GP01152F/00/EN/01.20
71499381
2020-08-31

Description of Device Parameters
Prosonic S FMU95

Level measurement

Endress+Hauser
People for Process Automation

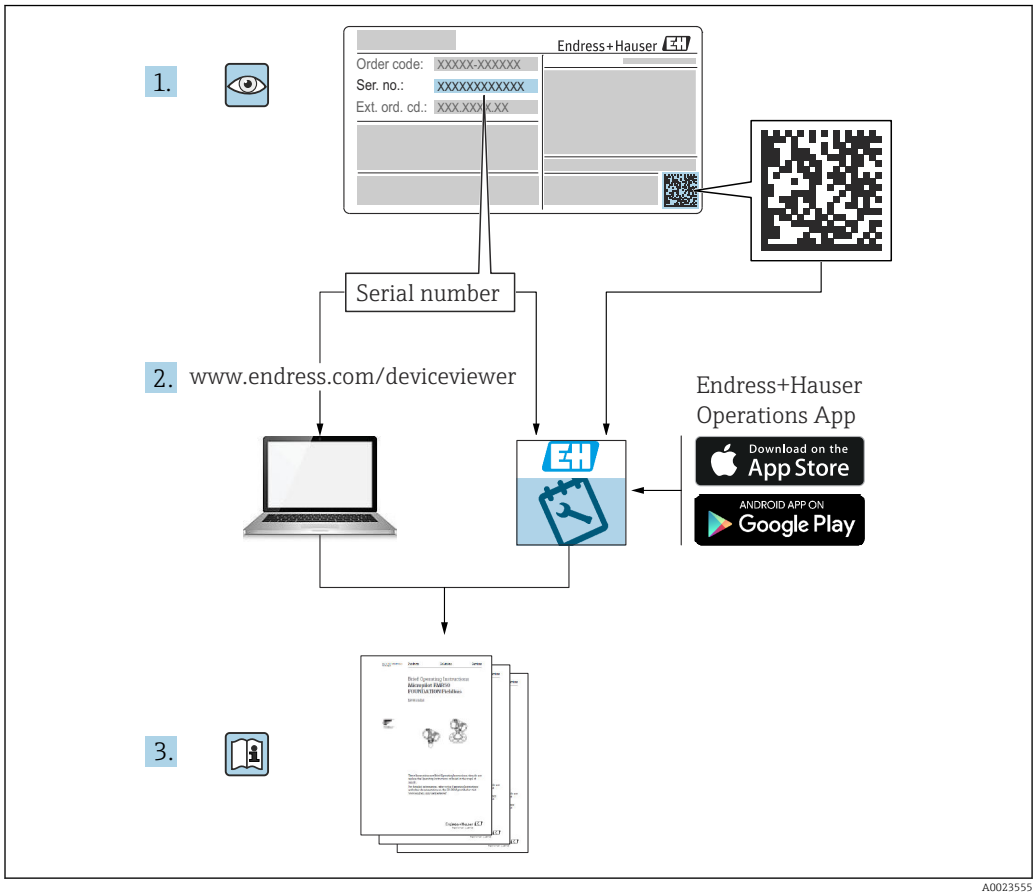

1.
Endress+Hauser
Order code: XXXXX-XXXXXX
Ser. no.: XXXXXXXXXXX
Ext. ord. cd.: XXX XXX XX XX
Serial number
2. www.endress.com/deviceviewer
Endress+Hauser
Operations App
Download on the App Store
ANDROID APP ON Google Play
3.
A0023555

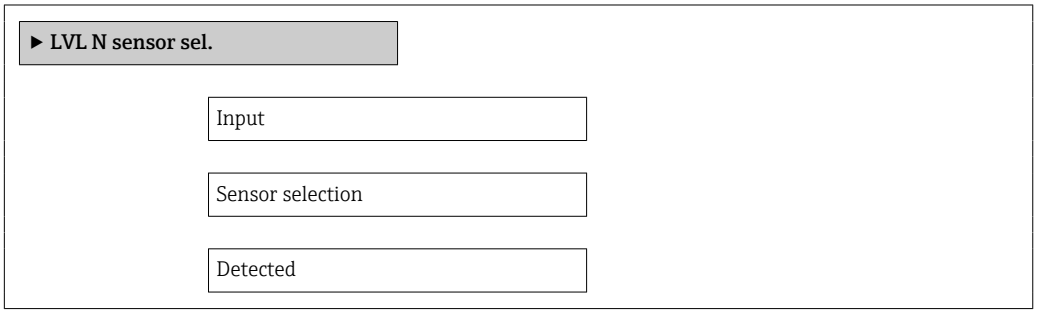
Table of contents

1 Menu "Level → Level (LVL) N"

1.1 Submenu "Basic setup"

1.1.1 Parameter set "LVL N sensor sel."

Navigation Level → Level (LVL) N → Basic setup → LVL N sensor sel.



Input

Navigation Level → Level (LVL) N → Basic setup → LVL N sensor sel. → Input

Description Assign a sensor to the channel N.

Selection
- No sensor
- Sensor 1
- ...
- Sensor 10

Sensor selection

Navigation Level → Level (LVL) N → Basic setup → LVL N sensor sel. → Sensor selection

Description Specify the type of sensor that is connected.

Factory setting Automatic

Additional information

- **For FDU9x sensors**:
  Select the **Automatic** option. Prosonic S then automatically detects the type of sensor that is connected.
- **For FDU8x sensors**:
  Specify the sensor type explicitly.

Following sensor replacement
Prosonic S automatically detects the new type of sensor. Measurement is resumed. To ensure smooth and correct measurement:
- Check the **Empty E** and **Full F** parameters and adjust them if necessary. In doing so, pay attention to the blocking distance of the new sensor.
- Check the distance displayed in the **LVL N check value** parameter set. Perform a new interference echo suppression (mapping) if necessary.

Detected

Navigation Level → Level (LVL) N → Basic setup → LVL N sensor sel. → Detected

Prerequisite **Sensor selection** = **Automatic**

Description Displays the type of sensor detected automatically.

1.1.2 Parameter set "LVL N appl. param."

Navigation Level → Level (LVL) N → Basic setup → LVL N appl. para.

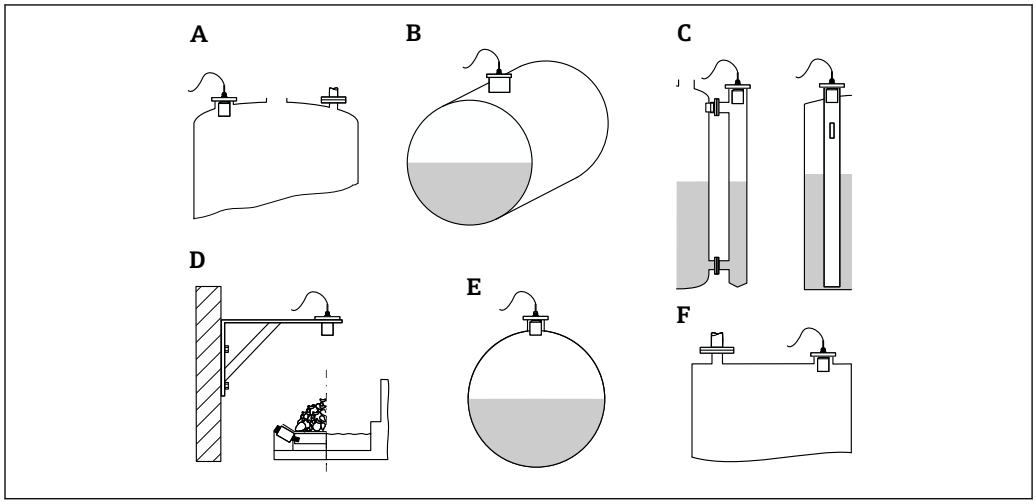
Tank shape

Navigation Level → Level (LVL) N → Basic setup → LVL N appl. para. → Tank shape

Description Specify the tank shape.

Factory setting Flat ceiling

Additional information



1 Tank shape

A Dome ceiling
B Horizontal cyl.
C Bypass/stilling well
D No ceiling
E Sphere
F Flat ceiling

Medium property

Navigation Level → Level (LVL) N → Basic setup → LVL N appl. para. → Medium property

Description Specify the medium property.

Selection
- Liquid
- Paste-like
- Solid <4 mm
- Solid >4 mm
- Unknown

Factory setting Liquid

Additional information

If the medium property cannot be categorized clearly and unequivocally, select the **Unknown** option.

Process conditions

Navigation

Level → Level (LVL) N → Basic setup → LVL N appl. para. → Process conditions

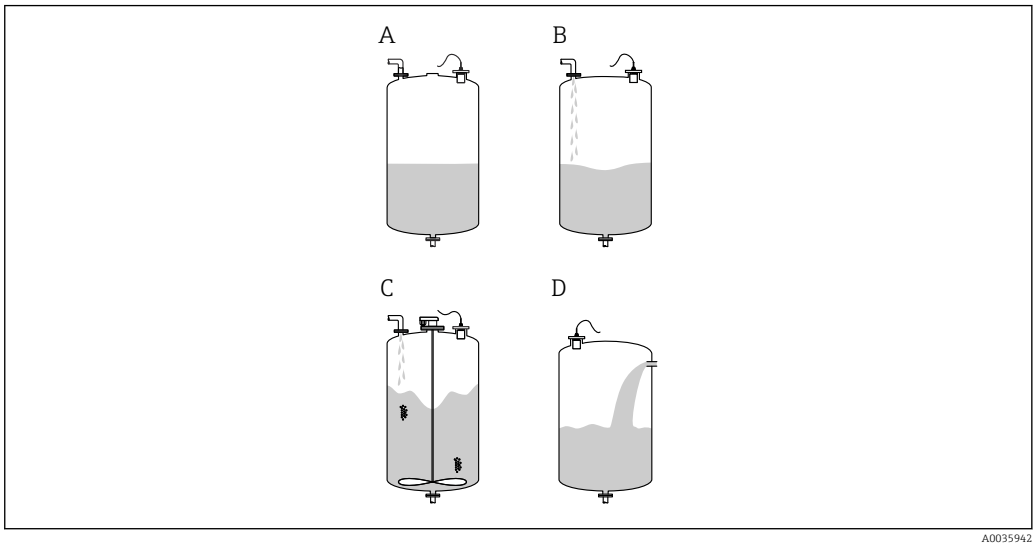
Description

Specify the process conditions.

