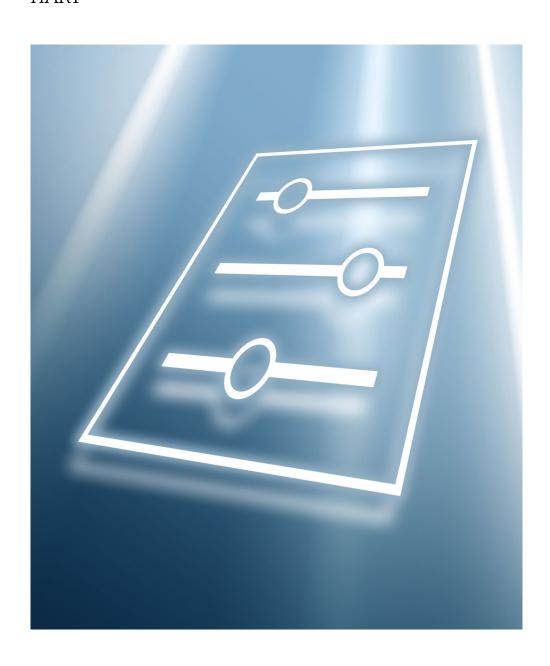
Products

Valid as of version 01.01.zz (Device firmware)

# Description of Device Parameters Micropilot FMR60B, FMR62B, FMR63B, FMR66B, FMR67B; Operating tool

Free-space radar HART







#### 1 About this document

#### 1.1 **Document function**

The document is part of the Operating Instructions and serves as a reference for parameters.

Tasks that require detailed knowledge of the function of the device:

- Starting up measurements under difficult conditions
- Optimal adjustment of measurements to difficult conditions
- Detailed configuration of communication interface
- Fault diagnosis in difficult cases

#### 1.2 Target group

This document is aimed at specialists who work with the device over the entire life cycle and perform specific configurations.

#### 1.3 **Document structure**

The document consists of a general part and a specific part.

The structure of the document and its components are explained in the general part (section 1).

The specific part starts with an overview of the device operating menu, which is the focus of this manual.

The description of the device parameters follows the overview of the operating menu. The description is divided into 4 main menus and their submenus.

The 4 main menus:

- Guidance
- Diagnostics
- Application
- System

In the "Description of device parameters" section, the menus, submenus and parameters are displayed in the same way as they are laid out in the menu structure for the **operating** tool.

An operating tool is software, such as FieldCare, which can be used to display and edit the data and parameters stored in the device on a PC or laptop. Compared to operation via the local display, an operating tool offers more options. It provides additional information, such as graphics and help texts, which explain the properties of the parameters.

The submenus visible to a user depend on the **User role** ( $\rightarrow \equiv 100$ ) they are logged in with. This document lists the submenus and their parameters that are available to the User role Maintenance.

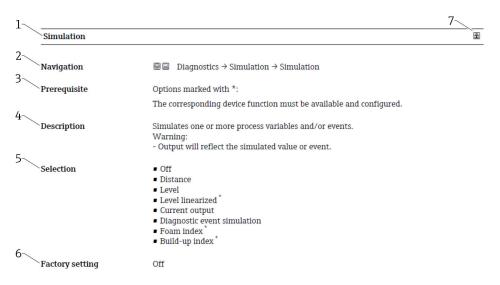
The operating menu is dynamic and adapts the choice of parameters to the selected options.



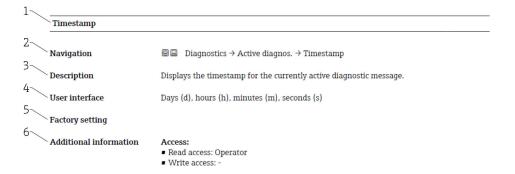
For information on operating options, see the Operating Instructions.

#### 1.4 Elements of parameter descriptions

Parameter descriptions are structured and made up of a number of elements. Depending on the parameter, more or fewer elements may be available. Below are 2 examples of different parameters:



- 1 Name: Parameter designation (Label)
- 2 Navigation: Navigation path to the parameter. The graphics indicate whether the path applies to the onsite display, the operating tool or both.
- 3 Prerequisite: The marked options can only be selected under the condition specified in each case
- 4 Description: Description of the parameter function
- 5 Selection: List of the individual options for the parameter
- 6 Factory setting: Default setting on leaving the factory
- 7 The lock symbol indicates that the parameter is write-protected



- 1 Name: Parameter designation (Label)
- 2 Navigation: Navigation path to the parameter. The graphics indicate whether the path applies to the onsite display, the operating tool or both.
- 3 Description: Description of the parameter function
- 4 User interface: Display value/data of the parameter
- 5 Factory setting: Default setting on leaving the factory
- 6 Additional information:

Read and write access: Information on access rights that users with certain roles have to the parameter

Additional information at the end of the parameter description can refer to all elements of the parameter description and expand them.

# 1.5 Symbols

## 1.5.1 Safety symbols

#### A DANGER

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

## **▲** WARNING

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

#### **A** CAUTION

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

#### **NOTICE**

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

## 1.5.2 Symbols for certain types of information

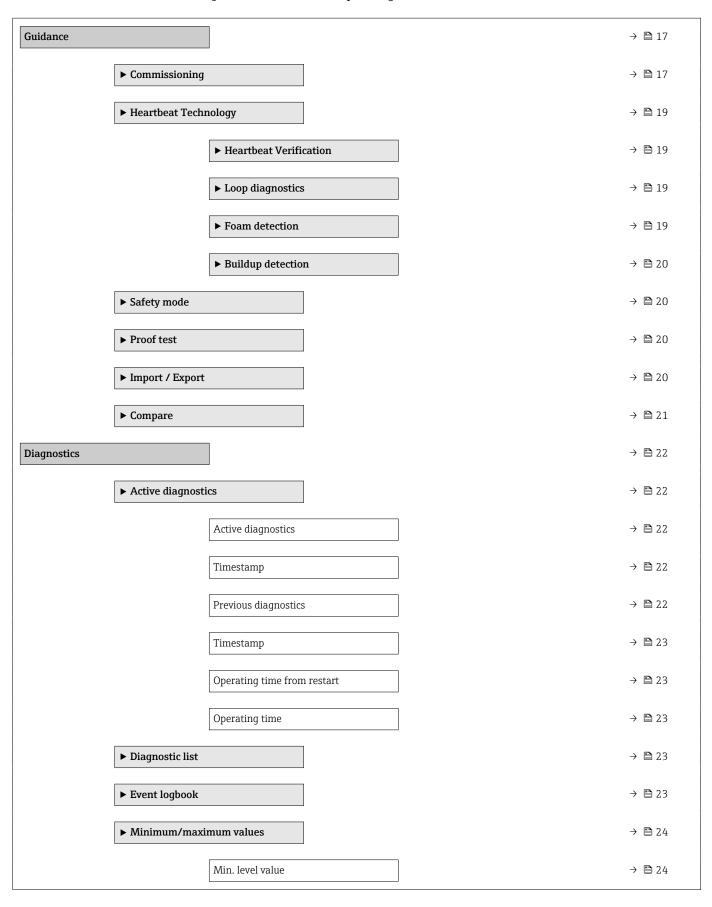
- Indicates additional information
- Reference to documentation
- Operation via local display
- Operation via operating tool
- Write-protected parameter

## 1.6 Documentation

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

The documentation is available via the Internet: → www.endress.com Download

# 2 Overview of the operating menu



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▶ HART output ⇒ 월 90   Assign PV ⇒ 월 90   Primary variable (PV) ⇒ 월 90   Assign SV ⇒ 월 91   Assign TV ⇒ 월 91   Tertiary variable (TV) ⇒ 월 92   Assign QV ⇒ 월 92   Quaternary variable (QV) ⇒ 월 92   ▶ Burst configuration 1 ⇒ 월 93   Burst command 1 ⇒ 월 93   Burst variable 0 3 ⇒ 월 93   Burst variable 4 7 ⇒ 월 94				
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# 3 Description of device parameters

## 3.1 Guidance

The Guidance main menu contains functions which enable users to perform basic tasks swiftly, e.g. commissioning.

These are primarily guided wizards and cross-subject special functions.

Navigation 🗐 🗐 Guidance

## 3.1.1 Overview

The **Guidance** menu contains the following submenus and wizards:

- Commissioning
- Heartbeat Technology
  - Heartbeat Verification
  - Loop diagnostics
  - Foam detection
  - Buildup detection
- Safety mode
- Proof test
- Import / Export
- Compare

## 3.1.2 Commissioning

Run the **Commissioning** wizard to commission the device. Enter the appropriate value in each parameter or select the appropriate option.

## **A** WARNING

If the wizard is canceled before all the necessary parameters have been configured, any settings already set are saved.

The device may be in an undefined state!

► Reset the device to factory settings.

Navigation

■ Guidan

Guidance → Commissioning

## Parameters for the "Commissioning" wizard

## The following parameters are configured or displayed in this wizard:

- Device identification
  - Device tag
  - Device name
  - Serial number
  - Extended order code 1 ... 3
  - Locking status
  - HART short tag
  - HART date code
  - HART descriptor
  - HART message
  - HART address

## Measurement adjustments

- Distance unit
- Temperature unit
- Level unit
- Application
- Empty calibration
- Full calibration
- Level
- Displayed level/distance correct?
- Show possible signals in?
- Distance 1 ... 5
- Level 1 ... 5
- Is a linearization required?
- Linearization type
- Unit after linearization
- Free text
- Maximum value
- Diameter
- Intermediate height
- Level linearized
- Table mode
- Table number
- Level
- Customer value
- Activate table

#### Output settings

## **Current output 1**

- Process variable output current
- Current range output
- Lower range value output
- Upper range value output
- Failure behavior current output
- Failure current
- Loop current mode
- Assign HART variables?

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## Output settings

## Current output 2\*

- Process variable output current
- Current range output
- Lower range value output
- Upper range value output
- Failure behavior current output
- Failure current

## Output settings

## Digital output\*

- Assign PV
- Assign SV
- Assign TV
- Assign QV

## 3.1.3 Heartbeat Technology

Heartbeat Technology offers the following functions:

- Diagnostics through continuous self-monitoring
- Additional measured variables output to an external condition monitoring system
- In situ verification of measuring instruments in the application
- Special Documentation on Heartbeat Technology is available via the Internet: www.endress.com → Download

*Navigation*  $\square$  Guidance  $\rightarrow$  Heartbeat Techn.

#### **Heartbeat Verification**

This wizard is used to start an automatic verification of the device functionality. The results can be documented as a verification report.

Navigation  $\square$  Guidance  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Heartbeat Verif.

## Loop diagnostics

Using this wizard, changes in the current-voltage loop characteristics (baseline) can be used to detect unwanted installation anomalies such as creep currents caused by terminal corrosion or a deteriorating power supply that can lead to an incorrect 4-20 mA measured value.

*Navigation*  $\square$  Guidance  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Loop diagn.

#### Foam detection

This wizard configures the automatic foam detection.

Foam detection can be linked to an output variable or status information e.g. to control a sprinkler used to dissolve the foam. It is also possible to monitor the foam increase in a so called foam index. The foam index can also be linked to an output variable and can be shown on the display.

## Preparation:

The Foam monitoring initialization should only be done without or less foam.

<sup>\*</sup>Visibility depends on order options or device settings

Navigation  $\Box$  Guidance  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection

#### **Buildup detection**

This wizard configures the build-up detection.

Basic idea:

The build-up detection can, for example, be linked to a compressed-air system to clean the antenna.

With the build-up monitoring the maintenance cycles can be optimized.

Preparation

The build-up monitoring initialization should only be done without or less build-up.

Navigation  $\Box$  Guidance  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Buildup detect.

## 3.1.4 Safety mode

The write protection guards the device settings against overwriting. In addition, it is recommended for safety applications to confirm the safety relevant device settings. This ensures that the correct values have been entered and downloaded to device.

