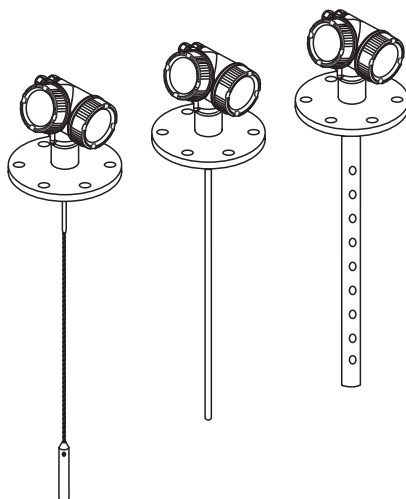


Brief Operating Instructions

Levelflex FMP55

Guided Level-Radar



These Instructions are Brief Operating Instructions; they do not replace the Operating Instructions included in the scope of supply.

For detailed information, refer to the Operating Instructions and other documentation on the CD-ROM provided or visit "www.endress.com/deviceviewer".

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1 Important document information

1.1 Document conventions






1.1.1 Safety symbols

in preparation

1.1.2 Electrical symbols

| Symbol | Meaning |
|---|--|
|  A0011197 | Direct current A terminal to which DC voltage is applied or through which direct current flows. |
|  A0011198 | Alternating current A terminal to which alternating voltage (sine-wave) is applied or through which alternating current flows. |
|  A0011200 | Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system. |
|  A0011199 | Protective ground connection A terminal which must be connected to ground prior to establishing any other connections. |
|  A0011201 | Equipotential connection A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice. |

1.1.3 Tool symbols

| | | | | |
|--|--|--|--|--|
|  A0011219 |  A0011220 |  A0013442 |  A0011221 |  A0011222 |
| Phillips head screwdriver | Flat blade screwdriver | Torx screwdriver | Allen key | Hexagon wrench |

1.1.4 Symbols for certain types of information

in preparation

1.1.5 Symbols in graphics

in preparation

2 Basic safety instructions

2.1 Requirements concerning the staff

The staff must fulfill the following requirements for their tasks:

- ▶ Trained staff: Must have a qualification which corresponds to their function and tasks.
- ▶ Authorized by the plant operator.
- ▶ Familiar with the national regulations.
- ▶ Before starting their work: Must have read and understood all instructions in the operating manual and supplementary documentation as well as the certificate (depending on the application).
- ▶ Must comply with all instructions and the regulatory framework.

2.2 Designated use

Application and measured materials

The measuring device described in these Operating Instructions is intended only for level and interface measurement of liquids. Depending on the version ordered the device can also measure potentially explosive, flammable, poisonous and oxidizing materials.

Observing the limit values specified in the "Technical data" and listed in the Operating Instructions and supplementary documentation, the measuring device may be used for the following measurements only:

- ▶ Measured process variable: Level and/or interface
- ▶ Calculated process variable: Volume oder mass in arbitrarily shaped vessels (calculated from the level by the linearization functionality)

To ensure that the measuring device remains in proper condition for the operation time:

- ▶ Use the measuring device only for measured materials against which the process-wetted materials are adequately resistant.
- ▶ Observe the limit values in "Technical data".

Incorrect use

The manufacturer is not liable for damage caused by improper or non-designated use.

Verification for borderline cases:

- ▶ For special measured materials and cleaning agents, Endress+Hauser is glad to provide assistance in verifying the corrosion resistance of wetted materials, but does not accept any warranty or liability.

Residual risk

The electronics housing and its built-in components such as display module, main electronics module and I/O electronics module may heat to 80 °C (176 °F) during operation through heat transfer from the process as well as power dissipation within the electronics. During operation the sensor may assume a temperature near the temperature of the measured material.

Danger of burns due to heated surfaces!

- ▶ For high process temperatures: Install protection against contact in order to prevent burns.

2.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to federal/national regulations.

2.4 Operational safety

Risk of injury!

- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for interference-free operation of the device.

Conversions to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers

- ▶ If, despite this, modifications are required, consult with Endress+Hauser.

Repair

To ensure continued operational safety and reliability,

- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to repair of an electrical device.
- ▶ Use original spare parts and accessories from Endress+Hauser only.

Hazardous area

To eliminate a danger for persons or for the facility when the device is used in the hazardous area (e.g. explosion protection, pressure vessel safety):

- ▶ Based on the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of these Instructions.

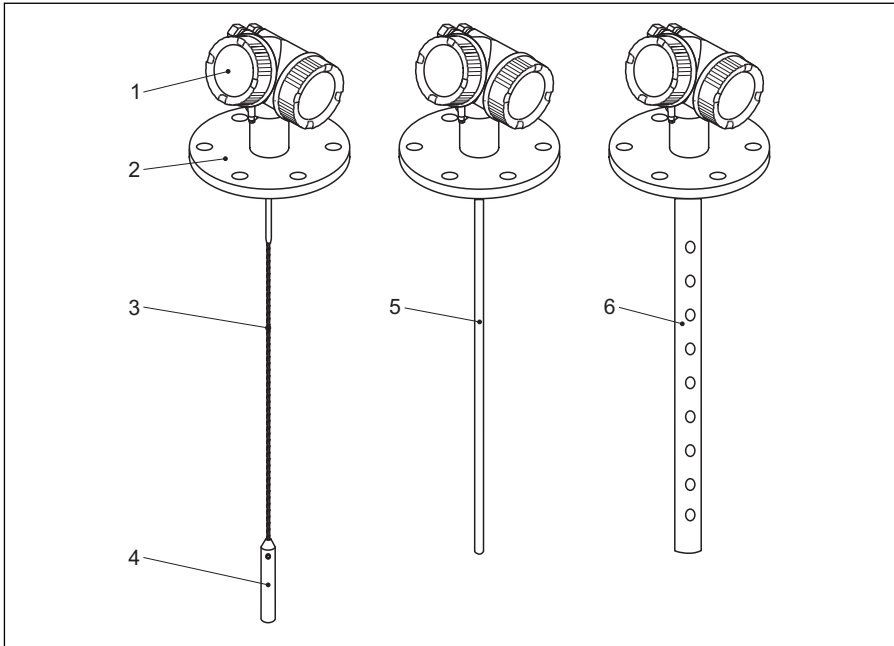
2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which they are safe to operate.