Factory setting

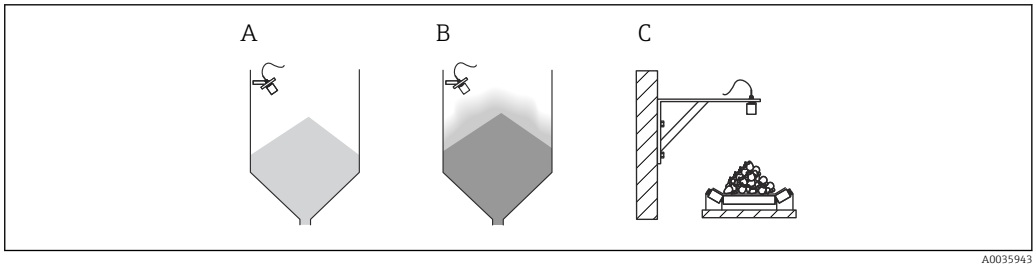
Calm surface

Additional information



2 *Process conditions for liquids*

A Calm surface
B Turb. surface
C Add. agitator
C Fast change



3 *Process conditions for bulk solids*

A Standard solid
B Solid dusty
C Conveyor belt

Meaning of the options

- **Standard liq.**
  - For liquid applications that do not fall into any of the following categories.
  - Average filter values and output damping
- **Calm surface**
  - For storage tanks with an immersion tube or bottom filling
  - Large filtering range and output damping
    → Stable measured value, accurate measurement, slow response time
- **Turb. surface**
  - For storage and buffer tanks with turbulent surfaces due to free filling, mixing nozzles or small bottom agitators
  - Emphasis on filters to stabilize the input signal.
    → Steady measured value, medium response time
- **Add. agitator**
  - For agitated surfaces due to agitators (possibly with vortex formation)
  - Large values are set for filters to stabilize the input signal.
    → Stable measured value, medium response time
- **Fast change**
  - For fast changes in the level, particularly in small tanks
  - Low values are set for the filters.
    → Fast response, possibly unstable measured value
- **Standard solid**
  - For bulk solid applications that do not fall into any of the following categories.
  - Average filter values and output damping
- **Solid dusty**
  - For dusty bulk solids
  - The filters are set in such a way that even relatively weak wanted signals are detected.
- **Conveyor belt**
  - For bulk solids with rapid changes in the level (e.g. on conveyor belts)
  - Low values are set for the filters.
    → Fast response, possibly unstable measured value
- **Test: no filter**
  For service and diagnostics only
  All the filters are switched off.

1.1.3 Parameter set "LVL N empty cal."

Navigation Level → Level (LVL) N → Basic setup → LVL N empty cal.

Empty E

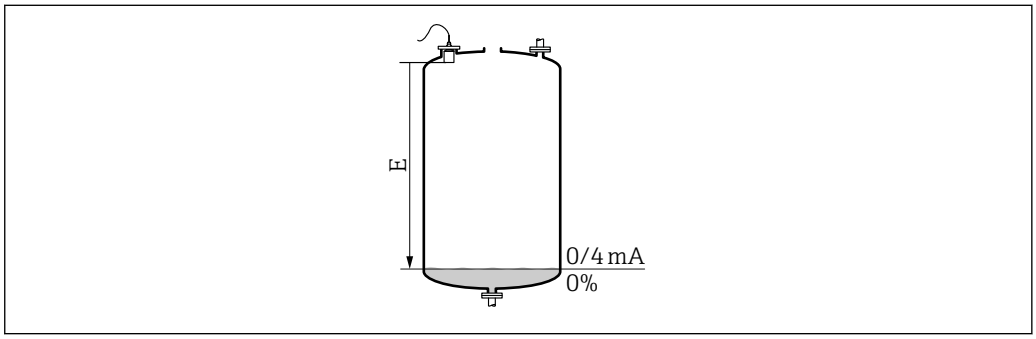
Navigation Level → Level N → Basic setup → LVL N empty cal. → Empty E

Description Specify the empty distance **E**.

User entry Depends on the sensor

Factory setting Maximum sensor measuring range

Additional information



4 *Definition of empty distance "E"*

E may not be lower than the point where the ultrasonic wave hits the tank floor.

1.1.4 Parameter set "LVL N full cal."

Navigation Level → Level (LVL) N → Basic setup → LVL N full cal.

Full F

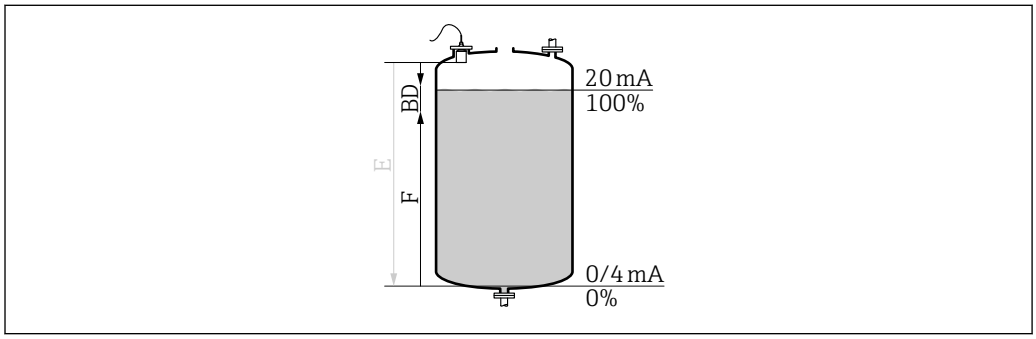
Navigation Level → Level (LVL) N → Basic setup → LVL N full cal. → Full F

Description Specify the span **F**.

User entry Depends on the sensor

Factory setting Depends on the sensor

Additional information



5 Definition of the span "F" and the blocking distance "BD"

F may not project into the blocking distance (BD) of the sensor.

Blocking distance

Navigation Level → Level (LVL) N → Basic setup → LVL N full cal. → Blocking distance

Description Indicates the blocking distance (BD) of the sensor.

1.1.5 Parameter set "LVL N unit"

Navigation Level → Level (LVL) N → Basic setup → LVL N unit

Unit level

Navigation Level → Level (LVL) N → Basic setup → LVL N unit → Unit level

Description Select the level unit.

Selection
- m
- mm
- ft
- inch
- %

Factory setting %

Additional information The level is output linearly in this unit if linearization is not performed.

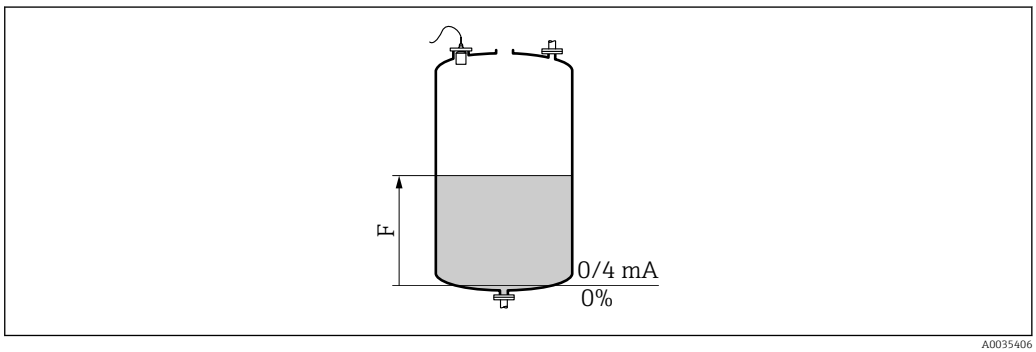
After changing the level unit, adjust the switch points of the limit relay and the pump control relay.

Level N

Navigation Level → Level (LVL) N → Basic setup → LVL N unit → Level N

Description Displays the level **F** currently measured.

Additional information



6 *Definition of level "F"*

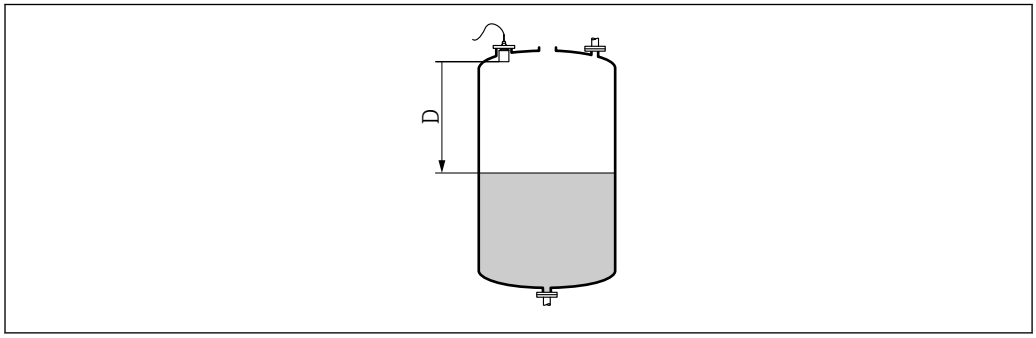
F is displayed in the level unit: **Level → Level (LVL) N → Basic setup → LVL N unit → Unit level**.

Distance

Navigation Level → Level (LVL) N → Basic setup → LVL N unit → Distance

Description Displays the distance **D** between the reference point of the sensor and the surface of the product.

Additional information



7 *Definition of distance "D"*

D is displayed in the distance unit:
Device properties → Operating param. → Distance unit.

If the displayed value deviates from the actual distance:
Perform interference echo suppression (mapping).

1.1.6 Parameter set "LVL N linearisat."

Using the linearization function

Linearization is used to convert the level to other units. In particular, it can be used to calculate the volume or mass in a vessel of any shape. Prosonic S provides different types of linearization. In addition, a linearization table can be created for vessels of any shape.

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat.