This input can be used as the confirmation sequence instead of manual checklists. After the safety relevant device settings have been confirmed, the device is marked with the property Safety-locked. This indicates that the safety relevant parameter settings have been checked and evaluated as correct.

To unlock the safety locking the sequence needs to be restarted. The safety locking is deactivated when the safety unlocking code (= safety locking code) is entered.

Navigation  $\Box$  Guidance  $\rightarrow$  Safety mode

## 3.1.5 Proof test

The proof test will simulate the current output.

The safety function is not guaranteed during proof test. Alternative process control in manual must be taken to ensure process safety.

Note: It is only possible to perform a proof test when the device has no alarm and the hardware write protection switch is off.

## 3.1.6 Import / Export

## Save / Restore

- The device settings can be saved in a .deh file.
- The device settings saved in a .deh file can be written to the device.

## Create configuration report

Device documentation can be saved in PDF format under Create configuration report. This device documentation contains the following general device information:

- Information on device parameters
- Information on Linearization
- Echo curve
- Event list
- Diagnostic list

Navigation  $\Box$  Guidance  $\rightarrow$  Import / Export

## 3.1.7 Compare

## **Compare datasets**

This function can be used to compare the following datasets:

- Data records in the .deh file format from the function Import / Export
- Datasets with the configuration currently in the device

Navigation  $\Box$  Guidance  $\rightarrow$  Compare

## 3.2 Diagnostics

## 3.2.1 Active diagnostics

*Navigation*  $\blacksquare \square$  Diagnostics  $\rightarrow$  Active diagnos.

## Active diagnostics

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Active diagnos.  $\rightarrow$  Active diagnos.

**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.

**User interface** • Operating time of the device until the event occurs

Symbol for diagnostic behavior

■ Code for diagnostic behavior

■ Event text

Corrective measure

## Timestamp

**Navigation**  $\blacksquare \square$  Diagnostics  $\rightarrow$  Active diagnos.  $\rightarrow$  Timestamp

**Description** Displays the timestamp for the currently active diagnostic message.

**User interface** Days (d), hours (h), minutes (m), seconds (s)

## Previous diagnostics

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Active diagnos.  $\rightarrow$  Prev.diagnostics

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

**User interface** ■ Operating time of the device until the event occurs

Symbol for diagnostic behavior

• Code for diagnostic behavior

■ Event text

Corrective measure

**Timestamp** 

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Active diagnos.  $\rightarrow$  Timestamp

**Description** Displays the timestamp of the diagnostic message generated for the last diagnostic event

that has ended.

**User interface** Days (d), hours (h), minutes (m), seconds (s)

Operating time from restart

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Active diagnos.  $\rightarrow$  Time fr. restart

**Description** Indicates how long the device has been in operation since the last time the device was

restarted.

**User interface** Days (d), hours (h), minutes (m), seconds (s)

Operating time

Clear event list

**Navigation** □ Diagnostics → Active diagnos. → Operating time

**Description** Indicates how long the device has been in operation.

**User interface** Days (d), hours (h), minutes (m), seconds (s)

3.2.2 Diagnostic list

3.2.3 Event logbook

**Navigation**  $\square$  Diagnostics  $\rightarrow$  Event logbook  $\rightarrow$  Clear event list

**Description** Delete all entries of the event list.

**Selection** • Cancel

■ Clear data

Factory setting

Cancel

Additional information

Access:

Read access: ExpertWrite access: Expert

## 3.2.4 Minimum/maximum values

*Navigation*  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Min/max val.

Min. level value

**Description** Minimum or maximum measured value by device.

Note:

This value can be reset via the "Reset min./max." parameter.

This value is also reset when device is reset.

User interface

**Navigation** 

Signed floating-point number

Time min. level

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Time min. level

**Description** Displays operating time at which the lowest level was measured.

Note:

This value can be reset via the "Reset min./max." parameter.

This value is also reset when device is reset.

**User interface** Character string comprising numbers, letters and special characters

Max, level value

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Max. level value

**Description** Minimum or maximum measured value by device.

Note:

This value can be reset via the "Reset min./max." parameter.

This value is also reset when device is reset.

**User interface** Signed floating-point number

Time max. level

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Time max. level

**Description** Displays operating time at which the highest level was measured.

Note:

This value can be reset via the "Reset min./max." parameter.

This value is also reset when device is reset.

**User interface** Character string comprising numbers, letters and special characters

Maximum draining speed

**Description** Displays highest draining speed measured since the last reset.

Note:

This value can be reset via the "Reset min./max." parameter.

This value is also reset when device is reset.

**User interface** Positive floating-point number

Maximum filling speed

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Max. fill. speed

**Description** Displays highest filling speed measured since the last reset.

Note:

This value can be reset via the "Reset min./max." parameter.

This value is also reset when device is reset.

**User interface** Positive floating-point number

### Counter underfilling

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Count underfill.

**Description** Displays the number of underfills (level < 0 %) or overfills (level > 100 %).

Note:

This value can be reset via the "Reset min./max." parameter.

This value is also reset when device is reset.

**User interface** 0 to 65 535

Factory setting 0

## Counter overfilling

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Count overfill.

**Description** Displays the number of underfills (level < 0 %) or overfills (level > 100 %).

Note:

This value can be reset via the "Reset min./max." parameter.

This value is also reset when device is reset.

**User interface** 0 to 65 535

Factory setting 0

#### Minimum sensor temperature

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Min. sensor temp

**Description** Displays lowest or highest sensor temperature measured so far.

**User interface** −150 to 200 °C

## Time min. sensor temperature

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Time min s. temp

**Description** Displays operating time at which the lowest sensor temperature was measured so far.

**User interface** Character string comprising numbers, letters and special characters

## Maximum sensor temperature

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Max. sensor temp

**Description** Displays lowest or highest sensor temperature measured so far.

**User interface** −150 to 200 °C

#### Time max. sensor temperature

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Time max s. temp

**Description** Displays operating time at which the highest sensor temperature was measured so far.

**User interface** Character string comprising numbers, letters and special characters

## Minimum terminal voltage

**Navigation**  $\square$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Min.term.volt.

**Description** Minimum or maximum measured terminal (supply) voltage.

**User interface** 0.0 to 50.0 V

## Maximum terminal voltage

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Max.term.voltage

**Description** Minimum or maximum measured terminal (supply) voltage.

**User interface** 0.0 to 50.0 V

## Minimum electronics temperature

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Min.electr.temp.

**Description** Minimum or maximum measured main electronics temperature.

**User interface** Signed floating-point number

## Maximum electronics temperature

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Min/max val.  $\rightarrow$  Max.electr.temp.

**Description** Minimum or maximum measured main electronics temperature.

**User interface** Signed floating-point number

Reset min./max.

**Navigation** □ Diagnostics → Min/max val. → Reset min/max

**Description** Resets the drag indicator of the selected process variable.

**Selection** • None

■ Drain/fill speed

■ Level

■ Reset all

Factory setting None

## 3.2.5 Simulation

Navigation  $\square$  Diagnostics  $\rightarrow$  Simulation

Simulation

**Navigation**  $\square$  Diagnostics  $\rightarrow$  Simulation

**Description** Simulates one or more process variables and/or events.

Warning:

Output will reflect the simulated value or event.

Selection ■ Off

- Distance
- Level
- Level linearized \*
- Current output 1
- Current output 2
- Digital Output \*
- Diagnostic event simulation
- Foam index\*
- Buildup index \*

<sup>\*</sup> Visibility depends on order options or device settings

Factory setting

Off

Value current output

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Simulation  $\rightarrow$  Current output

**Prerequisite** Simulation = Current output 1

**Description** Defines the value of the simulated output current.

**User entry** 3.59 to 23 mA

**Factory setting** 3.59 mA

Value current output

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Simulation  $\rightarrow$  Current output

**Prerequisite** Simulation = Current output 2

**Description** Defines the value of the simulated output current.

**User entry** 3.59 to 23 mA

**Factory setting** 3.59 mA

Switch state

**Navigation**  $\blacksquare \square$  Diagnostics  $\rightarrow$  Simulation  $\rightarrow$  Switch state

**Description** Select a switch state. In this manner, it is possible to verify the switch output is configured

correctly and downstream processing units are functioning properly.

**Selection** ■ Open

Closed

Factory setting Open

Simulation distance

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Simulation  $\rightarrow$  Sim distance

**Prerequisite** Simulation = Distance

Endress+Hauser

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**User entry** -999 900 to 999 900 mm

**Factory setting** 0 mm

Buildup index

**Prerequisite** Simulation = Buildup index

**User entry** 0 to 100.0 %

**Factory setting** 0 %

Foam index

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Simulation  $\rightarrow$  Foam index

**Prerequisite** Simulation = Foam index

**User entry** 0 to 100.0 %

**Factory setting** 0 %

Process variable value

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Simulation  $\rightarrow$  Proc. var. value

**Prerequisite** Simulation = Level linearized

**Description** Defines the value of the selected variable.

The outputs assume values or states according to this value.

**User entry** Signed floating-point number

Factory setting 0

Diagnostic event simulation

**Prerequisite** Simulation = Diagnostic event simulation

**Description** Select the diagnostic event to be simulated.

Note:

To terminate the simulation, select "Off".

**Selection** 062 Sensor connection faulty

151 Sensor electronic failure

203 HART Device Malfunction

204 HART Electronic Defect

242 Firmware incompatible

252 Module incompatible

270 Main electronics defective

272 Main electronics faulty

273 Main electronics defective

282 Data storage inconsistent

283 Memory content inconsistent

287 Memory content inconsistent

388 Electronics and HistoROM defective

410 Data transfer failed

412 Processing download

420 HART Device Configuration Locked

421 HART Loop Current fixed

430 Configuration faulty

431 Trim required

435 Linearization faulty

437 Configuration incompatible

438 Dataset different

441 Current output 1 saturated

441 Current output 2 saturated

452 Calculation error detected

484 Failure mode simulation active

485 Process variable simulation active

491 Current output 1 simulation active

494 Switch output simulation active

538 Configuration Sensor Unit invalid

585 Simulation distance

586 Record map

801 Supply voltage too low

802 Supply voltage too high

805 Loop current faulty

807 No Baseline due to insuf. volt. at 20 mA

825 Electronics temperature

826 Sensor temperature out of range

843 Process value above limit

844 Process value out of specification

 $846\ HART\ Non-Primary\ Variable\ Out\ of\ Limit$ 

847 HART Primary Variable Out of Limit

848 HART Device Variable Alert

941 Echo lost

942 In safety distance 968 Level limited

**Factory setting** 

Off

## 3.2.6 Heartbeat Technology

Navigation  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.

#### **Heartbeat Verification**

Navigation  $\Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Heartbeat Verif.

## **Date/time Heartbeat Verification**

**Navigation** □ Diagnostics → Heartbeat Techn. → Heartbeat Verif. → Date/time Heartbeat

Verification

**Description** Date and time of last Heartbeat Verification.

This value is updated with every Heartbeat verification.

Note:

If time information is not available, e.g. Heartbeat verification is started from display,

'----' is shown.

**User interface** Character string comprising numbers, letters and special characters

**Factory setting** 01.01.1970 00:00:00

## Operating time (Verification)

**Navigation** □ Diagnostics → Heartbeat Techn. → Heartbeat Verif. → Operating time

**Description** Value of the operating hours counter at the time of verification.

**User interface** Days (d), hours (h), minutes (m), seconds (s)

Verification result

**Navigation** □ Diagnostics → Heartbeat Techn. → Heartbeat Verif. → Verific. result

**Description** Result of Heartbeat Verification.

**User interface** ■ Not done

PassedNot doneFailed

Factory setting Not done

Status

**Navigation** □ Diagnostics → Heartbeat Techn. → Heartbeat Verif. → Status

**Description** Shows the actual status.

**User interface** ■ Done

BusyFailedNot done

Factory setting Not done

Loop diagnostics

*Navigation*  $\blacksquare \blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Loop diagn.

