

Description of Device Parameters

Proservo NMS81

Tank Gauging



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1 About this document

1.1 Document function

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

1.2 Symbols

1.2.1 Safety symbols



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



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



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



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

1.2.2 Electrical symbols



Alternating current



Direct current and alternating current



Direct current



Ground connection

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



Ground terminals that must be connected to ground prior to establishing any other connections.

The ground terminals are located on the interior and exterior of the device:

- Interior ground terminal: protective earth is connected to the mains supply.
- Exterior ground terminal: device is connected to the plant grounding system.

1.2.3 Tool symbols



Phillips head screwdriver



Flat blade screwdriver



Torx screwdriver



Allen key



Open-ended wrench

1.2.4 Symbols for certain types of information and graphics



Permitted

Procedures, processes or actions that are permitted



Preferred

Procedures, processes or actions that are preferred



Forbidden

Procedures, processes or actions that are forbidden



Tip

Indicates additional information



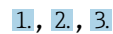
Reference to documentation



Reference to graphic



Notice or individual step to be observed



Series of steps



Result of a step



Visual inspection



Operation via operating tool



Write-protected parameter

1, 2, 3, ...

Item numbers

A, B, C, ...

Views



Safety instructions

Observe the safety instructions contained in the associated Operating Instructions



Temperature resistance of the connection cables

Specifies the minimum value of the temperature resistance of the connection cables

1.3 Documentation

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

 For an overview of the scope of the associated Technical Documentation, refer to the following:

- *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the matrix code on the nameplate

1.3.1 Technical Information (TI)

Planning aid

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

1.3.2 Brief Operating Instructions (KA)

Guide that takes you quickly to the 1st measured value

The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

1.3.3 Operating Instructions (BA)

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

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

1.3.4 Description of Device Parameters (GP)

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

1.3.5 Safety Instructions (XA)

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

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

1.3.6 Installation instructions (EA)

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

2 Overview of the operating menu

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- 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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3 The "Expert" menu

Navigation  Expert

 Expert		
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Direct access

Navigation	 Expert → Direct access (0106)
User entry	0 to 65 535
Factory setting	0
Additional information	Enter the access code of a parameter in order to access this parameter directly (i.e. without navigation). The direct access code consists of a five digit number and an optional channel code, 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 <i>Navigation</i> category.

Locking status

Navigation

 Expert → Locking status (0004)

Description

Indicates the type of locking.

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

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

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

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

Additional information

Read access	Operator
Write access	-

Access status display

Navigation

 Expert → Access stat.disp (0091)

Prerequisite

The device has a local display.

Description

Indicates access authorization to parameters via local display.

Additional information

Read access	Operator
Write access	-

 The access authorization can be changed via the **Enter access code** parameter (→  33).

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

User role

Navigation

 Expert → User role (0005)

Description

Shows the access authorization to the parameters via the operating tool

Additional information

Read access	Operator
Write access	-

Enter access code

Navigation	 Expert → Ent. access code (0003)	
Description	Enter access code to disable write protection of parameters.	
Additional information	Read access	Operator
	Write access	Operator

3.1 "System" submenu

Navigation  Expert → System

▶ System	
▶ Display	→  35
▶ System units	→  42
▶ Date / time	→  49
▶ Administration	→  55

3.1.1 "Display" submenu

Navigation   Expert → System → Display

► Display		
Language	→ 	35
Format display	→ 	36
Value 1 to 4 display	→ 	37
Decimal places 1 to 4	→ 	38
Separator	→ 	39
Number format	→ 	39
Header	→ 	39
Header text	→ 	40
Display interval	→ 	40
Display damping	→ 	41
Backlight	→ 	41
Contrast display	→ 	41

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

Additional information

Read access	Operator
Write access	Operator

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

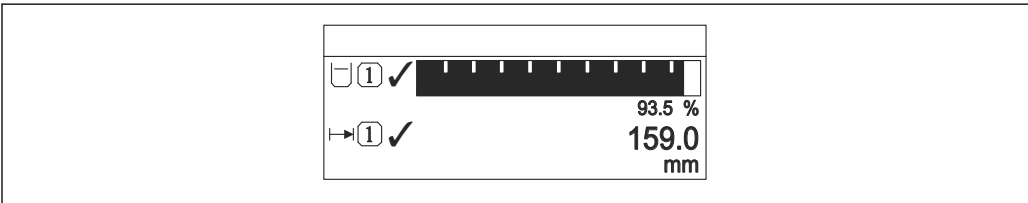
2 values

Additional information



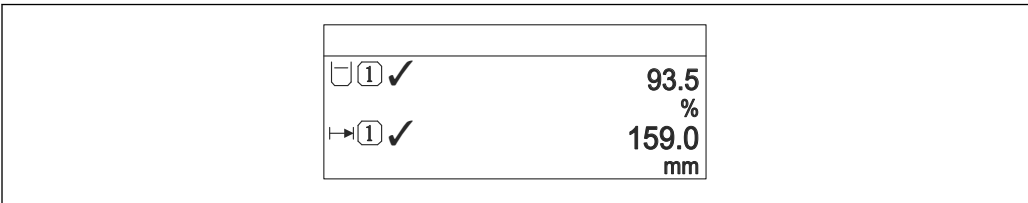
A0019963

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



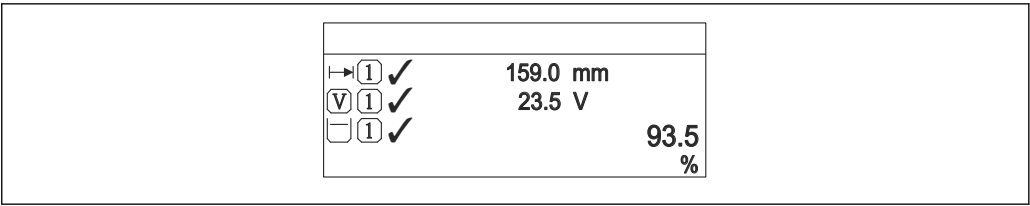
A0019964

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



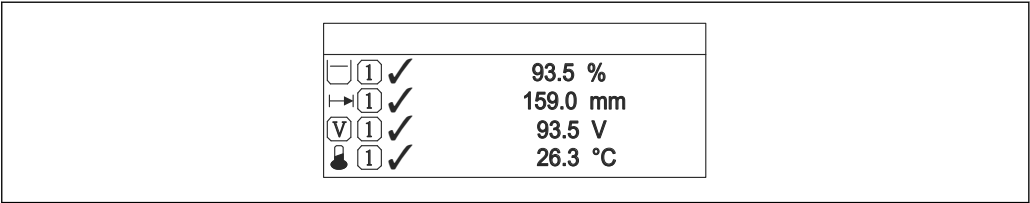
A0019965

 3 "Format display" = "2 values"



A0019966

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



A0019968

5 "Format display" = "4 values"

Read access	Operator
Write access	Operator

- 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

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

Factory setting Depending on device version

Additional information

Read access	Operator
Write access	Maintenance

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.

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

Number format

Navigation	  Expert → System → Display → Number format (0099)
Prerequisite	The device has a local display.
Description	Choose number format for the display.
Selection	■ Decimal ■ ft-in-1/16"
Factory setting	Decimal

Additional information

Read access	Operator
Write access	Maintenance



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

Additional information	Read access	Operator
	Write access	Maintenance

- Meaning of the options**
- **Device tag**
The header contents is defined in the **Device tag** parameter (→ ⓘ 207).
 - **Free text**
The header contents is defined in the **Header text** parameter (→ ⓘ 40).

Header text	ⓘ
-------------	---

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

Prerequisite Header (→ ⓘ 39) = **Free text**

Description Enter display header text.

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

Factory setting TG-Platform

Additional information	Read access	Operator
	Write access	Maintenance

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.

Read access	Operator
Write access	Operator

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

► System units

Units preset

→  42

Distance unit

→  43

Pressure unit

→  43

Temperature unit

→  43

Density unit

→  44

Decimal places length

→  44

Decimal places pressure

→  44

Decimal places temperature

→  45

Decimal places density

→  45

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

Read access	Operator
Write access	Maintenance

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

<i>SI units</i>	<i>US units</i>
■ m	■ ft
■ mm	■ in
■ cm	■ ft-in-16
	■ ft-in-8

Factory setting mm

Additional information

Read access	Operator
Write access	Maintenance (if Units preset (→  42) = Customer value)

Pressure unit



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

Selection

<i>SI units</i>	<i>US units</i>	<i>Other units</i>
■ bar	psi	■ inH2O
■ Pa		■ inH2O (68°F)
■ kPa		■ ftH2O (68°F)
■ MPa		■ mmH2O
■ mbar a		■ mmHg

Factory setting bar

Additional information

Read access	Operator
Write access	Maintenance (if Units preset (→  42) = Customer value)

Temperature unit



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

Description Select temperature unit.

Selection

<i>SI units</i>	<i>US units</i>
■ °C	■ °F
■ K	■ °R

Factory setting °C

Additional information

Read access	Operator
Write access	Maintenance (if Units preset (→  42) = Customer value)

Density unit

Navigation

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

Description

Select density unit.

Selection

SI units

■ g/cm³
■ g/ml
■ g/l
■ kg/l
■ kg/dm³
■ kg/m³

US units

■ lb/ft³
■ lb/gal (us)
■ lb/in³
■ STon/yd³

Other units

■ °API
■ SGU

Factory setting

kg/m³

Additional information

Read access	Operator
Write access	Maintenance (if Units preset (→ 42) = Customer value)

Decimal places length

Navigation

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

Description

Number of decimal places for length values.

Selection

■ X
■ X.X
■ X.XX
■ X.XXX
■ X.XXXX

Factory setting

X.X

Additional information

Read access	Operator
Write access	Maintenance

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

Factory setting X.XXX

Additional information

Read access	Operator
Write access	Maintenance

 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

Factory setting X.X

Additional information

Read access	Operator
Write access	Maintenance

 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

Factory setting X.X

Additional information

Read access	Operator
Write access	Maintenance

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

3.1.3 "Date / time" submenu

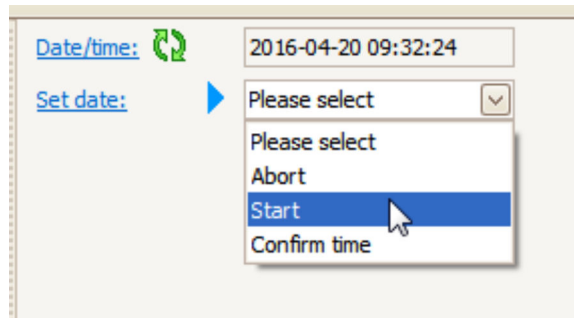
The **Date / time** submenu is used to set the real-time clock of the device.

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

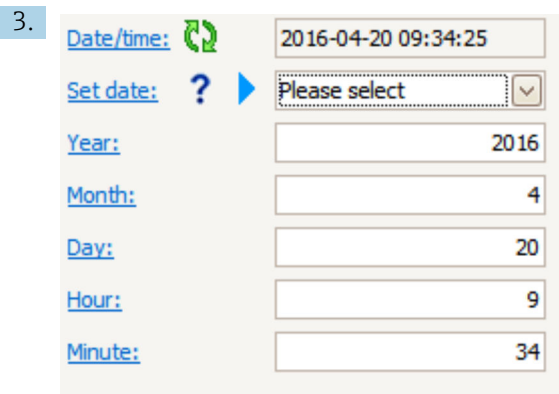
1. Navigate to Expert → System → Date / time → Set date.
 - ↳ The current value of the real-time clock is displayed.
2. If the displayed value is correct: Press  to terminate the wizard.
3. If the displayed value is not correct: Press  to edit it.
 - ↳ The current value of the **Year** parameter is displayed.
4. If the displayed value is correct: Press  to go to the next value.
5. If the displayed value is incorrect: Press  and enter the correct value. Confirm the new value by pressing .
6. Repeat the last two steps for the following parameters: **Month, Day, Hour, Minute**.
 - ↳ The new value of the real-time clock is displayed.
7. Confirm the new value of the real-time clock by pressing .
8. Quit the wizard by pressing  again.

Setting the real-time clock via an operating tool (e.g. FieldCare)

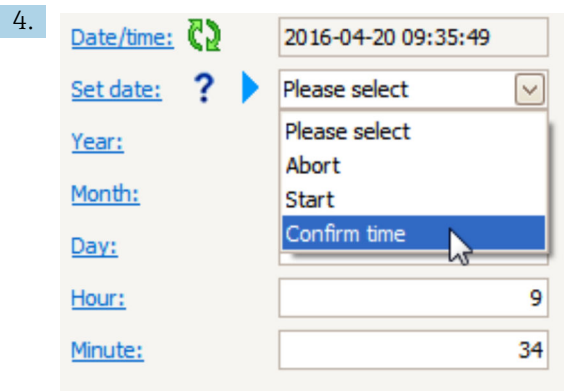
1. Navigate to: Expert → System → Date / time
- 2.



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



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



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

► Date / time		
Date/time	→ 	50
► Set date		
Date/time	→ 	53
Year	→ 	53
Month	→ 	53
Day	→ 	53
Hour	→ 	53
Minute	→ 	54
Set date	→ 	54

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

Navigation  Expert → System → Date / time

► Date / time		
Date/time	→ 	50
Set date	→ 	50
Year	→ 	50
Month	→ 	51
Day	→ 	51
Hour	→ 	51
Minute	→ 	52

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	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

"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



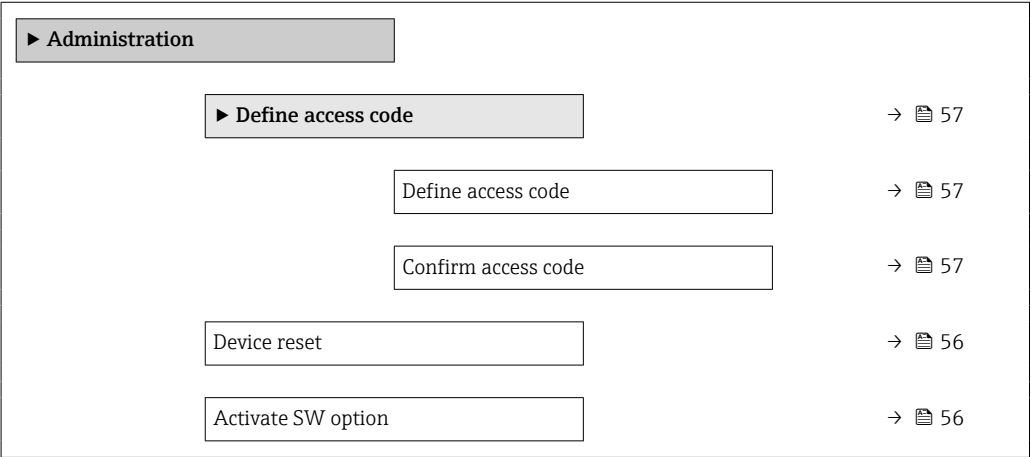
Expert → System → Date / time → Set date → Set date

DescriptionConfirm the displayed new value of the real-time clock by pressing .

3.1.4 "Administration" submenu

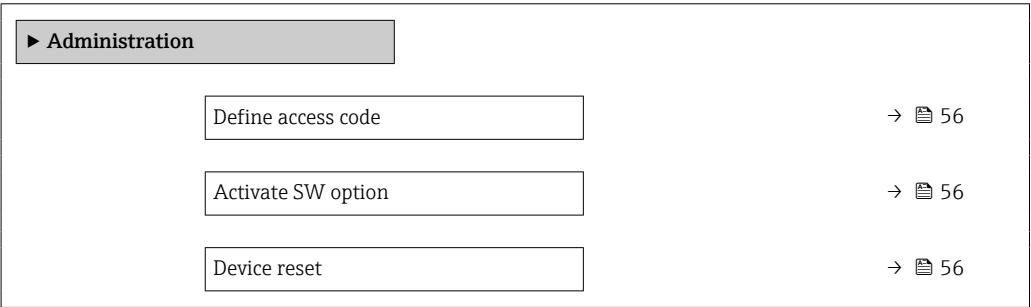
Structure of the submenu on the display and operating module

Navigation  Expert → System → Administration



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

Navigation  Expert → System → Administration



Description of parameters

Navigation  Expert → System → Administration

Define access code

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	Read access	Operator
	Write access	Maintenance

-  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	Read access	Operator
	Write access	Maintenance

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><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>Maintenance</td></tr></table>		Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

"Define access code" wizard

Navigation  Expert → System → Administration → Def. access code

Define access code	
--------------------	---

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

Description →  56

Confirm access code	
---------------------	---

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

Description Confirm the entered access code.