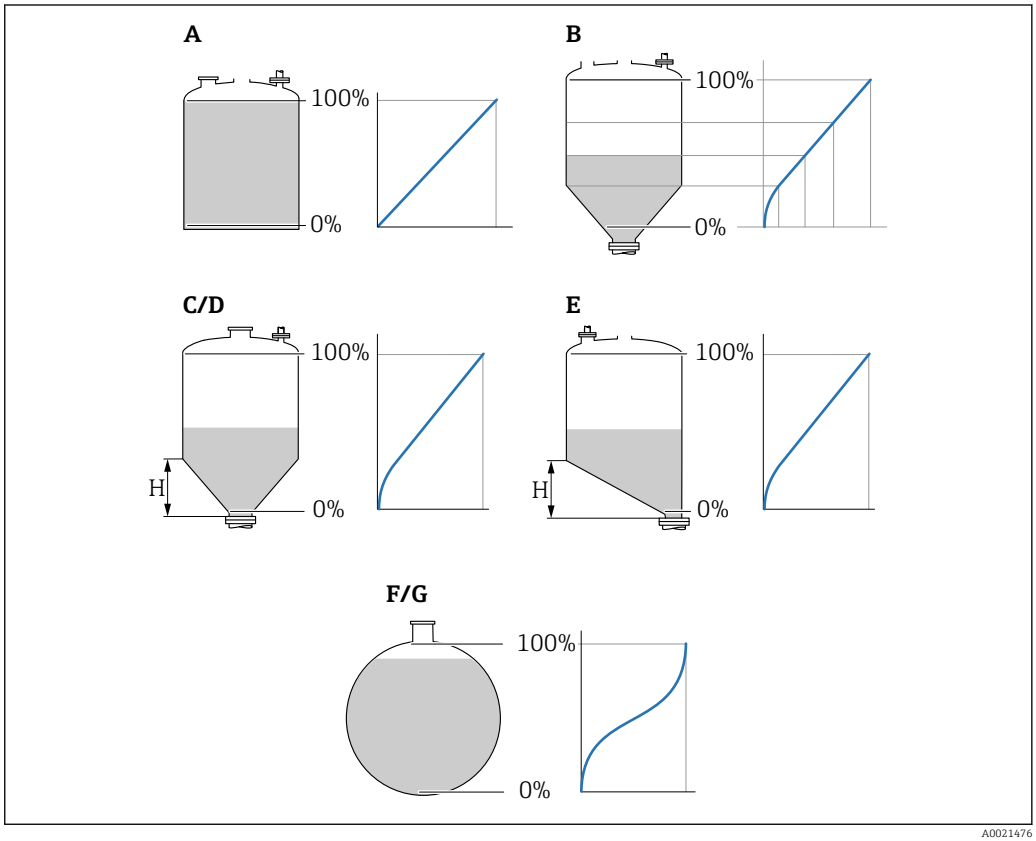
Type

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Type

Description Select the type of linearization.

Factory setting None

Additional information



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8 *Types of linearization*

A Linear
B Table
C Pyramid bottom
D Conical bottom
E Angled bottom
F Sphere
G Horizontal cyl.

Customer unit

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Customer unit

Prerequisite **Type** ≠ **None**

Description Select the unit for the linearized value.

Additional information
- The unit is for display purposes only. The values are not converted.
- To enter a unit that does not appear in the picklist:
  Select the **"Customer spec."** option. Then enter the unit in the **"Customized text"** parameter.

Free text

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Free text

Prerequisite **Customer unit** = **Customer spec.**

Description Specify the unit symbol for the linearized value.

User entry Max. 5 alphanumeric characters

Max. scale

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Max. scale

Prerequisite **Type** ≠ **None** or **Table**

Description Specify the maximum vessel content in the customer unit.

Additional information If **Type** = **Sphere** or **Horizontal cyl.**, the **Max scale** must always refer to a completely full tank.

Diameter

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Diameter

Prerequisite **Type** = **Horizontal cyl.** or **Sphere**

Description Specify the vessel diameter D.

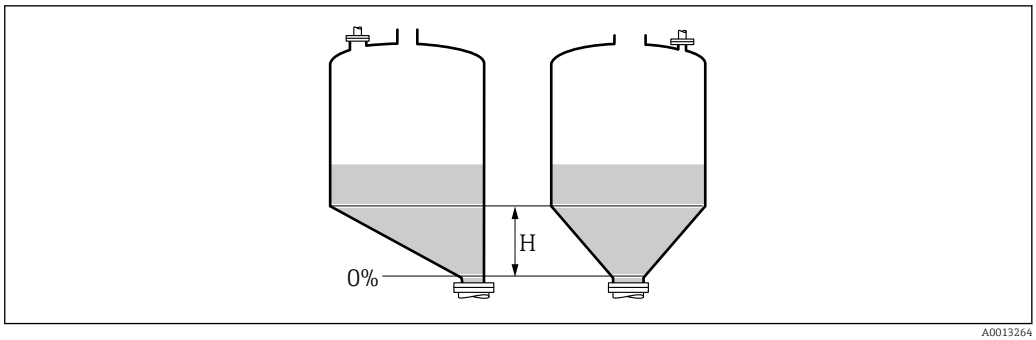
Intermediate height (H)

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Intermediate height (H)

Prerequisite **Type** = **Angled bottom**, **Pyramid bottom** or **Conical bottom**

Description Specify the intermediate height H.

Additional information



9 Definition of the intermediate height H

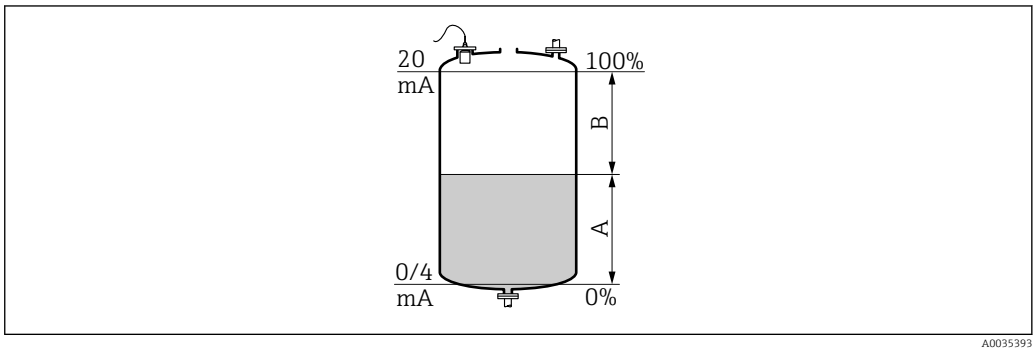
Mode

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Mode

Description Specify whether the linearization refers to the level or the ullage.

Factory setting Level

Additional information



10 Definition of level and ullage

A Level
B Ullage

Edit

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Edit

Prerequisite **Type** = **Table**

Description

Select the entry mode for the linearization table.

Additional information

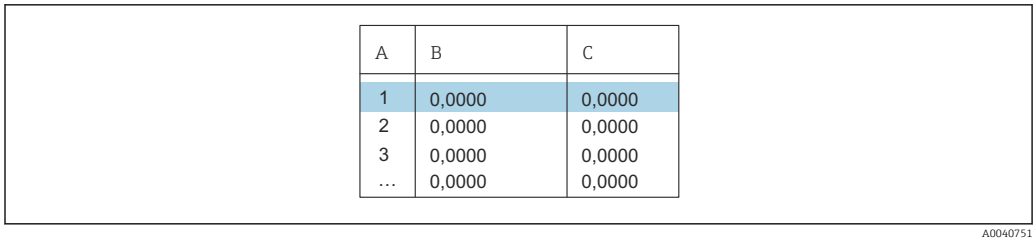
Meaning of the options

- **Read**
  The table editor is opened. The table can be read but cannot be edited.
- **Manual**
  The table editor is opened. Points in the table can be entered and changed.
- **Semi-automatic**
  The table editor is opened. The level value is automatically read by the Prosonic S. The user must enter the associated linearized value.
- **Clear**
  The linearization table is deleted.

Conditions for the linearization table:
- Up to 32 "Level/volume" value pairs
- Monotonically decreasing or increasing

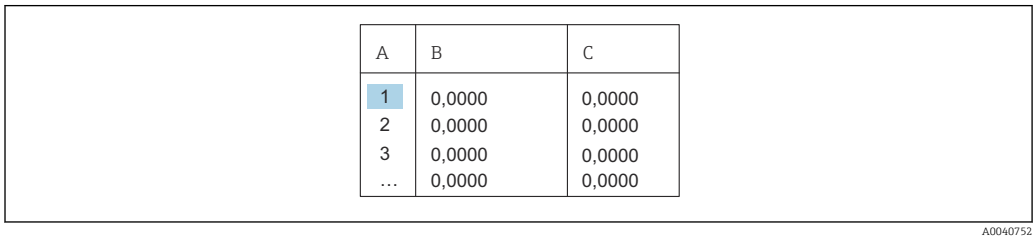
Table editor

Linearization table conditions:
- Up to 32 "Level to volume" value pairs.
- Monotonically increasing or decreasing. (The monotonicity is checked when the table is activated).
- Once entered, must be activated by the **Status table** parameter.



A Line number
B Column for level
C Column for values

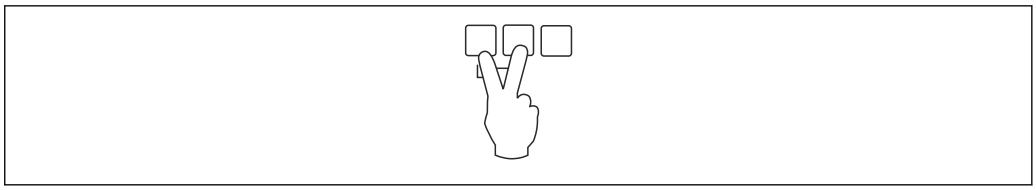
1. Press [redacted] to jump to the next line.
2. Press [redacted] to jump to the previous line.
3. Press [redacted] to open the selected line for editing.



A Line number
B Column for level
C Column for values

1. Press [redacted] or [redacted] to navigate inside the table.
2. Press [redacted] or [redacted] to navigate inside the column with the line numbers.
3. Press [redacted] to delete the entire line, insert or move a line.

Press **Escape** to return to the previous step.



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Status table

Navigation Level → Level (LVL) N → Basic setup → LVL N linearisat. → Status table

Description Enable or disable the linearization table.

