"Density table" submenu

**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

<table>
<thead>
<tr>
<th>▶ Sensor diag</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Start self check  ➔  [\text{71}]</td>
</tr>
</tbody>
</table>

| Status self check ⇒ \[\text{71}\] |
| Self check ⇒ \[\text{71}\] |
| Gauge status ⇒ \[\text{72}\] |
| Status self check ⇒ \[\text{72}\] |

"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.

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

<table>
<thead>
<tr>
<th>Additional information</th>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</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>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Post gauge command</td>
<td>→ 73</td>
</tr>
<tr>
<td>Displacer</td>
<td>→ 74</td>
</tr>
<tr>
<td>Wiredrum</td>
<td>→ 77</td>
</tr>
<tr>
<td>Safety settings</td>
<td>→ 78</td>
</tr>
<tr>
<td>Level settings</td>
<td>→ 81</td>
</tr>
<tr>
<td>Balance settings</td>
<td>→ 85</td>
</tr>
<tr>
<td>Spot density</td>
<td>→ 88</td>
</tr>
<tr>
<td>Profile density</td>
<td>→ 90</td>
</tr>
</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**

<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" 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**

<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 diameter**

**Navigation**

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

**Prerequisite**

Displacer type (→ 74) = Custom diameter

**Description**

Sets the diameter of the cylindrical part of displacer.
Proservo NMS80

User entry 0 to 999.9 mm

Factory setting See label on the device.

Additional information

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

Displacer weight

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

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

Displacer volume

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

Description Displacer volume indicated on displacer in milliliter.

User entry 10 to 999.9 ml

Factory setting See label on the device.

Additional information

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

Displacer balance volume


Description Defines the balance volume of the displacer as the lower part of displacer immersed in liquid. Units in milliliters. Indicated on displacer.

User entry 10 to 999.9 ml

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

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

### 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**

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

**Navigation**  
Expert → Sensor → Sensor config → Wiredrum

<table>
<thead>
<tr>
<th>Wiredrum</th>
<th>→ 77</th>
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</thead>
<tbody>
<tr>
<td>Drum circumference</td>
<td></td>
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<tr>
<td>Wire weight</td>
<td>→ 77</td>
</tr>
</tbody>
</table>

**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**

<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 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**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
### "Safety settings" submenu

**Navigation**

Expert → Sensor → Sensor config → Safety settings

<table>
<thead>
<tr>
<th>Safety settings</th>
<th></th>
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<td>78</td>
</tr>
<tr>
<td>Low stop level</td>
<td>78</td>
</tr>
<tr>
<td>Slow hoist zone</td>
<td>79</td>
</tr>
<tr>
<td>Overtension weight</td>
<td>79</td>
</tr>
<tr>
<td>Undertension weight</td>
<td>79</td>
</tr>
<tr>
<td>Output out of range</td>
<td>80</td>
</tr>
</tbody>
</table>

#### 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**

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

#### 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**

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

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

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**

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

Undertension weight

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

**Description**  
Defines the undertension error weight. Untertension 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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</table>
The 'Expert' menu

Output out of range

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

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

Selection
- Last valid value
- Alarm
- None

Factory setting
Last valid value

Additional information

<table>
<thead>
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</table>
"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**

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

**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**

| Read access | Operator |
| Write access | Maintenance |
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**
- **Read access:** Operator
- **Write access:** Maintenance

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.

- **Read access:** Operator
- **Write access:** Maintenance

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**
- **Read access:** Operator
- **Write access:** Maintenance
### 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 999 999.9 mm

**Factory setting**

500 mm

---

Diagram: 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
Additional information

8

a: Offset standby distance
"Balance settings" submenu

**Navigation**

Expert → Sensor → Sensor config → Balance settings

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<tr>
<td>Seek delay</td>
</tr>
<tr>
<td>Weight tolerance</td>
</tr>
</tbody>
</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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<tr>
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<tbody>
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</table>
The "Expert" menu

Proservo NMS80

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

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

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
**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**

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

---

**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**

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

---

10  Balancing parameter
"Spot density" submenu

Navigation  

Expert → Sensor → Sensor config → Spot density

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<th></th>
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<tbody>
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</tr>
<tr>
<td>Upper density offset</td>
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<tr>
<td>Middle density offset</td>
<td>→ 88</td>
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<tr>
<td>Lower density offset</td>
<td>→ 89</td>
</tr>
<tr>
<td>Submersion depth</td>
<td>→ 89</td>
</tr>
</tbody>
</table>

**Upper density offset**

Navigation  

Expert → Sensor → Sensor config → Spot density → Up dens. offset (8176)

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**

Navigation  

Expert → Sensor → Sensor config → Spot density → Mid dens. offset (8177)

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**

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

<table>
<thead>
<tr>
<th>Read access</th>
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</table>
"Profile density" submenu

Navigation  
Expert → Sensor → Sensor config → Profile density

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<tr>
<td>Profile density offset distance</td>
<td>→  91</td>
</tr>
<tr>
<td>Profile density interval</td>
<td>→  91</td>
</tr>
<tr>
<td>Profile density offset</td>
<td>→  91</td>
</tr>
</tbody>
</table>

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

<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 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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Sensor config → Profile density → Dens offset dist (8185)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Profile density offset distance [mm] is the distance between start point and first measurement point.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 999 999.9 mm</td>
</tr>
<tr>
<td>Factory setting</td>
<td>500 mm</td>
</tr>
</tbody>
</table>

### Profile density interval

<table>
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<th>Navigation</th>
<th>Expert → Sensor → Sensor config → Profile density → Density interval (8174)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Sets the interval between two measurement points in profile density operation.</td>
</tr>
<tr>
<td>User entry</td>
<td>1 to 100 000 mm</td>
</tr>
<tr>
<td>Factory setting</td>
<td>1 000 mm</td>
</tr>
</tbody>
</table>

### Profile density offset

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Sensor config → Profile density → Prof dens offset (8173)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Defines an offset value which is added to the measured profile density value.</td>
</tr>
<tr>
<td>User entry</td>
<td>−999.99 to 999.99 kg/m³</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 kg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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</table>
3.2.5 "Calibration" submenu

Navigation:  Expert → Sensor → Calibration

- Move displacer → 93
- Sensor calibration → 95
- Reference calibration → 98
- Drum calibration → 100
- Calibration parameters → 103
"Move displacer" wizard

**Navigation**

> Expert → Sensor → Calibration → Move displacer → Move distance

**Move distance**

**Navigation**

> Expert → Sensor → Calibration → Move displacer → Move distance

**Description**

Up or down movement of displacer in mm.

**User entry**

0 to 999,999.9 mm

**Factory setting**

0 mm

**Additional information**

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</table>

**Distance**

**Navigation**

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

**Description**

Shows measured distance from reference position.

**Additional information**

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<td>Write access</td>
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</tbody>
</table>
Move displacer

**Navigation**  
Expert → Sensor → Calibration → Move displacer → Move displacer

**Selection**  
- Stop  
- Move down  
- Move up

**Factory setting**  
Stop

**Additional information**

<table>
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<tbody>
<tr>
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</table>

Motor status

**Navigation**  
Expert → Sensor → Calibration → Move displacer → Motor status (8118)

**Description**  
Shows the current moving Direction of the Motor.

**Additional information**

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

Move displacer

**Navigation**  
Expert → Sensor → Calibration → Move displacer → Move displacer

**Selection**  
- No  
- Yes

**Factory setting**  
No

**Additional information**

<table>
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"Sensor calibration" wizard

**Navigation**


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<tr>
<td>Zero calibration</td>
<td>➡️ 96</td>
</tr>
<tr>
<td>Calibration status</td>
<td>➡️ 96</td>
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<tr>
<td>Offset calibration</td>
<td>➡️ 96</td>
</tr>
<tr>
<td>Span calibration</td>
<td>➡️ 97</td>
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**Sensor calibration**

**Navigation**


**Description**

This sequence calibrates the sensor of the servo.