Rebuild baseline

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Loop diagn.  $\rightarrow$  Reb. baseline

**Description** Notice

The current output is simulated.

Bridge the PLC or take other appropriate measures to prevent an erroneous triggering of

alarm messages or changes in the control loop behavior.

The baseline should be rebuilt if planned changes have been made in the loop.

Selection • No

Yes

Factory setting No

User interface

Factory setting

**Factory setting** 

Additional information

FailedSuccess

Failed

Disable

Tolerated deviation +/-		
Navigation	□□ Diagnostics → Heartbeat Techn. → Loop diagn. → Toler. deviation	
Description	A value should be chosen to ensure that normal voltage deviations do not lead to unwanted messages.	
	Default 1.5 V DC	
User entry	0.5 to 3.0 V	
Baseline status		
Navigation		
Description	"Failed" Means, baseline is not available or creation not possible.	
	"Success" Baseline is available.	

Loop diagnostics		
Navigation		
Description	Enable/disable loop diagnostics.  Note:  If the function is disabled, there is no analysis and no event message.	
Selection	■ Disable ■ Enable	

The parameter is visible if the baseline has been created.

Terminal voltage 1

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Loop diagn.  $\rightarrow$  Terminal volt. 1

**Description** Shows the current terminal voltage that is applied at the output

**User interface** 0.0 to 50.0 V

Clamping voltage lower threshold

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Loop diagn.  $\rightarrow$  Lower threshold

**User interface** 0.0 to 50.0 V

Clamping voltage upper threshold

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Loop diagn.  $\rightarrow$  Upper threshold

**User interface** 0.0 to 50.0 V

**Navigation** □ Diagnostics → Heartbeat Techn. → Loop diagn. → 806 Event delay

**Description** Displays how long the triggering status must be present until an event message is issued.

Used to filter out short-term signal interference.

**User entry** 0 to 60 s

**Factory setting** 1 s

806 Event delay

Endress+Hauser

_	1
Foam	detection

Navigation  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection

Foam detection 🗈

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection

Selection ■ Off ■ On

**Factory setting** Off

Foam index

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection  $\rightarrow$  Foam index

**Description** Foam index 0% means: no foam.

Foam index 100% means: maximum detectable foam.

**User interface** 0 to 100 %

**Factory setting** 0 %

Foam detec. threshold

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection  $\rightarrow$  Foam threshold

**Description** Enter the threshold for the foam detection. As soon as the foam index has reached the

preset switching point, an event is triggered.

**Selection** ■ Sensitive (20%)

■ Middle (40%)

Insensitive (80%)User defined (xx%)

Factory setting Middle (40%)

Foam detec. threshold value

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection  $\rightarrow$  Foam detect val.

**Description** User-defined threshold value for the foam detection.

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**User entry** 0 to 100.0 %

Factory setting 40 %

**Additional information** The parameter is visible if the **Foam detec. threshold** parameter = User defined (xx%)

Lower level range limit

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection  $\rightarrow$  LLR limit

**Description** Assign lower limit of foam monitoring area.

**Factory setting** 0 %

Upper level range limit

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection  $\rightarrow$  ULR limit

**Description** Assign upper limit of foam monitoring area.

Factory setting 100.0 %

Distance at foam zero adjustment

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection  $\rightarrow$  Dist. @zero foam

**Description** Displays the distance when the 0 % foam value was set.

**User entry** Signed floating-point number

**Factory setting** 0 mm

0% foam value

**Navigation** Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Foam detection  $\rightarrow$  0% foam value

**Description** Displays the relative echo amplitude when the 0 % foam value was set.

**User entry** -999 999.9 to 999 999.9 dB

**Factory setting** 0 dB

### **Buildup** detection

Navigation  $\Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Buildup detect.

Buildup detection

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Buildup detect.  $\rightarrow$  Buildup detect.

**Description** Activate or deactivate build-up detection.

Selection ■ Off

■ On

Factory setting Off

Buildup index

**Navigation** □ Diagnostics → Heartbeat Techn. → Buildup detect. → Buildup index

**Description** Build-up index 0% means: no build-up.

Build-up index 100% means: maximum detectable build-up.

**User interface** 0 to 100 %

**Factory setting** 0 %

Buildup detection threshold

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Buildup detect.  $\rightarrow$  Buildup detec.

**Description** Enter the threshold for the build-up detection. As soon as the build-up index has reached

the preset switching point, an event is triggered.

**Selection** ■ Sensitive (20%)

Middle (40%)Insensitive (80%)

■ User defined (xx%)

Factory setting Middle (40%)

### Buildup detection threshold value

**Navigation** □ Diagnostics → Heartbeat Techn. → Buildup detect. → Buildup value

**Description** User-defined threshold value for the build-up detection.

**User entry** 0 to 100.0 %

Factory setting 40 %

Additional information The parameter is visible if the Buildup detection threshold parameter = User defined (xx

%) option

### Minimum distance for buildup detection

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Buildup detect.  $\rightarrow$  Min dist buildup

**Description** Starting point for build-up detection area.

Note:

Build-up detection requires a minimum distance between the reference point of the

measurement and the medium surface.

**User entry** -999 900 to 999 900 mm

**Factory setting** 0 mm

### Maximum distance for buildup detection

A

**Description** Endpoint for build-up detection area.

Note:

Build-up detection requires a minimum distance between the reference point of the

measurement and the medium surface.

**User entry** -999 900 to 999 900 mm

Factory setting 1000 mm

0 % buildup value

**Navigation** □ Diagnostics → Heartbeat Techn. → Buildup detect. → 0 % buildup val

**Description** Displays the build up value at 0 % ("Area of incoupling" at 0 % build up).

Note:

This value is determined automatically in the guided commissioning and can be adjusted

manually in the menu later.

**User entry** Positive floating-point number

**Factory setting** 0

Area of incoupling

**Navigation** □ Diagnostics → Heartbeat Techn. → Buildup detect. → Area incoupling

**Description** Ringing integral within the detection area.

**User interface** Positive floating-point number

Factory setting 0.0

Limit offset for buildup detection

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Heartbeat Techn.  $\rightarrow$  Buildup detect.  $\rightarrow$  Offset buildup

**User entry** -999 999.9 to 999 999.9 dB

Factory setting 10 dB

### 3.2.7 Echo curve

*Navigation*  $\blacksquare \square$  Diagnostics  $\rightarrow$  Echo curve

Save reference curve

**Navigation**  $\blacksquare \blacksquare$  Diagnostics  $\rightarrow$  Echo curve  $\rightarrow$  Save ref. curve

**Description** Saves the currently measured echo curve as a reference curve in the device.

Note:

When the guided commissioning is executed the first time, the reference curve is

automatically saved at the end.

In the case of manual commissioning (menu), it is recommended to actively save the

reference curve immediately after commissioning.

**Selection** • Customer reference curve

Not active

**Factory setting** Not active

Time reference curve

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Echo curve  $\rightarrow$  Time ref. curve

**Description** Displays the timestamp of the recording of the reference curve.

**User interface** Days (d), hours (h), minutes (m), seconds (s)

Reference curve active

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Echo curve  $\rightarrow$  Ref.curve active

**Description** Displays if a customer reference curve has been stored in the device.

**User interface** ■ Delivery reference curve available

■ Customer reference curve available

**Factory setting** Customer reference curve available

### 3.2.8 Diagnostic settings

Navigation ☐ Diagnostics → Diag. settings

**Properties** 

Navigation  $\square$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties

806 Diagnostic behavior

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  806Diag. behav.

**Description** Select event behavior.

"Logbook entry only":

No digital or analog transmission of the message.

"Warning":

Current output unchanged. Message is output digitally (default).

If the permissible conditions are reached again, the warning is no longer available in the

instrument.

**Selection** • Warning

■ Logbook entry only

**Factory setting** Warning

806 Event category

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  806Event categ.

**Description** Select category for diagnostic message.

**Selection** ■ Failure (F)

Function check (C)Out of specification (S)Maintenance required (M)

■ No effect (N)

**Factory setting** Maintenance required (M)

806 Event delay

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  806 Event delay

**Description** Displays how long the triggering status must be present until an event message is issued.

Used to filter out short-term signal interference.

**User entry** 0 to 60 s

**Factory setting** 1 s

941 Diagnostic behavior

**Navigation** Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  941Diag. behav.

**Description** Defines the behavior of the output in case of an echo loss.

"Last valid value" Last valid value is kept. "Ramp at echo lost"

Output value is continuously shifted towards 0 % or 100 %.

"Value echo lost"

Output assumes a defined value.

"Alarm"

Device generates an alarm.

**Selection** • Last valid value

Ramp at echo lostValue echo lost

Alarm

Factory setting Last valid value

941 Event category

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  941Event categ.

Selection ■ Failure (F)

Function check (C)Out of specification (S)Maintenance required (M)

■ No effect (N)

**Factory setting** Out of specification (S)

Additional information

Access:

Read access: ExpertWrite access: Expert

Value echo lost **Navigation** Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  Value echo lost Description Value of the output in case of an echo loss. Signed floating-point number **User entry Factory setting** 0 % Ramp at echo lost Navigation Description Slope of the ramp in the case of an echo loss. If the slope is positive (+), the output increases until it reaches 100%. If the slope is negative (-), the output decreases until it reaches 0%. User entry Signed floating-point number 0.0 %/min Factory setting Delay echo lost **Navigation** Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  Delay echo lost Description Activate or deactivate the delay time in case of echo loss. After an echo loss, the device allows the delay time to pass before the reaction defined in parameter "941 Diagnostic behavior" occurs. This way it can be avoided that temporary disturbances interrupt the measurement unnecessarily. Selection Off On **Factory setting** On

Delay time echo lost

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  DlyTimeEchoLost

**Description** Enter the delay time in case of echo loss.

After an echo loss, the device allows the delay time defined here to pass before the reaction defined in parameter "941 Diagnostic behavior" occurs. This way it can be avoided

that temporary disturbances interrupt the measurement unnecessarily.

**User entry** 0 to 99 999.9 s

**Factory setting** 900 s

Delay time echo jump

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  DlyTimeEchoJump

**Description** Enter the delay time for the echo jump.

**User entry** 0 to 99 999.9 s

**Factory setting** 60.0 s

Read access: ExpertWrite access: Expert

Echo lost window right

**Navigation**  $\blacksquare \Box$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  Echo l.win.right

**Description** Enter the initial width of the extended search window in the direction of decreasing levels.

**User entry** 0 to 99 900 mm

Factory setting 4 000 mm

Read access: ExpertWrite access: Expert

Echo lost window left

**Navigation**  $\Box$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  Echo l.win.left

**Description** Enter the initial width of the extended search window in the direction of increasing levels.

**User entry** 0 to 99 000 mm

Factory setting 4 000 mm

Additional information Access:

■ Read access: Expert

Write access: Expert

Draining speed

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  Draining speed

**Description** Enter the opening speed of the extended search window in the direction of decreasing

levels.

**User entry** Signed floating-point number

**Factory setting** 100 cm/min

Additional information Access:

Read access: ExpertWrite access: Expert

Filling speed

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  Filling speed

**Description** Enter the opening speed of the extended search window in the direction of increasing

levels.

**User entry** Signed floating-point number

**Factory setting** 100 cm/min

Additional information Access:

Read access: ExpertWrite access: Expert

### 942 Diagnostic behavior

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  942Diag. behav.

**Description** Sets the behavior of the output when the safety distance is exceeded.

"Off"

No alarm or warning is generated.

"Alarm"

An alarm is generated.

"Warning"

A warning is generated.

"Self holding"

An alarm is generated. The alarm remains even if the signal is again outside the safety distance. To deactivate the alarm, the "Acknowledge alarm" parameter must be manually

set to "Yes".

Selection ■ Off

AlarmWarningSelf holding

**Factory setting** 

Warning

### 942 Event category

**Navigation**  $\blacksquare$  Diagnostics  $\Rightarrow$  Diag. settings  $\Rightarrow$  Properties  $\Rightarrow$  942Event categ.