It fulfills general safety requirements and legal requirements. It also conforms to the EC directives listed in the device-specific EC declaration of conformity. Endress+Hauser confirms this fact by applying the CE mark.

3 Product description

3.1 Compact device Levelflex

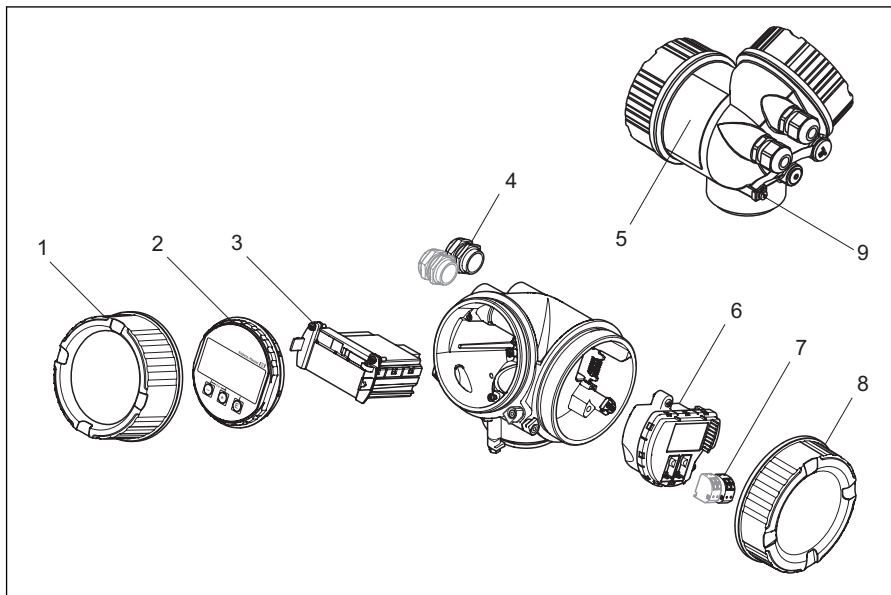


A0012399

1 Design of the Levelflex

- 1 Electronics housing
- 2 Process connection (here as an example: flange)
- 3 Rope probe
- 4 End-of-probe weight
- 5 Rod probe
- 6 Coax probe

3.2 Electronics housing



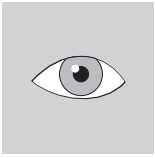
A001242Z

2 Design of the electronics housing

- 1 Electronics compartment cover
- 2 Display module
- 3 Main electronics module
- 4 Cable glands (1 or 2, depending on instrument version)
- 5 Nameplate
- 6 I/O electronics module
- 7 Terminals (pluggable spring terminals)
- 8 Connection compartment cover
- 9 Grounding terminal

4 Incoming acceptance and product identification

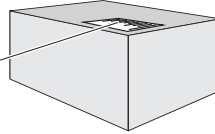
4.1 Incoming acceptance



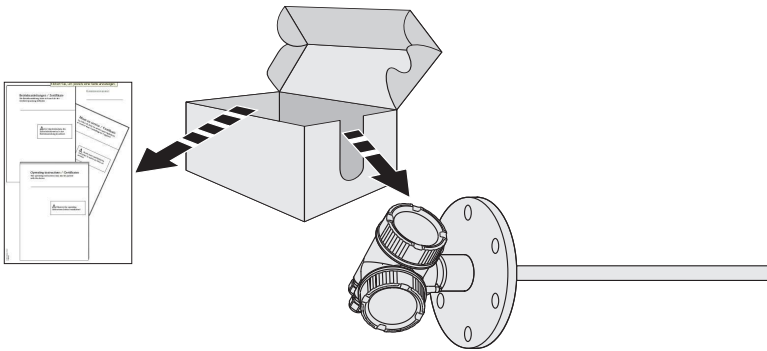
A0013696



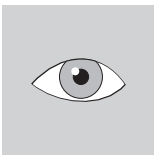
1 = 2



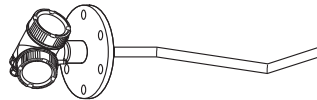
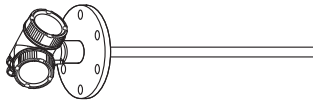
A0016870



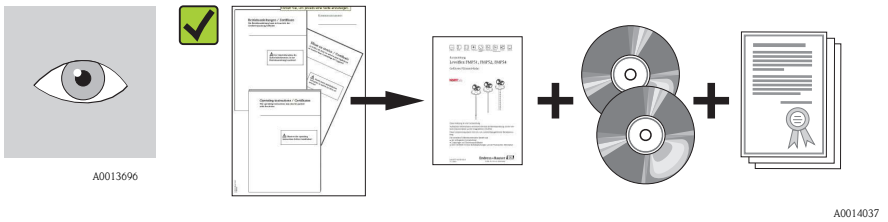
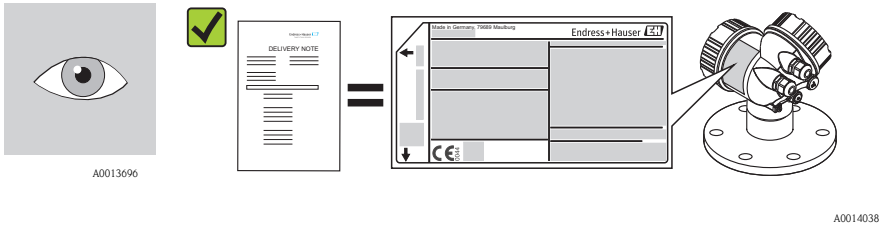
A0013921




A0013696



A0013922



 If one of the conditions does not comply, contact your Endress+Hauser distributor.

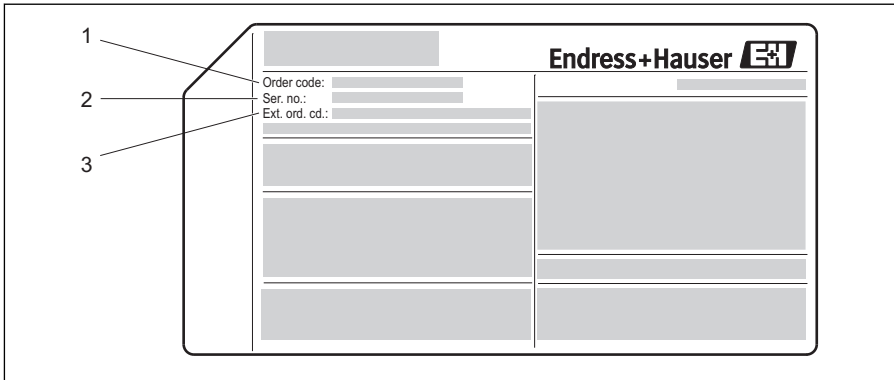
4.2 Product identification

The following options are available for identification of the measuring device:


- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter serial numbers from nameplates in *W@M Device Viewer* (www.endress.com/deviceviewer): All information about the measuring device is displayed.