**Additional information**

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</table>

**Offset weight**

**Navigation**


**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**

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</table>

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

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</table>

Zero calibration

**Navigation**

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

**Additional information**

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</table>

Calibration status

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

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

**Additional information**

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<tbody>
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</table>

Offset calibration

**Navigation**

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

**Additional information**

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</tbody>
</table>
Span calibration

**Navigation**

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

**Description**

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

**Additional information**

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</table>
"Reference calibration" wizard

**Navigation**


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</table>

**Reference calibration**

**Navigation**


**Description**

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

**Additional information**

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</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 9999.9 mm

**Factory setting**

Dependent on the device version

**Additional information**

<table>
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</table>

**Progress**

**Navigation**

Expert → Sensor → Calibration → Reference cal. → Progress

**Description**

Gives feedback on the latest status of the reference calibration process.
Calibration status

**Navigation**

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

**Description**

Gives feedback on the latest status of the calibration process.

**Additional information**

<table>
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</table>
"Drum calibration" wizard


Drum calibration

Make sure to have

Drum calibration

Calibration time

Set high weight

Make drum table

Drum table point

Calibration status

Make low table

Set low weight

Make sure to have


Additional information

Read access  Operator

Write access  -

Drum calibration


Description

This sequence will perform a drum calibration.

Additional information

Read access  Operator

Write access  Maintenance
Calibration time

**Navigation**
Expert → Sensor → Calibration → Drum cal. → Time

**Description**
Time until drum calibration is finished.

**Additional information**

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

Make drum table

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

**Description**
This will perform a drum calibration.

**Additional information**

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</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**

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</tbody>
</table>
### Calibration status

**Navigation**

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

**Description**

Gives feedback on the latest status of the calibration process.

**Additional information**

<table>
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<tbody>
<tr>
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</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

Calibration parameters

- Set high weight
- Set low weight
- Reference position
- Offset weight
- Span weight
- Calibration status

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

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>
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<tbody>
<tr>
<td>Operator</td>
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</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></th>
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<tbody>
<tr>
<td></td>
<td>Operator</td>
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</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

<table>
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<th>▶ HART devices</th>
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<tbody>
<tr>
<td>Number of devices → 107</td>
</tr>
<tr>
<td>▶ HART Device(s) → 108</td>
</tr>
<tr>
<td>▶ Forget device → 136</td>
</tr>
<tr>
<td>▶ #blank# → 136</td>
</tr>
</tbody>
</table>

**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>
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</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</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
- Polling address
- Device tag
- Operating mode
- Communication status
- Status signal
- #blank# (PV - designation dependent on device)
- #blank# (SV - designation dependent on device)
- #blank# (TV - designation dependent on device)
- #blank# (QV - designation dependent on device)
- HART device PV mA
- HART device PV %
- Output pressure
- Output density
- Output temperature
- Output vapor temperature
- Output level

- HART device information
- Element values
## Device name

### Navigation

[Diagram](#)  Expert → Input/output → HART devices → HART Device(s) → Device name (14722)

### Description

Shows the name of the transmitter.

### Additional information

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

## Polling address

### Navigation

[Diagram](#)  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>
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</thead>
<tbody>
<tr>
<td>Operator</td>
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</tbody>
</table>

## Device tag

### Navigation

[Diagram](#)  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>
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</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>

## Operating mode

### Navigation

[Diagram](#)  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

**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
- Measured level

**Factory setting**
PV,SV,TV & QV

**Additional information**

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

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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → #blank# (14716)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Shows the first HART variable (PV).</td>
</tr>
<tr>
<td>Additional information</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Write access</strong></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → #blank# (14705)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>For HART devices other than NMT: <strong>Operating mode (→  109) = PV,SV,TV &amp; QV</strong></td>
</tr>
<tr>
<td>Description</td>
<td>Shows the second HART variable (SV).</td>
</tr>
<tr>
<td>Additional information</td>
<td><strong>Read access</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Write access</strong></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → #blank# (14706)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>For HART devices other than NMT: <strong>Operating mode (→  109) = PV,SV,TV &amp; QV</strong></td>
</tr>
<tr>
<td>Description</td>
<td>Shows the third HART variable (TV).</td>
</tr>
<tr>
<td>Additional information</td>
<td><strong>Read access</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Write access</strong></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → #blank# (14716)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>For HART devices other than NMT: <strong>Operating mode (→  109) = PV,SV,TV &amp; QV</strong></td>
</tr>
<tr>
<td>Description</td>
<td>Shows the fourth HART variable (QV).</td>
</tr>
<tr>
<td>Additional information</td>
<td><strong>Read access</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Write access</strong></td>
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</tbody>
</table>
**HART device PV mA**

**Navigation**

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

(14708)

**Prerequisite**

Not available for Micropilot S FMR5xx and Prothermo 53x.

**Description**

Shows the first HART variable (PV) in mA.

**Additional information**

<table>
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<tr>
<th>Read access</th>
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<tbody>
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</table>

**HART device PV %**

**Navigation**

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

(14709)

**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>
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</tbody>
</table>

**Output pressure**

**Navigation**

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

(14719)

**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>
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</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>Read access</th>
<th>Write access</th>
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</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</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>Read access</th>
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</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
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</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.
The 'Expert' menu

**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>
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<tbody>
<tr>
<td>Write access</td>
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</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>
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<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>
"HART device information" submenu

**Navigation**

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

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<tr>
<td>Temperature</td>
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<tr>
<td>Vapor temperature</td>
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<tr>
<td>Water level</td>
</tr>
<tr>
<td>Level source</td>
</tr>
<tr>
<td>Tank level to NMT</td>
</tr>
<tr>
<td>Manual value</td>
</tr>
<tr>
<td>HART bus</td>
</tr>
<tr>
<td>Device type</td>
</tr>
<tr>
<td>Device ID</td>
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<tr>
<td>Device date</td>
</tr>
<tr>
<td>Device description</td>
</tr>
<tr>
<td>Device message</td>
</tr>
<tr>
<td>Software version</td>
</tr>
<tr>
<td>Firmware CRC</td>
</tr>
<tr>
<td>Custody transfer</td>
</tr>
</tbody>
</table>

**Pressure**

**Navigation**

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

**Prerequisite**

Output pressure (→ 112) = No value
**Density**

**Navigation**

 khổng lồ  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.

**Additional information**

<table>
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</table>

**Temperature**

**Navigation**

 khổng lồ  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.

**Additional information**

<table>
<thead>
<tr>
<th>Read access</th>
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</table>

**Vapor temperature**

**Navigation**

 khổng lồ  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.

**Additional information**

<table>
<thead>
<tr>
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<tbody>
<tr>
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</tbody>
</table>
Water level

Navigation

The "Expert" menu → 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>
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<tbody>
<tr>
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</table>

Level source

Navigation

The "Expert" menu → 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>
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<tbody>
<tr>
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<td>Maintenance</td>
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</tbody>
</table>

Tank level to NMT

Navigation

The "Expert" menu → 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>
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<tbody>
<tr>
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</table>
The 'Expert' menu

Proservo NMS80

---

### 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>Read access</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
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</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>
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</thead>
<tbody>
<tr>
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</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>
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</thead>
<tbody>
<tr>
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</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.
Proservo NMS80

The "Expert" menu

Additional information

<table>
<thead>
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<th>Operator</th>
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</thead>
<tbody>
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</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>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

Device description

Navigation

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

Description

Shows a user defined HART descriptor of the connected device.

Additional information

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

#### Proservo NMS80

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

### Firmware CRC

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → HART device info → Firmware CRC (14758)

**User interface**

Positive integer

**Factory setting**

0

**Additional information**

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

### Custody transfer

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → HART device info → Custody transfer (14748)

**Prerequisite**

Prothermo NMT53x with temperature measurement

**Description**

Shows information about hardware lock of NMT device. Off -> NMT parameter can be changed. On -> NMT parameter cannot be changed.

**Additional information**

<table>
<thead>
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<th>Read access</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Write access</td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
“Element values” submenu

This submenu is only available for Prothermo NMT5x.

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>
</tr>
</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>
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</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</table>
The "Expert" menu

"Diagnostics" submenu

This submenu is only available for Prothermo NMT53x.

Navigation

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

Diagnostic code

<table>
<thead>
<tr>
<th>Description</th>
<th>Shows the current diagnostic code of NMT. Check NMT manual for details.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

Last diagnostic

<table>
<thead>
<tr>
<th>Description</th>
<th>Shows the previous diagnostic code of NMT. Check NMT manual for details.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
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</tbody>
</table>

Reference 0

<table>
<thead>
<tr>
<th>Prerequisite</th>
<th>Prothermo NMT53x with temperature measurement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation</td>
<td>Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Reference 0 (14740)</td>
</tr>
</tbody>
</table>
Proservo NMS80

The "Expert" menu

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

"Diagnostics" submenu

This submenu is only available for Prothermo NMT8x.