Selection ■ Failure (F)

Function check (C)Out of specification (S)Maintenance required (M)

■ No effect (N)

**Factory setting** Out of specification (S)

Safety distance

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties  $\rightarrow$  Safety distance

**User entry** -200 000 to 125 000 mm

**Factory setting** 0 mm

Acknowledge alarm		
Navigation		
Selection	■ No ■ Yes	
Factory setting	No	
	Configuration	
	Navigation $\blacksquare \Box$ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Configuration	
	Sensor	
	Navigation $\  \                                $	
168 Diagnostic behavior		
Navigation		
Description	Select event behavior "Logbook entry only":	
	no digital or analog transmission of the message	
	"Warning": Current output unchanged. Message is output digitally (default).	
	"Alarm": Current output assumes the set alarm current.  Regardless of the setting, the message appears on the display. If the permissible condit are reached again, the warning is no longer available in the instrument.	tions
Selection	<ul> <li>Off</li> <li>Alarm</li> <li>Warning</li> <li>Logbook entry only</li> </ul>	
Factory setting	Warning	
168 Event category		
Navigation		
Description	Select category for diagnostic message.	

**Selection** ■ Failure (F)

Function check (C)Out of specification (S)Maintenance required (M)

■ No effect (N)

**Factory setting** Maintenance required (M)

Process

Navigation  $\square$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Configuration  $\rightarrow$  Process

806 Diagnostic behavior

**Navigation**  $\Box$  Diagnostics  $\Rightarrow$  Diagnostics  $\Rightarrow$  Configuration  $\Rightarrow$  Process  $\Rightarrow$  806Diag. behav.

**Description** Select event behavior.

"Logbook entry only":

No digital or analog transmission of the message.

"Warning":

Current output unchanged. Message is output digitally (default).

If the permissible conditions are reached again, the warning is no longer available in the

instrument.

**Selection** • Warning

■ Logbook entry only

**Factory setting** Warning

806 Event category

**Navigation**  $\blacksquare$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Configuration  $\rightarrow$  Process  $\rightarrow$  806Event categ.

**Description** Select category for diagnostic message.

**Selection** ■ Failure (F)

Function check (C)Out of specification (S)Maintenance required (M)

■ No effect (N)

**Factory setting** Maintenance required (M)

941 Diagnostic behavior			
Navigation		$\label{eq:Diagnostics} \mbox{Diag. settings} \rightarrow \mbox{Configuration} \rightarrow \mbox{Process} \rightarrow \mbox{941Diag. behav}.$	

**Description**Defines the behavior of the output in case of an echo loss.

"Last valid value"

Last valid value is kept.

"Ramp at echo lost"

Output value is continuously shifted towards 0 % or 100 %.

"Value echo lost"

Output assumes a defined value.

"Alarm"

Device generates an alarm.

Selection

• Last valid value
• Ramp at echo lost
• Value echo lost

Alarm

**Factory setting** Last valid value

941 Event category		
Navigation		
Selection	■ Failure (F)	

Function check (C)
Out of specification (S)
Maintenance required (M)

■ No effect (N)

**Factory setting** Out of specification (S)

# 942 Diagnostic behavior Navigation Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Configuration $\rightarrow$ Process $\rightarrow$ 942Diag. behav. Description Sets the behavior of the output when the safety distance is exceeded. "Off" No alarm or warning is generated. "Alarm" An alarm is generated. "Warning" A warning is generated. "Self holding" An alarm is generated. The alarm remains even if the signal is again outside the safety distance. To deactivate the alarm, the "Acknowledge alarm" parameter must be manually set to "Yes".

Selection

■ Off
■ Alarm
■ Warning
■ Self heldi

Self holding

**Factory setting** Warning

942 Event category		
Navigation		
Selection	<ul> <li>Failure (F)</li> <li>Function check (C)</li> <li>Out of specification (S)</li> <li>Maintenance required (M)</li> <li>No effect (N)</li> </ul>	

**Factory setting** Out of specification (S)

952 Diagnostic behavi	ior
Navigation	
Description	Select event behavior
	"Logbook entry only": no digital or analog transmission of the message
	"Warning": Current output unchanged. Message is output digitally (default).
	"Alarm": Current output assumes the set alarm current.
	Regardless of the setting, the message appears on the display. If the permissible condition are reached again, the warning is no longer available in the instrument.
Selection	<ul> <li>Off</li> <li>Alarm</li> <li>Warning</li> <li>Logbook entry only</li> </ul>
Factory setting	Warning
952 Event category	

Navigation

Diagnostics → Diag. settings → Configuration → Process → 952Event categ.

Description

Display diagnostic message category.

Selection

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

Out of specification (S)

**Factory setting** 

#### **Application** 3.3

Navigation ■ Application

#### 3.3.1 Measuring units

Navigation 

Level unit **Navigation** Description Select unit for level measurement. Selection SI units US units **•** % ■ ft ■ in ■ m ■ mm **Factory setting** %

Length unit 

Navigation Application  $\rightarrow$  Measuring units  $\rightarrow$  Length unit 

Description Select the length unit for distance measurement.

It is used, e.g., for the basic calibration ("Empty calibration" or "Full calibration").

Selection SI units US units ■ ft ■ mm

■ in m

**Factory setting** mm

Temperature unit

Navigation 

Description Select the temperature unit.

Selection SI units US units ■ °C °F

■ K

Factory setting

### 3.3.2 Measured values

Navigation  $\blacksquare \square$  Application  $\rightarrow$  Measured values

Level linearized

**Description** Displays the linearized level.

°C

**User interface** Signed floating-point number

**Factory setting** 0 %

Level

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Measured values  $\rightarrow$  Level

**Description** Displays the actual measured level.

**User interface** -99 999.9 to 200 000.0 %

**Factory setting** 0.0 %

Output current 1/2

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Measured values  $\rightarrow$  Output curr. 1

**Description** Displays the value currently calculated for the current output

**User interface** 3.59 to 23 mA

Switch state

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Measured values  $\rightarrow$  Switch state

**Description** Current status of the switch output.

**User interface** ■ Open

Closed

**Factory setting** Open

**Distance** 

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Measured values  $\rightarrow$  Distance

**Description** Distance from reference point to medium surface.

Note:

The reference point is specified in the respective Operating Instructions.

**User interface** Signed floating-point number

**Factory setting** 0 mm

Unfiltered distance

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Measured values  $\rightarrow$  Unfiltered dist.

**Description** Displays the distance from the reference point of the measurement to the medium surface

without the influence of the signal filters.

Note:

The reference point is specified in the respective Operating Instructions.

**User interface** Signed floating-point number

**Factory setting** 0 mm

Sensor temperature

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Measured values  $\rightarrow$  Sensor temp.

**Description** Displays the current temperature of the sensor electronics.

**User interface** −150 to 200 °C

**Factory setting** −150 °C

Terminal voltage 1

**Description** Shows the current terminal voltage that is applied at the output

**User interface** 0.0 to 50.0 V

**Electronics temperature** 

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Measured values  $\rightarrow$  Electronics temp

**Description** Displays the current temperature of the main electronics.

**User interface** Signed floating-point number

**Factory setting** 0 °C

3.3.3 Sensor

Navigation  $\square$  Application  $\rightarrow$  Sensor

Basic settings

*Navigation*  $\square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Basic settings

Medium type

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Basic settings  $\rightarrow$  Medium type

**Description** Select whether the measured medium is liquid or solid.

**Selection** ■ Liquid

Solid

Factory setting Liquid

Application

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Basic settings  $\rightarrow$  Application

**Prerequisite** Medium type parameter = Liquid

**Description** Select application type.

**Selection** ■ Stilling well

Workbench testOpen channel

SphereStorage vessel

Process vessel standard

Stirred vessel

Factory setting Process vessel standard

Application

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Basic settings  $\rightarrow$  Application

**Prerequisite** Medium type parameter = Solid

**Description** Select application type.

Selection ■ Buffer silo (fast)

Bin/PileCrusher/belt

■ Silo

Workbench test

**Factory setting** Silo

Empty calibration

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Basic settings  $\rightarrow$  Empty calibr.

**Description** Enter the distance from the reference point of the measurement to the minimum level (0

%).

Note:

The reference point is specified in the respective Operating Instructions.

**User entry** 0 to 125 000 mm

**Factory setting** 20 000 mm

Full calibration

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Basic settings  $\rightarrow$  Full calibr.

**Description** Distance between minimum level (0 %) and maximum level (100 %).

**User entry** 1 to 125 000 mm

Factory setting 20 000 mm

Advanced settings

*Navigation*  $\square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.

Navigation

**Additional information** "Adjustment" submenu

Maximum draining speed solid

**Description** By selecting the maximum expected filling and draining speed the signal evaluation is

automatically optimized for the process.

Note:

The filling and draining speeds can be set separately as the filling and draining procedures

may be different.

Note:

With the 'No filter / test' option all signal evaluation filters are deactivated. This option

should exclusively be used for tests.

**Selection** • Very slow < 0.5 m (1.6 ft)/h

■ Slow < 1 m (3.3 ft)/h

■ Standard < 2m (6,5ft) /h

■ Medium < 4m (13ft) /h

■ Fast < 8 m (26 ft)/h

■ Very fast > 8 m (26 ft)/h

■ No filter/test

**Factory setting** Standard < 2m (6,5ft) /h

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### Maximum filling speed solid

### **Navigation**

### Description

By selecting the maximum expected filling and draining speed the signal evaluation is automatically optimized for the process.

Moto.

The filling and draining speeds can be set separately as the filling and draining procedures may be different.

Note:

With the "No filter/ test" option all signal evaluation filters are deactivated. This option should exclusively be used for tests.

### Selection

Very slow < 0.5 m (1.6 ft)/h</li>
Slow < 1 m (3.3 ft)/h</li>
Standard < 2m (6,5ft) /h</li>
Medium < 4m (13ft) /h</li>

Fast < 8 m (26 ft)/h</li>Very fast > 8 m (26 ft)/h

■ No filter/test

### **Factory setting**

Standard < 2m (6,5ft) /h

### Maximum draining speed liquid

### **Navigation**

■ Application → Sensor → Advanced set. → Max drain liquid

### Description

By selecting the maximum expected filling and draining speed the signal evaluation is automatically optimized for the process.

Note:

The filling and draining speeds can be set separately as the filling and draining procedures may be different.

Note:

With the 'No filter / test' option all signal evaluation filters are deactivated. This option should exclusively be used for tests.

### Selection

■ Slow < 1 cm (0.4 in)/min

Medium < 10 cm (4 in)/min</li>Standard < 1 m (40 in)/min</li>

■ Fast < 2 m (80 in)/min

■ Very fast > 2 m (80 in)/min

■ No filter/test

### **Factory setting**

Standard < 1 m (40 in)/min

### Maximum filling speed liquid

### Navigation

### Description

By selecting the maximum expected filling and draining speed the signal evaluation is automatically optimized for the process.

Note:

The filling and draining speeds can be set separately as the filling and draining procedures may be different.

Note:

With the "No filter/test" option all signal evaluation filters are deactivated. This option should exclusively be used for tests.

### Selection

- Slow < 1 cm (0.4 in)/min
- Medium < 10 cm (4 in)/min
- Standard < 1 m (40 in)/min
- Fast < 2 m (80 in)/min
- Very fast > 2 m (80 in)/min
- No filter/test

### **Factory setting**

Standard < 1 m (40 in)/min

### Damping output

### **Navigation**

### Description

The damping is effective before the measured value is further processed, i.e., before the following processes:

- Scaling
- Limit value monitoring
- Forwarding to display
- Forwarding to Analog Input Block

### Note:

The Analog Input Block has its own "Damping" parameter. In the measurement chain, only one of the two attenuation parameters shall have a value other than 0.

Otherwise, the signal will be attenuated several times.