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


enter serial numbers from nameplates in *W@M Device Viewer* (www.endress.com/deviceviewer)




A0014103

 3 Example of a nameplate

- 1 Order code
- 2 Serial number (Ser. no.)
- 3 Extended order code (Ext. ord. cd.)

 Only 33 digits of the extended order code can be indicated on the nameplate. If the extended order code exceeds 33 digits, the rest will not be shown. However, the complete extended order code can be viewed in the operating menu of the device (Diagnostics → Device info → Extended order code 1/2/3).

 For detailed information about interpreting the nameplate specifications, refer to the Operating Instructions for the device on the CD-ROM provided.

5 Storage, Transport

5.1 Storage conditions

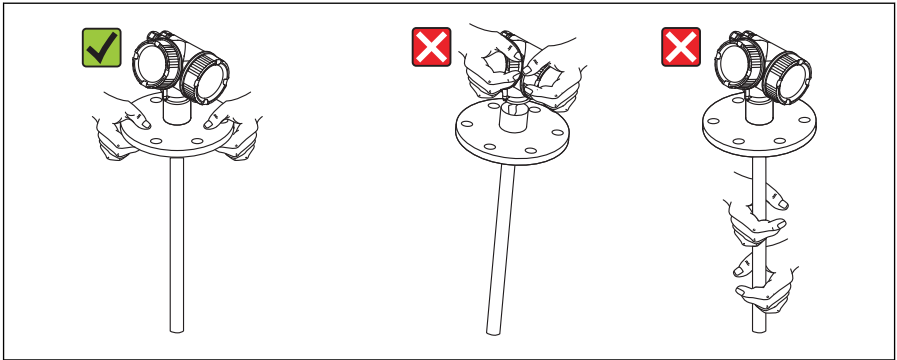
- Permitted storage temperature: -40 to $+80$ °C (-40 to $+176$ °F)
- Use the original packaging.

5.2 Transport product to the measuring point

WARNING

Risk of injury if the housing breaks away!

- ▶ Transport the measuring device to the measuring point in its original packaging or at the process connection.
- ▶ Comply with the safety instructions, transport conditions for devices over 18kg (39.6lbs).

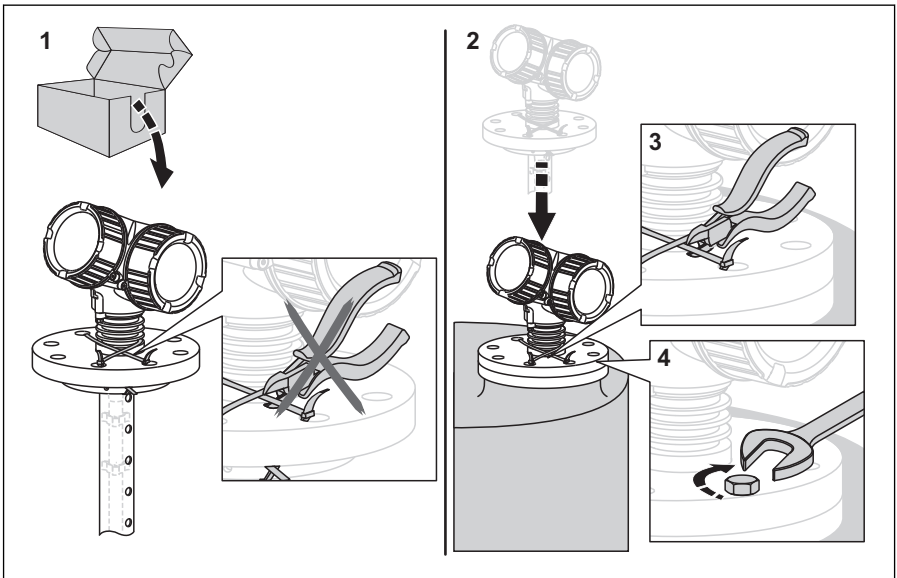


A0013920

NOTICE

Shipping lock for FMP5x with coax probe

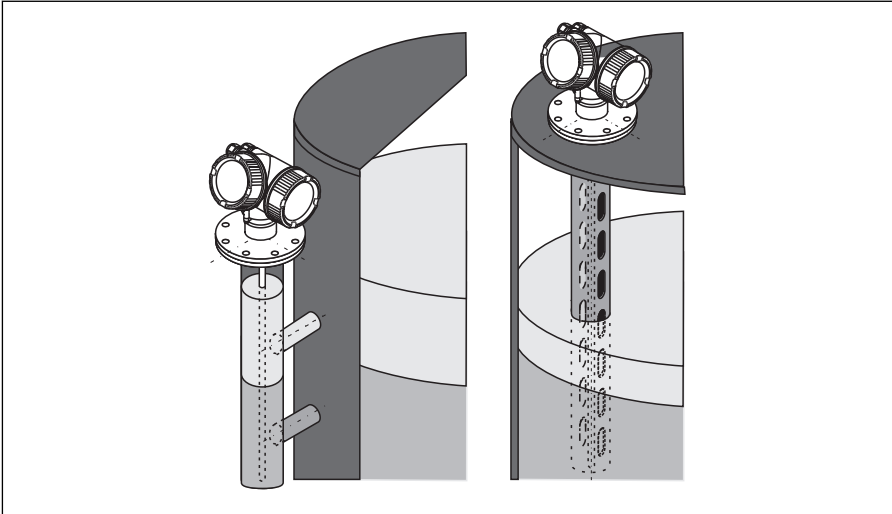
- ▶ For FMP5x with coax probe the coax tube is not fixed permanently to the electronics housing. For shipping and transport it is secured with two cable ties. In order to prevent the spacer at the probe rod from moving along the probe, these cable ties must not be loosened when transporting and mounting the device. They may only be undone directly before screwing the device flange to the process connection.