User entry 0 to 9 999

Factory setting 0

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

3.2 "Sensor" submenu

Navigation  Expert → Sensor

► Sensor		
Gauge command	→ 	58
Gauge status	→ 	59
Distance	→ 	59
► Information	→ 	60
► Measured values	→ 	63
► Sensor diag	→ 	71
► Sensor config	→ 	73
► Calibration	→ 	92

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

Additional information

Read access	Operator
Write access	Maintenance

Gauge status

Navigation

 Expert → Sensor → Gauge status (8081)

Description

Indicates the current status of the device gauge command.

Additional information

Read access	Operator
Write access	-

Distance

Navigation

  Expert → Sensor → Distance (8103)

Description

Shows measured distance from reference position.

Additional information

Read access	Operator
Write access	-

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

► Information		
Gross weight	→  60	
Net weight	→  60	
Gauge status	→  61	
Active gauge command	→  61	
Balance flag	→  61	
Displacer status	→  61	
Motor status	→  62	
One-time command status	→  62	
Sensor temperature	→  62	
Detector temperature	→  62	

Gross weight

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

Description Shows non-compensated measured weight from detector.

Additional information	Read access	Operator
	Write access	-

Net weight

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

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

Additional information

Read access	Operator
Write access	-

Gauge status

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

Indicates the current status of the device gauge command.

Additional information

Read access	Operator
Write access	-

Active gauge command

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

Indicates the currently executed Gauge Command.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

Displacer status

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

Shows the current moving and balancing status of the displacer.

Additional information

Read access	Operator
Write access	-

Motor status

Navigation  Expert → Sensor → Information → Motor status (8118)

Description Shows the current moving Direction of the Motor.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

Detector temperature

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

Description Shows the temperature of the detector unit.

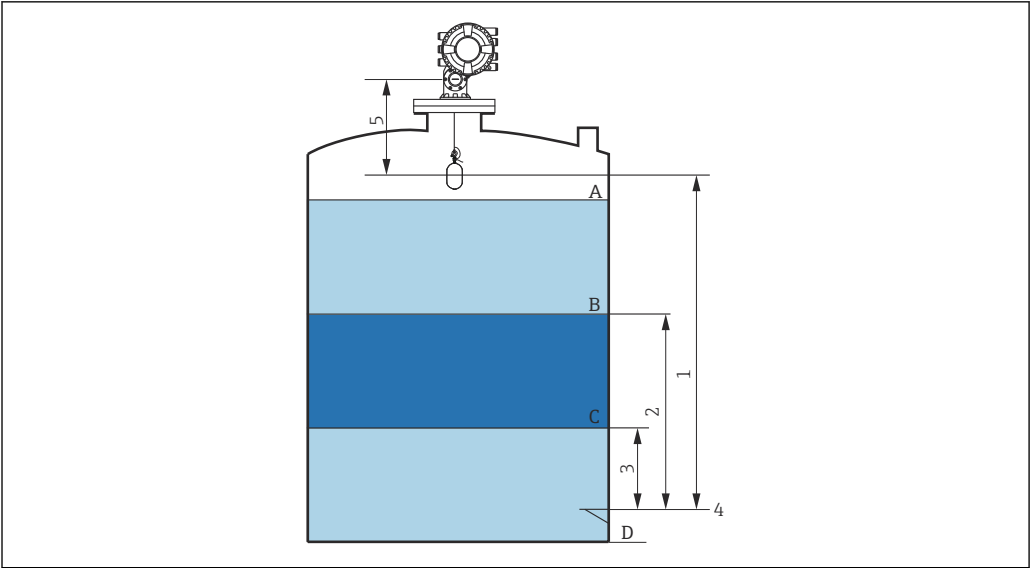
Additional information

Read access	Operator
Write access	-

3.2.2 "Measured values" submenu

Navigation  Expert → Sensor → Measured values

► Measured values		
Distance	→ 	64
Displacer position	→ 	64
Liquid level	→ 	65
Upper interface level	→ 	65
Upper interface level timestamp	→ 	65
Lower interface level	→ 	65
Lower interface level timestamp	→ 	66
Bottom level	→ 	66
Bottom level timestamp	→ 	66
► Spot density	→ 	67
► Profile density	→ 	69



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6 Terms concerning NMS8x installation

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

Distance

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

Description Shows measured distance from reference position.

Additional information	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

Lower interface level timestamp

Navigation

 Expert → Sensor → Measured values → LowI/F timestamp (8061)

Description

Shows timestamp of the last measured lower interface level.

Additional information

Read access	Operator
Write access	-

Bottom level

Navigation

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

Description

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

Additional information

Read access	Operator
Write access	-

Bottom level timestamp

Navigation

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

Description

Shows the timestamp for measured bottom level.

Additional information

Read access	Operator
Write access	-

"Spot density" submenu

Navigation   Expert → Sensor → Measured values → Spot density

► Spot density

Measured upper density

→  67

Upper density timestamp

→  67

Measured middle density

→  67

Middle Density Timestamp

→  68

Measured lower density

→  68

Lower density timestamp

→  68

Measured upper density

Navigation

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

Description

Shows the Measured Upper Density Value.

Additional information

Read access	Operator
Write access	-

Upper density timestamp

Navigation

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

Description

Shows timestamp of the last measured upper density.

Additional information

Read access	Operator
Write access	-

Measured middle density

Navigation

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

Description

Shows the Measured Middle Density Value.

Additional information	Read access	Operator
	Write access	-

Middle Density Timestamp

Navigation



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

Description

Shows the timestamp of the last measured middle density.

Additional information

Read access	Operator
Write access	-

Measured lower density

Navigation



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

Description

Shows the Measured Lower Density Value.

Additional information

Read access	Operator
Write access	-

Lower density timestamp

Navigation



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

Description

Shows timestamp of last measured lower density.

Additional information

Read access	Operator
Write access	-

"Profile density" submenu

Navigation   Expert → Sensor → Measured values → Profile density

► Profile density

Profile point

→  69

Profile average density

→  69

Profile density timestamp

→  69

► Density table

→  70

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

"Density table" submenu

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

Density table

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

Description Shows measured density table of profile density.

3.2.3 "Sensor diag" submenu

Navigation   Expert → Sensor → Sensor diag

► Sensor diag	
► Start self check	→  71
Status self check	→  71
► Self check	→  71
Self check	→  71
Gauge status	→  72
Status self check	→  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.

Additional information

Read access	Operator
Write access	-

"Self check" wizard

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

Self check

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

Additional information

Read access	Operator
Write access	-

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	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	-

3.2.4 "Sensor config" submenu

Navigation

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

► Sensor config

Post gauge command

► Displacer

► Wiredrum

► Safety settings

► Level settings

► Balance settings

► Spot density

► Profile density

→  73

→  74

→  77

→  78

→  81

→  85

→  88

→  90

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	Read access	Operator
	Write access	Maintenance

Endress+Hauser

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"Displacer" submenu

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

► Displacer		
Displacer type	→ 	74
Displacer diameter	→ 	74
Displacer weight	→ 	75
Displacer volume	→ 	75
Displacer balance volume	→ 	75
Displacer height	→ 	76
Immersion depth	→ 	76

Displacer type

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

Read access	Operator
Write access	Maintenance

Displacer diameter

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

Prerequisite **Displacer type (→  74) = Custom diameter**

Description Sets the diameter of the cylindrical part of displacer.

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



Navigation Expert → Sensor → Sensor config → Displacer → Balance volume (8009)

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.

Additional information	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

"Wiredrum" submenu

Navigation   Expert → Sensor → Sensor config → Wiredrum

► Wiredrum

Drum circumference

→  77

Wire weight

→  77

Drum circumference

Navigation   Expert → Sensor → Sensor config → Wiredrum → Drum circumfer (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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

"Safety settings" submenu

Navigation  Expert → Sensor → Sensor config → Safety settings

► Safety settings

High stop level

→  78

Low stop level

→  78

Slow hoist zone

→  79

Overtension weight

→  79

Undertension weight

→  79

Output out of range

→  80

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

Undertension weight

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

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

User entry 0 to 300 g

Factory setting 10 g

Additional information

Read access	Operator
Write access	Maintenance

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 HighStoplevel, LowStopLevel or ReferencePosition.

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

Factory setting Last valid value

Additional information

Read access	Operator
Write access	Maintenance

"Level settings" submenu

Navigation

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

► Level settings

Upper density

→  81

Middle density

→  81

Lower density

→  82

Process condition

→  82

Standby level

→  82

Offset standby distance

→  83

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 2 000 kg/m³

Factory setting

1 200 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

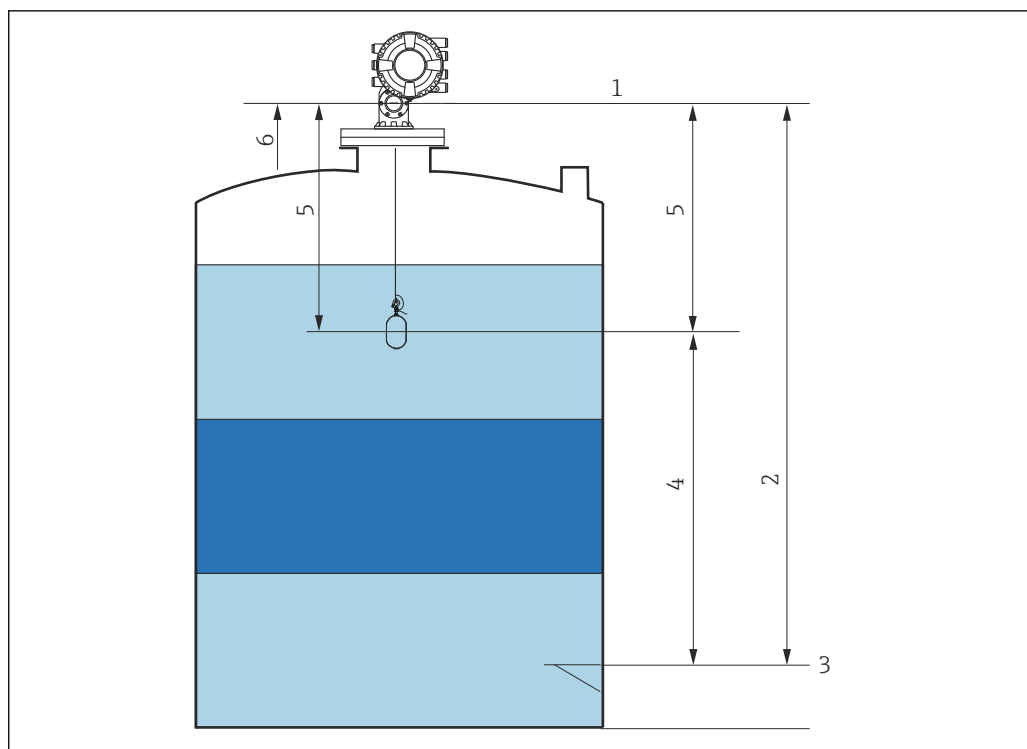
–999 999.9 to 999 999.9 mm

Factory setting

0 mm

Additional information

Read access	Operator
Write access	Maintenance



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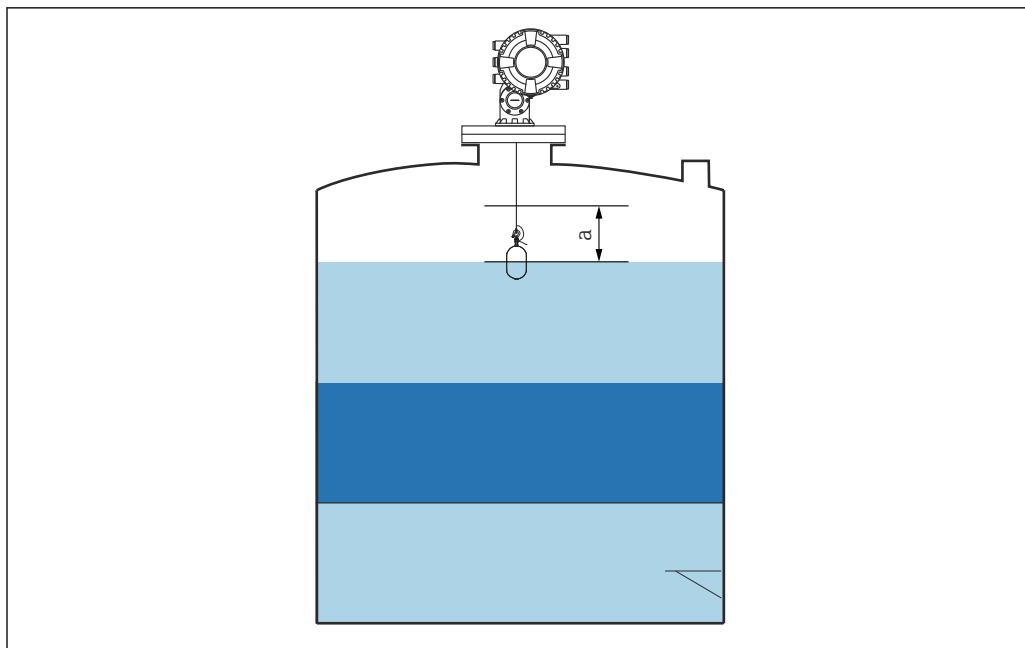
7 Displacer waiting for the liquid level to rise during standby level gauge command

- 1 Gauge reference height
- 2 Empty
- 3 Datum plate
- 4 Standby level
- 5 Standby distance
- 6 Reference position

Offset standby distance

Navigation	 Expert → 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

Additional information



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8 a: Offset standby distance

"Balance settings" submenu

Navigation   Expert → Sensor → Sensor config → Balance settings

► Balance settings

Level measurement mode

→  85

Interface measurement mode

→  86

Balancing waiting time

→  86

Seek delay

→  87

Weight tolerance

→  87

 The parameter "Process condition" does a pre-set of the major balancing parameters. For the most applications its 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

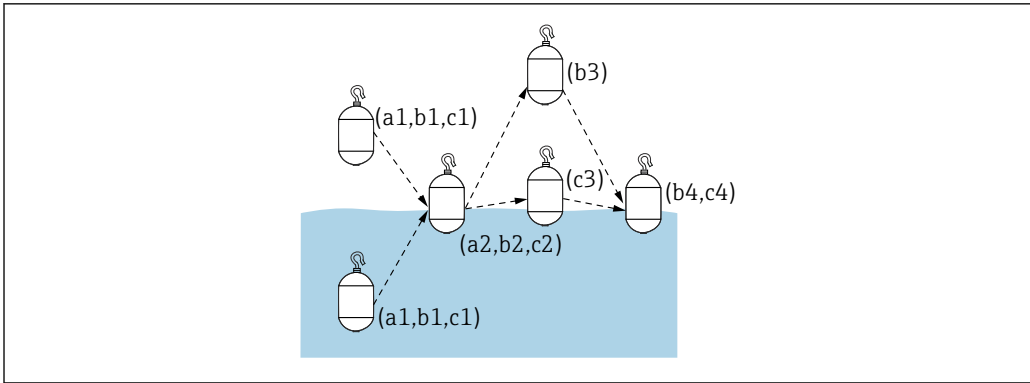
- Normal measure mode
- Compensation mode
- Non hysteresis mode

Factory setting

Non hysteresis mode

Additional information

Read access	Operator
Write access	Maintenance



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NMS8x level mode
- a1 Displacer is in liquid or air unbalanced
 - a2 Displacer on liquid balanced
 - b1 Displacer is in liquid or air unbalanced
 - b2 Displacer on liquid balanced
 - b3 Displacer is moved out of the liquid, the weight in vapour is measured and used for the new weight calculation
 - b4 Displacer on liquid balanced
 - c1 Displacer is in liquid or air unbalanced
 - c2 Displacer on liquid balanced
 - c3 Displacer is lifted up
 - c4 Displacer on liquid balanced

Interface measurement mode

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

Read access	Operator
Write access	Maintenance

Balancing waiting time

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

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

User entry 0 to 255 s

Factory setting 4 s

Additional information

Read access	Operator
Write access	Maintenance

Seek delay



Navigation

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

Description

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

User entry

1 to 255 s

Factory setting

2 s

Additional information

Read access	Operator
Write access	Maintenance

Weight tolerance



Navigation

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

Description

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

User entry

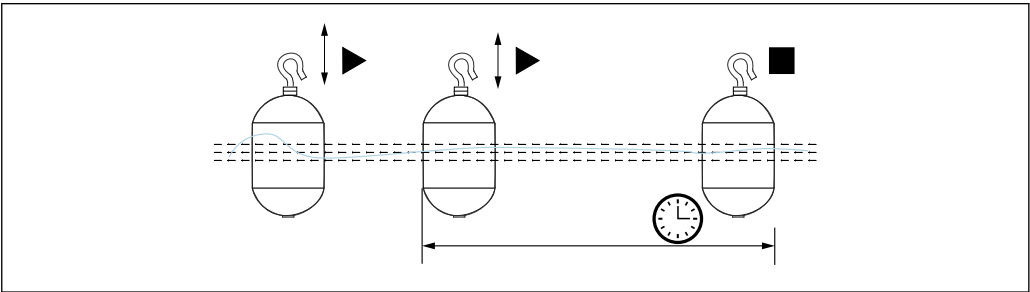
0.1 to 100 g

Factory setting

1.6 g

Additional information

Read access	Operator
Write access	Maintenance



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 10 Balancing parameter

"Spot density" submenu

Navigation  Expert → Sensor → Sensor config → Spot density

► Spot density

Upper density offset

→  88

Middle density offset

→  88

Lower density offset

→  89

Submersion depth

→  89

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/m ³	
Factory setting	0 kg/m ³	
Additional information	Read access	Operator
	Write access	Maintenance

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 99 999.9 mm	
Factory setting	150 mm	
Additional information	Read access	Operator
	Write access	Maintenance

"Profile density" submenu

Navigation  Expert → Sensor → Sensor config → Profile density

► Profile density		
Density measurement mode	→ 	90
Manual profile level	→ 	90
Profile density offset distance	→ 	91
Profile density interval	→ 	91
Profile density offset	→ 	91

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

Read access	Operator
Write access	Maintenance

 In normal mode, measures spot densities at requested positions. In compensations 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 -999 999.9 to 999 999.9 mm

Factory setting 1 000 mm

Additional information

Read access	Operator
Write access	Maintenance

Profile density offset distance**Navigation**

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

Description

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

User entry

0 to 999 999.9 mm

Factory setting

500 mm

Additional information

Read access	Operator
Write access	Maintenance

Profile density interval**Navigation**

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

Description

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

User entry

1 to 100 000 mm

Factory setting

1 000 mm

Additional information

Read access	Operator
Write access	Maintenance

Profile density offset**Navigation**

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

Description

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

User entry

-999.99 to 999.99 kg/m³

Factory setting

0 kg/m³

Additional information

Read access	Operator
Write access	Maintenance

3.2.5 "Calibration" submenu

Navigation  Expert → Sensor → Calibration

► 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 displacer

Move distance

→  93

Net Distance

→  93

Move displacer

→  94

Motor status

→  94

Move displacer

→  94

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	Read access	Operator
	Write access	Maintenance

Distance

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

Description Shows measured distance from reference position.