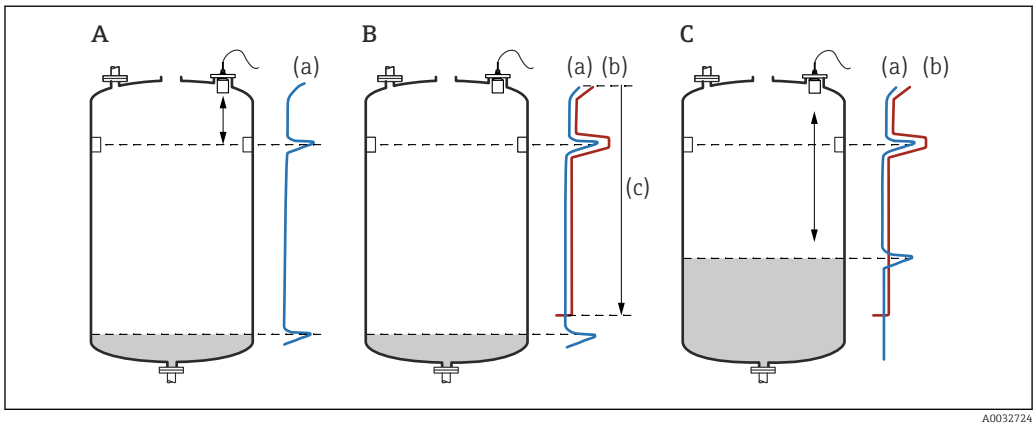
Additional information

Meaning of the options

- **Enabled**
  The linearized value is output.
- **Disabled**
  The unlinearized value is output.

If the **Disabled** option is selected, the table remains stored in the device. It can be enabled again at any time.

1.1.7 Parameter set "LVL N check value" (interference echo suppression)



11 *Operating principle of the mapping (interference echo suppression) function*

A The echo curve (a) contains an interference echo and the level echo. Without mapping, the interference echo would also be evaluated.

B Mapping generates the mapping curve (b). This suppresses all the echoes that are inside the range of mapping (c).

C Afterwards, only echoes that are higher than the mapping curve are evaluated. The interference echo is below the mapping curve and is therefore ignored (not evaluated).

To record all the interference echoes:
- Perform mapping at the minimum level possible (ideally with an empty vessel).
- If it is not possible to empty the vessel during commissioning, record preliminary mapping when the vessel is partially filled. Repeat mapping when the level reaches approximately 0% for the first time.

Navigation Level → Level (LVL) N → Basic setup → LVL N check value

Act. distance N

Navigation Level → Level (LVL) N → Basic setup → LVL N check value → Act. distance N

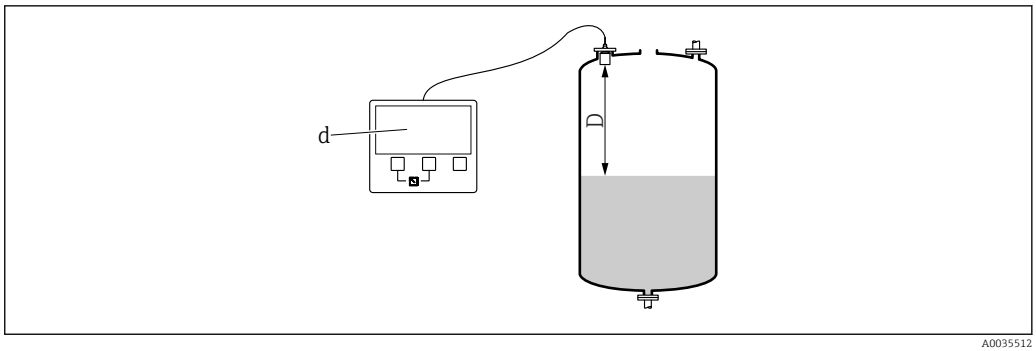
Description Displays the distance D measured between the sensor membrane and the surface of the product.

Check distance

Navigation Level → Level (LVL) N → Basic setup → LVL N check value → Check distance

Description Check whether the displayed distance d matches the actual distance D. Depending on the option selected, the device suggests a suitable range of mapping.

Additional information



12 Displayed distance d and actual distance D

Meaning of the options

- **Distance = ok**
  Select if d = D.
- **Dist. too small**
  Select if d < D.
- **Dist. too big**
  Select if d > D.
  This error is not due to an interference echo. Therefore interference echo suppression is not performed. Check the following parameters to rectify the error:
  - **Tank shape**
  - **Medium property**
  - **Process conditions**
- **Dist. unknown**
  Select if D is unknown. No interference echo suppression is performed.
- **Manual**
  Select in order to manually define the range of mapping in the **Range of mapping** parameter.

1.1.8 Parameter set "LVL N dist. map."

Navigation Level → Level (LVL) N → Basic setup → LVL N dist. map.

Range of mapping

Navigation Level → Level (LVL) N → Basic setup → LVL N dist. map. → Range of mapping

Description Define the range of mapping.

Additional information
- For **Check distance** = **Distance ok** or **Distance too small**, a suitable range of mapping is already entered.
- Enter a suitable range of mapping for **Check distance** = **Manual**.

Start mapping

Navigation Level → Level (LVL) N → Basic setup → LVL N dist. map. → Start mapping

Description Start recording the mapping curve.

Additional information

Meaning of the options
- **Yes**
  The mapping curve is recorded.
- **No**
  No mapping curve is recorded.

1.1.9 Parameter set "LVL N status"

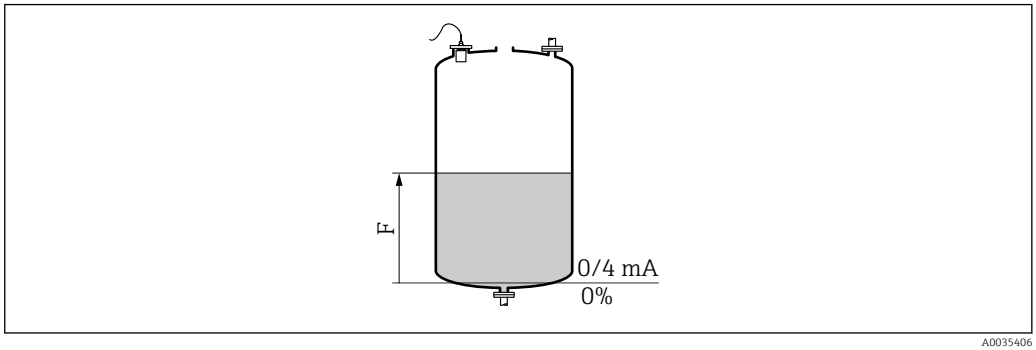
Navigation Level → Level (LVL) N → Basic setup → LVL N status

Level N

Navigation Level → Level (LVL) N → Basic setup → LVL N unit → Level N

Description Displays the level **F** currently measured.

Additional information



13 *Definition of level "F"*

F is displayed in the level unit: **Level → Level (LVL) N → Basic setup → LVL N unit → Unit level**.

Act. distance N

Navigation Level → Level (LVL) N → Basic setup → LVL N check value → Act. distance N

Description Displays the distance D measured between the sensor membrane and the surface of the product.

Status

Navigation Level → Level (LVL) N → Basic setup → LVL N status → Status

Description Specify the status of interference echo suppression (mapping).

Additional information

Meaning of the options

- **Enable map**
  The mapping curve is taken into consideration during signal evaluation.
- **Disable map**
  The mapping curve is not taken into consideration during signal evaluation. The curve remains stored in the device, however.
- **Delete map**
  The existing mapping curve is deleted.

1.2 Submenu "Extended calibr."

1.2.1 Parameter set "LVL N dist. map."

→ 20

1.2.2 Parameter set "LVL N check value"

Navigation Level → Level (LVL) N → Extended calib. → LVL N check value

Correction

Navigation Level → Level (LVL) N → Extended calib. → LVL N check value → Correction

Description Specify the distance correction.

Factory setting 0 mm

Additional information The value entered is added to the measured distance before the level is calculated.

1.2.3 Parameter set "LVL N correction"

Navigation Level → Level (LVL) N → Extended calib. → LVL N correction

Offset

Navigation Level → Level (LVL) N → Extended calib. → LVL N correction → Offset

Description Specify the level offset.

Factory setting 0 mm

Additional information The value entered is added to the measured level.

If linearization is enabled:
The corrected level is used for linearization.

1.2.4 Parameter set "LVL N blocking distance"

Navigation Level → Level (LVL) N → Extended calib. → LVL N blocking distance

Blocking distance

Navigation Level → Level (LVL) N → Basic setup → LVL N full cal. → Blocking distance

Description Indicates the blocking distance (BD) of the sensor.

1.2.5 Parameter set "LVL N limitation"

Navigation Level → Level (LVL) N → Extended calib. → LVL N limitation

Limitation

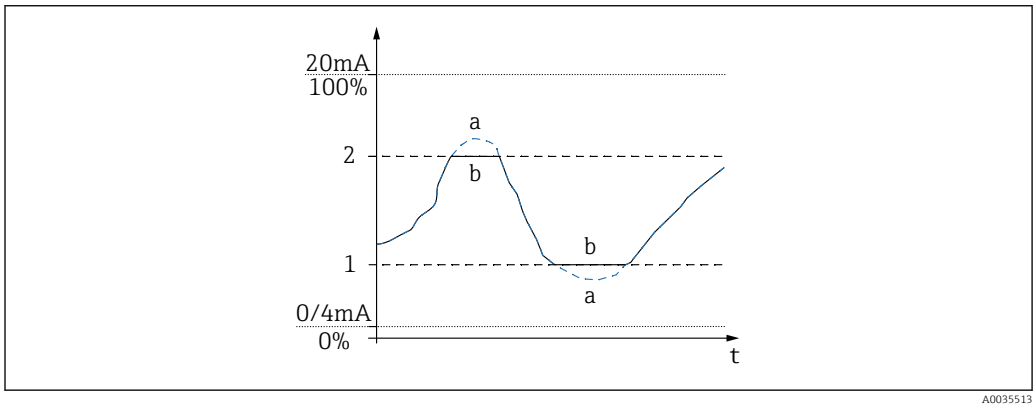
Navigation Level → Level (LVL) N → Extended calib. → LVL N limitation → Limitation

Description Specify whether a lower or upper threshold limit is to be set for the measured value.

Additional information

Meaning of the options

- **Off**
  The measured value is not limited.
- **Lower limit**
  A lower threshold limit is set for the measured value. The limit value is defined in the **Low limit** parameter.
- **Upper limit**
  An upper threshold limit is set for the measured value. The limit value is defined in the **High limit** parameter.
- **Low/high limit**
  A lower threshold limit and an upper threshold limit are set for the measured value. The limit values are defined in the **Low limit** and **High limit** parameters.



14 Measured value limitation

1 Lower limit
2 Upper limit
a Unlimited signal
b Limited signal

Upper limit

Navigation Level → Level (LVL) N → Extended calib. → LVL N limitation → Upper limit

Prerequisite **Limitation** = **high limit** or **low/high limit**

Description Specify the high limit for the measured value.