### **User entry**

0.0 to 1200.0 s

### **Factory setting**

 $0.0 \, s$ 

Evaluation sensitivity

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Evaluation sens.

**Description** Selection of the evaluation sensitivity

Options to select from:

- "Low"

Interferers but also small level signals are not recognized. The weighting curve is located

high.

- "Medium"

The weighting curve is in a medium region.

- "High"

Small level signals but also interferers can be reliably detected. The weighting curve is

located low.

Selection • Low

Medium

■ High

Factory setting Medium

First echo sensitivity

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  First echo sens.

**Description** This parameter describes the band for First Echo evaluation.

Is measured / calculated down from the peak of the current level echo.

Options to select from:

'T.ow

The band for the first echo evaluation is very narrow. The evaluation stays longer at the

found echo respectively does not jump to the next Echo or distortion signal.

"Medium"

The band for the first echo evaluation has an average width.

"High"

The band for the first echo evaluation is broad. The evaluation jumps earlier to the next

echo or distortion signal.

Selection ■ Low

Medium

High

**Factory setting** Medium

Frequency mode		
Navigation		
Description	Displays the device-specific measurement configuration.	
Selection	<ul> <li>Mode 1*</li> <li>Mode 2*</li> <li>Mode 3*</li> <li>Mode 4*</li> <li>Mode 5*</li> <li>Mode 9*</li> <li>Mode 10*</li> </ul>	
Factory setting	Mode 2	
Navigation		
Additional information	"Mapping" submenu	
Active map		<b>1</b>
Navigation		
Description	Select the mapping curve that is to be active. Alternatively, the option "No map" can be selected.	
Selection	<ul><li>Factory map</li><li>Customer map</li><li>No map</li></ul>	
Factory setting	No map	
Distance		
Navigation		
Description	Distance from reference point to medium surface.  Note: The reference point is specified in the respective Operating Instructions.	

<sup>\*</sup> Visibility depends on order options or device settings

**User interface** Signed floating-point number

**Factory setting** 0 mm

Confirm distance

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Confirm distance

**Description** State whether the measured distance and the actual distance are the same.

**Selection** ■ Modify map

■ Distance ok

■ Distance unknown

■ Level <=0

**Factory setting** Distance unknown

Mapping start point

**Navigation**  $\blacksquare \square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Map. start point

**Description** Enter the initial distance for the mapping.

**User entry** -999 900 to 999 900 mm

Factory setting -250 mm

Read access: ExpertWrite access: Expert

Mapping end point

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Map. end point

**Description** Defines up to which distance the new mapping has to be recorded.

Remark: Make sure the level signal is not covered by the mapping.

**User entry** 0.1 to 125 mm

Factory setting 100 mm

Map gap

**Description** Enter the distance between the defined and the actual end of the map.

**User entry** 0 to 100 000 mm

**Factory setting** 235 mm

Additional information Access:

Read access: ExpertWrite access: Expert

End of mapping

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  End of mapping

**Description** Define the behavior of the mapping curve at the end of the map.

**Selection** • Adjustable

Last map value

**Factory setting** Adjustable

Additional information Access:

Read access: ExpertWrite access: Expert

End map. ampl.

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  End map. ampl.

**Description** Enter the minimum amplitude of the mapping curve.

**User entry** -99 999.0 to 99 999.0 dB

**Factory setting** −100 dB

Additional information Access:

Read access: ExpertWrite access: Expert

Mapping overlay time

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Map overlay time

**Description** Enter the duration for which a map is recorded. During this time, the largest amplitude

values that occur are overlapped.

**User entry** 1 to 600 s

**Factory setting** 5 s

Read access: ExpertWrite access: Expert

Record map

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Record map

Selection • No

Overlay mapDelete cust map

Factory setting No

Navigation

Additional information "Distance" submenu

Maximum measuring distance

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Max. meas. dist.

**Description** If the preset measuring range differs significantly from the maximum measuring distance,

it is recommended to enter the maximum measuring distance here.

Example:

Continuous level monitoring in the upper third of a tank/silo.

Note:

For tanks or silos with a conical outlet, this parameter should not be changed, as in this type of applications Empty calibration is usually not much smaller than the tank/silo

height.

**User entry** 0 to 125 000 mm

**Factory setting** 

20000 mm

Upper blank out

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Upper blank out

**Description** Displays the distance from the reference point to slightly above the maximum level (100

%).

The value is calculated by the device to suppress signals in this range.

The value can also be adjusted manually.

Note:

No evaluation takes place in the upper blank out area.

**User entry** 0 to 125 000 mm

**Factory setting** 50 mm

### Upper blank out evaluation mode

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  UBO eval. mode

Selection ■ No measurement in upper blank out

■ Measurement in upper blank out

**Factory setting** Measurement in upper blank out

Additional information

Access:

■ Read access: -

■ Write access: Expert

### Output mode

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Output mode

**Description** Select output mode between:

Ullage:

Displays the remaining ullage.

or

Level linearized:

Display the measured level.

Note: If linearization has been activated, the linearized level is displayed here.

**Selection** • Ullage

Level linearized

**Factory setting** Level linearized

L max. drain speed

**Navigation** Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  L max draining

**Description** Enter the maximum draining speed.

**User entry** 0.0 to 50 000.0 %/min

**Factory setting** 0.0 %/min

Read access: ExpertWrite access: Expert

L max. fill speed

**Navigation** Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  L max.fill speed

**Description** Enter the maximum filling speed.

**User entry** 0.0 to 50 000.0 %/min

**Factory setting** 0.0 %/min

Additional information Access:

Read access: ExpertWrite access: Expert

Level limit mode

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Level limit mode

**Description** Determines whether the output value is limited by an upper or lower limit (or by both).

Selection ■ Off

Low limitHigh limit

■ Low and High Limit

Factory setting Low limit

High limit

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  High limit

**Description** Defines the upper limit of the output value.

**User entry** Signed floating-point number

**Factory setting** 0 %

Low limit

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Low limit

**Description** Defines the lower limit of the output value.

User entry -200 000.0 to 200 000.0 %

**Factory setting** 0.0 %

Level correction

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Level correction

**Description** Value is added to the measured level to compensate for a constant level error.

Level correction > 0:

The level is increased by this value.

Level correction < 0:

The level is decreased by this value.

User entry -200 000.0 to 200 000.0 %

**Factory setting** 0.0 %

Antenna zero distance

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Ant. zero dist.

**Description** Displays the zero point adjustment of the antenna at state of delivery.

Note:

This parameter is adjusted to the device at the factory and should not be changed.

**User entry** 0 to 10 000 mm

Factory setting 230 mm

Read access: ExpertWrite access: Expert

Echo evaluation

*Navigation*  $\square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation

Echo curve statistic

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Ec. curve stat.

**Description** Activate or deactivate the weighted echo curve statistics.

Selection ■ Off

On

Factory setting On

Read access: ExpertWrite access: Expert

Echo curve statistics up

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  EC. stat. up

**Description** Enter the number of measuring cycles to define the weighting of the last echo curve for

ascending signals.

**User entry** 0 to 30

Factory setting 3

Read access: ExpertWrite access: Expert

Echo curve statistic down

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  ECS in down

**Description** Enter the number of measuring cycles to define the weighting of the last echo curve for

descending signals.

**User entry** 0 to 30

**Factory setting** 5

Additional information Access:

Read access: ExpertWrite access: Expert

Echo curve smoothing

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  EC. smoothing

**Description** Enter window width for echo curve smoothing.

**User entry** 0 to 9 900 mm

**Factory setting** 0 mm

Additional information Access:

Read access: ExpertWrite access: Expert

Weighting curve offset

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  WqthCurveOffset

**Description** Enter offset of the weighting curve.

**User entry** -9 999.0 to 9 999.0 dB

Factory setting 12 dB

Additional information Access:

Read access: ExpertWrite access: Expert

## Window size weighting curve

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  WindowWgthCurve

**Description** Enter width of the weighting curve window.

**User entry** 0 to 9 900 mm

Factory setting 1600 mm

Read access: ExpertWrite access: Expert

### Maximum value weighting curve

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  MaxValWghtCurve

**Description** Enter maximum amplitude of the weighting curve.

**User entry** -9 999.0 to 9 999.0 dB

Factory setting 100 dB

Read access: ExpertWrite access: Expert

First echo band

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  First echo band

**Description** Enter width of the first echo band.

**User entry** 0.0 to 100.0 dB

Factory setting 10 dB

Read access: ExpertWrite access: Expert

Tank bottom range

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  TB range

**Description** Determines the range in which the physical bottom echo is searched for.

The bottom range extends downwards and starts at level 0 % "Empty calibration". It ends at

the entered value.

Note: If the level 0 % "Empty calibration" is far above the physical bottom, the bottom range

starts at the entered "Maximum measuring distance".

**User entry** 0 to 312 500 mm

Factory setting 15 000 mm

Min. amplitude TBD

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Min. ampl. TBD

**Description** Enter the minimum amplitude for tank bottom detection.

**User entry** 0 to 9 999.0 dB

**Factory setting** 3 dB

Read access: ExpertWrite access: Expert

Lower level area

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Lower level area

**Description** Enter lower level area.

In this defined range, the first echo band is lowered to the weighting curve.

**User entry** 0 to 125 000 mm

Factory setting 1000 mm

Additional information Access:

Read access: ExpertWrite access: Expert

Evaluation mode

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Evaluation mode

**Description** Defines the evaluation mode for the echo tracking.

**Selection** ■ FlexTracking

■ FlexTracking - Weak signals

FixTracking

• FixTracking - Weak signals

**Factory setting** FlexTracking

Reset evaluation

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Reset evaluation

**Description** Restarts level determination.

**Selection** • Reset done

■ Yes

**Factory setting** Reset done

Window size tracking

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Wind.size track.

**User entry** 0 to 20 500 mm

**Factory setting** 500 mm

Read access: ExpertWrite access: Expert

Debug parameter index

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Debug parm. idx

**User entry** 0 to 65 535

Factory setting 2

Additional information

Access:

Read access: ExpertWrite access: Expert

Debug array index

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Debug array indx

**User entry** 0 to 255

**Factory setting** 0

Additional information

Access:

Read access: ExpertWrite access: Expert

Status

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Status

**User entry** 0 to 255

Factory setting 0

Additional information

Access:

Read access: ExpertWrite access: Expert

Debug value

**User interface** Signed floating-point number

Factory setting 4.0

Read access: ExpertWrite access: -

# Debug value integer32

**Navigation** Application  $\rightarrow$  Sensor  $\rightarrow$  Advanced set.  $\rightarrow$  Echo evaluation  $\rightarrow$  Debug val. int32

**User interface** Positive integer

Factory setting 0

Additional information Access:

Read access: ExpertWrite access: -

### Linearization

*Navigation*  $\square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Linearization

# Linearization type

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Linearization  $\rightarrow$  Linearization  $\rightarrow$  Linearization

**Description** Select type of linearization.

**Selection** ■ None

LinearTable

Pyramid bottomConical bottomAngled bottomHorizontal cylinder

■ Sphere

Factory setting None

### Unit after linearization

Navigation

 $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Linearization  $\rightarrow$  Unit lineariz.

**Description** Defines the unit of the linearized value.

Note:

The selected unit is only used to be indicated on the display. The measured value is not

transformed according to the selected unit.

Note:

If "Free text" is selected, an additional parameter "Free text" appears in which the

designation of the unit can be defined.

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Selection	SI units STon t kg cm³ dm³ hl l m m mm mm % Custom-specific units Free text	US units Ib UsGal ft³ In	Imperial units impGal
Factory setting	%		
Free text			
Navigation		$\rightarrow$ Linearization $\rightarrow$ Free text	
User entry	Character string comprising	numbers, letters and special ch	naracters (32)
Factory setting	Free text		
Level linearized			
Navigation		$\rightarrow$ Linearization $\rightarrow$ Level linear	rized
Description	Displays the linearized level.		
User interface	Signed floating-point numbe	Pr	
Factory setting	0 %		
Maximum value			Ô
Navigation	$\blacksquare$ Application $\rightarrow$ Sensor	$\rightarrow$ Linearization $\rightarrow$ Maximum v	<i>v</i> alue
Description	Linearized value correspondi	ing to a level of 100 %	
Description	Linearized value correspondi	ing to a level of 100 %.	