Additional information	Read access	Operator
	Write access	-

Move displacer

- Navigation

Expert → Sensor → Calibration → Move displacer → Move displacer
- Selection
 - Stop
 - Move down
 - Move up
- Factory setting

Stop

Additional information

Read access	Operator
Write access	Maintenance

Motor status

- Navigation

Expert → Sensor → Calibration → Move displacer → Motor status (8118)
- Description

Shows the current moving Direction of the Motor.

Additional information

Read access	Operator
Write access	-

Move displacer

- Navigation

Expert → Sensor → Calibration → Move displacer → Move displacer
- Selection
 - No
 - Yes
- Factory setting

No

Additional information

Read access	Operator
Write access	Maintenance

"Sensor calibration" wizard

Navigation  Expert → Sensor → Calibration → Sensor cal.

► Sensor calibration

Sensor calibration

→  95

Offset weight

→  95

Span weight

→  96

Zero calibration

→  96

Calibration status

→  96

Offset calibration

→  96

Span calibration

→  97

Sensor calibration

Navigation  Expert → Sensor → Calibration → Sensor cal. → Sensor cal.

Description This sequence calibrates the sensor of the servo.

Additional information

Read access	Operator
Write access	Maintenance

Offset weight

Navigation  Expert → Sensor → Calibration → Sensor cal. → 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

Read access	Operator
Write access	Maintenance

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

Span weight

Navigation

Expert → Sensor → Calibration → Sensor cal. → 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

Read access	Operator
Write access	Maintenance

Zero calibration

Navigation

Expert → Sensor → Calibration → Sensor cal. → Zero calibration

Description

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

Additional information

Read access	Operator
Write access	Maintenance

Calibration status

Navigation

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

Description

Gives feedback on the latest status of the calibration process.

Additional information

Read access	Operator
Write access	-

Offset calibration

Navigation

Expert → Sensor → Calibration → Sensor cal. → Offset cal.

Description

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

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

"Reference calibration" wizard

Navigation  Expert → Sensor → Calibration → Reference cal.

▶ Reference calibration

Reference calibration

→  98

Reference position

→  98

Progress

→  98

Calibration status

→  99

Reference calibration

Navigation  Expert → Sensor → Calibration → Reference cal. → Reference cal.

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

Additional information	Read access	Operator
	Write access	Maintenance

Reference position

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

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

User entry 0 to 9 999.9 mm

Factory setting Dependent on the device version

Additional information	Read access	Operator
	Write access	Maintenance

Progress

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

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

Additional information

Read access	Operator
Write access	Maintenance

Calibration status

Navigation

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

Description

Gives feedback on the latest status of the calibration process.

Additional information

Read access	Operator
Write access	-

"Drum calibration" wizard

Navigation  Expert → Sensor → Calibration → Drum cal.

► 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

→  100

→  100

→  101

→  101

→  101

→  101

→  102

→  102

→  102

Make sure to have

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

Additional information

Read access	Operator
Write access	-

Drum calibration

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

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

Make drum table



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

Description This will perform a drum calibration.

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

Calibration status

Navigation	 Expert → Sensor → Calibration → Drum cal. → Status (8031)	
Description	Gives feedback on the latest status of the calibration process.	
Additional information	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

"Calibration parameters" submenu

Navigation  Expert → Sensor → Calibration → Calib parameters

► Calibration parameters

Set high weight

→  103

Set low weight

→  103

Reference position

→  104

Offset weight

→  104

Span weight

→  104

Calibration status

→  105

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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 9 999.9 mm

Factory setting

Dependent on the device version

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

 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

Read access	Operator
Write access	Maintenance

Calibration status

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

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

Additional information	Read access	Operator
	Write access	-

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

▶ HART devices		
Number of devices	→ 	107
▶ HART Device(s)	→ 	108
▶ Forget device	→ 	136
▶ #blank#	→ 	136

Number of devices

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

Description Shows the number of devices on the HART bus.

Additional information

Read access	Operator
Write access	-

"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)

▶ HART Device(s)		
Device name	→	 109
Polling address	→	 109
Device tag	→	 109
Operating mode	→	 109
Communication status	→	 110
Status signal	→	 110
#blank# (PV - designation dependent on device)	→	 111
#blank#(SV - designation dependent on device)	→	 111
#blank#(TV - designation dependent on device)	→	 111
#blank#(QV - designation dependent on device)	→	 111
HART device PV mA	→	 112
HART device PV %	→	 112
Output pressure	→	 112
Output density	→	 113
Output temperature	→	 113
Output vapor temperature	→	 113
Output level	→	 114
▶ HART device information	→	 115
▶ Element values	→	 121

► Diagnostics	→ 122
► Diagnostics	→ 123
► NMT device config	→ 125

Device name

Navigation

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

Description

Shows the name of the transmitter.

Additional information

Read access	Operator
Write access	-

Polling address

Navigation



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

Description

Shows the polling address of the transmitter.

Additional information

Read access	Operator
Write access	-

Device tag

Navigation

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

Description

Shows the device tag of the transmitter.

Additional information

Read access	Operator
Write access	-

Operating mode

Navigation	 Expert → Input/output → HART devices → HART Device(s) → Operating mode (14745)
Prerequisite	Not available if the HART device is a Prothermo NMT.

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

Selection

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

Factory setting PV,SV,TV & QV

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

Status signal

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

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

User interface

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

Factory setting ---

²⁾ only visible if the connected device is a Micropilot

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

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

Description Shows the first HART variable (PV).

Additional information

Read access	Operator
Write access	-

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

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

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

Description Shows the second HART variable (SV).

Additional information

Read access	Operator
Write access	-

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

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

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

Description Shows the third HART variable (TV).

Additional information

Read access	Operator
Write access	-

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

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

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

Description Shows the fourth HART variable (QV).

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

Output vapor temperature**Navigation**

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

Prerequisite

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

Description Defines which HART variable is the vapor temperature.

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

Factory setting No value

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

"HART device information" submenu

Navigation

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

► HART device information

Pressure

Density

Temperature

Vapor temperature

Water level

Level source

Tank level to NMT

Manual value

HART bus

Device type

Device ID

Device date

Device description

Device message

Software version

Firmware CRC

Custody transfer

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→  118

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→  119

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→  120

Pressure

Navigation

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

Prerequisite

Output pressure (→  112) ≠ No value

Description Shows the pressure value measured by the connected HART device.

Additional information	Read access	Operator
	Write access	-

Density

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

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

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

Additional information	Read access	Operator
	Write access	-

Temperature

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

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

Description Shows the temperature measured by the connected HART device.

Additional information	Read access	Operator
	Write access	-

Vapor temperature

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

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

Description Shows the temperature vaule of the vapor phase measured by the connected HART device.

Additional information	Read access	Operator
	Write access	-

Water level

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

Prerequisite **Output level (→  114) ≠ No value**

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

Additional information

Read access	Operator
Write access	-

Level source



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

Prerequisite Prothermo NMT53x

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

Selection

- Manual value
- Tank level

Factory setting Tank level

Additional information

Read access	Maintenance
Write access	Maintenance

Tank level to NMT

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

Prerequisite Prothermo NMT53x with level measurement

Description Shows the level transferred to NMT.

Additional information

Read access	Maintenance
Write access	-

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	Read access	Maintenance
	Write access	Maintenance

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	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	-

Device ID

Navigation	  Expert → Input/output → HART devices → HART Device(s) → HART device info → Device ID (14702)	
Description	Shows the device ID of the connected HART device.	

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

Device description

Navigation

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

Description

Shows a user defined HART descriptor of the connected device.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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.

Additional information	Read access	Maintenance
	Write access	-

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	Read access	Maintenance
	Write access	-

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 can not be changed.

Additional information	Read access	Maintenance
	Write access	-

"Element values" submenu

 This submenu is only available for Prothermo NMT53x.

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

"Element temperature" submenu

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

Element temperature 1 to 24

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

Description Shows the temperature of an element in the NMT.

Additional information	Read access	Operator
	Write access	-

"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	Read access	Operator
	Write access	-

"Diagnostics" submenu

 This submenu is only available for Prothermo NMT53x.

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

► Diagnostics

Diagnostic code

→  122

Last diagnostic

→  122

Reference 0

→  122

Reference 17

→  123

Diagnostic code

Navigation  Expert → Input/output → HART devices → HART Device(s) → Diagnostics → Diag. code (14739)

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

Read access	Operator
Write access	-

Last diagnostic

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

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

Read access	Operator
Write access	-

Reference 0

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

Prerequisite Prothermo NMT53x with temperature measurement.

Description Shows the temperature of internal reference element 0.

Additional information	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	-

"Diagnostics" submenu

 This submenu is only available for Prothermo NMT8x.

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

► Diagnostics

Active diagnostics

→  123

Previous diagnostics

→  124

Test resistance

→  124

WB frequency ratio

→  124

Active diagnostics

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

User interface Character string comprising numbers, letters and special characters

Factory setting

Additional information	Read access	Operator
	Write access	-

Previous diagnostics

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

User interface Character string comprising numbers, letters and special characters

Factory setting

Additional information	Read access	Operator
	Write access	-

Test resistance

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

User interface Signed floating-point number

Factory setting 0 Ohm

Additional information	Read access	Operator
	Write access	-

WB frequency ratio

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

User interface Signed floating-point number

Factory setting 0

Additional information	Read access	Operator
	Write access	-

"NMT device config" submenu

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

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

► NMT device config

Configure device?

→  125

Access code

→  126

Total no. element

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Bottom point

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Temperature element short

→  127

Temperature element open

→  127

Output at error

→  128

Gain adjust

→  128

Kind of interval

→  128

Element interval

→  129

Update water level

→  129

► Element setup

→  130

Select element

→  130

Zero adjust

→  130

Element temperature

→  131

Element position

→  131

Configure device? 

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

Description Enable NMT device configuration.

Endress+Hauser

125

Selection	■ No ■ Yes				
Factory setting	No				
Additional information	Meaning of the options ■ No Not configurable ■ Yes Configurable <table><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>Maintenance</td></tr></table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

Access code	
-------------	--

Navigation	Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Access code (14714)				
Prerequisite	Configure device? (→ 125) = Yes				
Description	Shows the access code to configure the NMT device. Code is read from NMT device at start up.				
User entry	0 to 65 535				
Factory setting	0				
Additional information	<table><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>Maintenance</td></tr></table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

Total no. element	
-------------------	--

Navigation	Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Total elements (14730)				
Description	Shows the total amount of configurable temperature elements.				
Additional information	<table><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>-</td></tr></table>	Read access	Operator	Write access	-
Read access	Operator				
Write access	-				

Bottom point

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

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

User entry Signed floating-point number

Factory setting 0 mm

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

Kind of interval

Navigation

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

Description

Determines how the element positions are defined.

Selection

■ Even

■ Not even

Factory setting

Even

Additional information**Meaning of the options**■ **Even**

First position bottom point + element interval for every next element.

■ **Not even**

Position of elements can be set manually.

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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.

Read access	Operator
Write access	Maintenance

"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.

User entry 1 to 24

Factory setting 1

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Service

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><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>-</td></tr></table>	Read access	Operator	Write access	-
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				
Additional information	<table><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>Service</td></tr></table>	Read access	Operator	Write access	Service
Read access	Operator				
Write access	Service				

"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
► NMT device config Configure device? →  132 Total no. element →  132 Bottom point →  133 No element in phase →  133 Water bottom level offset →  133	

Update water level	→ 134
► Element setup	→ 134
Select element	→ 134
Zero adjust	→ 135
Element temperature	→ 135
Element position	→ 135

Configure device?

Navigation	Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Config. device? (14728)				
Description	Enable NMT device configuration.				
Selection	■ No ■ Yes				
Factory setting	No				
Additional information	Meaning of the options ■ No Not configurable ■ Yes Configurable				
<table><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>Maintenance</td></tr></table>		Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

Total no. element

Navigation	Expert → Input/output → HART devices → HART Device(s) → NMT dev. config → Total elements (14730)				
Description	Shows the total amount of configurable temperature elements.				
Additional information	<table><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>-</td></tr></table>	Read access	Operator	Write access	-
Read access	Operator				
Write access	-				

Bottom point

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

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

User entry Signed floating-point number

Factory setting 0 mm

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Operator

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

Read access	Operator
Write access	Operator

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.

Read access	Operator
Write access	Maintenance

"Element setup" submenu

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

► Element setup

Select element

→ 134

Zero adjust

→ 135

Element temperature

→ 135

Element position

→ 135

Select element



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

Description Chooses the temperature element to be configured manually.

User entry 1 to 24

Factory setting 1

Additional information

Read access	Operator
Write access	Maintenance

Zero adjust



Navigation

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

User interface

Signed floating-point number

Factory setting

0 °C

Additional information

Read access	Operator
Write access	Maintenance

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

Additional information

Read access	Operator
Write access	Service

"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	Read access	Operator
	Write access	Maintenance

HART Bus interface

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

▶ #blank#

Operating mode

→  137

Current

→  137

* Visibility depends on order options or device settings

Operating mode

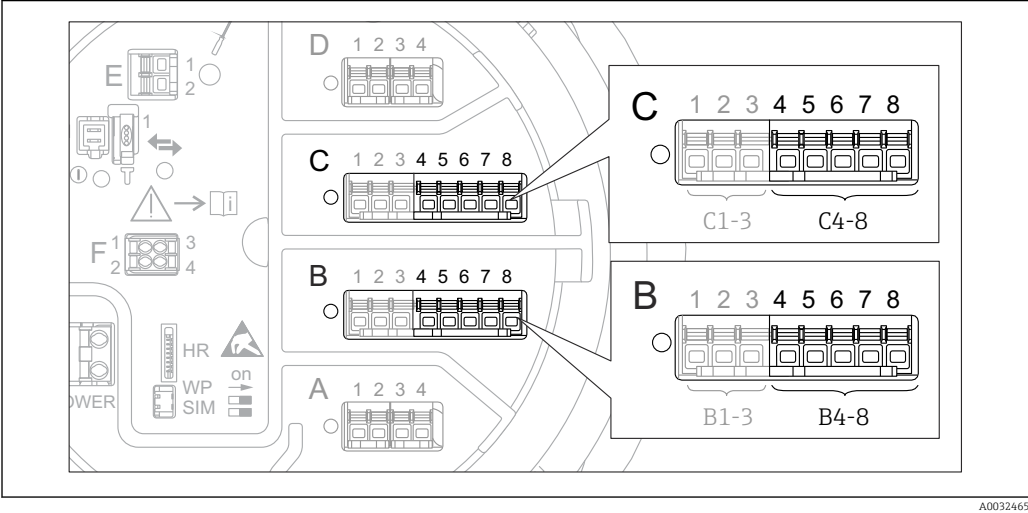
Navigation	 Expert → Input/output → HART devices → #blank# → Operating mode (14453)	
Description	Shows the operation mode of this HART bus.	
User interface	■ None ■ Disable ■ HART master ■ HART slave +4..20mA output ■ HART tunnel	
Factory setting	None	
Additional information	Read access	Operator
	Write access	-

Current

Navigation	 Expert → Input/output → HART devices → #blank# → Current (14457)	
Description	Shows the actual current on this HART bus.	
User interface	0 to 100 000 mA	
Factory setting	0 mA	
Additional information	Read access	Operator
	Write access	-

3.3.2 "Analog IP" submenu

i 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.