Lower limit

Navigation Level → Level (LVL) N → Extended calib. → LVL N limitation → Lower limit

Prerequisite **Limitation** = **low limit** or **low/high limit**

Description Specify the low limit for the measured value.

1.3 Submenu "Simulation"

1.3.1 Parameter set "LVL N simulation"

Navigation Level → Level (LVL) N → Simulation → LVL N simulation

Simulation

Navigation Level → Level (LVL) N → Simulation → LVL N simulation → Simulation

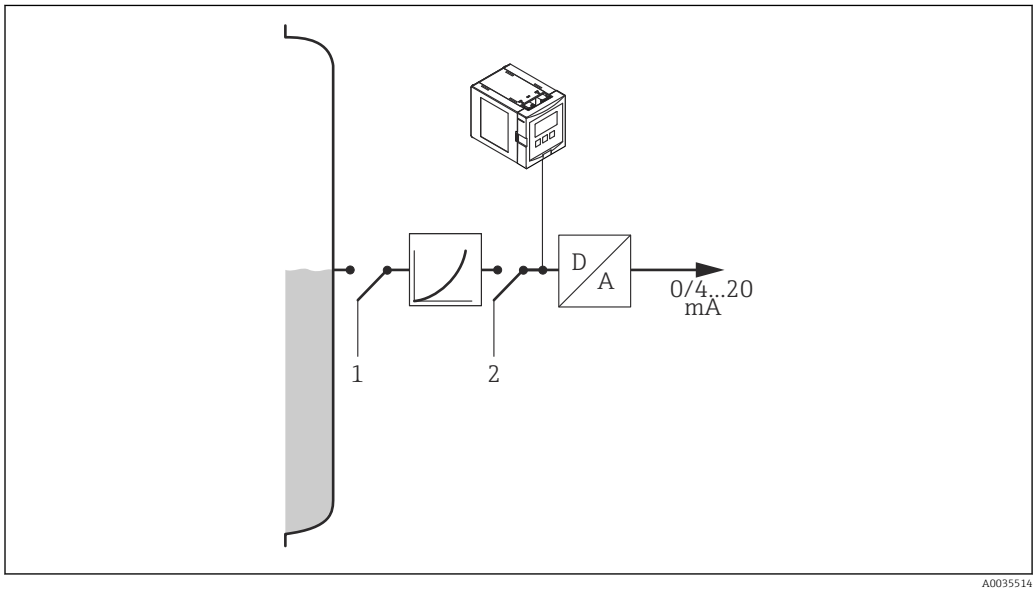
Description Select the simulation mode

Factory setting Sim. off

Additional information

Meaning of the options

- **Sim. off**
  No simulation (normal measuring mode)
- **Sim. level**
  Enter a level in the **Sim. level value** parameter. The displayed measured value and the signal output follow this value.
- **Sim. volume**
  Enter a volume or weight (depending on the linearization) in the **Sim. vol. value** parameter. The displayed measured value and the signal output follow this value.



15 Simulation modes

1 Level simulation
2 Volume simulation

If simulation is active, the device displays an error message to this effect.

Sim. level value

Navigation Level → Level (LVL) N → Simulation → LVL N simulation → Sim. level value

Prerequisite **Simulation** = **Sim. level**

Description Enter the level to be simulated.

Sim. volume value

Navigation Level → Level (LVL) N → Simulation → LVL N simulation → Sim. volume value

Prerequisite **Simulation** = **Sim. volume**

Description Enter the volume to be simulated.

2 Menu "Safety settings"

2.1 Parameter set "Outp. echo loss"

Navigation Safety settings → Outp. echo loss

Level N

Navigation Safety settings → Outp. echo loss → Level N

Description Specify the behavior of the level signal in the event of echo loss.

Additional information

Meaning of the options
- **Hold**
  The level value is held if an echo loss occurs.
- **Ramp %/min**
  After the set delay time (**Delay echo loss** parameter set) the level output value is shifted towards 0% (for a negative ramp) or towards 100% (for a positive ramp) with a configurable ramp (**Ramp level N** parameter).
- **User specific**
  After the set delay time (**Delay echo loss** parameter set), the level output adopts the value defined in the **Value level N** parameter.
- **Alarm**
  After the set delay time (**Delay echo loss** parameter set), the device adopts the alarm condition.

Ramp level N

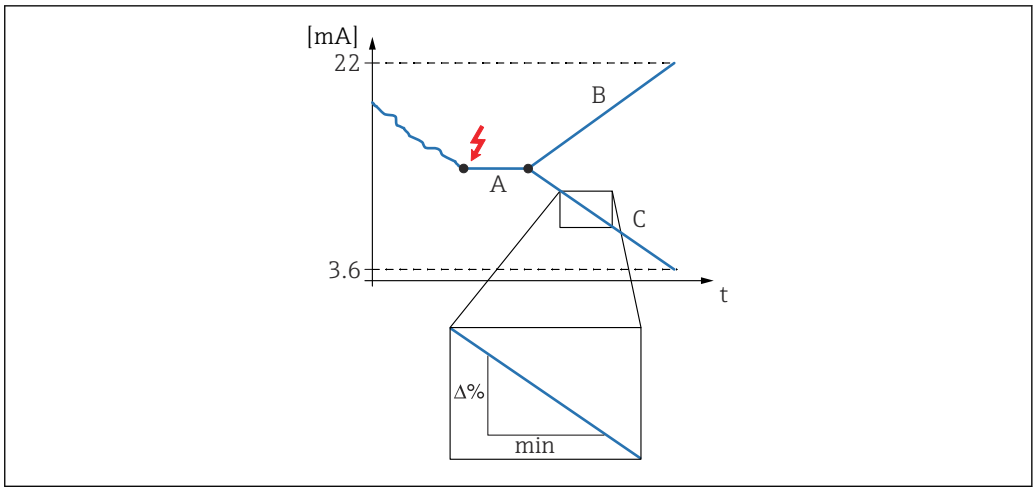
Navigation Safety settings → Outp. echo loss → Ramp level N

Prerequisite **Level N** = **Ramp %/min**

Description Define the slope of the ramp in the event of echo loss.

Unit: percentage of the measuring range per minute

Additional information



16 Ramp in event of echo loss

A Delay time
B Positive ramp
C Negative ramp

Value level N

Navigation Safety settings → Outp. echo loss → Value level N

Prerequisite **Level N = User specific**

Description Define the value of the level signal in the event of echo loss.

2.2 Parameter set "Delay echo loss"

Navigation Safety settings → Delay echo loss

Delay Sensor N

Navigation Safety settings → Delay echo loss → Delay Sensor N

Description Define the delay time for echo loss.

Factory setting 60 s

Additional information After an echo loss, Prosonic S waits for the time specified in this parameter to pass before "Outp. echo loss" becomes active. This ensures that the measurement is not unnecessarily interrupted by temporary interferences.

2.3 Parameter set "Safety distance"

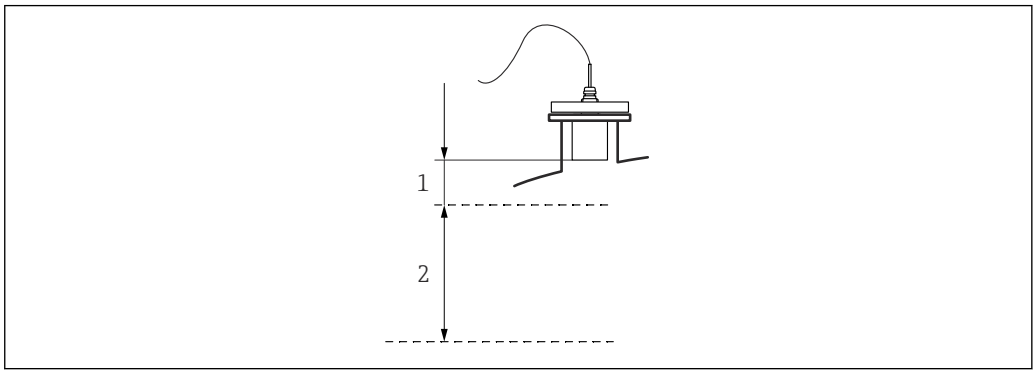
Navigation Safety settings → Safety distance

Saf. dist.sen N

Navigation Safety settings → Safety distance → Saf. dist.sen N

Description Define the safety distance for sensor N.

Additional information *Definition of the safety distance*

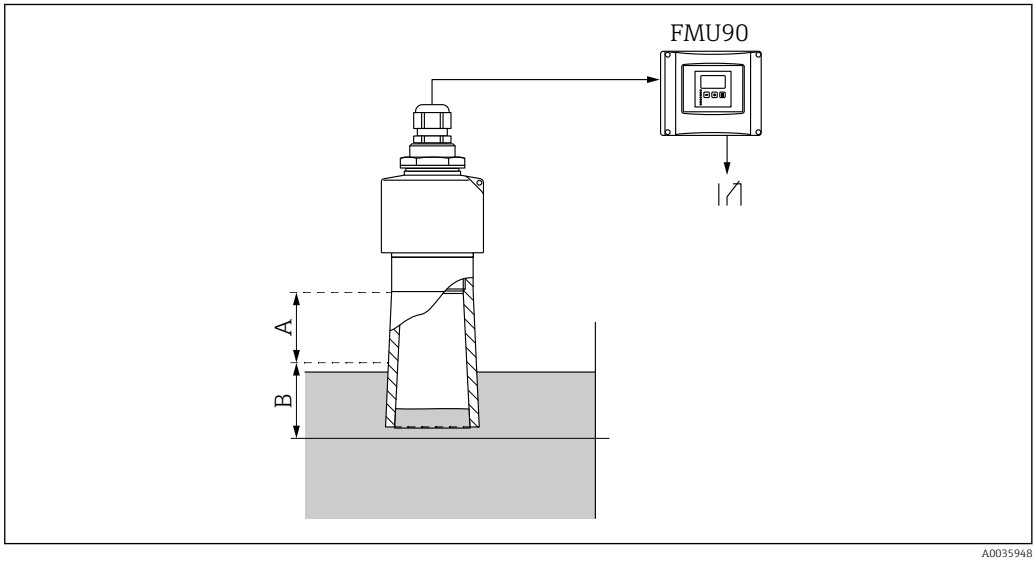


17 Definition of the safety distance

1 Blocking distance of the sensor (depends on the sensor type)
2 Safety distance

The safety distance is located immediately below the blocking distance. If the level enters the safety distance, Prosonic S generates a warning or an alarm.