**Navigation**

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

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<th>123</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous diagnostics</td>
<td>124</td>
</tr>
<tr>
<td>Test resistance</td>
<td>124</td>
</tr>
<tr>
<td>WB frequency ratio</td>
<td>124</td>
</tr>
</tbody>
</table>

**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**
### Previous diagnostics

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Prev.diagnostics (14755)</th>
</tr>
</thead>
<tbody>
<tr>
<td>User interface</td>
<td>Character string comprising numbers, letters and special characters</td>
</tr>
</tbody>
</table>

### Test resistance

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Test resistance (14752)</th>
</tr>
</thead>
<tbody>
<tr>
<td>User interface</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 Ohm</td>
</tr>
</tbody>
</table>

### WB frequency ratio

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Input/output → HART devices → HART Device(s) → Diagnostics → WB freq. ratio (14753)</th>
</tr>
</thead>
<tbody>
<tr>
<td>User interface</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

### 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>

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

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

**Navigation**

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

<table>
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</thead>
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<tr>
<td>Access code</td>
<td>→ 126</td>
</tr>
<tr>
<td>Total no. element</td>
<td>→ 126</td>
</tr>
<tr>
<td>Bottom point</td>
<td>→ 127</td>
</tr>
<tr>
<td>Temperature element short</td>
<td>→ 127</td>
</tr>
<tr>
<td>Temperature element open</td>
<td>→ 127</td>
</tr>
<tr>
<td>Output at error</td>
<td>→ 128</td>
</tr>
<tr>
<td>Gain adjust</td>
<td>→ 128</td>
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<tr>
<td>Kind of interval</td>
<td>→ 128</td>
</tr>
<tr>
<td>Element interval</td>
<td>→ 129</td>
</tr>
<tr>
<td>Update water level</td>
<td>→ 129</td>
</tr>
</tbody>
</table>

**Element setup**

ırken  → 130

| Select element    | → 130 |
| Zero adjust       | → 130 |
| Element temperature| → 131 |
| Element position  | → 131 |

**Description**

Enable NMT device configuration.
### Access code

**Selection**  
- No
- Yes

**Factory setting**  
No

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

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

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

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
**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**

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

<table>
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<tr>
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<td>Maintenance</td>
</tr>
</tbody>
</table>

*Element setup* submenu

**Navigation**

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

**Description**

Chooses the temperature element to be configured manually.

**User entry**

1 to 24

**Factory setting**

1

**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>

**Zero adjust**

**Navigation**

Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Element setup → Zero adjust (14735)

**Description**

Adjusts the offset of the selected temperature element.

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

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<td>Total no. element</td>
</tr>
<tr>
<td>Bottom point</td>
</tr>
<tr>
<td>No element in phase</td>
</tr>
<tr>
<td>Water bottom level offset</td>
</tr>
</tbody>
</table>
### 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**

<table>
<thead>
<tr>
<th>Meaning of the options</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No</strong></td>
<td>Not configurable</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Configurable</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>

### 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**

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

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

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

**"Element setup" submenu**

**Navigation**

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

**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.
### Zero adjust

**User entry**  
1 to 24

**Factory setting**  
1

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

**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

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

### 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

<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>Service</td>
</tr>
</tbody>
</table>
"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

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

**HART Bus interface**

**Navigation**

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

<table>
<thead>
<tr>
<th>#blank#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating mode</td>
</tr>
<tr>
<td>Current</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
### Operating mode

**Navigation**

[ salarié ] 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>
<th>Access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td></td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

### Current

**Navigation**

[ salarié ] 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>
<tr>
<th>Access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td></td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</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.

Navigation

Expert → Input/output → Analog IP

<table>
<thead>
<tr>
<th>▶ Analog IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating mode</td>
</tr>
<tr>
<td>RTD type</td>
</tr>
<tr>
<td>Ohms offset</td>
</tr>
<tr>
<td>Thermocouple type</td>
</tr>
<tr>
<td>RTD connection type</td>
</tr>
<tr>
<td>Process value</td>
</tr>
<tr>
<td>Process variable</td>
</tr>
<tr>
<td>0 % value</td>
</tr>
<tr>
<td>100 % value</td>
</tr>
<tr>
<td>Input value percent</td>
</tr>
<tr>
<td>Input value</td>
</tr>
<tr>
<td>Temperature offset after conversion</td>
</tr>
</tbody>
</table>
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**

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

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

Ohms offset

Navigation

Expert → Input/output → Analog IP → Ohms offset (14026)

Prerequisite

Operating mode (→ 139) = RTD temperature input

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.

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

Thermocouple type

Navigation

Expert → Input/output → Analog IP → Thermocouple typ (14008)

Description

Defines the type of the connected thermocouple.

Selection

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

<table>
<thead>
<tr>
<th><strong>Navigation</strong></th>
<th>Expert → Input/output → Analog IP → RTD connect type (14022)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisite</strong></td>
<td>Operating mode (→ 139) = RTD temperature input</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Defines the connection type of the RTD.</td>
</tr>
</tbody>
</table>
| **Selection** | - 4 wire RTD connection  
- 2 wire RTD connection  
- 3 wire RTD connection |
| **Factory setting** | 4 wire RTD connection |
| **Additional information** |  
| Read access | Operator  
Write access | Maintenance |

### Process value

<table>
<thead>
<tr>
<th><strong>Navigation</strong></th>
<th>Expert → Input/output → Analog IP → Process value (14003)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisite</strong></td>
<td>Operating mode (→ 139) ≠ Disabled</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Shows the measured value received via the analog input.</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Read access | Operator  
Write access | - |

### Process variable

<table>
<thead>
<tr>
<th><strong>Navigation</strong></th>
<th>Expert → Input/output → Analog IP → Process variable (14016)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisite</strong></td>
<td>Operating mode (→ 139) ≠ RTD temperature input</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Determines type of measured value.</td>
</tr>
</tbody>
</table>
| **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>

0 % value

Navigation

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

Input value percent

Navigation

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.
Additional information

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

<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

Navigation

Space ➤ Expert ➤ Input/output ➤ Analog IP ➤ Input value (14015)

Prerequisite

Operating mode (→ 139) ≠ Disabled

Description

Shows the value received via the analog input.

Temperature offset after conversion

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

Minimum probe temperature

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'.

Maintenance
### Maximum probe temperature

<table>
<thead>
<tr>
<th>User entry</th>
<th>–213 to 927 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory setting</td>
<td>–100 °C</td>
</tr>
<tr>
<td>Additional info</td>
<td>Read access: Operator</td>
</tr>
<tr>
<td></td>
<td>Write access:</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
</tr>
</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'.

<table>
<thead>
<tr>
<th>User entry</th>
<th>–213 to 927 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory setting</td>
<td>250 °C</td>
</tr>
<tr>
<td>Additional info</td>
<td>Read access: Operator</td>
</tr>
<tr>
<td></td>
<td>Write access:</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### Probe position

<table>
<thead>
<tr>
<th>User entry</th>
<th>–5 000 to 30 000 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory setting</td>
<td>5 000 mm</td>
</tr>
<tr>
<td>Additional info</td>
<td>Read access: Operator</td>
</tr>
<tr>
<td></td>
<td>Write access:</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Meaning of the options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not calibrated</td>
</tr>
<tr>
<td>This is a display option only. It can not be selected. It is shown if the analog input is not in a calibrated state.</td>
</tr>
<tr>
<td>User calibration</td>
</tr>
<tr>
<td>Activates a user calibration. The user calibration itself is defined in the User calibration wizard.</td>
</tr>
<tr>
<td>Factory calibration</td>
</tr>
<tr>
<td>Activates the factory calibration which is permanently stored in the device.</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>

**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
### 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 %
### Operating mode

**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>
Proservo NMS80

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**

**Navigation**

Expert → Input/output → Analog I/O → Fixed current (13989)

**Prerequisite**

Current span (→ 149) = Fixed current

**Description**

Defines the fixed output current.