11 Terminals for the "Analog IP" submenu (→ 138) ("B4-8" or "C4-8", respectively)

Navigation Expert → Input/output → Analog IP

▶ Analog IP

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

Minimum probe temperature	→ 143
Maximum probe temperature	→ 144
Probe position	→ 144
Calibration type AIP	→ 145
Active calibration	→ 145
Damping factor	→ 145
Gauge current	→ 146

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	Read access	Operator
	Write access	Maintenance

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)	

- 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

Read access	Operator
Write access	Maintenance

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.

Read access	Operator
Write access	Maintenance

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

Factory setting N type

RTD connection type

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

Prerequisite **Operating mode (→  139) = RTD temperature input**

Description Defines the connection type of the RTD.

Selection

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

Factory setting 4 wire RTD connection

Additional information

Read access	Operator
Write access	Maintenance

Process value

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

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

Description Shows the measured value received via the analog input.

Additional information

Read access	Operator
Write access	-

Process variable

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

Prerequisite **Operating mode (→  139) ≠ RTD temperature input**

Description Determines type of measured value.

Selection

- Level linearized
- Temperature
- Pressure
- Density

Factory setting Level linearized

Additional information	Read access	Operator
	Write access	Maintenance

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

Additional information	Read access	Operator
	Write access	Maintenance

100 % value

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

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

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

User entry Signed floating-point number

Factory setting 0 mm

Additional information	Read access	Operator
	Write access	Maintenance

Input value percent

Navigation  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

Read access	Operator
Write access	-

Input value**Navigation**
 Expert → Input/output → Analog IP → Input value (14015)
Prerequisite**Operating mode (→  139) ≠ Disabled****Description**

Shows the value received via the analog input.

Additional information

Read access	Operator
Write access	-

Temperature offset after conversion**Navigation**
 Expert → Input/output → Analog IP → Temp. offset (14025)
Prerequisite**Operating mode (→  139) = RTD temperature input****Description**

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

User entry

-20 to 20 °C

Factory setting

0 °C

Additional information

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

Read access	Operator
Write access	Maintenance

Minimum probe temperature**Navigation**
 Expert → Input/output → Analog IP → Min. probe temp (14010)
Prerequisite**Operating mode (→  139) = RTD temperature input****Description**

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

User entry -213 to 927 °C

Factory setting -100 °C

Additional information

Read access	Operator
Write access	Maintenance

Maximum probe temperature



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

Prerequisite **Operating mode (→  139) = RTD temperature input**

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

User entry -213 to 927 °C

Factory setting 250 °C

Additional information

Read access	Operator
Write access	Maintenance

Probe position



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

Prerequisite **Operating mode (→  139) = RTD temperature input**

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

User entry -5 000 to 30 000 mm

Factory setting 5 000 mm

Additional information

Read access	Operator
Write access	Maintenance

Calibration type AIP


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

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

Description Select calibration state of the analog input or output.

Selection

- User calibration
- Factory calibration

Factory setting Factory calibration

Additional information **Meaning of the options**

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

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	Read access	Operator
	Write access	Maintenance

Gauge current

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

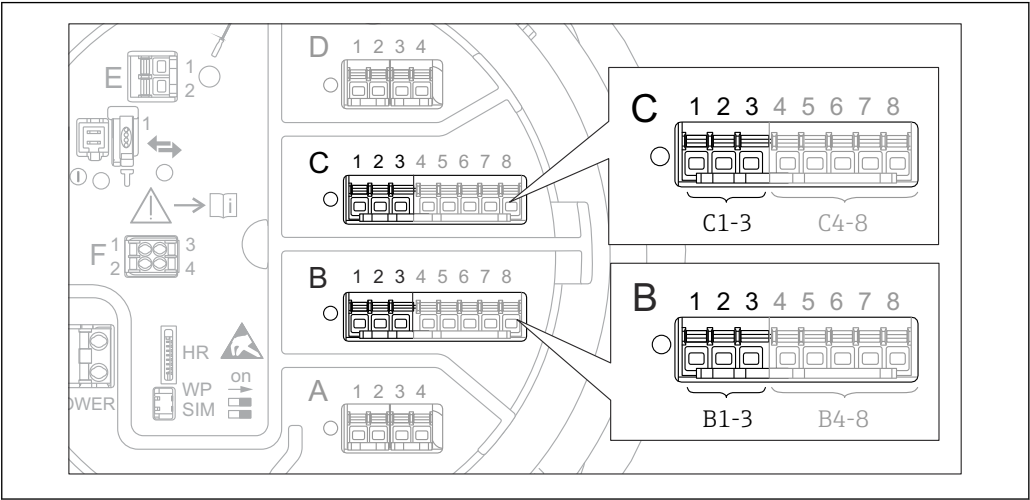
Prerequisite **Operating mode (→  139) = Gauge power supply**

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

Additional information	Read access	Operator
	Write access	-

3.3.3 "Analog I/O" submenu

i 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.



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12 Terminals for the "Analog I/O" submenu (→ 147) ("B1-3" or "C1-3", respectively)

Navigation Expert → Input/output → Analog I/O

► Analog I/O

Operating mode

→ 148

Current span

→ 149

Fixed current

→ 150

Analog input source

→ 150

Failure mode

→ 151

Error value

→ 152

Output out of range

→ 152

Error on event

→ 152

Input value

→ 153

0 % value

→ 153

100 % value

→ 153

Input value %

→ 154

Output value	→ 154
Readback value	→ 154
Feedback threshold	→ 155
Process variable	→ 155
Analog input 0% value	→ 155
Analog input 100% value	→ 156
Error event type	→ 156
Process value	→ 156
Input value in mA	→ 157
Input value percent	→ 157
Damping factor	→ 157
Calibration	→ 158
Active calibration	→ 158
Used for SIL/WHG	→ 158

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

Read access	Operator
Write access	Maintenance

Meaning of the options

Operating mode (→  148)	Direction of signal	Type of signal
Disabled	-	-
4...20mA input	Input from 1 external device	Analog (4...20mA)
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.

Mode	Terminals of the I/O module		
	1	2	3
Passive (power supply from external source)	-	+	not used
Active (power supplied by the device itself)	not used	-	+



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

Read access	Operator
Write access	Maintenance

* Visibility depends on order options or device settings

Meaning of the options

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



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

Read access	Operator
Write access	Maintenance

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

- Upper interface level
- Lower interface level
- Bottom level
- Tank reference height
- Liquid temperature
- Vapor temperature
- Air temperature
- Observed density value
- Average profile density ³⁾
- Upper density
- Middle density
- Lower density
- P1 (bottom)
- P2 (middle)
- P3 (top)
- GP 1 ... 4 value
- AIO B1-3 value ³⁾
- AIO B1-3 value mA ³⁾
- AIO C1-3 value ³⁾
- AIO C1-3 value mA ³⁾
- AIP B4-8 value ³⁾
- AIP C4-8 value ³⁾
- Element temperature 1 ... 24 ³⁾
- HART device 1...15 PV ³⁾
- HART device 1 ... 15 PV mA ³⁾
- HART device 1 ... 15 PV % ³⁾
- HART device 1 ... 15 SV ³⁾
- HART device 1 ... 15 TV ³⁾
- HART device 1 ... 15 QV ³⁾

Factory setting

Tank level

Additional information

Read access	Operator
Write access	Maintenance

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

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

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

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

User entry Signed floating-point number

Factory setting 0 Unitless

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Additional information

Read access	Operator
Write access	-

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

Additional information

Read access	Operator
Write access	Maintenance

Analog input 100% value**Navigation** Expert → Input/output → Analog I/O → AI 100% value (13965)**Prerequisite****Operating mode (→  148) = 4..20mA input or HART master+4..20mA input****Description**

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

User entry

Signed floating-point number

Factory setting

0 mm

Additional information

Read access	Operator
Write access	Maintenance

Error event type**Navigation** Expert → Input/output → Analog I/O → Error event type (13953)**Prerequisite****Operating mode (→  148) ≠ Disabled or HART master****Description**

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

Selection

- None
- Warning
- Alarm

Factory setting

Warning

Additional information

Read access	Operator
Write access	Maintenance

Process value**Navigation** Expert → Input/output → Analog I/O → Process value (13963)**Prerequisite****Operating mode (→  148) = 4..20mA input or HART master+4..20mA input****Description**

Shows the input value scaled to customer units.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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.

Read access	Operator
Write access	-

Used for SIL/WHG

Navigation

 Expert → Input/output → Analog I/O → Used for SIL/WHG (13980)

- Prerequisite
- Operating mode (→  148) = 4..20mA output or HART slave +4..20mA output
 - The device has a SIL approval.

Description

Determines whether the discrete I/O module is in SIL/WHG mode.

- Selection
- Enabled
 - Disabled

Factory setting

Disabled

Additional information

Read access	Operator
Write access	Maintenance

Expected SIL/WHG chain

Navigation

 Expert → Input/output → Analog I/O → SIL/WHG chain (13952)

Prerequisite

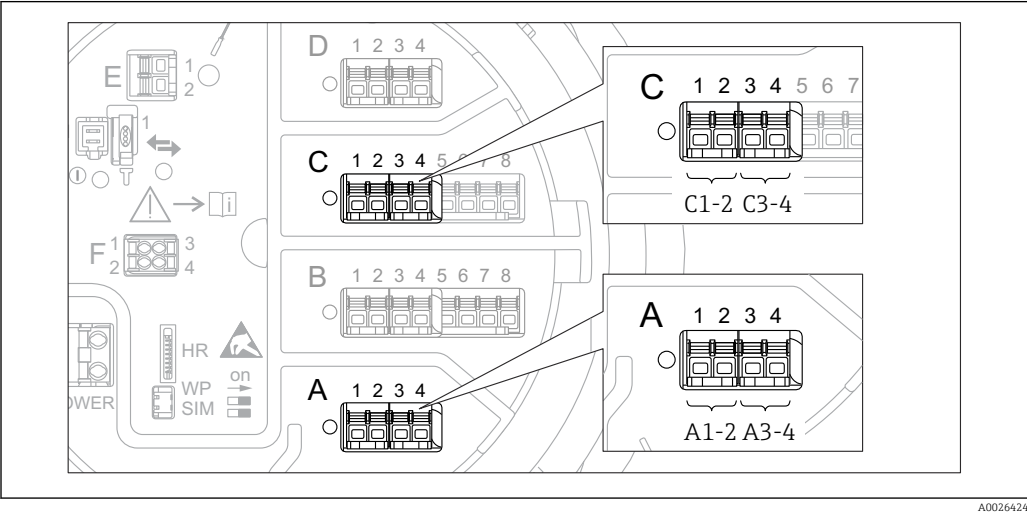
- Operating mode (→  148) = 4..20mA output or HART slave +4..20mA output
- The device has a SIL approval.

Additional information

Read access	Operator
Write access	-

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.



13 Designation of the digital inputs or outputs (examples)

Navigation  Expert → Input/output → Digital Xx-x → Operating mode (13911)

► Digital Xx-x

Operating mode

Digital input source

Input value

Contact type

Output simulation

Output value

Readback value

Error on event

Damping factor

Used for SIL/WHG

→ 161

→ 161

→ 162

→ 162

→ 163

→ 164

→ 164

→ 164

→ 165

→ 165

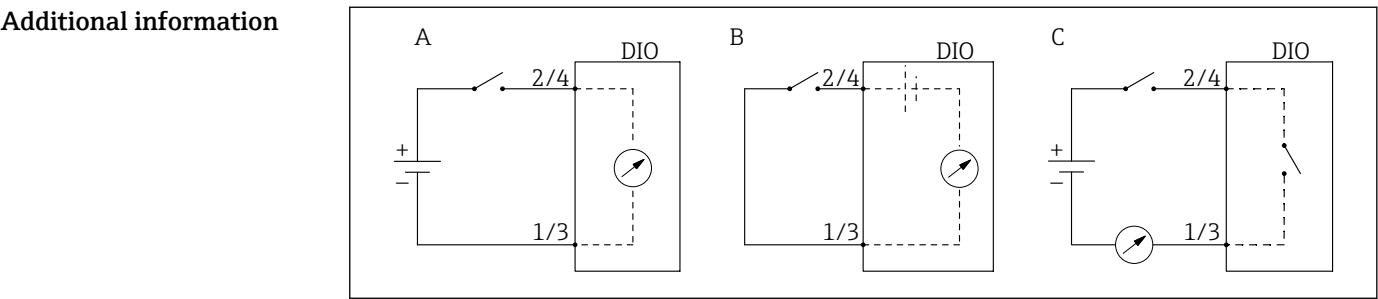
Operating mode

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



14 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** parameter⁵⁾ is passed to the digital output. For details refer to Special Documentation SD02066G.

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

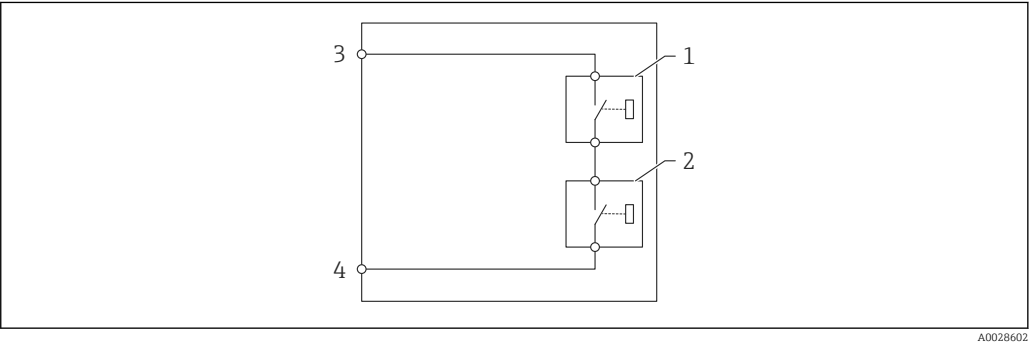
4) Only present if "Operating mode (→  161)" = "Input passive" or "Input active" for the respective Digital I/O module.

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><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>Maintenance</td></tr></table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

The digital output consists of two relays connected in series:



 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:

Output simulation	State of relay 1	State of relay 2	Expected result on the terminals of the I/O module
Simulating active	Closed	Closed	Closed
Simulating inactive	Open	Open	Open
Fault 1	Closed	Open	Open
Fault 2	Open	Closed	Open

 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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

3.3.5 "Digital input mapping" submenu

Navigation  Expert → Input/output → DI mapping

► Digital input mapping

Digital input source 1

Digital input source 2

Gauge command 0

Gauge command 1

Gauge command 2

Gauge command 3

→  166

→  166

→  167

→  168

→  168

→  169

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

* Visibility depends on order options or device settings

Gauge command 1

Navigation

Expert → Input/output → DI mapping → Gauge command 1 (8150)

Prerequisite

Digital input source 1 (→ 166) ≠ None

Description

Gauge command assigned to digital input combination 1 (DI2=0, DI1=1).

Selection

Stop *

Level

Up *

Bottom level *

Upper I/F level *

Lower I/F level *

Upper density *

Middle density *

Lower density *

Repeatability *

Water dip

Release overtension *

Tank profile *

Interface profile *

Manual profile *

Level standby *

Offset standby *

Factory setting

Up

Additional information

Read access	Operator
Write access	Maintenance

Gauge command 2

Navigation

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

Prerequisite

Digital input source 1 (→ 166) ≠ None

Digital input source 2 (→ 166) ≠ None

Description

Gauge command assigned to digital Input combination 2 (DI2=1, DI1=0).