Application example: flooding detection with FDU90 sensor with a flooding protection tube



18 Flooding detection with FDU90 sensor with a flooding protection tube

A Blocking distance FDU90 = 7 cm (2.8 in)
B Set the safety distance to 4 cm (1.6 in)

- To detect flooding, set the safety distance to 4 cm (1.6 in).
  A warning or an alarm is then generated shortly before the level reaches the flooding protection tube.
- In order to indicate that flooding is detected, configure the diagnostics relay with **Allocation M** = **Level in safety distance sensor N**

2.4 Parameter set "In safety dist."

Navigation Safety settings → In safety dist.

In saf. dist.s N

Navigation Safety settings → In safety dist. → In saf. dist.s N

Description Define how the device reacts if the safety distance is undershot.

Additional information

Meaning of the options

- **Warning**
  The device generates a warning (A01651 to A10651) but continues measuring.
  The warning disappears as soon as the level is no longer in the safety distance.
- **Alarm**
  The device adopts a defined output state (**Output on alarm** parameter set), and a warning (A01651 to A10651) is generated.
  The warning disappears as soon as the level is no longer in the safety distance, and the device continues measuring.
- **Self holding**
  The device adopts a defined output state (**Output on alarm** parameter set), and a warning (A01651 to A10651) is generated.
  The alarm state is maintained when the error leaves the safety distance. The self-holding function must first be reset (**Reset sensor N** parameter) before the warning disappears and the device continues measuring.

Reset sen N

Navigation Safety settings → In safety dist. → Reset sen N

Prerequisite **In saf. dist.s N** = **Self holding**

Description Select the **Yes** option to reset the alarm.

Additional information

Meaning of the options

- **No**
  The alarm remains active.
- **Yes**
  The alarm is reset. Measurement is resumed.

2.5 Parameter set "React. high temp."

Navigation Safety settings → React. high temp.

Overtemp. sen N (N = 1 - 10)

Navigation Safety settings → React. high temp. → Overtemp. sen N

Description Define the behavior of the device if the maximum sensor temperature is exceeded.

Additional information

Meaning of the options
- **Warning**
  The device continues measuring but generates an error message (E01661 to E10661).
- **Alarm**
  The device adopts a defined output state (**Output on alarm** parameter set), and an error message (E01661 to E10661) is generated.

Max. temp. sen. N

Navigation Safety settings → React. high temp. → Max. temp. sen. N

Description Displays the maximum permissible temperature of the sensor.

2.6 Parameter set "Defect temp. sen."

Navigation Safety settings → Defect temp. sen.

Def. temp. sen N (N = 1 - 10)

Navigation Safety settings → Defect temp. sen. → Def.temp.sen N

Description Define the behavior of the device in the event of a defective temperature sensor.

Additional information

Meaning of the options
- **Warning**
  The device continues measuring but generates an error message (A01281 to A10281).
- **Alarm**
  The device adopts a defined output state (**Output on alarm** parameter set), and an error message (A01281 to A10281) is generated.

3 Menu "Output/calculat." (PROFIBUS DP)

3.1 Submenu "Analog input"

3.1.1 Parameter set "Analog input N" (N = 1 - 20)

There is an **Analog input N** parameter set for each AI Block in the device.

Navigation Output/calculat. → Analog input → Analog input N

Measured value N (N = 1 - 10)

Navigation Output/calculat. → Analog input → Analog input N → Measured value N

Description Select the measured variable which should be output via the Analog Input Block.

Additional information

If **Sum N** or **Average N** is selected, the device returns to the **Analog input N** parameter set. The parameters **Level 1** to **Level 10** now appear here. Select **Yes** in these parameters if the measured value should be taken into account in the sum or the average. Select **No** (default) if the value should not be taken into account.

The **Temperature sen. M** option always refers to the temperature which has been assigned to the sensor in the **Sensor management → US Sensor M → Temp.measurement** parameter.

Value

Navigation Output/calculat. → Analog input → Analog input N → Value

Description Displays the current value of the selected measured variable.

Status

Navigation Output/calculat. → Analog input → Analog input N → Status

Description Displays the status that is transmitted together with the measured variable.

3.2 Parameter set "PROFIBUS DP"

Navigation Output/calculat. → PROFIBUS DP

Profile version

Navigation Output/calculat. → PROFIBUS DP → Profile version

Description Displays the version of the PROFIBUS profile that is used.

Instrument address

Navigation Output/calculat. → PROFIBUS DP → Instrument address

Description Displays the bus address of the device

Additional information The bus address can be set as follows:
- Via the DIP switches in the connection compartment
- Via an operating tool (e.g. FieldCare)

Ident number

Navigation Output/calculat. → PROFIBUS DP → Ident number

Description Specify the ident number of the device.

Factory setting Manufacturer

Additional information **Meaning of the options**
- **Profile**
  The ident number of the PROFIBUS profile is used.
- **Manufacturer**
  The ident number of the device-specific GSD file is used.

4 Menu "Device properties"

4.1 Submenu "Operating param."

4.1.1 Parameter set "Distance unit"

Navigation Device properties → Operating parameters → Distance unit

Distance unit

Navigation Device properties → Operating parameters → Distance unit → Distance unit

Description Specify the distance unit.

Selection
- m
- ft
- mm
- inch

Factory setting m

4.1.2 Parameter set "Temperature unit"

Navigation Device properties → Operating parameters → Temperature unit

Temperature unit

Navigation Device properties → Operating parameters → Temperature unit → Temperature unit

Description Define the temperature unit.

Selection
- °C
- °F

Factory setting °C

4.2 Submenu "Tag marking"

4.2.1 Parameter set "Tag marking"

Navigation Device properties → Tag marking → Tag marking

Device marking

Navigation Device properties → Tag marking → Tag marking → Device marking

Description Enter a string consisting of max. 16 alphanumeric characters as the name for the entire device.

4.3 Parameter set "Language"

Navigation Device properties → Language

Language

Navigation Device properties → Language → Language

Description Select the language for the display module.

Additional information The "Language" feature in the product structure determines which languages can be selected:

Language = 1:
- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Português

Language = 2:
- English
- Deutsch
- Russian
- Polish
- Czech

Language = 3:
- English
- Chinese
- Japanese
- Korean
- Thai
- Bahasa (Indonesia, Malaysia)

4.4 Parameter set "Password/reset"

Navigation Device properties → Password/reset

Reset

Navigation Device properties → Password/reset → Reset

Description Enter the reset code to reset the parameters to their default values.

Additional information Reset code: 33 333

Response of the linearization function in the event of a reset
In the event of a reset, the linearization method (level) or type of linearization (flow) is reset to **None**. If a linearization table is present it is not deleted, however, and can be reactivated if necessary.

Effect of a reset on the 5-point linearity protocol
With the creation of a 5-point linearity protocol, the FDU9x sensor and the FMU9x transmitter electronics (the measuring system) are perfectly adjusted to one another and the measuring accuracy is optimized for the specified range. The **Zero distance** service parameter is fine-adjusted for this purpose. Following a reset, this parameter must be re-configured in the Service menu according to the data indicated on the 5-point linearity protocol for the FDU9x sensor. Contact Endress+Hauser customer service for this purpose.

Code

Navigation Device properties → Password/reset → Code

Description
- To unlock the device, enter the access code.
- To lock the device, enter any other number of your choice.

Additional information Access code: 2 457

Status

Navigation Device properties → Password/reset → Status

Description Displays the current locking state of the device.

Additional information

Meaning of the information displayed

- **Unlocked**
  All parameters (apart from Service parameters) can be edited.
- **Code locked**
  The device has been locked via the operating menu. It can only be unlocked by entering the access code in the **Code** parameter.
- **Key-locked**
  The device has been locked via the operating keys. It can only be unlocked again by pressing all three keys simultaneously.
- **Switch locked**
  The device has been locked via the write protection switch in the terminal compartment. It can only be unlocked again using this switch.

5 Menu "System informat."

5.1 Submenu "Device information"

5.1.1 Parameter set "Device family"

Navigation System informat. → Device information → Device family

Device family

Navigation System informat. → Device information → Device family → Device family

Description Displays the device family.

5.1.2 Parameter set "Device name"

Navigation System informat. → Device information → Device name

Device name

Navigation System informat. → Device information → Device name → Device name

Description Displays the device name.

5.1.3 Parameter set "Device marking"

Navigation System informat. → Device marking → Device marking

Device marking

Navigation System informat. → Device information → Device marking → Device marking

Description Displays the device marking.

5.1.4 Parameter set "Serial no."

Navigation System informat. → Serial no. → Serial no.

Serial no.

Navigation System informat. → Device information → Serial no. → Serial no.

Description Displays the serial number.

5.1.5 Parameter set "Software version"

Navigation System informat. → Software version → Software version

Software version

Navigation System informat. → Device information → Software version → Software version

Description Displays the software version.

Additional information This function displays the version of the protocol, hardware and software: Vxx.yy.zz.prot.
- xx: HW version
- yy: SW version
- zz: SW revision
- prot: communication protocol

5.1.6 Parameter set "Dev. rev."

Navigation System informat. → Dev. rev. → Dev. rev.

Dev. rev.

Navigation System informat. → Device information → Dev. rev. → Dev. rev.

Description Displays the device revision.

5.1.7 Parameter set "DD version"

Navigation System informat. → DD version → DD version

DD version

Navigation System informat. → Device information → DD version → DD version

Description Displays the DD version that is needed to operate the device via FieldCare.

5.2 Submenu "In/output info"

5.2.1 Parameter set "Level N" (N = 1 - 10)

Navigation System informat. → In/output info → Level N

Input

Navigation System informat. → In/output info → Level N → Input

Description Indicates which sensor input is connected to the level channel.

Sensor selection

Navigation System informat. → In/output info → Level N → Sensor selection

Description Displays the type of sensor that is connected. **Automatic** is displayed for FDU9x sensors because Prosonic S detects these sensors automatically.

Detected

Navigation System informat. → In/output info → Level N → Detected

Prerequisite **Sensor selection** = **Automatic**

Description Displays the type of sensor detected automatically.

5.2.2 Parameter set "Analog input N" (N = 1 - 20)

Navigation System informat. → In/output info → Analog input N

Measured value N (N = 1 - 20)

Navigation System informat. → In/output info → Analog input N → Measured value N

Description Indicates which measured value has been assigned to Analog Input Block N.