**User entry**

4 to 22.5 mA

**Factory setting**

4 mA

**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>

---

**Analog input source**

**Navigation**

Expert → Input/output → Analog I/O → Analog source (13974)

**Prerequisite**

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

**Description**

Defines the process variable transmitted via the AIO.

**Selection**

- None
- Tank level
- Tank level %
- Tank ullage
- Tank ullage %
- Measured level
- Distance
- Displacer position
- Water level
The "Expert" menu

- 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.

3) Visibility depends on order options or device settings
The 'Expert' menu

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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 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

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 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

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

Input value

Navigation

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

Prerequisite

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

Description

Shows the input value of the analog I/O 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>

0 % value

Navigation

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

Prerequisite

- Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output
- Current span (→ 149) ≠ 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>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td></td>
</tr>
</tbody>
</table>

100 % value

Navigation

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

Prerequisite

- Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output
- Current span (→ 149) ≠ Fixed current
The 'Expert' menu

Proservo NMS80

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

Input value %

Navigation
Expert → Input/output → Analog I/O → Input value % (13955)

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>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<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>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<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**:  
  - Read access: Operator
  - Write access: -

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**:  
  - Read access: Operator
  - Write access: Maintenance

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

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### Analog input 100% value

**Navigation**

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

**Prerequisite**

Operating mode (→  bb 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 (→  bb 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 (→  bb 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></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</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></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</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></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</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></th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</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>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</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>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</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
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>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</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.

![Diagram of digital inputs or outputs](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

![Operating modes of the Digital I/O module]

A  Input passive
B  Input active
C  Output passive

Read access
Operator
Write access
Maintenance

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 4)
  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.

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

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

The digital output consists of two relays connected in series:

![diagram]

**Image 15** The two relays of a digital output

1/2 The relays
3/4 The terminals of the digital output

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>

**Information** 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>
<tr>
<th>Read access</th>
<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

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</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>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</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>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</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>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
3.3.5 "Digital input mapping" submenu

Navigation   ▶ Expert → Input/output → DI mapping

<table>
<thead>
<tr>
<th>Digital input mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital input source 1</td>
</tr>
<tr>
<td>Digital input source 2</td>
</tr>
<tr>
<td>Gauge command 0</td>
</tr>
<tr>
<td>Gauge command 1</td>
</tr>
<tr>
<td>Gauge command 2</td>
</tr>
<tr>
<td>Gauge command 3</td>
</tr>
</tbody>
</table>

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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</tr>
</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>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</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>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
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</tbody>
</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 (→) ≠ 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>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

Gauge command 2

Navigation
Expert → Input/output → DI mapping → Gauge command 2 (8151)

Prerequisite
- Digital input source 1 (→) ≠ None
- Digital input source 2 (→) ≠ 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
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- Water dip
- Release overtension
- Tank profile
- Interface profile
- Manual profile
- Level standby
- Offset standby

**Factory setting**

Stop

**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 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>
<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 "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.

![Diagram of communication interfaces]

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

---

**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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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

| Write access |  |
|--------------|-

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

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<td>Parity</td>
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<td>Modbus address</td>
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<tr>
<td>Float swap mode</td>
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<td>CRC seed</td>
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<tr>
<td>Old TSM mode</td>
</tr>
<tr>
<td>Bus termination</td>
</tr>
<tr>
<td>Compatibility mode</td>
</tr>
</tbody>
</table>

Baudrate

Navigation

Expert → Communication → Modbus X1-4 → Configuration → Baudrate (13203)

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

**Additional information**

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</tbody>
</table>

**Parity**

**Navigation**

Expert → Communication → Modbus X1-4 → Configuration → Parity (13204)

**Prerequisite**

Communication interface protocol (→ 171) = MODBUS

**Description**

Defines the parity of the Modbus communication.

**Selection**

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

**Factory setting**

None / 1 stop bit

**Modbus address**

**Navigation**

Expert → Communication → Modbus X1-4 → Configuration → Modbus address (13205)

**Prerequisite**

Communication interface protocol (→ 171) = MODBUS

**Description**

Defines the Modbus address of the device.

**User entry**

1 to 247

**Factory setting**

1

**Additional information**

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</table>

**Float swap mode**

**Navigation**

Expert → Communication → Modbus X1-4 → Configuration → Float swap mode (13232)

**Prerequisite**

Communication interface protocol (→ 171) = MODBUS
**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**
<table>
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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>
<thead>
<tr>
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</tbody>
</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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</table>
The 'Expert' menu

Proservo NMS80

**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**

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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>
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</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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</table>
"Integer conversion" submenu

Only visible for devices with a Modbus I/O module.

**Navigation**

Expert → Communication → Modbus Xx-x → Integer conversion

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<td>→ 178</td>
</tr>
<tr>
<td>Level 100%</td>
<td>→ 179</td>
</tr>
<tr>
<td>Temperature 0%</td>
<td>→ 179</td>
</tr>
<tr>
<td>Temperature 100%</td>
<td>→ 179</td>
</tr>
<tr>
<td>Pressure 0%</td>
<td>→ 180</td>
</tr>
<tr>
<td>Pressure 100%</td>
<td>→ 180</td>
</tr>
<tr>
<td>Density 0%</td>
<td>→ 180</td>
</tr>
<tr>
<td>Density 100%</td>
<td>→ 181</td>
</tr>
<tr>
<td>User 0%</td>
<td>→ 181</td>
</tr>
<tr>
<td>User 100%</td>
<td>→ 181</td>
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<tr>
<td>Percent 0%</td>
<td>→ 182</td>
</tr>
<tr>
<td>Percent 100%</td>
<td>→ 182</td>
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</tbody>
</table>

**Level 0%**

**Navigation**

Expert → Communication → Modbus Xx-x → Integer conversion → 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>
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</table>
## 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>
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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>Access</th>
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<tr>
<td>Read 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>
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<tr>
<td><strong>Pressure 0%</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Navigation</strong></td>
<td>Expert → Communication → Modbus Xx-x → Integer converters → Pressure 0% (13217)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Defines the pressure that represents 0% on the integer value scale.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>Signed floating-point number</td>
</tr>
<tr>
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<tr>
<td><strong>Additional information</strong></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Pressure 100%</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
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<td><strong>Factory setting</strong></td>
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<tr>
<td><strong>Additional information</strong></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Density 0%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
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<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
### Density 100%

**Navigation**

Expert → Communication → Modbus Xx:x → Integer convrs → Density 100%

(13218)

**Description**

Defines the density that represents 100% on the integer value scale.

**User entry**

Signed floating-point number

**Factory setting**

1000 kg/m³

**Additional information**

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

### User 0%

**Navigation**

Expert → Communication → Modbus Xx:x → Integer convrs → 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**

<table>
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</table>

### User 100%

**Navigation**

Expert → Communication → Modbus Xx:x → Integer convrs → 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**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Operator</td>
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</tbody>
</table>
### Percent 0%

**Navigation**

Expert → Communication → Modbus Xx-x → Integer conver → 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>
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<tr>
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</table>

### Percent 100%

**Navigation**

Expert → Communication → Modbus Xx-x → Integer conver → 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>
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<tbody>
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</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
- 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>
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</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)

**GP 1 value 0%**

**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>
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</table>

**GP 1 value 100%**

**Description**
Defines the GP1 value that represents 100% on the integer value scale.

**User entry**
Signed floating-point number

**Factory setting**
0 Unitless
### 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>
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<th>Read access</th>
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</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>
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</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>
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The 'Expert' menu

Proservo NMS80

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>
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</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

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</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

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</table>
"Discrete selector" submenu

Navigation

Expert → Communication → Modbus Xx-x → Discrete select

Discrete 1 selector

Navigation

Expert → Communication → WM550 X1-4 → Discrete select → Discrete 1select

Description
Determines the input source which is transferred as Alarm bit [n] value in the corresponding WM550 tasks.