Selection

Stop *

Level

Up *

Bottom level *

Upper I/F level *

Lower I/F level *

Upper density *

Middle density *

Lower density *

Repeatability *

* Visibility depends on order options or device settings

- Water dip *
- Release overtension *
- Tank profile *
- Interface profile *
- Manual profile *
- Level standby *
- Offset standby *

Factory setting

Stop

Additional information

Read access	Operator
Write access	Maintenance

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

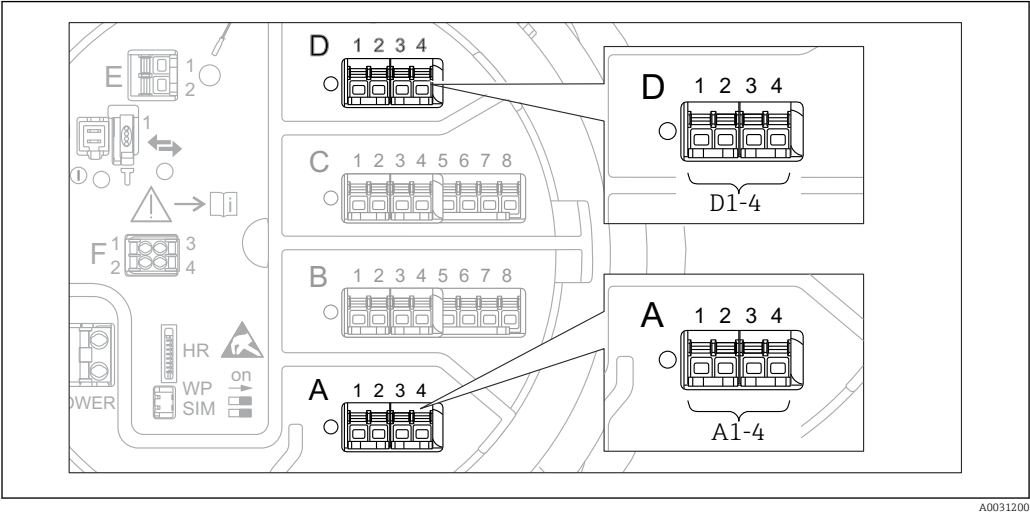
Additional information

Read access	Operator
Write access	Maintenance

* Visibility depends on order options or device settings

3.4 "Communication" submenu

This menu contains a submenu for each digital communication interface of the device. The communication interfaces are designated by "X1-4" where "X" specifies the slot in the terminal compartment and "1-4" the terminals within this slot.



16 Designation of the "Modbus" or "V1" modules (examples); depending on the device version these modules may also be in slot B or C.

Navigation Expert → Communication

3.4.1 "Modbus Xx-x" or "V1 Xx-x" submenu

This submenu is only present for devices with **MODBUS** and/or **V1** communication interface. There is one submenu of this type for each communication interface.

Navigation  Expert → Communication → Modbus Xx-x / V1 Xx-x

► Modbus Xx-x

Communication interface protocol

→  171

Modbus value 1 to 4

→  172

Modbus discrete 1 to 4

→  172

► Configuration

→  173

► Integer conversion

→  178

► User value source

→  183

► GP values

→  184

► Discrete selector

→  187

► V1 Xx-x

Communication interface protocol

→  171

► Configuration

→  188

► V1 input selector

→  191

Communication interface protocol

Navigation  Expert → Communication → Modbus X1-4 / V1 X1-4 / WM550 X1-4 → Commu I/F protoc (13201)

Description Shows the type of communication protocol.

Additional information

Read access	Operator
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

Read access	Operator
Write access	-

 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

Read access	Operator
Write access	-

 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

► Configuration		
Baudrate	→ 	173
Parity	→ 	174
Modbus address	→ 	174
Float swap mode	→ 	174
Invalid data	→ 	175
Word type	→ 	175
CRC seed	→ 	176
Old TSM mode	→ 	176
Bus termination	→ 	176
Compatibility mode	→ 	177

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

Additional information	Read access	Operator
	Write access	Maintenance

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

Additional information	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	

Factory setting Off

Additional information

Read access	Operator
Write access	Maintenance

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.

Read access	Operator
Write access	Maintenance

"Integer conversion" submenu

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

Navigation  Expert → Communication → Modbus Xx-x → Integer convers

► Integer conversion

Level 0%

→  178

Level 100%

→  179

Temperature 0%

→  179

Temperature 100%

→  179

Pressure 0%

→  180

Pressure 100%

→  180

Density 0%

→  180

Density 100%

→  181

User 0%

→  181

User 100%

→  181

Percent 0%

→  182

Percent 100%

→  182

Level 0% 

Navigation  Expert → Communication → Modbus Xx-x → Integer convers → Level 0% (13214)

Description Defines the level that represents 0% on the integer value scale.

User entry Signed floating-point number

Factory setting 0.00 mm

Additional information	Read access	Operator
	Write access	Maintenance

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 border="1"> <tr> <td>Read access</td><td>Operator</td></tr> <tr> <td>Write access</td><td>Maintenance</td></tr> </table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

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 border="1"> <tr> <td>Read access</td><td>Operator</td></tr> <tr> <td>Write access</td><td>Maintenance</td></tr> </table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

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 border="1"> <tr> <td>Read access</td><td>Operator</td></tr> <tr> <td>Write access</td><td>Maintenance</td></tr> </table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

Pressure 0%

Navigation

Expert → Communication → Modbus Xx-x → Integer convers → Pressure 0% (13217)

Description

Defines the pressure that represents 0% on the integer value scale.

User entry

Signed floating-point number

Factory setting

0 bar

Additional information

Read access	Operator
Write access	Maintenance

Pressure 100%

Navigation

Expert → Communication → Modbus Xx-x → Integer convers → Pressure 100% (13251)

Description

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

User entry

Signed floating-point number

Factory setting

25 000 bar

Additional information

Read access	Operator
Write access	Maintenance

Density 0%

Navigation

Expert → Communication → Modbus Xx-x → Integer convers → Density 0% (13252)

Description

Defines the density that represents 0% on the integer value scale.

User entry

Signed floating-point number

Factory setting

0 kg/m³

Additional information

Read access	Operator
Write access	Maintenance

Density 100%**Navigation**

 Expert → Communication → Modbus Xx-x → Integer convers → Density 100% (13218)

Description

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

User entry

Signed floating-point number

Factory setting

1 000 kg/m³

Additional information

Read access	Operator
Write access	Maintenance

User 0%**Navigation**

 Expert → Communication → Modbus Xx-x → Integer convers → User 0% (13221)

Description

Defines the value of the user selected variable that represents 0% on the integer value scale.

User entry

Signed floating-point number

Factory setting

0

Additional information

Read access	Operator
Write access	Maintenance

User 100%**Navigation**

 Expert → Communication → Modbus Xx-x → Integer convers → User 100% (13222)

Description

Defines the value of the user selected variable that represents 100% on the integer value scale.

User entry

Signed floating-point number

Factory setting

0

Additional information

Read access	Operator
Write access	Maintenance

Percent 0%

Navigation

Expert → Communication → Modbus Xx-x → Integer convers → Percent 0% (13202)

Description

Defines the percentage of the measured value that represents 0% on the integer value scale.

User entry

−200 to +400 %

Factory setting

0.00 %

Additional information

Read access	Operator
Write access	Maintenance

Percent 100%

Navigation

Expert → Communication → Modbus Xx-x → Integer convers → Percent 100% (13234)

Description

Defines the percentage of the measured value that represents 100% on the integer value scale.

User entry

−200 to +400 %

Factory setting

100 %

Additional information

Read access	Operator
Write access	Maintenance

"User value source" submenu

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

NavigationExpert → Communication → Modbus Xx-x → UserVal source
→ UserVal 1 source (13209)**User value 1 to 8 source****Navigation**Expert → Communication → Modbus Xx-x → UserVal source → UserVal 1 to 8 source
(13209-1 to 8)**Description**

Selects which parameter shall be transmitted as User value x.

Selection

- None
- Tank ullage
- Distance
- Upper interface level
- Lower interface level
- Bottom level
- Average profile density ⁶⁾
- Vapor density
- Manual density
- P1 position
- P3 position
- GP 1...4 value
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value
- HART device 1...15 PV
- HART device 1...15 PV mA
- HART device 1...15 PV %
- HART device 1...15 SV
- HART device 1...15 TV
- HART device 1...15 QV

Factory setting

None

Additional information

Read access	Operator
Write access	Maintenance

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 values

GP 1 value 0%

GP 1 value 100%

GP 2 value 0%

GP 2 value 100%

GP 3 value 0%

GP 3 value 100%

GP 4 value 0%

GP 4 value 100%

→  184

→  184

→  185

→  185

→  185

→  186

→  186

→  186

GP 1 value 0%

Navigation  Expert → Communication → Modbus Xx-x → GP values → GP 1 value 0% (13223)

Description Defines the GP1 value that represents 0% on the integer value scale.

User entry Signed floating-point number

Factory setting 0 Unitless

Additional information	Read access	Operator
	Write access	Maintenance

GP 1 value 100%

Navigation  Expert → Communication → Modbus Xx-x → GP values → GP 1 value 100% (13224)

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

User entry Signed floating-point number

Factory setting 0 Unitless

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

"Discrete selector" submenu

Navigation  Expert → Communication → Modbus Xx-x → Discreteselect

Discrete 1 selector

Navigation	 Expert → Communication → WM550 X1-4 → Discreteselect → Discrete 1select (13260)	
Description	Determines the input source which is transferred as Alarm bit [n] value in the corresponding WM550 tasks.	
Selection	■ None ■ Balance flag optionVisibility depends on order options or device settings ■ Alarm 1...4 any ■ Alarm 1...4 HighHigh ■ Alarm 1...4 High or HighHigh ■ Alarm 1...4 High ■ Alarm 1...4 Low ■ Alarm 1...4 Low or LowLow ■ Alarm 1...4 LowLow ■ Digital Xx-x	
Factory setting	None	
Additional information	Read access	Operator
	Write access	Maintenance

"Configuration" submenu (V1)

 Only visible for devices with a V1 I/O module.

Navigation  Expert → Communication → V1 Xx-x → Configuration

► Configuration		
Communication interface protocol variant	→ 	188
V1 addressV1/MDP	→ 	188
V1 addressBBB/MIC+232	→ 	189
Level mapping	→ 	189
Line impedance	→ 	190
Compatibility mode	→ 	190

Communication interface protocol variant

Navigation	 Expert → Communication → V1 Xx-x → Configuration → Protocol variant (13269)	
Description	Determines which variant of the V1 protocol is used.	
User interface	■ None ■ V1 *	
Factory setting	None	
Additional information	Read access	Operator
	Write access	Maintenance

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

Factory setting 1

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

In V1, the level is always represented by a number in the range from 0 to 999 999. This number corresponds to a level as follows:

"Level mapping" = "+ve"

Number	Corresponding level
0	0.0 mm
999 999	99 999.9 mm

"Level mapping" = "+ve & -ve"

Number	Corresponding level
0	0.0 mm
500 000	50 000.0 mm
500 001	-0.1 mm
999 999	-49 999.9 mm

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

Read access	Operator
Write access	Maintenance

 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.

Read access	Operator
Write access	Maintenance

"V1 input selector" submenu (V1)

Only visible for devices with a V1 I/O module.

Navigation

Expert → Communication → V1 Xx-x → V1 input select.

► V1 input selector	
User value 1 to 8 source	→ 191
Alarm 1 input source	→ 192
Alarm 2 input source	→ 192
Alarm 3 input source	→ 193
Alarm 4 input source	→ 193
SP 1 value selector	→ 194
SP 2 value selector	→ 194
SP 3 value selector	→ 195
SP 4 value selector	→ 195
Value percent selector	→ 196

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 density⁷⁾
- Vapor density
- Manual density
- P1 position
- P3 position
- GP 1...4 value

7) Visibility depends on order options or device settings

- 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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Additional information	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

* Visibility depends on order options or device settings

SP 3 value selector



Navigation

Expert → Communication → V1 → V1 input select. → SP3 value select (13276)

Description

Selects which discrete value will be transmitted as V1 external status bit 3 in Z0/Z1 message.

Selection

- None
- Digital A1-2 *
- Digital A3-4 *
- Digital B1-2 *
- Digital B3-4 *
- Digital C1-2 *
- Digital C3-4 *
- Digital D1-2 *
- Digital D3-4 *

Factory setting

None

Additional information

Read access	Operator
Write access	Maintenance

SP 4 value selector



Navigation

Expert → Communication → V1 → V1 input select. → SP4 value select (13277)

Description

Selects which discrete value will be transmitted as V1 external status bit 4 in Z0/Z1 message.

Selection

- None
- Digital A1-2 *
- Digital A3-4 *
- Digital B1-2 *
- Digital B3-4 *
- Digital C1-2 *
- Digital C3-4 *
- Digital D1-2 *
- Digital D3-4 *

Factory setting

None

Additional information

Read access	Operator
Write access	Maintenance

* Visibility depends on order options or device settings

Value percent selector



Navigation  Expert → Communication → V1 → V1 input select. → Value % select (13282)

Description Selects which value shall be transmitted as a 0..100% value in the V1 Z0/Z1 message.

- Selection**
- None
 - Tank level %
 - Tank ullage %
 - AIO B1-3 value % *
 - AIO C1-3 value % *

Factory setting None

Additional information	Read access	Operator
	Write access	Maintenance

* 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.

► HART configuration		
System polling address	→	 198
No. of preambles	→	 199
PV source	→	 199
Assign PV	→	 199
0 % value	→	 200
100 % value	→	 201
PV mA selector	→	 201
Primary variable (PV)	→	 201
Percent of range	→	 202
Assign SV	→	 202
Secondary variable (SV)	→	 203
Assign TV	→	 203
Tertiary variable (TV)	→	 204
Assign QV	→	 204
Quaternary variable (QV)	→	 205

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

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Maintenance
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

0 % value



Navigation

 Expert → Communication → HART output → HART config. → 0 % value (11632)

Prerequisite

PV source = Custom

Description

0% value of the primary variable (PV).

User entry

Signed floating-point number

Factory setting

0 mm

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

* 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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance



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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance



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

Read access	Operator
Write access	-

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

Additional information

Read access	Operator
Write access	Maintenance

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

Quaternary variable (QV)

Navigation

 Expert → Communication → HART output → HART config. → Quaterna.var(QV) (0203)

Prerequisite

Assign QV (→  204) ≠ None

Description

Shows the current measured value of the quaternary (fourth) dynamic variable (QV)

Additional information

Read access	Operator
Write access	-

"Information" submenu

Navigation  Expert → Communication → HART output → Information

► Information		
HART short tag	→	 206
Device tag	→	 207
Device revision	→	 207
Device ID	→	 207
Device type	→	 208
Manufacturer ID	→	 208
HART revision	→	 208
HART descriptor	→	 209
HART message	→	 209
Hardware revision	→	 209
Software revision	→	 210
HART date code	→	 210

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

Read access	Operator
Write access	Maintenance

Device tag

**Navigation** Expert → Communication → HART output → Information → Device tag (0215)**Description** Enter a unique name for the measuring point to identify the device quickly within the plant.**User entry** Character string comprising numbers, letters and special characters (32)**Factory setting** NMS8x**Additional information**

Read access	Operator
Write access	Maintenance

Device revision

Navigation Expert → Communication → HART output → Information → Device revision (0204)**Description** Shows the device revision with which the device is registered with the HART Communication Foundation**User interface** 0 to 255**Factory setting** 6**Additional information**

Read access	Operator
Write access	-

Device ID

Navigation Expert → Communication → HART output → Information → Device ID (0221)**Description** Shows the device ID for identifying the device in a HART network**User interface** Positive integer**Factory setting** 123456**Additional information**

Read access	Operator
Write access	-

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 65 535	
Factory setting	4 397	
Additional information	Read access	Operator
	Write access	-

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 65 535	
Factory setting	17	
Additional information	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	-

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 border="1"> <tr> <td>Read access</td><td>Operator</td></tr> <tr> <td>Write access</td><td>Maintenance</td></tr> </table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

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 border="1"> <tr> <td>Read access</td><td>Operator</td></tr> <tr> <td>Write access</td><td>Maintenance</td></tr> </table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

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 border="1"> <tr> <td>Read access</td><td>Operator</td></tr> <tr> <td>Write access</td><td>-</td></tr> </table>	Read access	Operator	Write access	-
Read access	Operator				
Write access	-				

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

3.5 "Application" submenu

Navigation  Expert → Application

► Application		
► Tank configuration	→ 	211
► Tank calculation	→ 	235
► Alarm	→ 	252

3.5.1 "Tank configuration" submenu

Navigation  Expert → Application → Tank config

Tank configuration		
Process condition	→ 	211
► 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.