Factory setting

100.0 %

Diameter

**Description** Diameter of the spherical tank or horizontal cylinder tank.

**User entry** 0.001 to 125 000 mm

Factory setting 20 000 mm

Intermediate height

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Linearization  $\rightarrow$  Intermed. height

**Description** Height of the pyramid, conical or angled bottom

**User entry** 0 to 125 000 mm

**Factory setting** 0 mm

Table mode

**Description** Defines the editing mode of the linearization table.

Note:

DeviceCare and FieldCare contain a graphical tool for the easy creation of a linearization

table.

Device Care: "Additional functions" -> "Linearization table"

FieldCare: "Device Operation" -> "Device Functions" -> "Additional functions" ->

"Linearization table"

Selection • Manual

Semiautomatic \*
Clear table
Sort table \*

Factory setting Manual

<sup>\*</sup> Visibility depends on order options or device settings

Table number	
--------------	--

**Description** Enter or change the table point.

**User entry** 1 to 32

Factory setting 1

Level

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Linearization  $\rightarrow$  Level

**Description** Enter level value of the table point (value before linearization).

**User entry** Signed floating-point number

**Factory setting** 0 %

Level

Navigation

**Description** Displays measured level (value before linearization). This value is transmitted to the table.

**User interface** Signed floating-point number

**Factory setting** 0.0%

Customer value

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Linearization  $\rightarrow$  Customer value

**Description** Enter linearized value for the table point.

**User entry** Signed floating-point number

**Factory setting** 0 %

Activate table

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Linearization  $\rightarrow$  Activate table

**Description** Activate or deactivate table.

The table can only be activated if the table values:

are present in at least 2 value pairs do not exceed the sensor limits

- represent a function which is monotonically ascending or descending

**Selection** • Disable

■ Enable

Factory setting Disable

**CRC** linearization table

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Linearization  $\rightarrow$  CRC lin. table

**Description** CRC checksum based on the current parameter settings of the linearization table.

Can be used to detect changes in the parameter settings.

**User interface** 0 to 65 535

Factory setting 0

Signal information

*Navigation*  $\square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Signal inform.

Signal quality

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Signal inform.  $\rightarrow$  Signal quality

**Description** Displays the quality of the evaluated level signal.

**User interface** ■ Strong

MediumWeakNo signal

**Factory setting** Strong

Absolute echo amplitude

**Navigation**  $\blacksquare \square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Signal inform.  $\rightarrow$  Abs. echo ampl.

**Description** Shows the absolute amplitude of the evaluated level signal.

User interface -150.0 to 32.0 dB

**Factory setting** 0.0 dB

Relative echo amplitude

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Sensor  $\rightarrow$  Signal inform.  $\rightarrow$  Relat.echo ampl.

**Description** Shows the relative amplitude (i.e. the distance to the evaluation curve) of the evaluated

level signal.

**User interface** 0.0 to 150.0 dB

**Factory setting** 0.0 dB

Sensor cycle time

**Description** Displays the cycle time of the measurement.

**User interface** 0 to 65 535 ms

**Factory setting** 0 ms

Additional information Access:

■ Read access: Expert

■ Write access: -

Actual IF gain

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Sensor  $\rightarrow$  Signal inform.  $\rightarrow$  Actual IF gain

**Description** Displays the actual gain of the intermediate frequency.

**User interface** 0 to 1000

Factory setting 0

### Additional information

# Access:

- Read access: Expert
- Write access: -

#### 3.3.4 Current output 1/2

Navigation 

Navigation

# Process variable output current

Application  $\rightarrow$  Curr.output  $1 \rightarrow$  Proc.var.curr. **Navigation** 

> Application  $\rightarrow$  Curr.output 2  $\rightarrow$  Proc.var.curr.

Description Determines which process variable is transmitted via the current output.

User interface Level linearized

Distance

Terminal voltage \*

Electronics temperature \*

Sensor temperature

Buildup index

Foam index \*

Absolute echo amplitude ^

■ Relative echo amplitude

Area of incoupling

■ Loop current

Percent of range

Buildup detected \*

Foam detected \*

Measured current ^

Loop diagnostics

■ Not used

**Factory setting** Level linearized

# Measuring mode current output

Navigation Application  $\rightarrow$  Curr.output 1  $\rightarrow$  Output mode

> Application  $\rightarrow$  Curr.output 2  $\rightarrow$  Output mode

Description Select curve of current output.

Visibility depends on order options or device settings

Selection	<ul><li>Standard</li><li>Inverse</li></ul>	
Factory setting	Standard	
Current range output		<b>1</b>
Navigation		
Description	Defines the current range used to transmit the measured or calculated value. In brackets are indicated the "low saturation value" and the "high saturation value". If Measured value $\leq$ "low saturation", the output current is set to "low saturation". If Measured value $\geq$ "high saturation", the output current is set to "high saturation".	
	Note: Currents below 3.6 mA or above 21.5 mA can be used to signal an alarm.	
Selection	<ul> <li>420 mA (420.5 mA)</li> <li>4 20 mA NE (3.8 20.5 mA)</li> <li>420 mA US (3.920.8 mA)</li> </ul>	
Factory setting	4 20 mA NE (3.8 20.5 mA)	
Lower range value output	0	
Navigation	B Application → Curr.output $1 \rightarrow$ Low.range outp	
Description	Depending on which variable has been selected as "Process variable output current", define the related lower (4 mA) and upper range values (20 mA).	
User entry	Signed floating-point number	
Factory setting	0.0 %	
Upper range value output		
Navigation		
Description	Depending on which variable has been selected as "Process variable output current", defir the related lower (4 mA) and upper range values (20 mA).	1e
User entry	Signed floating-point number	

**Factory setting** 100.0 %

**Navigation**  $\square$  Application  $\rightarrow$  Curr.output  $1 \rightarrow$  Failure behav.

**Description** Defines which current the output assumes in the case of an error.

Min: < 3.6 mA Max: >21.5 mA

Note: The hardware DIP Switch for alarm current (if available) has priority over software

setting.

**Selection** ■ Min.

Max.

**Factory setting** Min.

Failure current

**Navigation**  $\square$  Application  $\rightarrow$  Curr.output  $1 \rightarrow$  Failure current

**Description** Enter current output value in alarm condition

**User entry** 21.5 to 23 mA

Factory setting 22.5 mA

**Output current** 

**Navigation**  $\square$  Application  $\rightarrow$  Curr.output  $1 \rightarrow$  Output curr. 1

 $\square$  Application  $\rightarrow$  Curr.output 2  $\rightarrow$  Output curr. 2

**Description** Displays the value currently calculated for the current output

**User interface** 3.59 to 23 mA

**Factory setting** 3.59 mA

Terminal current			
Navigation		Application $\rightarrow$ Curr.output 1 $\rightarrow$ Terminal curr.	
		Application $\rightarrow$ Curr.output 2 $\rightarrow$ Terminal curr.	
Description	Shov	vs the current value of the current output which is currently measured	
User interface	0 to	30 mA	
Factory setting	0 mA		
4 mA trim value			
Navigation		Application $\rightarrow$ Curr.output 1 $\rightarrow$ 4 mA trim value	
		Application $\rightarrow$ Curr.output 2 $\rightarrow$ 4 mA trim value	
Description	Ente	r the trim value for the 4 mA current output.	
	Note Simu	: llation must be active.	
User entry	3 to 5 mA		
Factory setting	4 m <i>A</i>	A	
Additional information		ess: ad access: Expert rite access: Expert	
20 mA trim value			
Navigation		Application $\rightarrow$ Curr.output 1 $\rightarrow$ 20 mA trim value	
		Application $\rightarrow$ Curr.output 2 $\rightarrow$ 20 mA trim value	
Description		r the trim value for the 20 mA current output.	
	Note Simu	: llation must be active.	
User entry	18 to	o 22 mA	
Factory setting	20 m	nA	
Additional information		ess: ad access: Expert rite access: Expert	

# 3.3.5 Switch output

*Navigation*  $\blacksquare \Box$  Application  $\rightarrow$  Switch output

Switch output function	n <u> </u>
Navigation	
Description	Defines the function of the switch output.
	"Off' The switch output is always open (non-conductive)
	"On' The switch output is always closed (conductive).
	"Diagnostic behavior' The switch output is normally closed and is only opened if a diagnostic event is present.
	"Limit' The switch output is normally closed and is only opened if a measured variable exceeds a defined limit.
	"Digital output' The switch output is controlled by one of the digital output blocks of the device.
Selection	<ul> <li>Off</li> <li>On</li> <li>Diagnostic behavior</li> <li>Limit</li> <li>Digital Output</li> </ul>
Factory setting	Off

Assign limit	

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Switch output  $\rightarrow$  Assign limit

**Description** Defines which process variable will be checked for limit violation.

Selection ■ Off

Level linearized

■ Distance

■ Terminal voltage

Electronics temperature

Sensor temperature

Relative echo amplitude

 $\blacksquare$  Area of incoupling

■ Buildup index

■ Foam index

Visibility depends on order options or device settings

Factory setting

Off

Assign diagnostic behavior

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Switch output  $\rightarrow$  Assign diag. beh

**Description** Defines to which behavior of diagnostic events the switch output reacts.

**Selection** • Alarm

Alarm or warning

**Factory setting** Alarm

Assign status

**Description** Assigns a Discrete Output Block or an Advanced Diagnostic Block to the switch output.

Selection ■ Off

Foam detected \*
Buildup detected \*
Loop diagnostics \*

**Factory setting** Off

Switch-on value

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Switch output  $\rightarrow$  Switch-on value

**Description** Enter limit value for the switch-on point (process variable > switch-on value = closed,

conductive).

Additional information:

To use a hysteresis: Switch-on point > Switch-off point.

**User entry** Signed floating-point number

Factory setting 0

86

<sup>\*</sup> Visibility depends on order options or device settings

Switch-on delay

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Switch output  $\rightarrow$  Switch-on delay

**Description** Defines the delay applied before the output is switched on.

**User entry** 0.0 to 100.0 s

**Factory setting** 0.0 s

Switch-off value

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  Switch output  $\rightarrow$  Switch-off value

**Description** Enter limit value for the switch-off point (process variable < switch-off value = open, non-

conductive).

Additional information:

To use a hysteresis: Switch-on point > Switch-off point.

**User entry** Signed floating-point number

Factory setting 0

Switch-off delay

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Switch output  $\rightarrow$  Switch-off delay

**Description** Enter delay before the switch output is switched off.

**User entry** 0.0 to 100.0 s

**Factory setting** 0.0 s

Switch state

**Navigation**  $\blacksquare$  Application  $\rightarrow$  Switch output  $\rightarrow$  Switch state

**Description** Current status of the switch output.

**User interface** ■ Open

Closed

**Factory setting** Open

User entry

Factory setting

0 to 63

0

Failure mode		
Navigation		
Description	Defines the state of the switch output in case of an error.	
Selection	<ul><li>Actual status</li><li>Open</li><li>Closed</li></ul>	
Factory setting	Open	
Invert output signal		<b>A</b>
Navigation		
Description	"No' The switch output behaves as per its parameter setting. "Yes' The switching behavior is inverted as compared to its parameter setting.	
Selection	The switching behavior is inverted as compared to its parameter setting.  No Yes	
Factory setting	No	
	3.3.6 HART output	
	Navigation $\blacksquare$ Application $\rightarrow$ HART output	
	Configuration	
	<i>Navigation</i>	
HART address		
Navigation		
Description	Enter the address to exchange data via the HART protocol.	