Selection

- None
- Balance flag option Visibility 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

Factory setting

None

Additional information

<table>
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"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**

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**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**

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</thead>
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</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**

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<thead>
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</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 999999. 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>999999</td>
<td>999999.9 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>500000</td>
<td>500000.0 mm</td>
</tr>
<tr>
<td>500001</td>
<td>-0.1 mm</td>
</tr>
<tr>
<td>999999</td>
<td>-499999.9 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>
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</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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
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</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>Selection</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>User value 1 to 8 source</td>
<td>191</td>
</tr>
<tr>
<td>Alarm 1 input source</td>
<td>192</td>
</tr>
<tr>
<td>Alarm 2 input source</td>
<td>192</td>
</tr>
<tr>
<td>Alarm 3 input source</td>
<td>193</td>
</tr>
<tr>
<td>Alarm 4 input source</td>
<td>193</td>
</tr>
<tr>
<td>SP 1 value selector</td>
<td>194</td>
</tr>
<tr>
<td>SP 2 value selector</td>
<td>194</td>
</tr>
<tr>
<td>SP 3 value selector</td>
<td>195</td>
</tr>
<tr>
<td>SP 4 value selector</td>
<td>195</td>
</tr>
<tr>
<td>Value percent selector</td>
<td>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

- 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

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

<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>Maintenance</td>
</tr>
</tbody>
</table>

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

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

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
<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>

* Visibility depends on order options or device settings
Value percent selector

Navigation
Expert → Communication → V1 → V1 input select → Value % select

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>
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</thead>
<tbody>
<tr>
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</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.

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<th>➔ 198</th>
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<td>➔ 198</td>
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<tr>
<td>No. of preambles</td>
<td>➔ 199</td>
</tr>
<tr>
<td>PV source</td>
<td>➔ 199</td>
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<tr>
<td>Assign PV</td>
<td>➔ 199</td>
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<tr>
<td>0 % value</td>
<td>➔ 200</td>
</tr>
<tr>
<td>100 % value</td>
<td>➔ 201</td>
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<tr>
<td>PV mA selector</td>
<td>➔ 201</td>
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<tr>
<td>Primary variable (PV)</td>
<td>➔ 201</td>
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<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>
<td>➔ 203</td>
</tr>
<tr>
<td>Assign TV</td>
<td>➔ 203</td>
</tr>
<tr>
<td>Tertiary variable (TV)</td>
<td>➔ 204</td>
</tr>
<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
Proservo NMS80

The "Expert" menu

Additional information

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</tbody>
</table>

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

The Measured level option doesn't contain a unit. If a unit is needed, select the Tank level option.

0 % value

0 mm

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>
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<tr>
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</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>
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<th>Operator</th>
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</thead>
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<td>Write access</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>
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</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>
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</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>
</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.
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>
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</thead>
<tbody>
<tr>
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<td>-</td>
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</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>
<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 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>
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<td>-</td>
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</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
### Quaternary variable (QV)

<table>
<thead>
<tr>
<th>Navigation</th>
<th>📊 📊  Expert → Communication → HART output → HART config. → Quaterna.var(QV) (0203)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>Assign QV (→ 🔍 204) ≠ None</td>
</tr>
<tr>
<td>Description</td>
<td>Shows the current measured value of the quaternary (fourth) dynamic variable (QV)</td>
</tr>
</tbody>
</table>

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

**Navigation**  
Expert → Communication → HART output → Information

<table>
<thead>
<tr>
<th>Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HART short tag</td>
<td>➔  206</td>
</tr>
<tr>
<td>Device tag</td>
<td>➔  207</td>
</tr>
<tr>
<td>Device revision</td>
<td>➔  207</td>
</tr>
<tr>
<td>Device ID</td>
<td>➔  207</td>
</tr>
<tr>
<td>Device type</td>
<td>➔  208</td>
</tr>
<tr>
<td>Manufacturer ID</td>
<td>➔  208</td>
</tr>
<tr>
<td>HART revision</td>
<td>➔  208</td>
</tr>
<tr>
<td>HART descriptor</td>
<td>➔  209</td>
</tr>
<tr>
<td>HART message</td>
<td>➔  209</td>
</tr>
<tr>
<td>Hardware revision</td>
<td>➔  209</td>
</tr>
<tr>
<td>Software revision</td>
<td>➔  210</td>
</tr>
<tr>
<td>HART date code</td>
<td>➔  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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → HART output → Information → Device tag (0215)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Enter a unique name for the measuring point to identify the device quickly within the plant.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>Character string comprising numbers, letters and special characters (32)</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>NMS8x</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td>Read access</td>
</tr>
<tr>
<td></td>
<td>Write access</td>
</tr>
</tbody>
</table>

### Device revision

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → HART output → Information → Device revision (0204)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Shows the device revision with which the device is registered with the HART Communication Foundation</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>0 to 255</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td>Read access</td>
</tr>
<tr>
<td></td>
<td>Write access</td>
</tr>
</tbody>
</table>

### Device ID

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → HART output → Information → Device ID (0221)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Shows the device ID for identifying the device in a HART network</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>Positive integer</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>123456</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td>Read access</td>
</tr>
<tr>
<td></td>
<td>Write access</td>
</tr>
</tbody>
</table>
The 'Expert' menu

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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
### HART descriptor

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

### HART message

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

### Hardware revision

**Navigation**
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>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</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>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</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>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
3.5 "Application" submenu

Navigation: Expert → Application

- Tank configuration → 211
- Tank calculation → 235
- Alarm → 252

3.5.1 "Tank configuration" submenu

Navigation: Expert → Application → Tank config

Process condition

- Level → 213
- Temperature → 217
- Density → 221
- Pressure → 225
- GP values → 233

Process condition

Navigation: Expert → Application → Tank config → 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.
The 'Expert' menu

<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>
"Level" submenu

**Navigation**

Expert → Application → Tank config → Level → Level source (14601)

**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>
</tr>
</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>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 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>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>

### 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.

**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 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>Access</th>
<th>Level</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 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>Access</th>
<th>Level</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

**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>Access</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Maintenance</td>
</tr>
<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>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</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>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</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>
<td>Maintenance</td>
</tr>
</tbody>
</table>
"Temperature" submenu

**Navigation**  
Expert → Application → Tank config → Temperature

<table>
<thead>
<tr>
<th><strong>Temperature</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid temp source</td>
</tr>
<tr>
<td>Manual liquid temperature</td>
</tr>
<tr>
<td>Liquid temperature</td>
</tr>
<tr>
<td>Air temperature source</td>
</tr>
<tr>
<td>Manual air temperature</td>
</tr>
<tr>
<td>Air temperature</td>
</tr>
<tr>
<td>Vapor temp source</td>
</tr>
<tr>
<td>Manual vapor temperature</td>
</tr>
<tr>
<td>Vapor temperature</td>
</tr>
</tbody>
</table>

**Liquid temp source**  

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

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

Liquid temperature

Navigation

Expert → Application → Tank config → 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>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>

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

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

<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 temperature

**Navigation**  
Expert → Application → Tank config → 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>
<td>-</td>
</tr>
</tbody>
</table>

### 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**

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

### Vapor temperature

**Navigation**  
Expert → Application → Tank config → Temperature → Vapor temp. (14985)

**Description**  
Shows the measured vapor temperature.

**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>
"Density" submenu

**Navigation**

[Expert] → [Application] → [Tank config] → [Density]

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed density source</td>
<td>➔ 221</td>
</tr>
<tr>
<td>Observed density</td>
<td>➔ 222</td>
</tr>
<tr>
<td>Air density</td>
<td>➔ 222</td>
</tr>
<tr>
<td>Vapor density</td>
<td>➔ 222</td>
</tr>
<tr>
<td>Measured upper density</td>
<td>➔ 222</td>
</tr>
<tr>
<td>Measured middle density</td>
<td>➔ 223</td>
</tr>
<tr>
<td>Measured lower density</td>
<td>➔ 223</td>
</tr>
<tr>
<td>Water density</td>
<td>➔ 223</td>
</tr>
<tr>
<td>Profile point</td>
<td>➔ 223</td>
</tr>
<tr>
<td>Profile average density</td>
<td>➔ 224</td>
</tr>
<tr>
<td>Profile density timestamp</td>
<td>➔ 224</td>
</tr>
</tbody>
</table>

**Observed density source**

**Navigation**

[Expert] → [Application] → [Tank config] → [Density] → [Density source (13454)]

**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**

<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
## Observed density

**Navigation**

Expert → Application → Tank config → Density → Observed density (13452)

**Description**

Shows the measured or calculated density.