Read access	Operator
Write access	Maintenance

"Level" submenu

Navigation  Expert → Application → Tank config → Level

► Level		
Level source	→ 	213
Empty	→ 	214
Tank reference height	→ 	214
Tank level	→ 	214
Set level	→ 	215
Upper interface level	→ 	215
Lower interface level	→ 	215
Water level source	→ 	215
Water level	→ 	216
Manual water level	→ 	216

Level source

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	Read access	Operator
	Write access	Maintenance

* 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 10 000.00 mm

Factory setting

Dependent on the device version

Additional information

Read access	Operator
Write access	Maintenance

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 10 000.00 mm

Factory setting

Dependent on the device version

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

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 10 000.00 mm

Factory setting 0 mm

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Maintenance
Write access	-

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

Read access	Maintenance
Write access	-

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

Read access	Operator
Write access	Maintenance

Water level

Navigation  Expert → Application → Tank config → Level → Water level (14970)

Description Shows the bottom water level.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

"Temperature" submenu

Navigation   Expert → Application → Tank config → Temperature

► Temperature		
Liquid temp source	→	 217
Manual liquid temperature	→	 218
Liquid temperature	→	 218
Air temperature source	→	 218
Manual air temperature	→	 219
Air temperature	→	 219
Vapor temp source	→	 219
Manual vapor temperature	→	 220
Vapor temperature	→	 220

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

Liquid temperature

Navigation	  Expert → Application → Tank config → Temperature → Liquid temp. (14978)	
Description	Shows the average or spot temperature of the measured liquid.	
Additional information	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

Air temperature

Navigation Expert → Application → Tank config → Temperature → Air temp. (14986)

Description Shows the air temperature.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

Vapor temperature

- Navigation

Expert → Application → Tank config → Temperature → Vapor temp. (14985)
- Description

Shows the measured vapor temperature.

Additional information

Read access	Operator
Write access	-

"Density" submenu

Navigation   Expert → Application → Tank config → Density

► Density		
Observed density source	→	 221
Observed density	→	 222
Air density	→	 222
Vapor density	→	 222
Measured upper density	→	 222
Measured middle density	→	 223
Measured lower density	→	 223
Water density	→	 223
Profile point	→	 223
Profile average density	→	 224
Profile density timestamp	→	 224

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	Read access	Operator
	Write access	Maintenance

* 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	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

Measured upper density

Navigation  Expert → Application → Tank config → Density → Meas upper dens. (15001)

Description Shows the density of the upper phase.

Additional information

Read access	Operator
Write access	-

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 setting1 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.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

"Pressure" submenu

Navigation   Expert → Application → Tank config → Pressure

► Pressure		
P1 (bottom) source	→	 226
P1 (bottom)	→	 226
P1 (bottom) manual pressure	→	 226
P1 position	→	 227
P1 offset	→	 227
P1 absolute / gauge	→	 227
P2 (middle) source	→	 228
P2 (middle)	→	 228
P2 (middle) manual pressure	→	 228
P2 offset	→	 229
P1-2 distance	→	 229
P2 absolute / gauge	→	 229
P3 (top) source	→	 230
P3 (top)	→	 230
P3 (top) manual pressure	→	 230
P3 position	→	 231
P3 offset	→	 231
P3 absolute / gauge	→	 231
Ambient pressure	→	 232

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
- AIO B1-3 value
- AIO C1-3 value
- AIP B4-8 value
- AIP C4-8 value

Factory setting Manual value

Additional information

Read access	Operator
Write access	Maintenance

P1 (bottom)

Navigation  Expert → Application → Tank config → Pressure → P1 (bottom) (14983)

Description Shows the pressure at the tank bottom.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

P2 (middle)

Navigation

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

Description

Shows the pressure (P2) at the middle transmitter.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

P1-2 distance

Navigation  Expert → Application → Tank config → Pressure → P1-2 distance (14974)

Description Defines the distance between the bottom and the middle pressure transmitter.

User entry 0 to 100 000 mm

Factory setting 2 000 mm

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

P3 (top)

- Navigation

Expert → Application → Tank config → Pressure → P3 (top) (14988)
- Description

Shows the pressure (P3) at the top transmitter.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

"GP values" submenu

Navigation  Expert → Application → Tank config → GP values

▶ GP values

GP 1 to 4 source

→  233

GP 1 to 4 name

→  234

GP Value 1

→  234

GP Value 2

→  234

GP Value 3

→  234

GP Value 4

→  235

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	Read access	Operator
	Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>-</td></tr></table>	Read access	Operator	Write access	-
Read access	Operator				
Write access	-				

3.5.2 "Tank calculation" submenu

Navigation   Expert → Application → Tank calculation

► Tank calculation

Local gravity

→  235

► HyTD

→  238

► CTSh

→  243

► HTMS

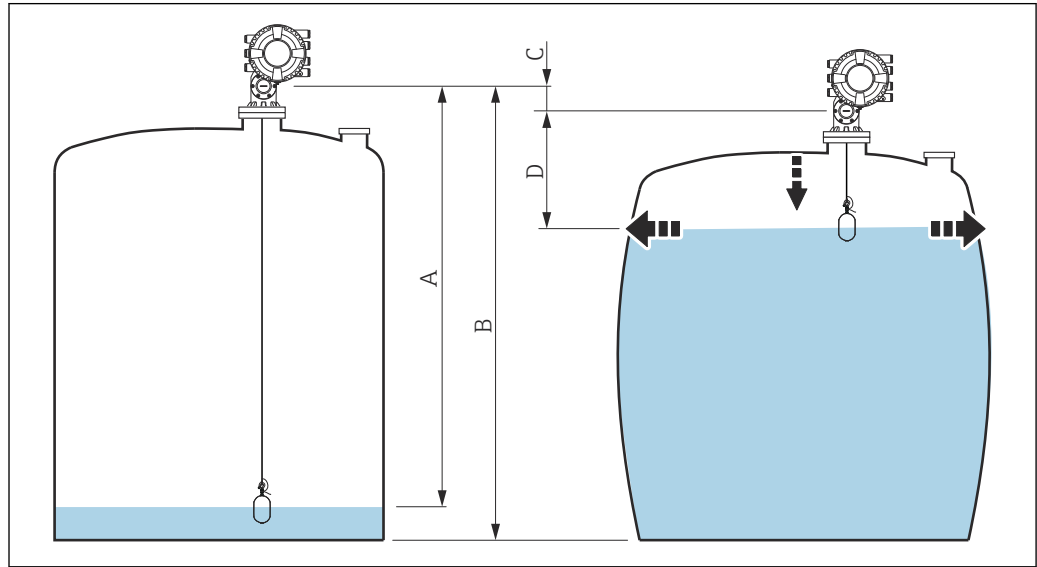
→  248

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/s ²
Factory setting	9.807 m/s ²

"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.



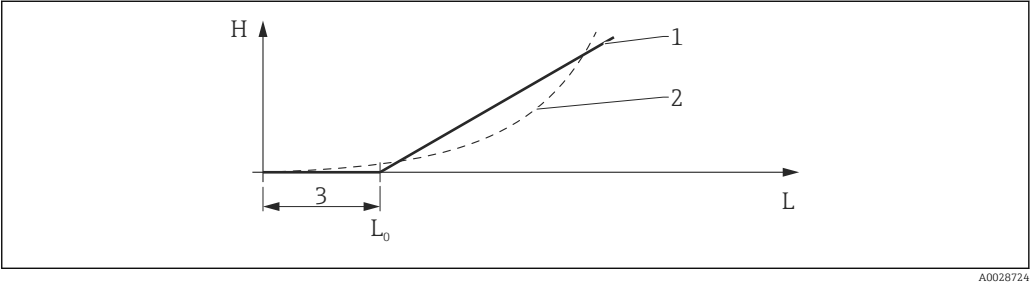
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17 Correction of the hydrostatic tank deformation (HyTD)

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



18 Calculation of the HyTD correction

- 1 Linear correction according to "Deformation factor (→ 239)"
- 2 Real correction
- 3 Starting level (→ 238)
- L Measured level
- H HyTD correction value (→ 238)

Calculation of the HyTD correction

$$L \leq L_0 \Rightarrow C_{HyTD} = 0$$
$$L > L_0 \Rightarrow C_{HyTD} = - (L - L_0) \times D$$

A0028715

L	Measured level
L ₀	Starting level
C _{HyTD}	HyTD correction value
D	Deformation factor

Description of parameters

Navigation  Expert → Application → Tank calculation → HyTD

► HyTD

HyTD correction value

→  238

HyTD mode

→  238

Starting level

→  238

Deformation factor

→  239

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	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

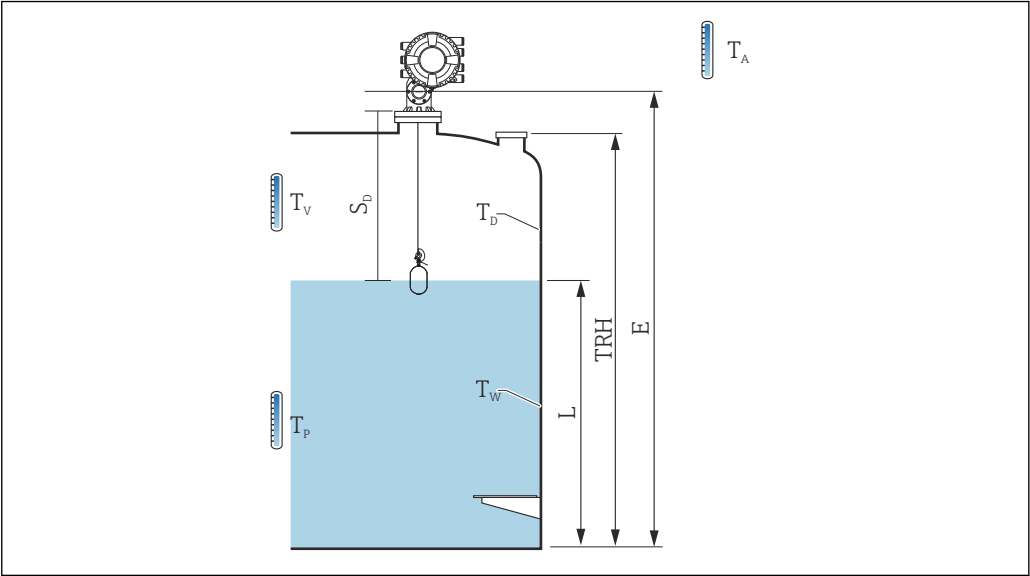
"CTSh" submenu

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 ($\Delta T > 10\text{ °C}$ (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



19 Parameters for the CTSh calculation

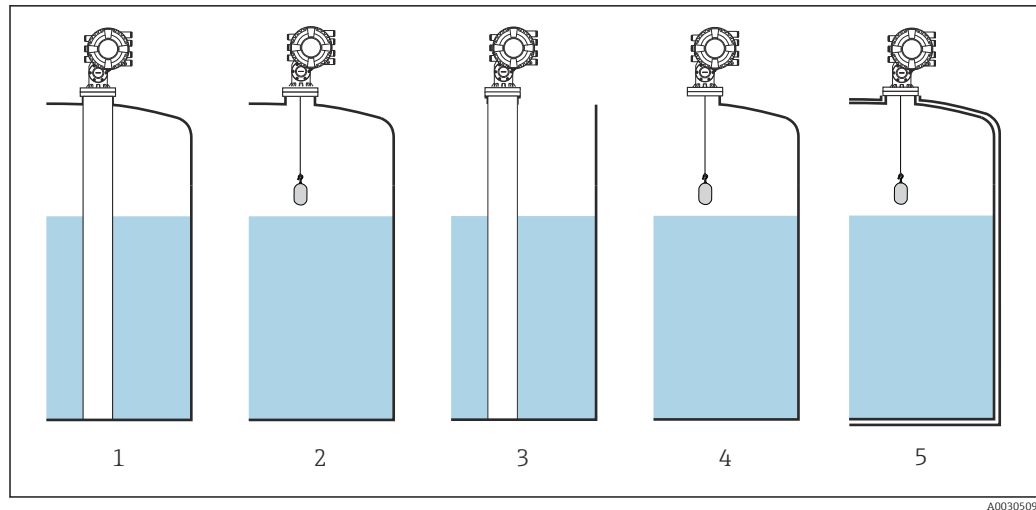
T _w	Temperature of the wetted part of the tank shell
T _d	Temperature of the dry part of the tank shell
T _p	Product temperature
T _v	Vapor temperature (in the tank)
T _A	Ambient temperature (atmosphere surrounding the tank)
S _d	Measured distance (Empty to Level)
TRH	Tank reference height
E	Empty
L	Level

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:

Covered tank (→ 244)	Stilling well (→ 244)	T _w	T _d
Covered	Yes ¹⁾	T _p	T _v
	No	(7/8) T _p + (1/8) T _A	(1/2) T _v + (1/2) T _A
Open top	Yes	T _p	T _A
	No	(7/8) T _p + (1/8) T _A	T _A

1) This option is also valid for insulated tanks without a stilling well. This is due to the temperature inside and outside of the tank shell being the same due to the insulation of the tank.



- 1 Covered tank (→ 244) = Covered; Stilling well (→ 244) = Yes
- 2 Covered tank (→ 244) = Covered; Stilling well (→ 244) = No
- 3 Covered tank (→ 244) = Open top; Stilling well (→ 244) = Yes
- 4 Covered tank (→ 244) = Open top; Stilling well (→ 244) = No
- 5 Insulated tank: Covered tank (→ 244) = Open top; Stilling well (→ 244) = Yes

CTSh: Calculation of the correction

$$C_{CTSh} = \alpha_{tank} (TRH - L) (T_D - T_{cal}) + \alpha_{tank} L (T_W - T_{cal}) - \alpha_{wire} S_D (T_v - T_{cal})$$

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TRH	Tank reference height
L	Level
T _D	Temperature of the dry part of the tank shell (calculated from T _p , T _V and T _A)
T _W	Temperature of the wetted part of the tank shell (calculated from T _p , T _V and T _A)
T _{cal}	Temperature at which the measurement has been calibrated
α _{tank}	Linear expansion coefficient of tank
α _{wire}	Linear expansion coefficient of wire
C _{CTSh}	CTSh correction value

Description of parameters

Navigation  Expert → Application → Tank calculation → CTSh

► CTSh

CTSh correction value

→  243

CTSh mode

→  244

Covered tank

→  244

Stilling well

→  244

Calibration temperature

→  245

Linear expansion coefficient

→  245

Wire expansion coefficient

→  245

CTSh correction value

Navigation  Expert → Application → Tank calculation → CTSh → CTSh corr value (13651)

Description Shows the CTSh correction value.

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

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

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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

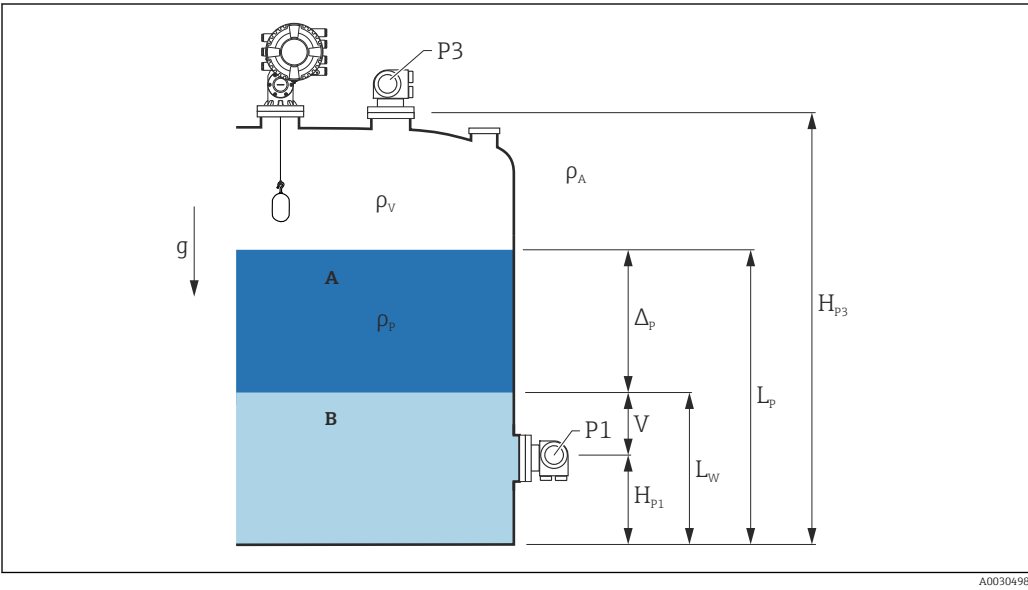
15 ppm

"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



20 HTMS parameters

- A Product
- B Water

Parameter	Navigation path
P1 (Bottom pressure)	Setup → Advanced setup → Tank configuration → Pressure → P1 (bottom)
H _{p1} (Position of P1 transmitter)	Setup → Advanced setup → Tank configuration → Pressure → P1 position
P3 (Top pressure)	Setup → Advanced setup → Tank configuration → Pressure → P3 (top)
H _{p3} (Position of P3 transmitter)	Setup → Advanced setup → Tank configuration → Pressure → P3 position
ρ _p (Density of the product ¹⁾)	- Measured value: Setup → Advanced setup → Calculation → HTMS → Density value (13753) - User-defined value: Setup → Advanced setup → Calculation → HTMS → Manual upper density (14998)
ρ _v (Vapor density)	Expert → Application → Tank configuration → Density → Vapor density
ρ _A (Ambient air temperature)	Setup → Advanced setup → Tank configuration → Density → Air density
g (Local gravity)	Expert → Application → Tank Calculation → Local gravity
L _p (Level of the product)	Operation → Tank level (14655)
L _w (Bottom water level)	Operation → Water level (14970)
V = L _w - H _{p1}	
Δ _p = L _p - L _w = L _p - V - H _{p1}	

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.