HART short tag

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Configuration  $\rightarrow$  HART short tag

**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** Customized

Device tag

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Configuration  $\rightarrow$  Device tag

**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** Customized

No. of preambles

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Configuration  $\rightarrow$  No. of preambles

**Description** Defines the number of preambles in the HART telegram

**User entry** 5 to 20

**Factory setting** 5

Loop current mode

**Navigation** Application  $\rightarrow$  HART output  $\rightarrow$  Configuration  $\rightarrow$  Loop curr mode

**Description** If Loop current mode is disabled, Multi-drop communication mode is activated. Multi-drop

is a HART digital communication mode where multiple devices may share the same pair of

wires for power and communications. In this mode the output current is fixed.

**Selection** • Disable

■ Enable

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FACTOR	settina :

Enable

**HART** output

*Navigation*  $\blacksquare \blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  HART output

Assign PV

**Description** Assign a measured variable to the primary dynamic variable (PV).

Additional information:

The assigned measured variable is also used by the current output.

**Selection** • Level linearized

■ Distance

Factory setting Level linearized

# Primary variable (PV)

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Primary var (PV)

**Description** Shows the current measured value of the primary dynamic variable (PV)

**User interface** Signed floating-point number

Factory setting 100.0 %

Assign SV 🗈

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  HART output  $\rightarrow$  Assign SV

**Description** Assign a measured variable to the second dynamic variable (SV).

**Selection** • Level linearized

Distance

Terminal voltage \*

Electronics temperature

Sensor temperature

90

Visibility depends on order options or device settings

- Absolute echo amplitude
- Relative echo amplitude
- Area of incoupling
- Buildup index <sup>¹</sup>
- Buildup detected \*
- Foam index '
- Foam detected \*
- Percent of range
- Loop current
- Terminal current
- Not used
- Loop diagnostics \*

# Factory setting

Distance

# Secondary variable (SV)

**Navigation**  $\blacksquare \Box$  Application  $\rightarrow$  HART output  $\rightarrow$  HART output  $\rightarrow$  Second.var(SV)

**Description** Shows the current measured value of the secondary dynamic variable (SV)

**User interface** 0 to 410.10498687664 mm

Assign TV

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  HART output  $\rightarrow$  Assign TV

**Description** Assign a measured variable to the tertiary dynamic variable (TV).

**Selection** • Level linearized

- Distance
- Terminal voltage \*
- Electronics temperature
- Sensor temperature
- Absolute echo amplitude
- Relative echo amplitude
- lacktriangle Area of incoupling
- Buildup index <sup>3</sup>
- Buildup detected \*
- Foam index '
- Foam detected \*
- Percent of range
- Loop current
- Terminal current \*
- Not used
- Loop diagnostics \*

# **Factory setting**

Absolute echo amplitude

<sup>\*</sup> Visibility depends on order options or device settings

**Tertiary variable (TV)** 

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  HART output  $\rightarrow$  Tertiary var(TV)

**Description** Shows the current measured value of the tertiary (third) dynamic variable (TV)

**User interface** −150.0 to 0.0 deciBel

**Factory setting** −150.0 deciBel

Assign QV

**Navigation** Application  $\rightarrow$  HART output  $\rightarrow$  HART output  $\rightarrow$  Assign QV

**Description** Assign a measured variable to the quaternary dynamic variable (QV).

**Selection** • Level linearized

Distance

Terminal voltage \*

Electronics temperature

Sensor temperature

Absolute echo amplitude

Relative echo amplitude

lacktriangle Area of incoupling

Buildup index \*

Buildup detected\*

Foam index\*

Foam detected \*

■ Percent of range

Loop current

Terminal current '

Not used

Loop diagnostics \*

**Factory setting** Relative echo amplitude

Quaternary variable (QV)

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  HART output  $\rightarrow$  Quaterna.var(QV)

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

**User interface** −150.0 to 0.0 deciBel

Visibility depends on order options or device settings

# Burst configuration 1

*Navigation*  $\blacksquare \Box$  Application  $\rightarrow$  HART output  $\rightarrow$  Burst config. 1

**Description** Switch HART burst mode for burst message on

Selection ■ Off ■ On

**Factory setting** Depends on the order option

Burst command 1

**Navigation** Application  $\rightarrow$  HART output  $\rightarrow$  Burst config.  $1 \rightarrow$  Burst command 1

**Description** Select the HART command that is sent to the HART master

**Selection** • Primary variable (PV)

Loop Current and Percent of Range

■ Dynamic Variables

Device variables with status

Device variables

Additional device status

**Factory setting** Loop Current and Percent of Range

Burst variable 0 ... 3

**Navigation** Application  $\rightarrow$  HART output  $\rightarrow$  Burst config. 1  $\rightarrow$  Burst variable 0 ... 3

**Description** For HART command 9 and 33, assign a HART device variable or process variable to burst

variable

**Selection** • Level linearized

■ Distance

■ Electronics temperature

Sensor temperature

Absolute echo amplitude

Relative echo amplitude

Area of incoupling

Buildup index

Visibility depends on order options or device settings

- Buildup detected \*
- Foam index \*
- Foam detected \*
- Terminal voltage
- Terminal current
- Percent of range
- Loop current
- Loop diagnostics \*
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)
- Not used

# **Factory setting**

Level linearized

Burst variable 4 ... 7

Navigation

Description

For HART command 33, assign a HART device variable or process variable to burst variable

Selection

- Level linearized
- Distance
- Electronics temperature
- Sensor temperature
- Absolute echo amplitude
- Relative echo amplitude
- Area of incoupling
- Buildup index \*
- Buildup detected \*
- Foam index \*
- Foam detected \*
- Terminal voltage \*
- Terminal current
- Percent of range
- Loop current
- Loop diagnostics \*
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)
- Not used

# **Factory setting**

Not used

<sup>\*</sup> Visibility depends on order options or device settings

Burst trigger mode		
Navigation		
Description	Select the event that triggers the burst message	
Selection	<ul> <li>Continuous</li> <li>Window*</li> <li>Rising*</li> <li>Falling*</li> <li>On change</li> </ul>	
Factory setting	Continuous	
Burst trigger level		Â
Navigation		
Description	Enter the burst trigger value that determines together with the option selected in "B trigger mode" parameter the time of burst message	urst
User entry	Signed floating-point number	
Min. update period		
Navigation		
Description	Enter the minimum time span between two burst responses of one burst message	
User entry	Positive integer	
Factory setting	1000 ms	
Max. update period		Â
Navigation		

Positive integer

Description

User entry

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Enter the maximum time span between two burst responses of one burst message

<sup>\*</sup> Visibility depends on order options or device settings

Factory setting	2 000 ms

#### Information

Navigation  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Information

**Device ID** 

**Description** Shows the device ID for identifying the device in a HART network

**User interface** Positive integer

Device type

**Description** Displays the device type with which the device is registered with the HART FieldComm

Group.

**User interface** 0 to 65 535

Device revision

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Information  $\rightarrow$  Device revision

**Description** Displays the device revision with which the device is registered with the HART FieldComm

Group.

**User interface** 0 to 255

Factory setting 2

97

HART short tag	
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**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Information  $\rightarrow$  HART short tag

**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** Customized

#### **HART** revision

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Information  $\rightarrow$  HART revision

**Description** Displays the revision of the HART protocol for the device.

**User interface** 5 to 7

Factory setting 7

HART descriptor

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Information  $\rightarrow$  HART descriptor

**Description** Use this function to define a description for the measuring point.

Maximum length: 16 characters

Allowed characters: A-Z, 0-9, certain special characters

**User entry** Character string comprising numbers, letters and special characters (16)

**Factory setting** 5xB/6xB

HART message

**Navigation**  $\blacksquare$  Application  $\rightarrow$  HART output  $\rightarrow$  Information  $\rightarrow$  HART message

**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

5xB/6xB

HART date code		
Navigation		
Description	Enter data for individual use	
User entry	Character string comprising numbers, letters and special characters (10)	

# 3.4 System

Navigation System

# 3.4.1 Device management

*Navigation*  $\blacksquare \square$  System  $\rightarrow$  Device manag.

Device tag	
Navigation	System → Device manag. → Device tag
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	5xB/6xB
Locking status	
Navigation	System → Device manag. → Locking status
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.
	"Safety locked" (SW) Unlock the device by entering the appropriate access code in "Enter safety unlocking 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.
User interface	<ul> <li>Hardware locked</li> <li>Safety locked</li> <li>Temporarily locked</li> </ul>

# **Configuration counter**

**Navigation** System  $\rightarrow$  Device manag.  $\rightarrow$  Config. counter

**Description** Displays the counter for changes to the device parameters.

Additional information:

- If the value for a static parameter is changed when optimizing or configuring the parameter, the counter is incremented by 1. This is to enable tracking different parameter versions.
- When multiple parameters are changed simultaneously, e.g. when loading parameters into the device from an external source such as FieldCare, the counter may display a higher value. The counter cannot be reset, nor is it reset to a default value on performing a device
- Once the counter has reached the value 65535, it restarts at 0.

**User interface** 0 to 65 535

Factory setting 0

Reset device

**Navigation** System  $\rightarrow$  Device manag.  $\rightarrow$  Reset device

**Description** Reset the device configuration - either entirely or in part - to a defined state

**Selection** • Cancel

To factory defaults \*
To delivery settings \*
Restart device

Factory setting Cancel

# 3.4.2 User management

User role

**Navigation**  $\blacksquare$  System  $\rightarrow$  User manag.  $\rightarrow$  User role

**Description** Shows the access authorization to the parameters via the operating tool

100

Visibility depends on order options or device settings

**User interface** ■ Operator

Maintenance

Expert

**Factory setting** Maintenance

Change user role

**Navigation** System  $\rightarrow$  User manag.  $\rightarrow$  Change user role

**Description** It is possible to change the user role.

If the actual role is 'Maintenance', the 'Enter access code' will be prompted. If the actual role is 'Operator', a 'Maintenance' password will be required.

**User entry** Character string comprising numbers, letters and special characters (1)

**Password** 

**Navigation**  $\square$  System  $\rightarrow$  User manag.  $\rightarrow$  Password

**Description** Enter the password for the "Maintenance" user role to get access to the functionality of this

role.

**User entry** Character string comprising numbers, letters and special characters (16)

Enter access code

**Navigation** System  $\rightarrow$  User manag.  $\rightarrow$  Ent. access code

**Description** For authorized service personnel only.

**User entry** 0 to 9 999

Factory setting 0

Status password entry

**Navigation** System  $\rightarrow$  User manag.  $\rightarrow$  Status pw entry

**Description** Use this function to display the status of the password verification.

User interface	<ul> <li>Wrong password</li> <li>Password rule violated</li> <li>Password accepted</li> <li>Permission denied</li> <li>Confirm PW mismatch</li> <li>Reset password accepted</li> <li>Invalid user role</li> <li>Wrong sequence of entry</li> </ul>	
Factory setting		
Define password		
Navigation		
User entry	Character string comprising numbers, letters and special characters (1)	
New password		<b>A</b>
Navigation		
Description	Define the new "Maintenance" password.  A new password is valid after it has been confirmed within the "Confirm new password parameter.  Any valid password consists of 4 to 16 characters and can contain letters and numbers	
User entry	Character string comprising numbers, letters and special characters (16)	
Confirm new password		
Navigation		
Description	Enter the new password again to confirm.	
User entry	Character string comprising numbers, letters and special characters (16)	
Change password		
Navigation	System → User manag. → Change password	
Description	Changes the 'Maintenance' password.	
User entry	Character string comprising numbers, letters and special characters (1)	

Old password		
Navigation	System → User manag. → Old password	
Description	Enter the current password, to subsequently change the existing password.	
User entry	Character string comprising numbers, letters and special characters (16)	
Delete password		Â
Navigation		
Description	Deletes the 'Maintenance' password.	
	After deleting, the 'Operator' role will be no more available.	
	All users have read/write access rights.	
User entry	Character string comprising numbers, letters and special characters (1)	
Forgot password?		
Navigation		
User entry	Character string comprising numbers, letters and special characters (1)	
Reset password		
Navigation		
Description	Enter a code to reset the current "Maintenance" password. The code is delivered by your local support.	
User entry	Character string comprising numbers, letters and special characters (16)	

# 3.4.3 Bluetooth configuration

*Navigation*  $\blacksquare \square$  System  $\rightarrow$  Bluetooth conf.