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

## 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**

<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>

## 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**

<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>

## 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**
- Read access: Operator
- Write access: -

### Measured lower density

**Navigation**
- Expert → Application → Tank config → Density → Meas lower dens. (15002)

**Description**
Density of the lower phase.

**Additional information**
- Read access: Maintenance
- Write access: -

### 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**
1 000 kg/m³

**Additional information**
- Read access: Operator
- Write access: Maintenance

### 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)

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

**Additional information**

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

### Profile density timestamp

**Navigation**  
Expert → Application → Tank config → Density → Profil dens time (8114)

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

**Additional information**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>
**“Pressure” submenu**

*Navigation*  
Expert → Application → Tank config → Pressure

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<thead>
<tr>
<th><strong>Pressure</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 (bottom) source</td>
<td>(\rightarrow) 226</td>
</tr>
<tr>
<td>P1 (bottom)</td>
<td>(\rightarrow) 226</td>
</tr>
<tr>
<td>P1 (bottom) manual pressure</td>
<td>(\rightarrow) 226</td>
</tr>
<tr>
<td>P1 position</td>
<td>(\rightarrow) 227</td>
</tr>
<tr>
<td>P1 offset</td>
<td>(\rightarrow) 227</td>
</tr>
<tr>
<td>P1 absolute / gauge</td>
<td>(\rightarrow) 227</td>
</tr>
<tr>
<td>P2 (middle) source</td>
<td>(\rightarrow) 228</td>
</tr>
<tr>
<td>P2 (middle)</td>
<td>(\rightarrow) 228</td>
</tr>
<tr>
<td>P2 (middle) manual pressure</td>
<td>(\rightarrow) 228</td>
</tr>
<tr>
<td>P2 offset</td>
<td>(\rightarrow) 229</td>
</tr>
<tr>
<td>P1-2 distance</td>
<td>(\rightarrow) 229</td>
</tr>
<tr>
<td>P2 absolute / gauge</td>
<td>(\rightarrow) 229</td>
</tr>
<tr>
<td>P3 (top) source</td>
<td>(\rightarrow) 230</td>
</tr>
<tr>
<td>P3 (top)</td>
<td>(\rightarrow) 230</td>
</tr>
<tr>
<td>P3 (top) manual pressure</td>
<td>(\rightarrow) 230</td>
</tr>
<tr>
<td>P3 position</td>
<td>(\rightarrow) 231</td>
</tr>
<tr>
<td>P3 offset</td>
<td>(\rightarrow) 231</td>
</tr>
<tr>
<td>P3 absolute / gauge</td>
<td>(\rightarrow) 231</td>
</tr>
<tr>
<td>Ambient pressure</td>
<td>(\rightarrow) 232</td>
</tr>
</tbody>
</table>
### P1 (bottom) source

**Navigation**

Expert → Application → Tank config → Pressure → P1 (bot) source (14994)

**Description**

Defines the source of the bottom pressure (P1).

**Selection**

- Manual value
- HART device 1 ... 15 pressure
- A1O 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>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

### P1 (bottom)

**Navigation**

Expert → Application → Tank config → 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>

### P1 (bottom) manual pressure

**Navigation**

Expert → Application → Tank config → Pressure → P1 (bot) manual (14951)

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

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

### 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**

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

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

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

**P2 (middle)**

**Navigation**

Expert → Application → Tank config → Pressure → P2 (middle) (14987)

**Description**

Shows the pressure (P2) at the middle 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>

**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**

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

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

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 100000 mm

Factory setting
2000 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>

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

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

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

P3 (top)

**Navigation**

Expert → Application → Tank config → 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>

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**

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

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

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**
<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 "Expert" menu

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**

<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>
"GP values" submenu

**Navigation**

Expert → Application → Tank config → GP values

<table>
<thead>
<tr>
<th>GP values</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GP 1 to 4 source</td>
<td>→ 233</td>
</tr>
<tr>
<td>GP 1 to 4 name</td>
<td>→ 234</td>
</tr>
<tr>
<td>GP Value 1</td>
<td>→ 234</td>
</tr>
<tr>
<td>GP Value 2</td>
<td>→ 234</td>
</tr>
<tr>
<td>GP Value 3</td>
<td>→ 234</td>
</tr>
<tr>
<td>GP Value 4</td>
<td>→ 235</td>
</tr>
</tbody>
</table>

**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**

<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 'Expert' menu

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**

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

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.

**Additional information**

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

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**

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

**Write access**

-  

3.5.2 "Tank calculation" submenu

**Navigation**

Expert → Application → Tank calculation

**Local gravity**

**Navigation**

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.

![Diagram of hydrostatic tank deformation (HyTD)](image)

17 Correction of the hydrostatic tank deformation (HyTD)

- A  'Distance' (level below \( L_0 \) → 'HyTD correction value' = 0)
- B  Gauge Reference Height (GRH)
- C  HyTD correction value
- D  'Distance' (level above \( L_0 \) → '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.

![Graph showing linear approximation]

**Calculation of the HyTD correction**

1. Linear correction according to "Deformation factor (→ § 239)"
2. Real correction
3. Starting level (→ § 238)
4. Measured level
5. HyTD correction value (→ § 238)

**Calculation of the HyTD correction**

\[
\begin{align*}
\text{If } L &< L_0 \Rightarrow C_{\text{HyTD}} = 0 \\
\text{If } L &> L_0 \Rightarrow C_{\text{HyTD}} = -(L - L_0) \times D
\end{align*}
\]

<table>
<thead>
<tr>
<th>L</th>
<th>Measured level</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_0</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.
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>

Deformation factor

Navigation Expert → Application → Tank calculation → HyTD → Deform factor (13602)

Description Defines the deformation factor for the HyTD (change of device position per change of level).

User entry -1.0 to 1.0 %
Factory setting 0.2 %

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 °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></td>
<td>$T_P$</td>
<td>$T_V$</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>$T_P$</td>
<td>$T_V$</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>$(7/8) T_P + (1/8) T_A$</td>
<td>$(1/2) T_V + (1/2) T_A$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open top</th>
<th></th>
<th>$T_P$</th>
<th>$T_A$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td>$T_P$</td>
<td>$T_A$</td>
</tr>
<tr>
<td>No</td>
<td></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
The "Expert" menu

**CTSh: Calculation of the correction**

\[ C_{CTSh} = \alpha_{\text{tank}} (H - L) (T_{D} - T_{\text{cal}}) + \alpha_{\text{wire}} L (T_{W} - T_{\text{cal}}) - \alpha_{\text{wire}} S_{\text{P}} (T_{r} - T_{\text{cal}}) \]

<table>
<thead>
<tr>
<th>Variable</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_{\text{tank}})</td>
<td>Linear expansion coefficient of tank</td>
</tr>
<tr>
<td>(\alpha_{\text{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

**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>
The 'Expert' menu

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

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

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
### Calibration temperature

**Navigation**
- 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**
- 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**
- 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

![Diagram of HTMS parameters]

- **A** Product
- **B** Water

<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>H₁ (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>H₃ (Position of P3 transmitter)</td>
<td>Setup → Advanced setup → Tank configuration → Pressure → P3 position</td>
</tr>
<tr>
<td>ρ₁ (Density of the product)¹</td>
<td>• Measured value: Setup → Advanced setup → Calculation → HTMS → Density value</td>
</tr>
<tr>
<td></td>
<td>13753</td>
</tr>
<tr>
<td></td>
<td>• User-defined value: Setup → Advanced setup → Calculation → HTMS → Manual upper</td>
</tr>
<tr>
<td></td>
<td>density (14998)</td>
</tr>
<tr>
<td>ρᵥ (Vapor density)</td>
<td>Expert → Application → Tank configuration → Density → Vapor density</td>
</tr>
<tr>
<td>ρₐ (Ambient air temperature)</td>
<td>Setup → Advanced setup → Tank configuration → Density → Air density</td>
</tr>
<tr>
<td>g (Local gravity)</td>
<td>Expert → Application → Tank Calculation → Local gravity</td>
</tr>
<tr>
<td>Lᵥ (Level of the product)</td>
<td>Operation → Tank level (14655)</td>
</tr>
<tr>
<td>Lₗ (Bottom water level)</td>
<td>Operation → Water level (14970)</td>
</tr>
<tr>
<td>V = Lₗ - H₁</td>
<td></td>
</tr>
<tr>
<td>Δᵥ = L₉₁ - Lₗ = L₉₁ - V - H₁</td>
<td></td>
</tr>
</tbody>
</table>