A0015471

6 Mounting

6.1 Suitable mounting position



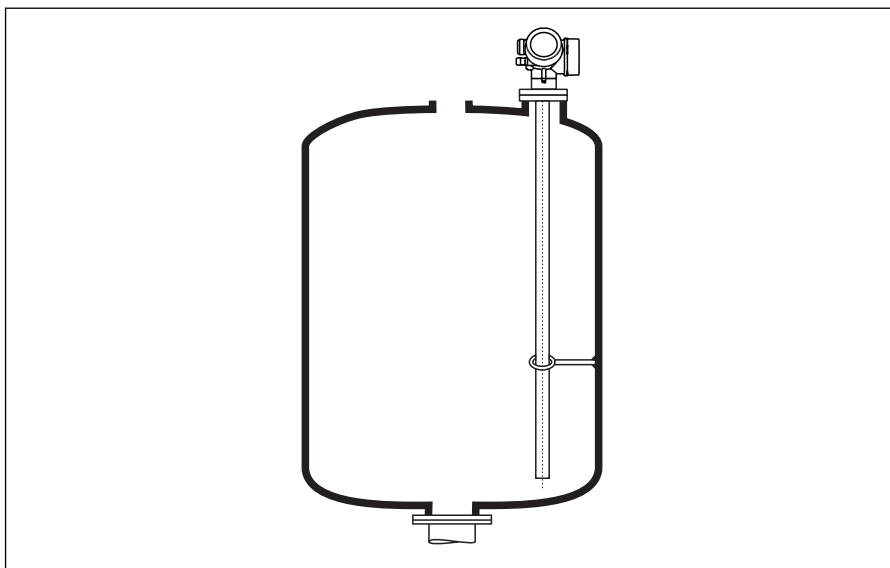
A0011281

- Rod probes / rope probes: must be mounted in a stilling well or bypass (→ 13)
- Coax probes: can be mounted at an arbitrary distance from the wall of the vessel
- When mounting in the open, a weather protection cover may be installed to protect the device against extreme weather conditions.
- Minimum distance from the end of probe to the bottom of the vessel: 10 mm (0.4 in)

6.2 Securing the probe

6.2.1 Securing coax probes

For Ex-approvals: For probe lengths ≥ 3 m (10 ft) a support is required.



A0012608

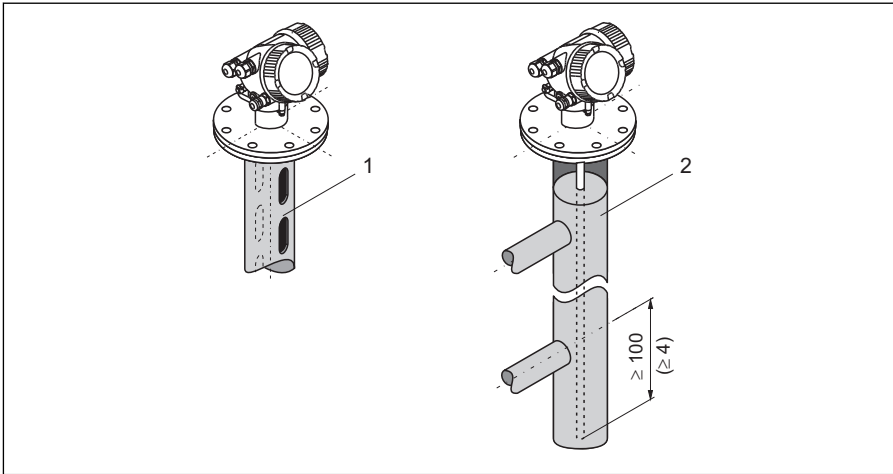
Coax probes can be supported at any point of the outer tube.

6.3 Special mounting conditions

6.3.1 Bypasses and stilling wells



For information on bypass solutions from Endress+Hauser please contact your Endress +Hauser sales representative.



A0014129

- 1 Mounting in a stilling well
- 2 Mounting in a bypass

- Pipe diameter: > 40 mm (1.6") for rod probes
- Rod probe installation can take place up to a diameter size of 100 mm. In the event of larger diameters, a coax probe is recommended.
- Side disposals, holes or slits and welded joints that protrude up to approx. 5 mm (0.2") inwards do not influence the measurement.
- The pipe may not exhibit any steps in diameter.
- The probe must be 100 mm longer than the lower disposal.
- Within the measuring range, the probe must not get into contact with the pipe wall. If necessary, use a center washer (see feature 610 of the product structure).
- Within the measuring range, the probe must not get into contact with the pipe wall. If necessary, use a PFA center washer (see feature 610 of the product structure).
- Coax probes can always be applied if there is enough mounting space.

i For bypasses with condensate formation (water) and a medium with low dielectric constant (e.g. hydrocarbons):

In the course of time the bypass is filled with condensate up to the lower disposal and for low levels the level echo is superimposed by the condensate echo. Thus in this range the condensate level is measured instead of the correct level. Only higher levels are measured correctly. To prevent this, position the lower disposal 100 mm (4 in) below the lowest level to be measured and apply a metallic centering disk at the height of the lower edge of the lower disposal.

i With heat insulated tanks the bypass should also be insulated in order to prevent condensate formation.

i For rope probes with a length exceeding 2 m (6.7 ft) an additional weight or a spring should be mounted in addition to the center washer (option OC) in order to tighten the rope. The mass of the center washer is 155 g (5.5 oz).

6.3.2 Non-metallic vessels

When mounting Levellflex in a non-metallic vessel, use a coax probe.

6.4 Mounting the device

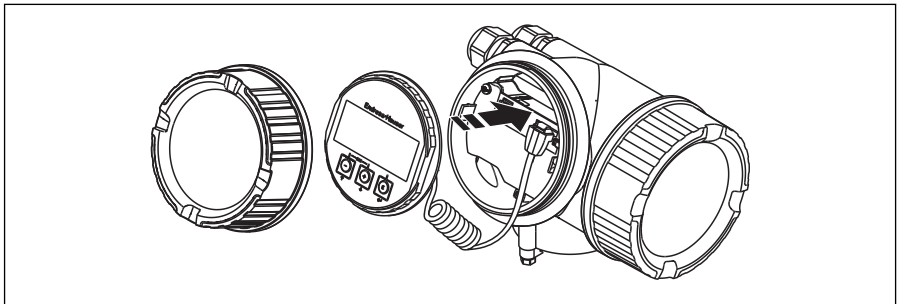
6.4.1 Required mounting tools

- For flanges and other process connections: appropriate mounting tools
- To turn the housing: Hexagonal wrench 8 mm

6.4.2 Preparing the device for mounting



When shortening the probe: Enter the new length of probe into the Quick Setup which can be found in the electronics housing behind the display module.