5.3 Submenu "Min/max values"

5.3.1 Parameter set "Level"

Navigation System informat. → Min/max values → Level

Max. value

Navigation System informat. → Min/max values → Level → Max. value

Description Displays the maximum level measured so far.

Min. Value

Navigation System informat. → Min/max values → Level → Min. Value

Description Displays the minimum level measured so far.

Reset

Navigation System informat. → Min/max values → Level → Reset

Description Select the suitable reset option.

Factory setting Keep

Additional information

Meaning of the options
- **Keep**
  Max. value and **Min. value** are not reset.
- **Clear**
  Max. value and **Min. value** are reset, i.e. they adopt the current value of the measured variable again.
- **Reset min.**
  Min. value is reset, i.e. it adopts the current value of the measured variable again.**Max. value** keeps its value.
- **Reset max.**
  Max. value is reset, i.e. it adopts the current value of the measured variable again. **Min. value** keeps its value.

5.3.2 Parameter set "Temperature"

Navigation System informat. → Min/max values → Temperature

Max. value

Navigation System informat. → Min/max values → Temperature → Max. value

Description Displays the maximum temperature measured so far.

Additional information
- **Max. value** refers to the temperature of the internal temperature detector in the sensor.
- The value can only be reset by Endress+Hauser Service.

Min. Value

Navigation System informat. → Min/max values → Temperature → Min. Value

Description Displays the minimum temperature measured so far.

Additional information
- **Min. value** refers to the temperature of the internal temperature detector in the sensor.
- The value can only be reset by Endress+Hauser Service.

Reset

Navigation System informat. → Min/max values → Temperature → Reset

Description Select the suitable reset option.

Factory setting Keep

Additional information

Meaning of the options
- **Keep**
  Max. value and **Min. value** are not reset.
- **Clear**
  Max. value and **Min. value** are reset, i.e. they adopt the current value of the measured variable again.
- **Reset min.**
  Min. value is reset, i.e. it adopts the current value of the measured variable again. **Max. value** keeps its value.
- **Reset max.**
  Max. value is reset, i.e. it adopts the current value of the measured variable again. **Min. value** keeps its value.

5.4 Submenu "Envelope curve"

5.4.1 Parameter set "En. curve sen. N" (N = 1 - 10)

Navigation System informat. → Envelope curve → En. curve sen. N

Plot settings (1)

Navigation System informat. → Envelope curve → En. curve sen. N → Plot settings

Description Select the information to be displayed.

Selection
- Envelope curve
- Env. curve+FAC
- Env.curve+cust.map

Factory setting Envelope curve

Plot settings (2)

Navigation System informat. → Envelope curve → En. curve sen. N → Plot settings

Description Select whether the envelope curve should only be read once or should be read cyclically.

Selection
- Single curve
- Cyclic

Factory setting Single curve

Additional information If cyclic envelope curve display is active, the measured value is updated at a slower cycle time. It is therefore advisable to exit the envelope curve display again after optimizing the measuring point.

Plot settings (2)

Navigation System informat. → Envelope curve → En. curve sen. N → Envelope curve

Description Displays the envelope curve.

Additional information To exit the visualization function, press the left and middle key simultaneously.

5.5 Submenu "Error list"

5.5.1 Parameter set "Actual error"

Displays a list of the error messages currently pending. Help text can be displayed for every error message.

5.5.2 Parameter set "Last error"

Displays a list of the errors last fixed. Help text can be displayed for every error message.

5.6 Submenu "Diagnostics"

5.6.1 Parameter set "Operating hours"

Navigation System informat. → Diagnostics → Operating hours

Operating hours

Navigation System informat. → Diagnostics → Operating hours → Operating hours

Description Indicates how long the device has been in operation.

5.6.2 Parameter set "Actual distance"

Navigation System informat. → Diagnostics → Actual distance

Act. distance N (N = 1 - 10)

Navigation System informat. → Diagnostics → Actual distance → Act. distance N

Description Displays the distance currently measured between the sensor membrane and the surface of the product.

5.6.3 Parameter set "Act. meas. value"

Navigation System informat. → Diagnostics → Act. meas. value

Level N (N = 1 - 10)

Navigation System informat. → Diagnostics → Act. meas. value → Level N

Description Displays the level currently measured, or (in the case of linearization) the volume currently measured.

5.6.4 Parameter set "Application par."

Navigation System informat. → Diagnostics → Application par.

Sensor N (N = 1 - 10)

Navigation System informat. → Diagnostics → Application par. → Sensor N

Description Indicates whether a setting that depends on the application parameters ("Tank shape", "Medium property", "Process cond.") has been modified subsequently.

5.6.5 Parameter set "Echo quality sen."

Navigation System informat. → Diagnostics → Echo quality sen.

Echo quality N (N = 1 - 10)

Navigation System informat. → Diagnostics → Echo quality sen. → Echo quality N

Description Displays the echo quality.

Additional information The echo quality is the distance (in dB) between the echo and the echo evaluation curve FAC.

6 Menu "Display"

6.1 Parameter set "Display"

Navigation Display → Display

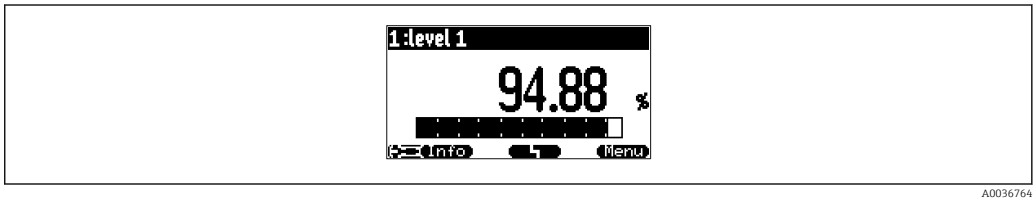
Type

Navigation Display → Display → Type

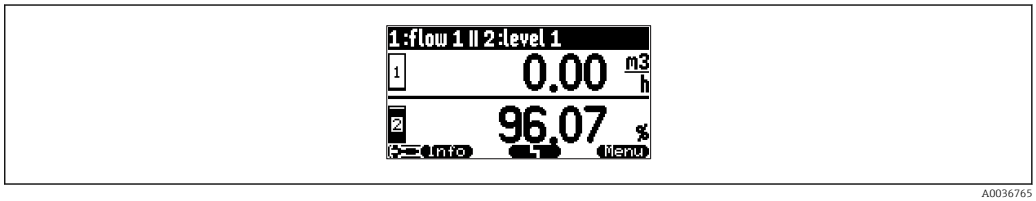
Description Select the display visualization format.

Factory setting 1x value+bargr.

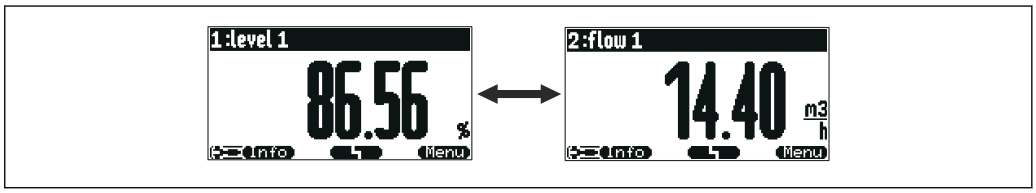
Additional information *Meaning of the options*



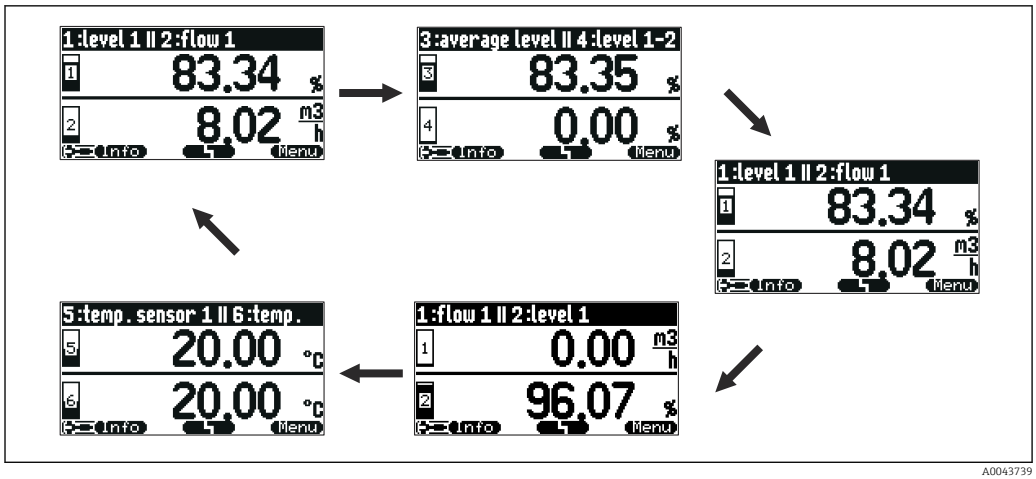
19 "Type" = "1x value+bargr."



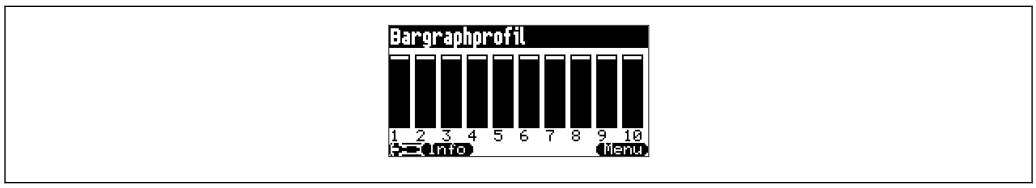
20 "Type" = "2x value+bargr."



21 "Type" = "Value max. size"



22 *"Type" = "Alter. 5x2 val."*



23 *"Type" = "Bargr. profil"*

Time

Navigation Display → Display → Time

Prerequisite **Type** = **Value max. size** or **Alter. 5x2 val.**

Description Specify the time after which the next value should be displayed.

Additional information To change to the next value immediately in the main display screen, press .

Value N (N = 1 - 10)

Navigation Display → Display → Value N

Description Specify which measured value or calculated value should appear as value N on the display.

Additional information The number of values that can be displayed depends on the **Type** parameter.

Customized text N (N = 1 - 10)

Navigation Display → Display → Customized text N

Description Specify the display text for value N.