HTMS mode (→  248)	Measured variables	Required additional parameters	Calculated variables
HTMS P1	▪ P_1 ▪ L_p	▪ g ▪ H_{p1} ▪ L_w (optional)	ρ_p
HTMS P1+P3	▪ P_1 ▪ P_3 ▪ L_p	▪ ρ_v ▪ ρ_a ▪ g ▪ H_{p1} ▪ H_{p3} ▪ L_w (optional)	ρ_p (more precise calculation for pressurized tanks)

Minimum level

The density of the product can only be calculated if the product has a minimum thickness :

$$\Delta_p \geq \Delta_{p, \min}$$

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

$$L_p - V \geq \Delta_{p, \min} + H_{p1} = L_{\min}$$

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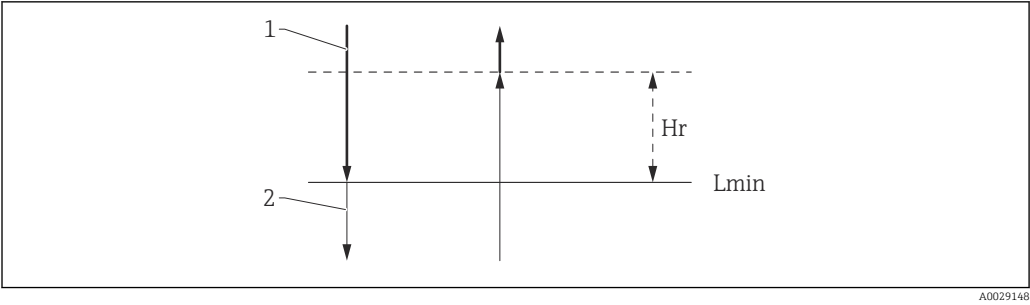
$L_{\min}$ is defined in the **Minimum level** parameter (→  249). As can be seen from the formula it always must be bigger than H_{p1} .

If $L_p - V$ 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.



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21 HTMS hysteresis

- 1 Value calculated
- 2 Value held/manual
- L_{min} Minimum level (→ 249)
- H_r Hysteresis (→ 250)

Description of parameters

Navigation Expert → Application → Tank calculation → HTMS

► HTMS

HTMS mode

→ 248

Manual density

→ 249

Density value

→ 249

Minimum level

→ 249

Minimum pressure

→ 250

Safety distance

→ 250

Hysteresis

→ 250

Water density

→ 251

HTMS mode



Navigation Expert → Application → Tank calculation → HTMS → HTMS mode (13751)

Description Defines the HTMS mode. Depending on the mode one or two pressure transmitters are used.

- Selection
- HTMS P1
 - HTMS P1+P3

Factory setting HTMS P1

Additional information

Read access	Operator
Write access	Maintenance

Meaning of the options

- HTMS P1
Only a bottom pressure transmitter (P1) is used.
- HTMS P1+P3
A bottom (P1) and top (P3) pressure transmitter are used. This option should be selected for pressurized tanks.

Manual density**Navigation**

Expert → Application → Tank calculation → HTMS → Manual density (15009)

Description

Defines the manual density.

User entry

0 to 3 000 kg/m³

Factory setting

800 kg/m³

Additional information

Read access	Maintenance
Write access	Maintenance

Density value**Navigation**

Expert → Application → Tank calculation → HTMS → Density value (13753)

Description

Shows the calculated product density.

Additional information

Read access	Operator
Write access	-

Minimum level**Navigation**

Expert → Application → Tank calculation → HTMS → Min. level (13752)

Description

Defines the minimum product level for a HTMS calculation.

If Lp - V falls below the limit defined in this parameter, the density retains its last value or the manual value is used instead.

User entry

0 to 20 000 mm

Factory setting

7 000 mm

Additional information

Read access	Operator
Write access	Maintenance

Minimum pressure**Navigation** Expert → Application → Tank calculation → HTMS → Min. pressure (13754)**Description**

Defines the minimum pressure for a HTMS calculation.

If the pressure P1 (or the difference P1 - P3) falls below the limit defined in this parameter, the density retains its last value or the manual value is used instead.

User entry

0 to 100 bar

Factory setting

0.1 bar

Additional information

Read access	Operator
Write access	Maintenance

Safety distance**Navigation** Expert → Application → Tank calculation → HTMS → Safety distance (13756)**Description**

Defines the minimum level which must be present above the bottom pressure sensor before its signal is used for the calculation.

User entry

0 to 10 000 mm

Factory setting

2 000 mm

Additional information

Read access	Operator
Write access	Maintenance

Hysteresis**Navigation** Expert → Application → Tank calculation → HTMS → Hysteresis (13755)**Description**

Defines the hysteresis for the HTMS calculation. Prevents constant switching if the level is near the switch-over point.

User entry

0 to 2 000 mm

Factory setting

50 mm

Additional information	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

3.5.3 "Alarm" submenu

Navigation  Expert → Application → Alarm

"Alarm" submenu

Navigation  Expert → Application → Alarm → Alarm

▶ Alarm		
Alarm mode	→	 253
Error value	→	 254
Alarm value source	→	 255
Alarm value	→	 256
HH alarm value	→	 256
H alarm value	→	 256
L alarm value	→	 257
LL alarm value	→	 257
HH alarm	→	 257
H alarm	→	 258
HH+H alarm	→	 258
L alarm	→	 258
LL alarm	→	 258
LL+L alarm	→	 259
Any error	→	 259
Clear alarm	→	 259
Alarm hysteresis	→	 260
Damping factor	→	 260

Alarm mode

Navigation  Expert → Application → Alarm → Alarm → Alarm mode (13864)

Description Defines the alarm mode of the selected alarm.

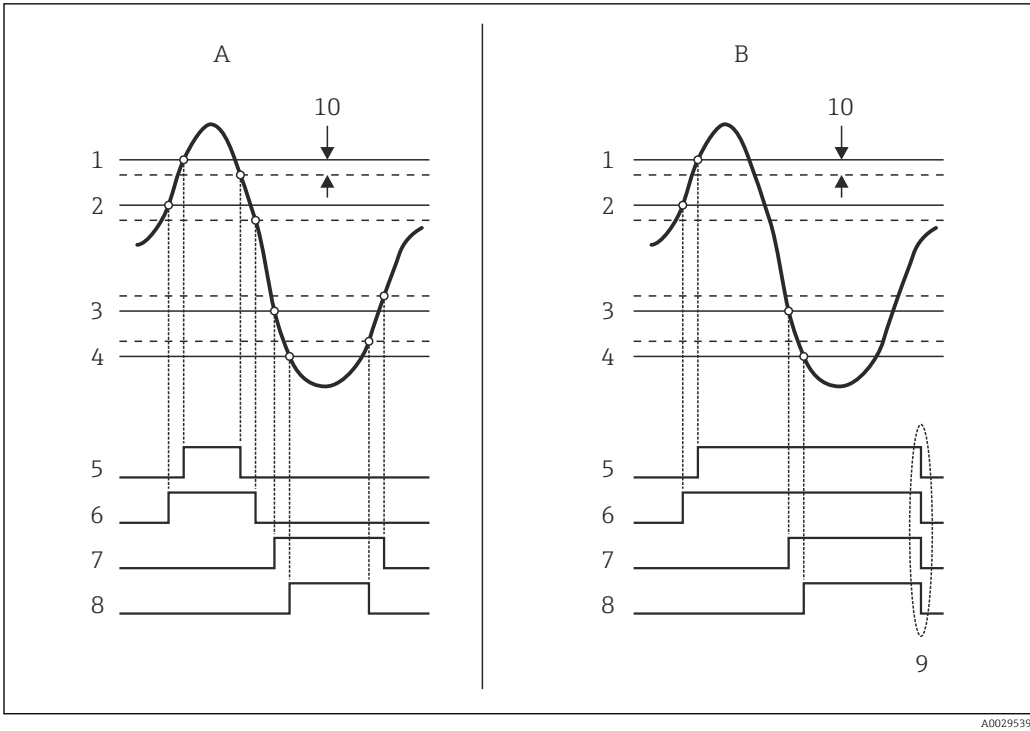
- Selection**
- Off
 - On
 - Latching

Factory setting Off

Additional information	Read access	Operator
	Write access	Maintenance

Meaning of the options

- **Off**
No alarms are generated.
- **On**
An alarm disappears if the alarm condition is no longer present (taking into consideration the hysteresis).
- **Latching**
All alarms remain active until the user selects **Clear alarm** (→  259) = **Yes** or the power is switched off and on.



22 Principle of the limit evaluation

A Alarm mode (→ 253) = On
B Alarm mode (→ 253) = Latching
1 HH alarm value (→ 256)
2 H alarm value (→ 256)
3 L alarm value (→ 257)
4 LL alarm value (→ 257)
5 HH alarm (→ 257)
6 H alarm (→ 258)
7 L alarm (→ 258)
8 LL alarm (→ 258)
9 "Clear alarm (→ 259)" = "Yes" or power off-on
10 Hysteresis (→ 260)

Error value

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

Prerequisite Alarm mode (→ 253) ≠ Off

Description Defines the alarm to be issued if the input value is invalid.

- Selection**
- No alarm
 - HH+H alarm
 - H alarm
 - L alarm
 - LL+L alarm
 - All alarms

Factory setting All alarms

Additional information	Read access	Operator
	Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

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	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Additional information	Read access	Operator
	Write access	Maintenance

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

Additional information

Read access	Maintenance
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

3.6 "Tank values" submenu

Navigation  Expert → Tank values

► Tank values		
Net weight	→ 	261
Gauge status	→ 	261
Balance flag	→ 	262
Standby level	→ 	262
Offset standby distance	→ 	263
One-time command status	→ 	264
► Level	→ 	264
► Temperature	→ 	269
► Density	→ 	272
► Pressure	→ 	276
► GP values	→ 	277

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	Read access	Operator
	Write access	-

Gauge status

Navigation  Expert → Tank values → Gauge status (8081)

Description Indicates the current status of the device gauge command.

Additional information	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	-

Standby level

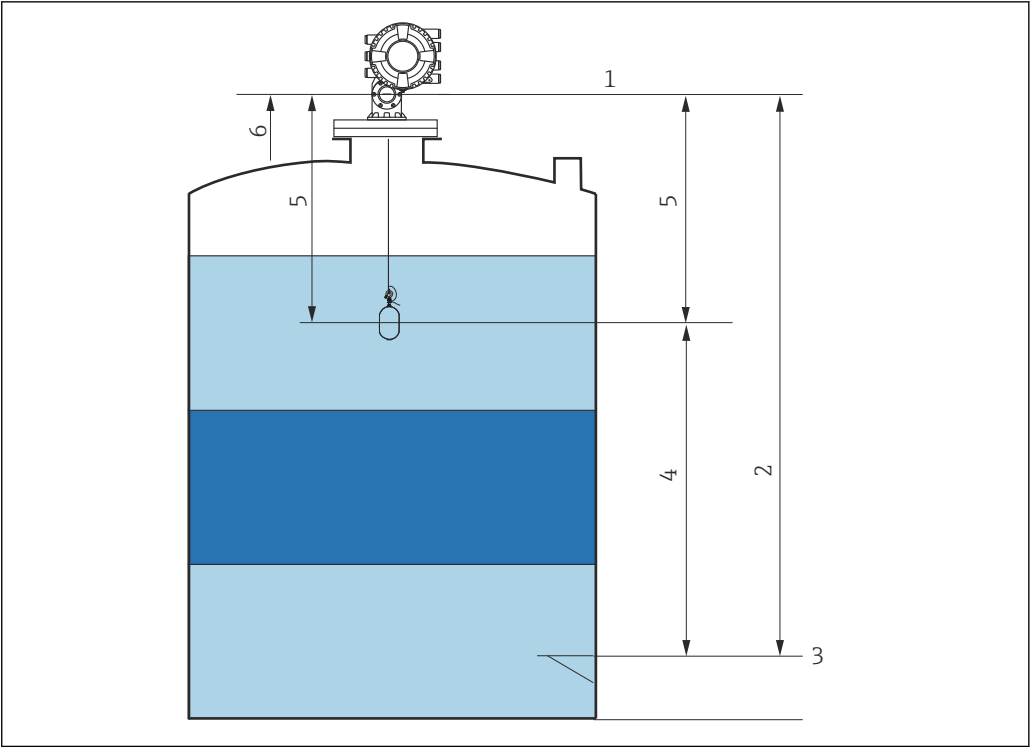
Navigation  Expert → Tank values → Standby level (8194)

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

User entry -999 999.9 to 999 999.9 mm

Factory setting 0 mm

Additional information	Read access	Operator
	Write access	Maintenance



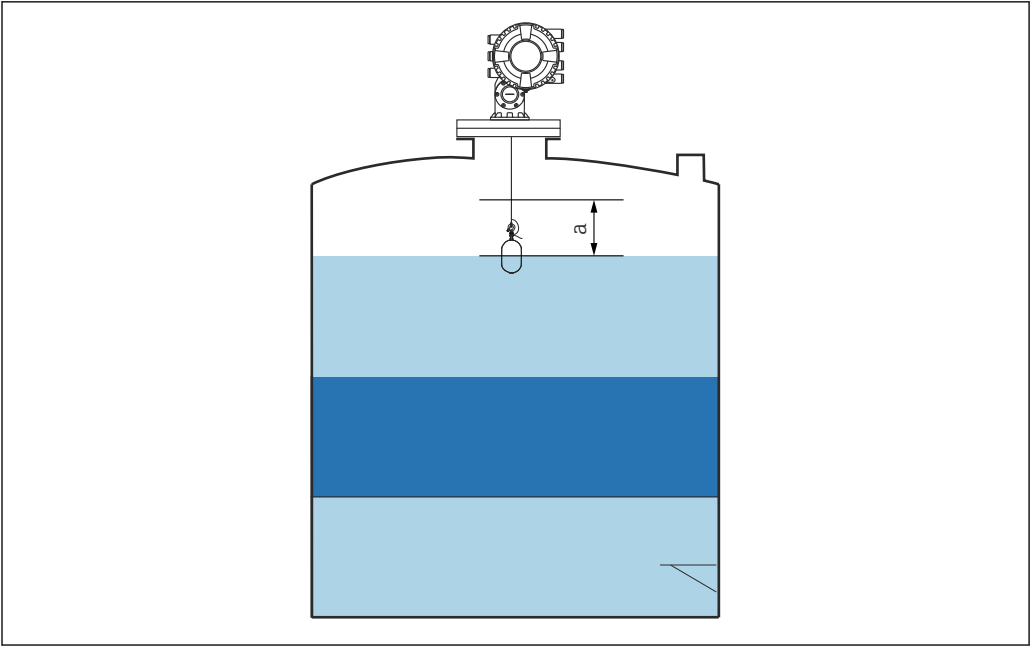
A0040297

- 23 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

Additional information



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24 a: Offset standby distance

One-time command status

Navigation

Expert → Tank values → One-time Cmd (8201)

Description

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

Additional information

Read access	Operator
Write access	-

Additional information

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

3.6.1 "Level" submenu

Navigation Expert → Tank values → Level

► Level

Tank level

→ 265

Tank Level %

→ 265

Tank ullage

→ 266

Tank ullage %

→ 266

Upper interface level	→  266
Upper interface level timestamp	→  266
Lower interface level	→  267
Lower interface level timestamp	→  267
Bottom level	→  267
Bottom level timestamp	→  267
Water level	→  268
Measured level	→  268
Distance	→  268
Displacer position	→  268

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><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>-</td></tr></table>	Read access	Operator	Write access	-
Read access	Operator				
Write access	-				

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><tr><td>Read access</td><td>Operator</td></tr><tr><td>Write access</td><td>-</td></tr></table>	Read access	Operator	Write access	-
Read access	Operator				
Write access	-				

Tank ullage

Navigation

 Expert → Tank values → Level → Tank ullage (14657)

Description

Shows the remaining empty space in the tank.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Maintenance
Write access	-

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

Read access	Operator
Write access	-

Lower interface level

Navigation   Expert → Tank values → Level → Lower I/F level (15004)

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

Additional information

Read access	Maintenance
Write access	-

Lower interface level timestamp

Navigation   Expert → Tank values → Level → LowI/F timestamp (8061)

Description Shows timestamp of the last measured lower interface level.