A0014241

Shortening rod probes

Rod probes must be shortened if the distance to the container floor or outlet cone is less than 10 mm (0.4 in). The rods of a rod probe are shortened by sawing at the bottom end.



Rod probes of FMP52 can **not** be shortened as they are coated.

6.4.3 Mounting the device

Flange mounting

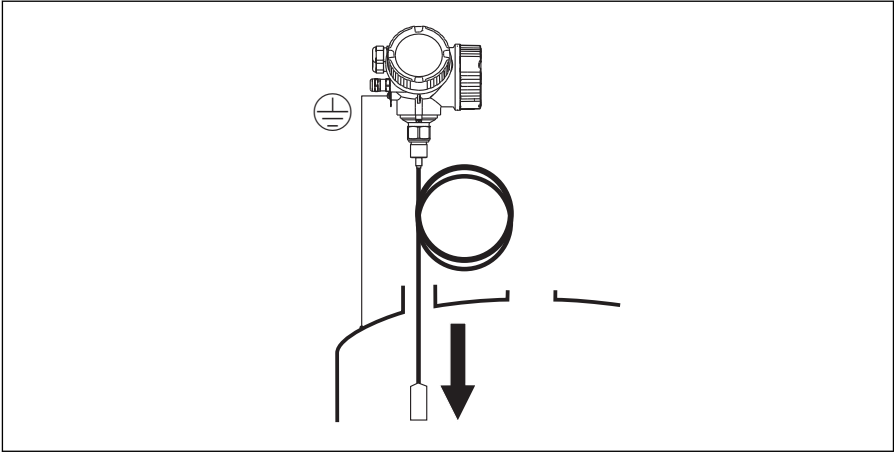
If a seal is used, be sure to use unpainted metal bolts to ensure good electrical contact between probe flange and process flange.

Mounting rope probes

NOTICE

Electrostatic discharges may damage the electronics.

- ▶ Earth the housing before lowering the rope into the vessel.



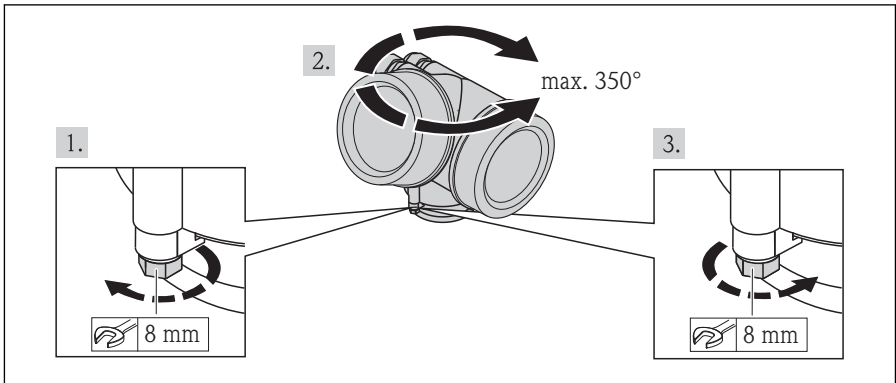
A0012852

When lowering the rope probe into the vessel, observe the following:

- Uncoil rope and lower it slowly and carefully into the vessel.
- Do not kink the rope.
- Avoid any backlash, since this might damage the probe or the vessel fittings.

6.4.4 Turning the transmitter housing

To provide easier access to the connection compartment or display module, the transmitter housing can be turned:

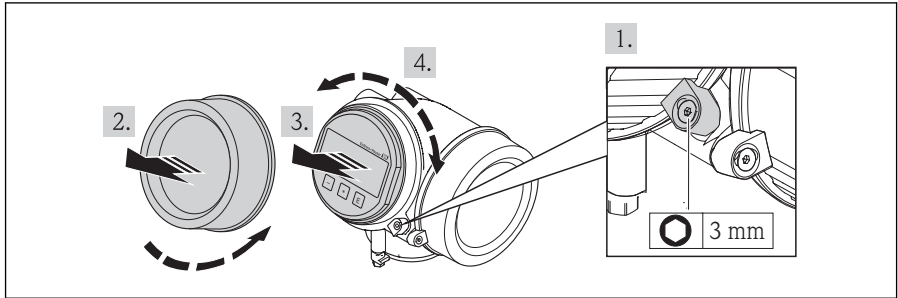


A0013713

1. Unscrew the securing screw using an open-ended wrench.
2. Rotate the housing in the desired direction.

3. Firmly tighten the securing screw. (1,5 Nm for plastics housing; 2,5 Nm for aluminium or stainless steel housing).

6.4.5 Turning the display module



A0013905

1. Loosen the screw of the securing clamp of the electronics compartment cover using an Allen key and turn the clamp 90° counterclockwise.
2. Unscrew cover of the electronics compartment from the transmitter housing.
3. Pull out the display module with a gentle rotation movement.
4. Rotate the display module into the desired position: Max. $8 \times 45^\circ$ in each direction.
5. Feed the spiral cable into the gap between the housing and main electronics module and plug the display module into the electronics compartment until it engages.
6. Screw the cover of the electronics compartment firmly back onto the transmitter housing.
7. Tighten the securing clamp again using the Allen key.