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>ρₚ</td>
</tr>
<tr>
<td></td>
<td>• Lₚ</td>
<td>• Hₚ₁</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lₗ (optional)</td>
<td></td>
</tr>
<tr>
<td>HTMS P1+P3</td>
<td>• P₁, P₃</td>
<td>• ρₜ</td>
<td>ρₚ (more precise calculation for pressurized tanks)</td>
</tr>
<tr>
<td></td>
<td>• Lₚ</td>
<td>• ½</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hₚ₁</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hₚ₃</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lₗ (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:

\[ Δₚ ≥ Δ_{p,min} \]

This is equivalent to the following condition for the product level:

\[ Lₚ - V ≥ Δ_{p,min} + H_{p1} = L_{min} \]

Lₘᵢₙ 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.
21 HTMS hysteresis

1 Value calculated
2 Value held/manual
Lmin Minimum level (→ 249)
Hr Hysteresis (→ 250)

Description of parameters

Navigation Expert → Application → Tank calculation → HTMS

<table>
<thead>
<tr>
<th>HTMS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HTMS mode</td>
<td>→ 248</td>
</tr>
<tr>
<td>Manual density</td>
<td>→ 249</td>
</tr>
<tr>
<td>Density value</td>
<td>→ 249</td>
</tr>
<tr>
<td>Minimum level</td>
<td>→ 249</td>
</tr>
<tr>
<td>Minimum pressure</td>
<td>→ 250</td>
</tr>
<tr>
<td>Safety distance</td>
<td>→ 250</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>→ 250</td>
</tr>
<tr>
<td>Water density</td>
<td>→ 251</td>
</tr>
</tbody>
</table>

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
Proservo NMS80

The “Expert” menu

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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Tank calculation → HTMS → Manual density (15009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Defines the manual density.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 3 000 kg/m³</td>
</tr>
<tr>
<td>Factory setting</td>
<td>800 kg/m³</td>
</tr>
<tr>
<td>Additional information</td>
<td>Read access</td>
</tr>
<tr>
<td></td>
<td>Write access</td>
</tr>
</tbody>
</table>

Density value

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Tank calculation → HTMS → Density value (13753)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Shows the calculated product density.</td>
</tr>
</tbody>
</table>

Minimum level

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Tank calculation → HTMS → Min. level (13752)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Defines the minimum product level for a HTMS calculation.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 20 000 mm</td>
</tr>
<tr>
<td>Factory setting</td>
<td>7 000 mm</td>
</tr>
</tbody>
</table>
The 'Expert' menu

**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

**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 10000 mm

**Factory setting**

2000 mm

**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 2000 mm

**Factory setting**

50 mm
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

"Alarm" submenu

Navigation # # Expert → Application → Alarm → Alarm

<table>
<thead>
<tr>
<th>Alarm</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm mode</td>
<td>→ 253</td>
</tr>
<tr>
<td>Error value</td>
<td>→ 254</td>
</tr>
<tr>
<td>Alarm value source</td>
<td>→ 255</td>
</tr>
<tr>
<td>Alarm value</td>
<td>→ 256</td>
</tr>
<tr>
<td>HH alarm value</td>
<td>→ 256</td>
</tr>
<tr>
<td>H alarm value</td>
<td>→ 256</td>
</tr>
<tr>
<td>L alarm value</td>
<td>→ 257</td>
</tr>
<tr>
<td>LL alarm value</td>
<td>→ 257</td>
</tr>
<tr>
<td>HH alarm</td>
<td>→ 257</td>
</tr>
<tr>
<td>H alarm</td>
<td>→ 258</td>
</tr>
<tr>
<td>HH+H alarm</td>
<td>→ 258</td>
</tr>
<tr>
<td>L alarm</td>
<td>→ 258</td>
</tr>
<tr>
<td>LL alarm</td>
<td>→ 258</td>
</tr>
<tr>
<td>LL+L alarm</td>
<td>→ 259</td>
</tr>
<tr>
<td>Any error</td>
<td>→ 259</td>
</tr>
<tr>
<td>Clear alarm</td>
<td>→ 259</td>
</tr>
<tr>
<td>Alarm hysteresis</td>
<td>→ 260</td>
</tr>
<tr>
<td>Damping factor</td>
<td>→ 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.
Principle of the limit evaluation

A  Alarm mode (→ K253) = On
B  Alarm mode (→ K253) = Latching
1  HH alarm value (→ K256)
2  H alarm value (→ K256)
3  L alarm value (→ K257)
4  LL alarm value (→ K257)
5  HH alarm (→ K257)
6  H alarm (→ K258)
7  L alarm (→ K258)
8  LL alarm (→ K258)
9  "Clear alarm (→ K259)" = "Yes" or power off-on
10  Hysteresis (→ K260)

Error value

Navigation  
Expert → Application → Alarm → Alarm → Error value (13851)

Prerequisite  
Alarm mode (→ K253) ≠ 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>Access</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<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>Access</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<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>Access</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
H alarm

Navigation  
Expert → Application → Alarm → Alarm → H alarm (13856)

Prerequisite  
Alarm mode (→ 253) ≠ Off

Description  
Shows whether an H alarm is currently active.

Additional information

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

Additional information

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

Additional information

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

**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

**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>

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>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
3.6 "Tank values" submenu

**Navigation**

[Expert ➔ Tank values](#)

<table>
<thead>
<tr>
<th>▶ Tank values</th>
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<tbody>
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<td>Net weight ➔ 261</td>
</tr>
<tr>
<td>Gauge status ➔ 261</td>
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<tr>
<td>Balance flag ➔ 262</td>
</tr>
<tr>
<td>Standby level ➔ 262</td>
</tr>
<tr>
<td>Offset standby distance ➔ 263</td>
</tr>
<tr>
<td>One-time command status ➔ 264</td>
</tr>
<tr>
<td>▶ Level ➔ 264</td>
</tr>
<tr>
<td>▶ Temperature ➔ 269</td>
</tr>
<tr>
<td>▶ Density ➔ 272</td>
</tr>
<tr>
<td>▶ Pressure ➔ 276</td>
</tr>
<tr>
<td>▶ GP values ➔ 277</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.
### 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>
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</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
The 'Expert' menu

**Additional information**

![Diagram of a tank with level and ullage measurements.](image)

---

**One-time command status**

**Navigation**

- Open the 'Expert' menu → Tank values → One-time Cmd (8201)

**Description**

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

**Additional information**

- **Read access**: Operator
- **Write access**: -

**Additional information**

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

---

### 3.6.1 "Level" submenu

**Navigation**

- Open the 'Expert' menu → Tank values → Level

<table>
<thead>
<tr>
<th>Level</th>
<th>Tank level</th>
<th>→ 265</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tank Level %</td>
<td>→ 265</td>
</tr>
<tr>
<td></td>
<td>Tank ullage</td>
<td>→ 266</td>
</tr>
<tr>
<td></td>
<td>Tank ullage %</td>
<td>→ 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>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</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>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>-</td>
</tr>
</tbody>
</table>
The 'Expert' menu

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>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>

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>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>

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

**Navigation**

[ Mentor ] 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>
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<th>Maintenance</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

### Lower interface level timestamp

**Navigation**

[ Mentor ] Expert → Tank values → Level → LowI/F timestamp (8061)

**Description**

Shows timestamp of the last measured lower 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>

### Bottom level

**Navigation**

[ Mentor ] Expert → Tank values → Level → Bottom level (15018)

**Description**

Shows the bottom level.

**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>

### Bottom level timestamp

**Navigation**

[ Mentor ] Expert → Tank values → Level → BotLev timestamp (8048)

**Description**

Shows the timestamp for measured bottom level.