Additional information

Read access	Operator
Write access	-

Bottom level

Navigation   Expert → Tank values → Level → Bottom level (15018)

Description Shows the bottom level.

Additional information

Read access	Operator
Write access	-

Bottom level timestamp

Navigation   Expert → Tank values → Level → BotLev timestamp (8048)

Description Shows the timestamp for measured bottom level.

Additional information

Read access	Operator
Write access	-

Water level

Navigation

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

Description

Shows the bottom water level.

Additional information

Read access	Operator
Write access	-

Measured level

Navigation

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

Description

Shows the measured level without any correction from the tank calculations.

Additional information

Read access	Operator
Write access	-

Distance

Navigation

 Expert → Tank values → Level → Distance (8103)

Description

Shows measured distance from reference position.

Additional information

Read access	Operator
Write access	-

Displacer position

Navigation

 Expert → Tank values → Level → Displacer pos (15019)

Description

Shows the displacer position.

Additional information

Read access	Operator
Write access	-

3.6.2 "Temperature" submenu

Navigation  Expert → Tank values → Temperature

► Temperature	
Liquid temperature	→  269
Vapor temperature	→  269
Air temperature	→  270
► NMT element values	→  270
► Element temperature	→  270
Element temperature 0 to 23	→  270
► Element position	→  270
Element position 0 to 23	→  270

Liquid temperature

Navigation  Expert → Tank values → Temperature → Liquid temp. (14978)

Description Shows the average or spot temperature of the measured liquid.

Additional information	Read access	Operator
	Write access	-

Vapor temperature

Navigation  Expert → Tank values → Temperature → Vapor temp. (14985)

Description Shows the measured vapor temperature.

Additional information	Read access	Operator
	Write access	-

Air temperature

Navigation	 Expert → Tank values → Temperature → Air temp. (14986)	
Description	Shows the air temperature.	
Additional information	Read access	Operator
	Write access	-

"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	Read access	Operator
	Write access	-

"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

Read access	Operator
Write access	-

3.6.3 "Density" submenu

Navigation  Expert → Tank values → Density

► Density		
Observed density	→ 	272
Observed density temperature	→ 	273
Vapor density	→ 	273
Air density	→ 	273
Measured upper density	→ 	273
Upper density timestamp	→ 	274
Measured middle density	→ 	274
Middle Density Timestamp	→ 	274
Measured lower density	→ 	274
Lower density timestamp	→ 	275
► Profile density	→ 	275
Profile density 0 to 49	→ 	275
Profile density position 0 to 49	→ 	275

Observed density

Navigation  Expert → Tank values → Density → Observed density (13451)

Description Calculated density of the product.

Additional information

Read access	Operator
Write access	-

 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/m ³				
Factory setting	1.2 kg/m ³				
Additional information	<table border="1"> <tr> <td>Read access</td><td>Operator</td></tr> <tr> <td>Write access</td><td>Maintenance</td></tr> </table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

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/m ³				
Factory setting	1.2 kg/m ³				
Additional information	<table border="1"> <tr> <td>Read access</td><td>Operator</td></tr> <tr> <td>Write access</td><td>Maintenance</td></tr> </table>	Read access	Operator	Write access	Maintenance
Read access	Operator				
Write access	Maintenance				

Measured upper density

Navigation	 Expert → Tank values → Density → Meas upper dens. (15001)
Description	Shows the density of the upper phase.

Additional information	Read access	Operator
	Write access	-

Upper density timestamp

Navigation  Expert → Tank values → Density → UpDens timestamp (8067)

Description Shows timestamp of the last measured upper density.

Additional information	Read access	Operator
	Write access	-

Measured middle density

Navigation  Expert → Tank values → Density → Meas middle dens (14997)

Description Density of the middle phase.

Additional information	Read access	Operator
	Write access	-

Middle Density Timestamp

Navigation  Expert → Tank values → Density → MidDensTimestamp (8011)

Description Shows the timestamp of the last measured middle density.

Additional information	Read access	Operator
	Write access	-

Measured lower density

Navigation  Expert → Tank values → Density → Meas lower dens. (15002)

Description Density of the lower phase.

Additional information	Read access	Maintenance
	Write access	-

Lower density timestamp

Navigation Expert → Tank values → Density → LowerDensTimestp (8122)**Description**

Shows timestamp of last measured lower density.

Additional information

Read access	Operator
Write access	-

"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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

3.6.4 "Pressure" submenu

Navigation  Expert → Tank values → Pressure

► Pressure

P1 (bottom)

→  276

P3 (top)

→  276

P1 (bottom)

Navigation  Expert → Tank values → Pressure → P1 (bottom) (14983)

Description Shows the pressure at the tank bottom.

Read access	Operator
Write access	-

P3 (top)

Navigation  Expert → Tank values → Pressure → P3 (top) (14988)

Description Shows the pressure (P3) at the top transmitter.

Read access	Operator
Write access	-

3.6.5 "GP values" submenu

Navigation   Expert → Tank values → GP values

▶ GP values

GP 1 to 4 name

→  277

GP Value 1

→  277

GP Value 2

→  277

GP Value 3

→  278

GP Value 4

→  278

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	Read access	Operator
	Write access	Maintenance

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	Read access	Operator
	Write access	-

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.	

Additional information	Read access	Operator
	Write access	-

GP Value 3

Navigation  Expert → Tank values → GP values → GP Value 3 (14968)

Description Displays the value that will be used as general purpose value.

Additional information	Read access	Operator
	Write access	-

GP Value 4

Navigation  Expert → Tank values → GP values → GP Value 4 (14969)

Description Displays the value that will be used as general purpose value.

Additional information	Read access	Operator
	Write access	-

3.7 "Diagnostics" submenu

Navigation  Expert → Diagnostics

► Diagnostics		
Actual diagnostics		→  281
Timestamp		→  281
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Operating time from restart		→  282
Operating time		→  282
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► Diagnostic list		
Diagnostics 1 to 5		→  284
Timestamp 1 to 5		→  284
► Event logbook		
► Simulation		
Device alarm simulation		→  286
Diagnostic event simulation		→  286
Simulation distance on		→  287
Simulation distance		→  287
Current output 1 to 2 simulation		→  287
Simulation value		→  288
► Device information		
Device tag		→  289
Serial number		→  290
Firmware version		→  290

Firmware CRC	→ ⓘ 290
Weight and measures configuration CRC	→ ⓘ 290
Device name	→ ⓘ 291
Order code	→ ⓘ 291
Extended order code 1 to 3	→ ⓘ 291
ENP version	→ ⓘ 291
Device type	→ ⓘ 292
Module type	→ ⓘ 292
Communication Slot	→ ⓘ 292
▶ Board info	→ ⓘ 294
Date/time	→ ⓘ 283
System temperature	→ ⓘ 294
W&M lock switch	→ ⓘ 294
▶ Data logging	→ ⓘ 296
Assign channel 1 to 4	→ ⓘ 297
Logging interval	→ ⓘ 298
Clear logging data	→ ⓘ 299
▶ Device check	→ ⓘ 301
▶ Commissioning check	→ ⓘ 302
Commissioning check	→ ⓘ 302
Result drum check	→ ⓘ 302
Step X / 11	→ ⓘ 302
▶ Commissioning parameter	→ ⓘ 303
Step X / 11	→ ⓘ 303

	Result drum check	→  303
	Displacer weight tolerance	→  303
	Reference calibration incomplete	→  304

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

Previous diagnostics

Navigation

  Expert → Diagnostics → Prev.diagnostics (0690)

Description

Displays the diagnostic message for the last diagnostic event that has ended.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

Operating time

Navigation

 Expert → Diagnostics → Operating time (0652)

Description

Indicates how long the device has been in operation.

Additional information

Read access	Operator
Write access	-

Date/time

Navigation   Expert → Diagnostics → Date/time (0790)

Description Displays the device internal real time clock.

Additional information

Read access	Operator
Write access	-

3.7.1 "Diagnostic list" submenu

Navigation  Expert → Diagnostics → Diagnostic list

► Diagnostic list

Diagnostics 1 to 5

→  284

Timestamp 1 to 5

→  284

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

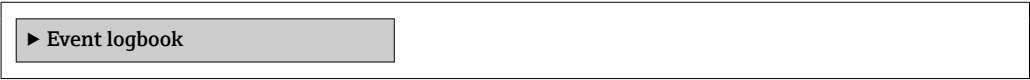
Timestamp of the diagnostic message.
- Additional information

Read access	Operator
Write access	-

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

► Simulation		
Device alarm simulation	→ 	286
Diagnostic event simulation	→ 	286
Simulation distance on	→ 	287
Simulation distance	→ 	287
Current output 1 to 2 simulation	→ 	287
Simulation value	→ 	288

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	Read access	Operator
	Write access	Maintenance

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	

Additional information

Read access	Operator
Write access	Maintenance



To terminate the simulation, select **Off**.

Simulation distance on**Navigation**

Expert → Diagnostics → Simulation → Sim distance on (8002)

Description

Switches the distance simulation on or off.

Selection

- Off
- On

Factory setting

Off

Additional information

Read access	Operator
Write access	Maintenance

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

Read access	Operator
Write access	Maintenance

Current output N simulation**Navigation**

Expert → Diagnostics → Simulation → Curr.outp N sim. (13985)

Prerequisite

- The device has an Analog I/O module.
- **Operating mode (→ 148) = 4..20mA output or HART slave +4..20mA output**

Description

Switches the simulation of the current on or off.

Selection ■ Off
 ■ On

Factory setting Off

Additional information	Read access	Operator
	Write access	Maintenance

Simulation value 

Navigation   Expert → Diagnostics → Simulation → Simulation value (13976)

Prerequisite **Current output simulation (→  287) = On**

Description Defines the current to be simulated.

User entry 3.4 to 23 mA

Factory setting The current at the time the simulation was started.

Additional information	Read access	Operator
	Write access	Maintenance

3.7.4 "Device information" submenu

Navigation   Expert → Diagnostics → Device info

► Device information		
Device tag	→ 	289
Serial number	→ 	290
Firmware version	→ 	290
Firmware CRC	→ 	290
Weight and measures configuration CRC	→ 	290
Device name	→ 	291
Order code	→ 	291
Extended order code 1 to 3	→ 	291
ENP version	→ 	291
Device type	→ 	292
Module type	→ 	292
Communication Slot	→ 	292
Recovery state	→ 	292
► Board info	→ 	294

Device tag

Navigation	  Expert → Diagnostics → Device info → Device tag (0011)
Description	Shows the device tag.
User interface	Character string comprising numbers, letters and special characters
Factory setting	- none -

Additional information

Read access	Operator
Write access	-

Serial number

Navigation

 Expert → Diagnostics → Device info → Serial number (0009)

Description

The serial number is a unique alphanumeric 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

Read access	Operator
Write access	-

Firmware version

Navigation

 Expert → Diagnostics → Device info → Firmware version (0010)

Description

Displays the device firmware version installed.

Additional information

Read access	Operator
Write access	-

Firmware CRC

Navigation

 Expert → Diagnostics → Device info → Firmware CRC (8563)

Description

Result of the cyclic redundancy check of the firmware.

Additional information

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

Order code



Navigation   Expert → Diagnostics → Device info → Order code (0008)

Description Shows the device order code.

Additional information

Read access	Operator
Write access	Service

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

Read access	Operator
Write access	Service

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

Read access	Operator
Write access	-

Device type

Navigation

 Expert → Diagnostics → Device info → Device type (8561)

Description

Displays the device type.

Additional information

Read access	Operator
Write access	-

Module type

Navigation

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

Description

Shows the type of installed IO module.

Additional information

Read access	Operator
Write access	-

Communication Slot

Navigation

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

Description

Indicates which IOM slot contains the communication protocol interface board.

Additional information

Read access	Operator
Write access	-

Recovery state

Navigation

 Expert → Diagnostics → Device info → Recovery state (8565)

Description

Indicate the state of the backup data process.

User interface

- Inactive
- distributing
- restoring
- Distribution done
- Distribution failed
- Operating normally
- Restore done
- Restore failed

Factory setting Inactive

"Board info" submenu

Navigation  Expert → Diagnostics → Device info → Board info

► Board info

Date/time

→  294

System temperature

→  294

W&M lock switch

→  294

Date/time

Navigation  Expert → Diagnostics → Device info → Board info → Date/time (0790)

Description Displays the device internal real time clock.

Additional information	Read access	Operator
	Write access	-

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	Read access	Operator
	Write access	-

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

Read access	Operator
Write access	-

3.7.5 "Data logging" submenu

Structure of the submenu on the local display

Navigation  Expert → Diagnostics → Data logging

► Data logging

Assign channel 1 to 4

Logging interval

Clear logging data

► Display channel 1 to 4

→  297

→  298

→  299

Structure of the submenu in an operating tool

Navigation  Expert → Diagnostics → Data logging

► Data logging

Assign channel 1 to 4

Logging interval

Clear logging data

→  297

→  298

→  299

Description of parameters

Navigation  Expert → Diagnostics → Data logging

Assign channel 1 to 4

Navigation  Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

Description Assign a process variable to logging channel.

Selection

- Off
- Tank level
- Measured level
- Tank level %
- Distance
- Water level
- Upper interface level
- Lower interface level
- Displacer position *
- Upper density
- Middle density
- Lower density
- Bottom level
- Average profile density *
- Liquid temperature
- Vapor temperature
- Air temperature
- Tank ullage
- Tank ullage %
- Observed density value
- P1 (bottom)
- P2 (middle)
- P3 (top)
- GP 1 value
- GP 2 value
- GP 3 value
- GP 4 value
- AIO B1-3 value *
- AIO B1-3 value mA *
- AIO B1-3 value % *
- AIO C1-3 value *
- AIO C1-3 value mA *
- AIO C1-3 value % *
- AIP B4-8 value *
- AIP C4-8 value *
- Absolute echo amplitude *
- Amplitude eval distance *
- DiffPhase *

Factory setting Off

* Visibility depends on order options or device settings

Additional information

A total of 1000 measured values can be logged. This means:

- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

If the maximum number of data points is reached, the oldest data points in the data log are cyclically overwritten in such a way that the last 1000, 500, 333 or 250 measured values are always in the log (ring memory principle).

 The logged data are deleted if a new option is selected in this parameter.

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

- $T_{log} = 1000 \cdot 1 \text{ s} = 1000 \text{ s} \approx 16.5 \text{ min}$
- $T_{log} = 1000 \cdot 10 \text{ s} = 1000 \text{ s} \approx 2.75 \text{ h}$
- $T_{log} = 1000 \cdot 80 \text{ s} = 80\,000 \text{ s} \approx 22 \text{ h}$
- $T_{log} = 1000 \cdot 3\,600 \text{ s} = 3\,600\,000 \text{ s} \approx 41 \text{ d}$

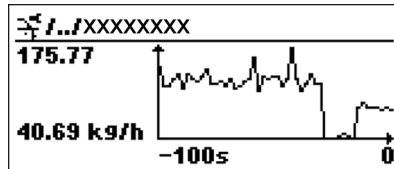
Read access	Operator
Write access	Maintenance

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	Read access	Operator
	Write access	Maintenance

"Display channel 1 to 4" submenu

i 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.

i To quit the diagram and to return to the operating menu, press $\oplus$ and $\ominus$ simultaneously.

Navigation



Expert → Diagnostics → Data logging → Displ.channel 1 to 4

3.7.6 "Device check" submenu

Navigation   Expert → Diagnostics → Device check



"Commissioning check" wizard

Navigation  Expert → Diagnostics → Device check → Commission check

► Commissioning check

Commissioning check

Result drum check

Step X / 11

→  302

→  302

→  302

Commissioning check

Navigation

 Expert → Diagnostics → Device check → Commission check → Commission check

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

Result drum check

Navigation

 Expert → Diagnostics → Device check → Commission check → Result drum chk (8155)

Description

Gives feedback on the latest status of the commissioning check.

Additional information

Read access	Operator
Write access	-

Step X / 11

Navigation

 Expert → Diagnostics → Device check → Commission check → Step X / 11 (8143)

Description

Indicates which step of the commissioning check is currently running.

Additional information

Read access	Operator
Write access	-

"Commissioning parameter" submenu

Navigation

 Expert → Diagnostics → Device check → Commission para.

► Commissioning parameter

Step X / 11

→  303

Result drum check

→  303

Displacer weight tolerance

→  303

Reference calibration incomplete

→  304

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

Read access	Operator
Write access	-

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

Read access	Operator
Write access	-

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

Additional information

Read access	Operator
Write access	Service

Reference calibration incomplete

Navigation

 Expert → Diagnostics → Device check → Commission para. → Ref cal. incomp (8157)

User interface

0 to 1

Factory setting

0

Additional information

Read access	Operator
Write access	-

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