6.5 Post-installation check

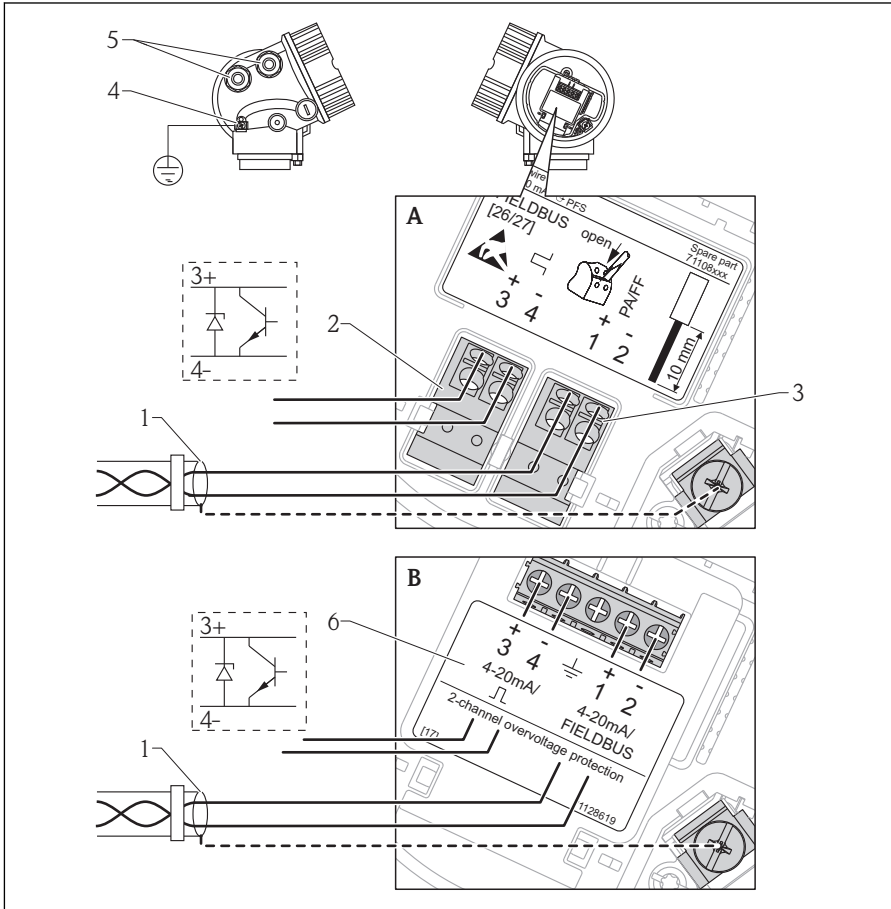
| | |
|-----------------------|---|
| <input type="radio"/> | Is the device undamaged (visual inspection)? |
| <input type="radio"/> | Does the device conform to the measuring point specifications? For example: <ul style="list-style-type: none"> ■ Process temperature ■ Process pressure (refer to the chapter on "Material load curves" of the "Technical Information" document) ■ Ambient temperature range ■ Measuring range |
| <input type="radio"/> | Are the measuring point identification and labeling correct (visual inspection)? |
| <input type="radio"/> | Is the device adequately protected from precipitation and direct sunlight? |
| <input type="radio"/> | Are the securing screw and securing clamp tightened securely? |

7 Electrical connection

7.1 Connection options

7.1.1 Connection options

PROFIBUS PA / FOUNDATION Fieldbus



A0011341

4 Terminal assignment PROFIBUS PA / FOUNDATION Fieldbus

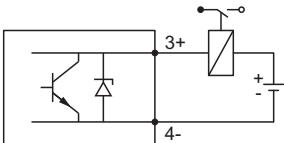
- A Without integrated overvoltage protection
- B With integrated overvoltage protection
- 1 Cable screen: Observe cable specifications (→ 20)
- 2 Terminals for switch output (open collector)
- 3 Terminals PROFIBUS PA / FOUNDATION Fieldbus

- 4 *Terminal for potential equalization line*
- 5 *Cable entries*
- 6 *Overvoltage protection module*

Connection examples for the switch output

i For HART devices, the switch output is available as an option. See product structure, feature 20: "Power Supply, Output", option B: "2-wire; 4-20mA HART, switch output"

Devices with PROFIBUS PA and FOUNDATION Fieldbus always have a switch output.

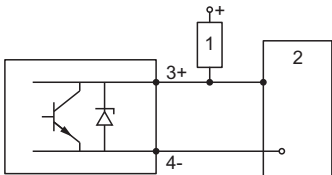


A0015909

5 Connection of a relay

Suitable relays (examples):

- Solid-state relay: Phoenix Contact OV-24DC/480AC/5 with mounting rail connector UMK-1 OM-R/AMS
- Electromechanical relay: Phoenix Contact PLC-RSC-12DC/21



A0015910

6 Connection of a digital input

- 1 Pull-up resistor
- 2 Digital input

7.2 Connection options

7.2.1 Cable specification

PROFIBUS

Use a twisted, screened two-wire cable, preferably cable type A.

i For further information on the cable specifications, see Operating Instructions BA00034S "Guidelines for planning and commissioning PROFIBUS DP/PA", PNO Guideline 2.092 "PROFIBUS PA User and Installation Guideline" and IEC61158-2 (MBP).

7.2.2 Cable diameter and cross-section of the strands

| Type of protection | Cable gland | Admissible cable diameter | Admissible cross-section of the strands |
|---|------------------|------------------------------|---|
| <ul style="list-style-type: none"> ■ Standard ■ Ex ia ■ Ex ic | Plastics M20x1,5 | 5 to 10 mm (0.2 to 0.39 in) | 0.5 to 2.5 mm ² (20 to 14 AWG) |
| <ul style="list-style-type: none"> ■ Ex tD ■ Ex nA ■ FM approval ■ CSA approval | Metal M20x1.5 | 7 to 10 mm (0.28 to 0.39 in) | |

7.2.3 Overvoltage protection

If the measuring device is used for level measurement in flammable liquids which requires the use of overvoltage protection according to DIN EN 60079-14, standard for test procedures 60060-1 (10 kA, pulse 8/20 μ s), overvoltage protection has to be ensured by an integrated or external overvoltage protection module.

Integrated overvoltage protection

An integrated overvoltage protection module is available for 2-wire HART as well as PROFIBUS PA and FOUNDATION Fieldbus devices.

Product structure: Feature 610 "Accessory mounted", option NA "Overvoltage protection".

| Technical data | |
|---|----------------------|
| Resistance per channel | 2 * 0.5 Ω max |
| Threshold DC voltage | 400 to 700 V |
| Threshold impulse voltage | < 800 V |
| Capacitance at 1 MHz | < 1.5 pF |
| Nominal arrest impulse voltage (8/20 μ s) | 10 kA |

External overvoltage protection

HAW562 or HAW569 from Endress+Hauser are suited as external overvoltage protection.