Additional information The display text entered is displayed along with the value if the option **Customized text** = **Yes** has been selected.

6.2 Parameter set "Display format"

Navigation Display → Display format

Format

Navigation Display → Display format → Format

Description Select the format for displaying the length.

Selection
- Decimal
- ft-in-1/16

Factory setting Decimal

No. of decimals

Navigation Display → Display format → No. of decimals

Description Select the number of decimal places.

Selection
- x
- x.x
- x.xx
- x.xxx

Factory setting x.xx

Sep. character

Navigation Display → Display format → Sep. character

Description Select the decimal separator.

Selection
- . (point)
- , (comma)

Factory setting . (point)

Free text

Navigation Display → Display format → Free text

Description Specify whether **Customized text 1** to **Customized text 10** are displayed together with the corresponding value.

6.3 Parameter set "Back to home"

Navigation Display → Back to home

Back to home

Navigation Display → Back to home → Back to home

Description Specify the time after which the onsite display automatically returns to home (measured value display screen).

User entry 3 to 9 999 s

Factory setting 900 s

7 Sensor management

7.1 Submenu "FDU sensor N" (N = 1 - 10)

7.1.1 Parameter set "US sensor N" (N = 1 - 10) (sensor settings)

Navigation Sensor management → Sensor management → US sensor N

Sensor operation

Navigation Sensor management → Sensor management → US sensor N → Sensor operation

Description Switch the sensor on or off.

Factory setting On

Additional information **Meaning of the options**
- **On**
  The sensor is switched on.
- **Hold**
  The sensor is switched off. The last measured value is held.
- **Off**
  The sensor is switched off. No measured value is transmitted.

Sensor priority

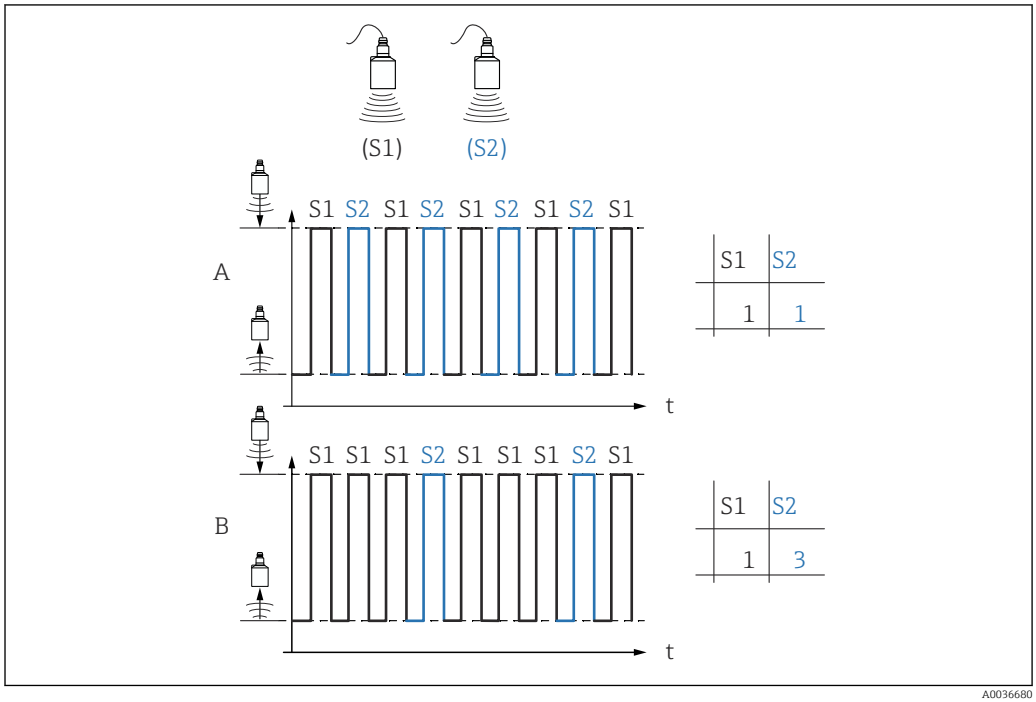
Navigation Sensor management → Sensor management → US sensor N → Sensor priority

Description Specify the priority of sensor N.

Additional information

The priorities can be specified for all connectable sensors 1 to 10. The priorities can be set between 1 and 255. The priority number then corresponds to the number of sensor polling cycles after which the value is polled.

Example for 2 sensors



A
- Priority sensor 1 = 1
- Priority sensor 2 = 1
- → Both sensors send one pulse each time on an alternating basis.

B
- Priority sensor 1 = 1
- Priority sensor 2 = 3
- → After three pulses from sensor 1, sensor 2 sends one pulse.

Detected

Navigation Sensor management → Sensor management → US sensor N → Detected

Prerequisite **Sensor selection** = **Automatic**

Description Displays the type of sensor detected automatically.

Detection window

Navigation Sensor management → Sensor management → US sensor N → Detection window

Description Switch the detection window on and off.

Additional information

If the detection window function is switched on, a window is defined around the current level echo (typical width 1 - 2.5 m (3.3 - 8.2 ft); depending on the application parameters). The device searches for echoes within this window. The window moves with the level echo when the level increases or decreases. Echoes outside this window are ignored and are not analyzed.

Meaning of the options

- **Off**
  The detection window is switched off.
- **On**
  The detection window is switched on.
- **Reset**
  The current window is deleted. The device searches for the level echo in the entire measuring range. A new window is defined around the level echo that is found.

The window width can be set by Endress+Hauser Service if necessary.

8 Overview of the operating menu

8.1 Menu "Level → Level (LVL N)"

8.1.1 Submenu "Basic setup"

Parameter set L1003 "LVL N sensor sel."
- Input
- Sensor selection
- Detected

Parameter set L1004 "LVL N appl. param."
- Tank shape
- Medium property
- Process conditions

Parameter set L1005 "LVL N empty cal."
Empty E

Parameter set L 1006 "LVL N full cal."
- Full F
- Blocking distance

Parameter set L1007 "LVL N unit"
- Unit level
- Level N
- Distance

Parameter set L1008 "LVL N linearisat."
- Type
- Customer unit
- Customized text
- Max. scale
- Diameter
- Intermediate height (H)
- Mode
- Edit
- Status table

Parameter set L100B "LVL N check value"
- Act. distance N
- Check distance

Parameter set L100B "LVL N dist. map."
- Act. distance N
- Range of mapping
- Start mapping
- Status

Parameter set L100C "LVL N status"
- Level N
- Act. distance N
- Status

8.1.2 Submenu "Extended calibr."

Parameter set L1016 "LVL N dist. map."
- Act. distance N
- Range of mapping
- Start mapping
- Status

Parameter set L1017 "LVL N check value"
Correction

Parameter set L1018 "LVL N correction"
Offset

Parameter set L1020 "LVL N blocking distance"
Blocking distance

Parameter set L1019 "LVL N limitation"
- Limitation
- High limit
- Low limit

8.1.3 Submenu "Simulation"

Parameter set L1022 "LVL N simulation"
- Simulation
- Sim. level value
- Sim. volume value

8.2 Menu "Safety settings"

Parameter set AX102 "Outp. echo loss"
- Level N
- Ramp level N
- Value level N

Parameter set AX103 "Delay echo loss"
Delay Sensor N

Parameter set AX104 "Safety distance"
Saf. dist.sen N

Parameter set AX105 "In safety dist."
- In saf. dist.s N
- Reset sen N

Parameter set AX107 "React. high temp."
- Overtemp. sen. N
- Max. temp. sen. N

Parameter set A0000 "Defect temp. sen."
Def. temp. sen. N

8.3 Overview of the "Output/calculat." menu (PROFIBUS DP)

8.3.1 Submenu "Analog input"

Parameter set OXA01 "Analog input N"
- Measured value N
- Value
- Status

8.3.2 Submenu "PROFIBUS DP"

Parameter set O1C01 "PROFIBUS DP"
- Profile version
- Instrument address
- Ident number

8.4 Overview of the "Device properties" menu

8.4.1 Submenu "Operating param."

Parameter set D1101 "Distance unit"
Distance unit

Parameter set D110B "Temperature unit"
Temperature unit

8.4.2 Submenu "Tag marking"

Parameter set D1102 "Tag marking"
Device marking

8.4.3 Submenu "Language"

Parameter set D1103 "Language"
Language

8.4.4 Submenu "Password/reset"

Parameter set D1104 "Password/reset"
- Reset
- Code
- Status

8.5 Menu "System informat."

8.5.1 Submenu "Device information"

Parameter set IX101 "Device family"
Device family

Parameter set IX102 "Device name"
Device name

Parameter set IX103 "Device marking"
Device marking

Parameter set IX105 "Serial no."
Serial number

Parameter set IX106 "Software version"
Software version

Parameter set IX107 "Dev. rev."
Dev. rev.

Parameter set IX108 "DD version"
DD version

8.5.2 Submenu "In/output info"

Parameter set IX108 "Level N"
- Input
- Sensor selection
- Detected

Parameter set IX11A "Analog input N"
Measured value N

8.5.3 Submenu "Min/max values"

Parameter set IX302 "Level → Level (LVL) N"
- Max. value
- Min. Value
- Reset

Parameter set IX302 "Temperature → Temperature sen. N"
- Max. value
- Min. Value

8.5.4 Submenu "Envelope curve"

Parameter set IX126 "En. curve sen. N"
- Plot settings (choice of displayed curves)
- Plot settings (choice between an individual curve and cyclic presentation)

8.5.5 Submenu "Error list"

Parameter set E1002 "Actual error"
- 1:
- 2:
- ...

Parameter set E1003 "Last error"
- 1:
- 2:
- ...

8.5.6 Submenu "Diagnostics"

Parameter set E1403 "Operating hours"
Operating hours

Parameter set E1404 "Actual distance"
Act. distance N

Parameter set E1405 "Act. meas. value"
Level N

Parameter set E1405 "Application par."
Sensor N

Parameter set E1406 "Echo quality sen."
Echo quality N

8.6 Menu "Display"

Parameter set DX202 "Display"
- Type
- Value N
- Customized text N

Parameter set DX201 "Display format"
- Format
- No. of decimals
- Sep. character
- Customized text

Parameter set DX200 "Back to home"
Back to home

8.7 Menu "Sensor management"

8.7.1 Submenu "Sensor management → FDU sensor N"

Parameter set D1106 "US sensor N"
- Sensor operation
- Sensor priority
- Detected
- Detection window

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