#### Bluetooth activation

**Navigation** System  $\rightarrow$  Bluetooth conf.  $\rightarrow$  Bluetooth active

**Description** If Bluetooth is deactivated, it can only be reactivated via the display or the operating tool.

Reactivating via the SmartBlue app is not possible.

**Selection** • Disable

■ Enable

**Factory setting** Depends on the order option

# 3.4.4 Display

# Language

**Description** Set display language

1 7 5 5

- **Selection** English
  - Deutsch \*
  - Français \*
  - Español
  - Italiano
  - Nederlands <sup>7</sup>
  - Portuguesa
  - Polski
  - русский язык (Russian) \*
  - Svenska
  - Türkçe
  - 中文 (Chinese) \*
  - 日本語 (Japanese) \*
  - 한국어 (Korean)
  - ُ (Arabic) الْعَرَبيّة •
  - Bahasa Indonesia \*

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<sup>\*</sup> Visibility depends on order options or device settings

๑ ภาษาไทย (Thai) \*

tiếng Việt (Vietnamese)

■ čeština (Czech)

**Factory setting** 

English

### Format display

**Description** Select how measured values are shown on the display

**Selection** ■ 1 value, max. size

■ 1 bargraph + 1 value

2 values

**Factory setting** 1 value, max. size

Value 1 display

**Navigation** System  $\rightarrow$  Display  $\rightarrow$  Value 1 display

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

**Selection** • Level linearized

Distance

Absolute echo amplitude
 Relative echo amplitude
 Area of incoupling
 Current output
 Buildup index\*

Foam index \*Terminal voltage

Electronics temperature Sensor temperature Unfiltered distance

**Factory setting** Level linearized

Decimal places 1 ... 4

**Navigation** System  $\rightarrow$  Display  $\rightarrow$  Decimal places 1

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

Visibility depends on order options or device settings

Selection

■ X

■ X.X

X.XX

x.xxxx.xxxx

**Factory setting** 

X.XX

# Value 2 display

Description

**Navigation** 

Select the measured value that is shown on the local display

Selection

- None
- Level linearized
- Distance
- Absolute echo amplitude
- Relative echo amplitude
- Area of incoupling
- Current output
- Buildup index
- Foam index \*
- Terminal voltage
- Electronics temperature
- Sensor temperature
- Unfiltered distance

**Factory setting** 

None

# Value 3 display

Navigation

Description

Select the measured value that is shown on the local display

Selection

- None
- Level linearized
- Distance
- Absolute echo amplitude
- Relative echo amplitude
- Area of incoupling
- Current output
- Buildup index
- Foam index \*
- Terminal voltage

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<sup>\*</sup> Visibility depends on order options or device settings

Electronics temperatureSensor temperatureUnfiltered distance

**Factory setting** 

None

Value 4 display

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

**Selection** • None

Level linearized

■ Distance

Absolute echo amplitude

Relative echo amplitude

lacktriangle Area of incoupling

Current outputBuildup index \*

Foam index

Terminal voltage

Electronics temperature

Sensor temperature

Unfiltered distance

Factory setting None

Number format

**Description** Choose number format for the display

**Selection** • Decimal

■ ft-in-1/16"

**Factory setting** Decimal

Contrast display

**Navigation** System  $\rightarrow$  Display  $\rightarrow$  Contrast display

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

\* Visibility depends on order options or device settings

**User entry** 20 to 80 %

30 % **Factory setting** 

#### 3.4.5 Geolocation

Navigation System → Geolocation

**Process Unit Tag** Navigation System → Geolocation → Process Unit Tag Description Enter the process unit in which the device is installed. Character string comprising numbers, letters and special characters (32) **User entry Factory setting** Process Unit Tag **Location Description** Navigation 

Description Use this function to enter a description of the location so that the device can be located in

the plant.

**User entry** Character string comprising numbers, letters and special characters (32)

**Factory setting** somewhere

Longitude 

**Navigation** 

Description Use this function to enter the longitude coordinates that describe the device location.

-180 to 180° **User entry** 

0° **Factory setting** 

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Latitude

**Navigation** System  $\rightarrow$  Geolocation  $\rightarrow$  Latitude

**Description** Use this function to enter the latitude coordinates that describe the device location.

**User entry** -90 to 90 °

Factory setting  $0^{\circ}$ 

Altitude

**Navigation**  $\blacksquare \Box$  System  $\rightarrow$  Geolocation  $\rightarrow$  Altitude

**Description** Use this function to enter the altitude data that describe the device location.

**User entry** Signed floating-point number

**Factory setting** 0 m

Location method

**Navigation** System  $\rightarrow$  Geolocation  $\rightarrow$  Location method

**Description** Use this function to select the data format for specifying the geographic location. The

codes for specifying the location are based on the US National Marine Electronics

Association (NMEA) Standard NMEA 0183.

**Selection** ■ No fix

■ GPS or Standard Positioning Service fix

Differential GPS fix

• Precise positioning service (PPS) fix

■ Real Time Kinetic (RTK) fixed solution

ullet Real Time Kinetic (RTK) float solution

Estimated dead reckoning

Manual input mode

Simulation Mode

**Factory setting** No fix

User interface

# 3.4.6 Information

Navigation  $\blacksquare \square$  System  $\rightarrow$  Information

Device name **Navigation** Description Use this function to display the device name. It can also be found on the nameplate. User interface Character string comprising numbers, letters and special characters **Factory setting** 5xB/6xB Manufacturer **Navigation** Description Displays the manufacturer. User interface Character string comprising numbers, letters and special characters Endress+Hauser Factory setting Serial number Navigation Description The serial number is a unique alphanumerical code identifying the device. It is printed on the nameplate. In combination with the Operations app it allows to access all device related documentation. User interface Character string comprising numbers, letters and special characters Order code Navigation Description Shows the device order code.

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Character string comprising numbers, letters and special characters

Factory setting - none -

Read access: OperatorWrite access: Expert

Firmware version

**Navigation** System  $\rightarrow$  Information  $\rightarrow$  Firmware version

**Description** Displays the device firmware version installed.

**User interface** Character string comprising numbers, letters and special characters

Hardware version

**Navigation** System  $\rightarrow$  Information  $\rightarrow$  Hardware version

**User interface** Character string comprising numbers, letters and special characters

Extended order code 1 ... 3

**Navigation** System  $\rightarrow$  Information  $\rightarrow$  Ext. order cd. 1

**Description** The extended order code is an alphanumeric code containing all information to identify

the device and its options.

**User interface** Character string comprising numbers, letters and special characters

Additional information Access:

■ Read access: Operator

■ Write access: Expert

XML build number

**Navigation** System  $\rightarrow$  Information  $\rightarrow$  XML build no.

**User interface** Positive integer

■ Read access: Expert

■ Write access: -

	_	
Ch	001201120	
	ecksum	

**Navigation**  $\blacksquare \square$  System  $\rightarrow$  Information  $\rightarrow$  Checksum

**Description** Checksum for Firmware version.

**User interface** Positive integer

# 3.4.7 Additional information

Navigation  $\square$  System  $\rightarrow$  Additional info

Sensor

Navigation  $\square$  System  $\rightarrow$  Additional info  $\rightarrow$  Sensor

#### Serial number

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Sensor  $\rightarrow$  Serial number

**Description** Shows the serial number of the module

**User interface** Character string comprising numbers, letters and special characters

Read access: ExpertWrite access: -

# Firmware version

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**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Sensor  $\rightarrow$  Firmware version

**Description** Displays the firmware version of the module.

**User interface** Positive integer

Additional information Access:

Read access: ExpertWrite access: -

Build no. software

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Sensor  $\rightarrow$  Build no. softw.

**Description** Shows the build number of the module firmware

**User interface** 0 to 65 535

Read access: ExpertWrite access: -

Hardware version

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Sensor  $\rightarrow$  Hardware version

**Description** Displays the hardware version of the module.

**User interface** Character string comprising numbers, letters and special characters

Additional information Access:

Read access: ExpertWrite access: -

Checksum

**Description** Checksum for Firmware version.

**User interface** Positive integer

Factory setting 0

Additional information Access:

Read access: ExpertWrite access: -

#### **Electronics**

*Navigation* System  $\rightarrow$  Additional info  $\rightarrow$  Electronics

Serial number

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Electronics  $\rightarrow$  Serial number

**Description** Shows the serial number of the module

**User interface** Character string comprising numbers, letters and special characters

Read access: ExpertWrite access: -

#### Firmware version

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Electronics  $\rightarrow$  Firmware version

**Description** Displays the firmware version of the module.

**User interface** Positive integer

Read access: ExpertWrite access: -

# Build no. software

**Navigation**  $\blacksquare$  System  $\rightarrow$  Additional info  $\rightarrow$  Electronics  $\rightarrow$  Build no. softw.

**Description** Shows the build number of the module firmware

**User interface** 0 to 65 535

Read access: ExpertWrite access: -

# Hardware version

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Electronics  $\rightarrow$  Hardware version

**Description** Displays the hardware version of the module.

**User interface** Character string comprising numbers, letters and special characters

Read access: ExpertWrite access: -

# Display/Bluetooth

*Navigation*  $\square$  System  $\rightarrow$  Additional info  $\rightarrow$  Displ./Bluetooth

#### Serial number

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Displ./Bluetooth  $\rightarrow$  Serial number

**Description** Shows the serial number of the module

**User interface** Character string comprising numbers, letters and special characters

Read access: ExpertWrite access: -

# Firmware version

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Displ./Bluetooth  $\rightarrow$  Firmware version

**Description** Displays the firmware version of the module.

**User interface** Positive integer

Read access: ExpertWrite access: -

Build no. software

**Navigation**  $\blacksquare$  System  $\rightarrow$  Additional info  $\rightarrow$  Displ./Bluetooth  $\rightarrow$  Build no. softw.

**Description** Shows the build number of the module firmware

**User interface** 0 to 65 535

Read access: ExpertWrite access: -

Hardware version

**Navigation** System  $\rightarrow$  Additional info  $\rightarrow$  Displ./Bluetooth  $\rightarrow$  Hardware version

**Description** Displays the hardware version of the module.

**User interface** Character string comprising numbers, letters and special characters

Additional information Access:

Read access: ExpertWrite access: -

# 3.4.8 Software configuration

*Navigation*  $\blacksquare \blacksquare$  System  $\rightarrow$  Softw. config.

CRC device configuration

**Navigation** System  $\rightarrow$  Softw. config.  $\rightarrow$  CRC device conf.

**Description** CRC device configuration based on current settings of safety relevant parameters.

The CRC device configuration is unique and can be used to detect changes in safety

relevant parameter settings.

**User interface** 0 to 65 535

**Factory setting** 65 535

**Additional information** A CRC code (Cyclic Redundancy Check) for measuring instruments is an error detection

method that is used to ensure the integrity of data.

# Stored CRC device configuration

**Navigation** System  $\rightarrow$  Softw. config.  $\rightarrow$  Stored CRC conf.

**Description** Stored CRC after the last safety lock. Factory delivery is 65535 means that the device has

not yet been safety locked.

**User interface** 0 to 65 535

**Factory setting** 65 535

# Timestamp stored CRC device config.

**Description** Gives the time stamp when the CRC was last stored following completion of the safety lock

wizard.

**User interface** Character string comprising numbers, letters and special characters

Activate SW option

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

**User entry** Positive integer

# Software option overview

**Navigation** System  $\rightarrow$  Softw. config.  $\rightarrow$  SW option overv.

**Description** Shows all enabled software options

**User interface** ■ SIL

WHG

Heartbeat VerificationHeartbeat Monitoring



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