For detailed information please refer to the following documents:

- HAW562: TI01012K
- HAW569: TI01013K

7.3 Connection data

7.3.1 PROFIBUS PA

| "Power supply; Output" ¹⁾ | Terminal voltage |
|---------------------------------------|-------------------------|
| G: 2-wire; PROFIBUS PA, switch output | 9 to 32 V _{DC} |

1) Feature 020 of the product structure

7.4 Connecting the measuring device

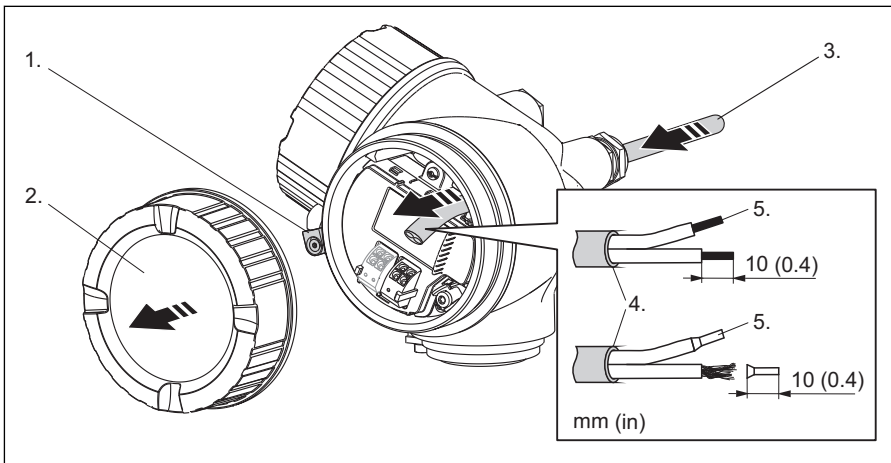
⚠ WARNING

Explosion hazard!

- ▶ Comply with the relevant national standards.
- ▶ Observe the specifications in the Safety Instructions (XA).
- ▶ Only use the specified cable glands.
- ▶ Check whether the supply voltage matches the specifications on the nameplate.
- ▶ Before connecting the device: Switch the supply voltage off.
- ▶ Before switching on the supply voltage: Connect the potential bonding line to the exterior ground terminal.

Required tools and accessories:

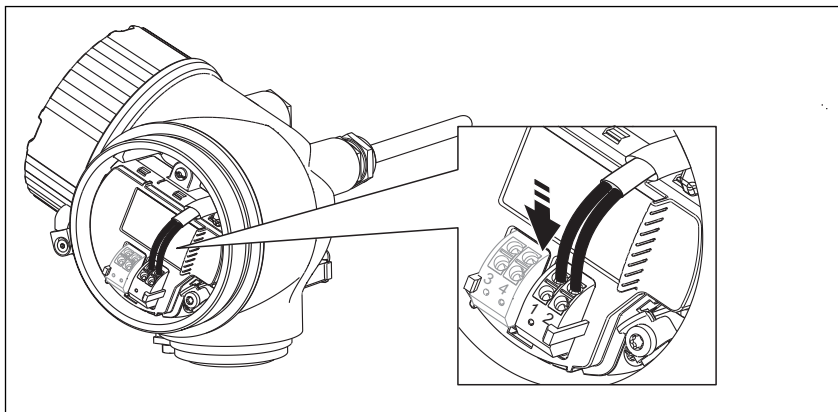
- For instruments with safety pin for the lid: AF 3 Allen key
- Wire stripping pliers
- When using stranded wires: Wire end sleeves.




A0012619

1. Loosen the screw of the securing clamp of the connection compartment cover and turn the clamp 90° counterclockwise.
2. Unscrew the connection compartment cover.
3. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
4. Strip the cable.
5. Strip the cable ends 10 mm (0.4 in). For stranded cables, also attach wire end ferrules.
6. Firmly tighten the cable glands.

7.



A0013837

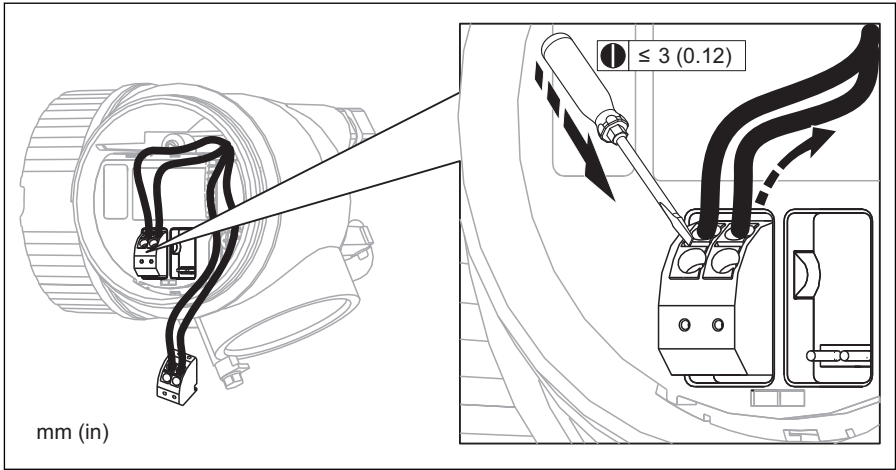
Connect the cable in accordance with the terminal assignment (→  18).

8. When using screened cable: Connect the cable screen to the ground terminal.
9. Screw the cover onto the connection compartment.
10. For instruments with safety pin for the lid: Adjust the safety pin so that its edge is over the edge of the display lid. Tighten the safety pin.



Pluggable spring-force terminals

Instruments without integrated overvoltage protection have pluggable spring-force terminals. Rigid or flexible conductors with or without cable sleeve can directly be inserted and are contacted automatically.

To remove cables from the terminal: Press on the groove between the terminals using a flat-tip screwdriver ≤ 3 mm (0.12 inch) while pulling the cables out of the terminals.