**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>
## Water level

**Navigation**  
Expert → Tank values → Level → Water level (14970)

**Description**  
Shows the bottom water level.

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

## Measured level

**Navigation**  
Expert → Tank values → Level → Measured level (14653)

**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**  
Expert → Tank values → Level → Distance (8103)

**Description**  
Shows the 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**  
Expert → Tank values → Level → Displacer pos (15019)

**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>
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</tr>
</tbody>
</table>
3.6.2  "Temperature" submenu

**Navigation**  
Expert → Tank values → Temperature

### Temperature

- **Liquid temperature**  
  - [269](#)
- **Vapor temperature**  
  - [269](#)
- **Air temperature**  
  - [270](#)

### NMT element values

- **Element temperature**  
  - [270](#)
- **Element position**  
  - [270](#)

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

**Write access**  
- [Operator](#)

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

**Write access**  
- [Operator](#)
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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</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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<td>-</td>
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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></th>
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<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Operator</td>
<td>-</td>
</tr>
<tr>
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<td>-</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
3.6.3 "Density" submenu

**Navigation**

Expert → Tank values → Density

**Observed density**

**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>
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</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>
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</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>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

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

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

<table>
<thead>
<tr>
<th>Write access</th>
<th>-</th>
</tr>
</thead>
</table>
3.6.4 "Pressure" submenu

**Navigation**

Expert → Tank values → Pressure

<table>
<thead>
<tr>
<th>➤ Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 (bottom) ➤ 276</td>
</tr>
<tr>
<td>P3 (top) ➤ 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>
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</tbody>
</table>
### 3.6.5  "GP values" submenu

**Navigation**

Expert → Tank values → GP values

**GP values**

- **GP 1 to 4 name**
  - GP Value 1
  - GP Value 2
  - GP Value 3
  - GP Value 4

**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.
### The 'Expert' menu

**Proservo NMS80**

---

#### GP Value 3

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Tank values → GP values → GP Value 3 (14968)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the value that will be used as general purpose value.</td>
</tr>
<tr>
<td>Additional information</td>
<td>Read access                 Operator</td>
</tr>
<tr>
<td></td>
<td>Write access                -</td>
</tr>
</tbody>
</table>

---

#### GP Value 4

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Tank values → GP values → GP Value 4 (14969)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the value that will be used as general purpose value.</td>
</tr>
<tr>
<td>Additional information</td>
<td>Read access                 Operator</td>
</tr>
<tr>
<td></td>
<td>Write access                -</td>
</tr>
</tbody>
</table>
3.7 "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

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware CRC</td>
<td>290</td>
</tr>
<tr>
<td>Weight and measures configuration CRC</td>
<td>290</td>
</tr>
<tr>
<td>Device name</td>
<td>291</td>
</tr>
<tr>
<td>Order code</td>
<td>291</td>
</tr>
<tr>
<td>Extended order code 1 to 3</td>
<td>291</td>
</tr>
<tr>
<td>ENP version</td>
<td>291</td>
</tr>
<tr>
<td>Device type</td>
<td>292</td>
</tr>
<tr>
<td>Module type</td>
<td>292</td>
</tr>
<tr>
<td>Communication Slot</td>
<td>292</td>
</tr>
<tr>
<td><strong>Board info</strong></td>
<td>294</td>
</tr>
<tr>
<td>Date/time</td>
<td>283</td>
</tr>
<tr>
<td>System temperature</td>
<td>294</td>
</tr>
<tr>
<td>W&amp;M lock switch</td>
<td>294</td>
</tr>
<tr>
<td><strong>Data logging</strong></td>
<td>296</td>
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<tr>
<td>Assign channel 1 to 4</td>
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</tr>
<tr>
<td>Logging interval</td>
<td>298</td>
</tr>
<tr>
<td>Clear logging data</td>
<td>299</td>
</tr>
<tr>
<td><strong>Device check</strong></td>
<td>301</td>
</tr>
<tr>
<td><strong>Commissioning check</strong></td>
<td>302</td>
</tr>
<tr>
<td>Commissioning check</td>
<td>302</td>
</tr>
<tr>
<td>Result drum check</td>
<td>302</td>
</tr>
<tr>
<td>Step X / 11</td>
<td>302</td>
</tr>
<tr>
<td><strong>Commissioning parameter</strong></td>
<td>303</td>
</tr>
<tr>
<td>Step X / 11</td>
<td>303</td>
</tr>
</tbody>
</table>
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></td>
<td></td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Write access</th>
<th>-</th>
</tr>
</thead>
</table>
Date/time

Navigation

Expert → Diagnostics → Date/time (0790)

Description
Displays the device internal real time clock.

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>
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  → 286</td>
</tr>
<tr>
<td>Diagnostic event simulation  → 286</td>
</tr>
<tr>
<td>Simulation distance on  → 287</td>
</tr>
<tr>
<td>Simulation distance  → 287</td>
</tr>
<tr>
<td>Current output 1 to 2 simulation  → 287</td>
</tr>
<tr>
<td>Simulation value  → 288</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
## 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>

1. To terminate the simulation, select Off.

## 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 Anlog 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.
The 'Expert' menu

**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 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**

<table>
<thead>
<tr>
<th>Read access</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write access</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
3.7.4 "Device information" submenu

**Navigation**
- Expert → Diagnostics → Device info

### Device information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device tag</td>
<td></td>
</tr>
<tr>
<td>Serial number</td>
<td></td>
</tr>
<tr>
<td>Firmware version</td>
<td></td>
</tr>
<tr>
<td>Firmware CRC</td>
<td></td>
</tr>
<tr>
<td>Weight and measures configuration CRC</td>
<td></td>
</tr>
<tr>
<td>Device name</td>
<td></td>
</tr>
<tr>
<td>Order code</td>
<td></td>
</tr>
<tr>
<td>Extended order code 1 to 3</td>
<td></td>
</tr>
<tr>
<td>ENP version</td>
<td></td>
</tr>
<tr>
<td>Device type</td>
<td></td>
</tr>
<tr>
<td>Module type</td>
<td></td>
</tr>
<tr>
<td>Communication Slot</td>
<td></td>
</tr>
<tr>
<td>Recovery state</td>
<td></td>
</tr>
</tbody>
</table>

---

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

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

Module type

**Navigation**

Expert → Diagnostics → Device info → Module type (8526)

**Description**

Shows the type of installed IO module.

**Additional information**

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

Communication Slot

**Navigation**

Expert → Diagnostics → Device info → Comm. Slot (13285)

**Description**

Indicates which IOM slot contains the communication protocol interface board.

**Additional information**

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

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/time</td>
<td>Displays the device internal real time clock.</td>
</tr>
<tr>
<td>System temperature</td>
<td>Shows the electronic temperature of the main board.</td>
</tr>
<tr>
<td>W&amp;M lock switch</td>
<td>Shows the position of the weights and measure (WP) switch.</td>
</tr>
</tbody>
</table>

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

**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
### Factory setting

Enabled

### Additional information

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Read access</td>
<td>Operator</td>
</tr>
<tr>
<td>Write access</td>
<td>-</td>
</tr>
</tbody>
</table>
3.7.5 "Data logging" submenu

Structure of the submenu on the local display

Navigation ▶ Expert → Diagnostics → Data logging

- Assigned channel 1 to 4
- Logging interval
- Clear logging data

Structure of the submenu in an operating tool

Navigation ▶ Expert → Diagnostics → Data logging

- Assigned channel 1 to 4
- Logging interval
- Clear logging data
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
The 'Expert' menu

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.

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

Logging interval

Navigation

- Expert → Diagnostics → Data logging → Logging interval (0856)
- Expert → Diagnostics → Data logging → Logging interval (0856)

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
- $T_{log} = 1000 \cdot 1 \text{ s} = 1000 \text{ s} \approx 16.5 \text{ min}$
- $T_{log} = 1000 \cdot 10 \text{ s} = 10000 \text{ s} \approx 2.75 \text{ h}$
- $T_{log} = 1000 \cdot 80 \text{ s} = 80000 \text{ s} \approx 22 \text{ h}$
- $T_{log} = 1000 \cdot 3600 \text{ s} = 3600000 \text{ s} \approx 41 \text{ d}$

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

Commissioning check

Result drum check

Step X / 11

Description
This sequence supports checking of the hardware on sensor side and correct installation of the sensor.

Additional information

Read access | Operator
Write access | Maintenance

Description
Gives feedback on the latest status of the commissioning check.

Additional information

Read access | Operator
Write access |

Description
Indicates which step of the commissioning check is currently running.

Additional information

Read access | Operator
Write access | -
"Commissioning parameter" submenu

**Navigation**  
Expert → Diagnostics → Device check → Commission para.

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→  303 |
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**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
### The 'Expert' menu

#### Proservo NMS80

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