7.5 Post-connection check

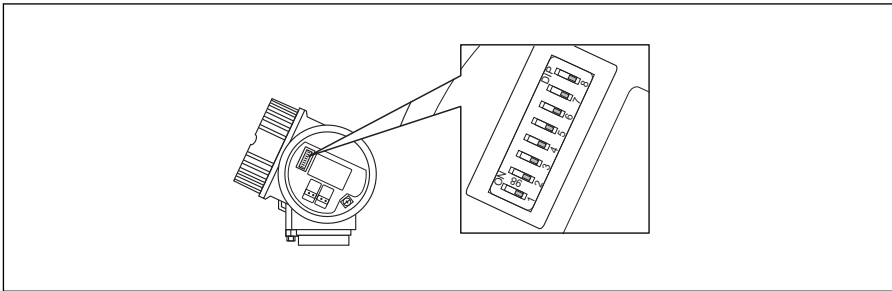
| | |
|-----------------------|--|
| <input type="radio"/> | Are cables or the device undamaged (visual inspection)? |
| <input type="radio"/> | Do the cables comply with the requirements? |
| <input type="radio"/> | Do the cables have adequate strain relief? |
| <input type="radio"/> | Are all cable glands installed, firmly tightened and correctly sealed? |
| <input type="radio"/> | Does the supply voltage match the specifications on the transmitter nameplate? |
| <input type="radio"/> | Is the terminal assignment correct (→  18)? |
| <input type="radio"/> | If required: Is the protective earth connected correctly (→  18)? |
| <input type="radio"/> | If supply voltage is present: Is the device ready for operation and do values appear on the display module? |
| <input type="radio"/> | Are all housing covers installed and firmly tightened? |
| <input type="radio"/> | Is the securing clamp tightened correctly? |

8 Integration into a PROFIBUS network

8.1 Overview of the device database files (GSD)

| | |
|------------------|--|
| Manufacturer ID | 17 (0x11) |
| Ident number | 0x1558 |
| Profile version | 3.02 |
| GSD file | Information and files under: |
| GSD file version | <ul style="list-style-type: none"> ▪ www.endress.com ▪ www.profibus.org |

8.2 Set device address



A0015686

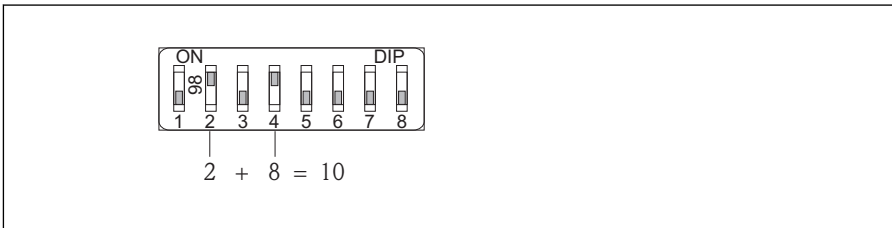
7 Address switches in terminal compartment

8.2.1 Hardware addressing

1. Set switch 8 to "OFF".
2. Define the address with switches 1 to 7 according to the table below.

The address change becomes effective after 10 seconds. The device restarts automatically.

| Switch | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------------|---|---|---|---|----|----|----|
| Value in position "ON" | 1 | 2 | 4 | 8 | 16 | 32 | 64 |
| Value in position "OFF" | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

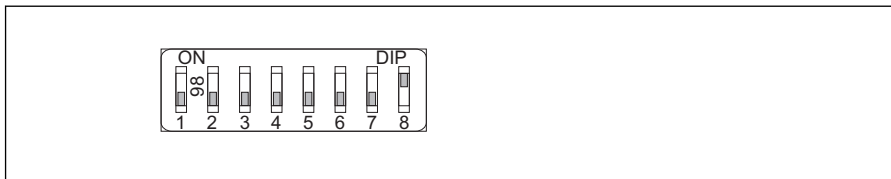


A0015902

8 Example of hardware addressing: switch 8 is in position "OFF"; switches 1 to 7 define the address.

8.2.2 Software addressing

1. Set switch 8 to "ON".
2. The device restarts automatically. The address remains the same as before (factory setting: 126).
3. Set the required address via the operating menu: Setup → Device address



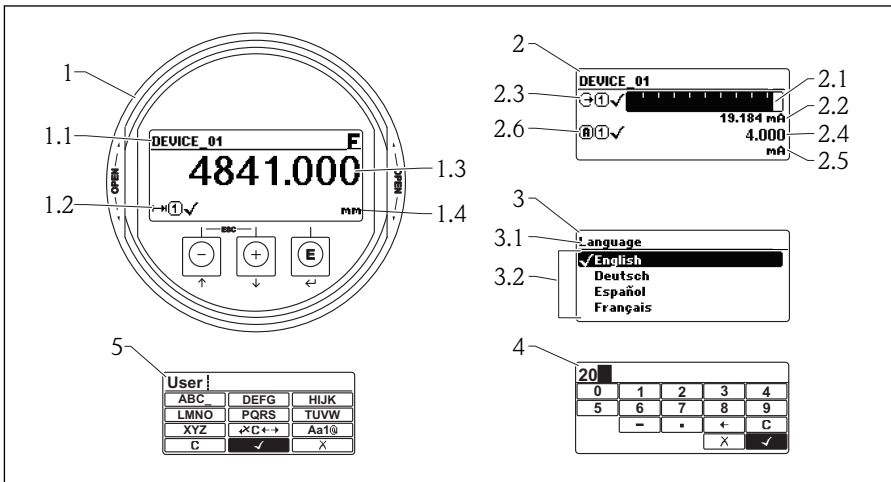
A0015903

- 9 *Example of software addressing; switch 8 is in position "ON"; the address is defined in the operating menu (Setup → Device address)*

9 Commissioning via operating menu (On-site display, FieldCare)

9.1 Display and operating module

9.1.1 Display appearance












A0012635

10 Appearance of the display and operation module for on-site operation

- 1 Measured value display (1 value max. size)
- 1.1 Header containing tag and error symbol (if an error is active)
- 1.2 Measured value symbols
- 1.3 Measured value
- 1.4 Unit
- 2 Measured value display (2 values)
- 2.1 Bargraph for measured value 1
- 2.2 Measured value 1 (including unit)
- 2.3 Measured value symbols for measured value 1
- 2.4 Measured value 2
- 2.5 Unit for measured value 2
- 2.6 Measured value symbols for measured value 2
- 3 Representation of a parameter (here: a parameter with selection list)
- 3.1 Header containing parameter name and error symbol (if an error is active)
- 3.2 Selection list; ✓ marks the current parameter value.
- 4 Input matrix for numbers
- 5 Input matrix for alphanumeric and special characters

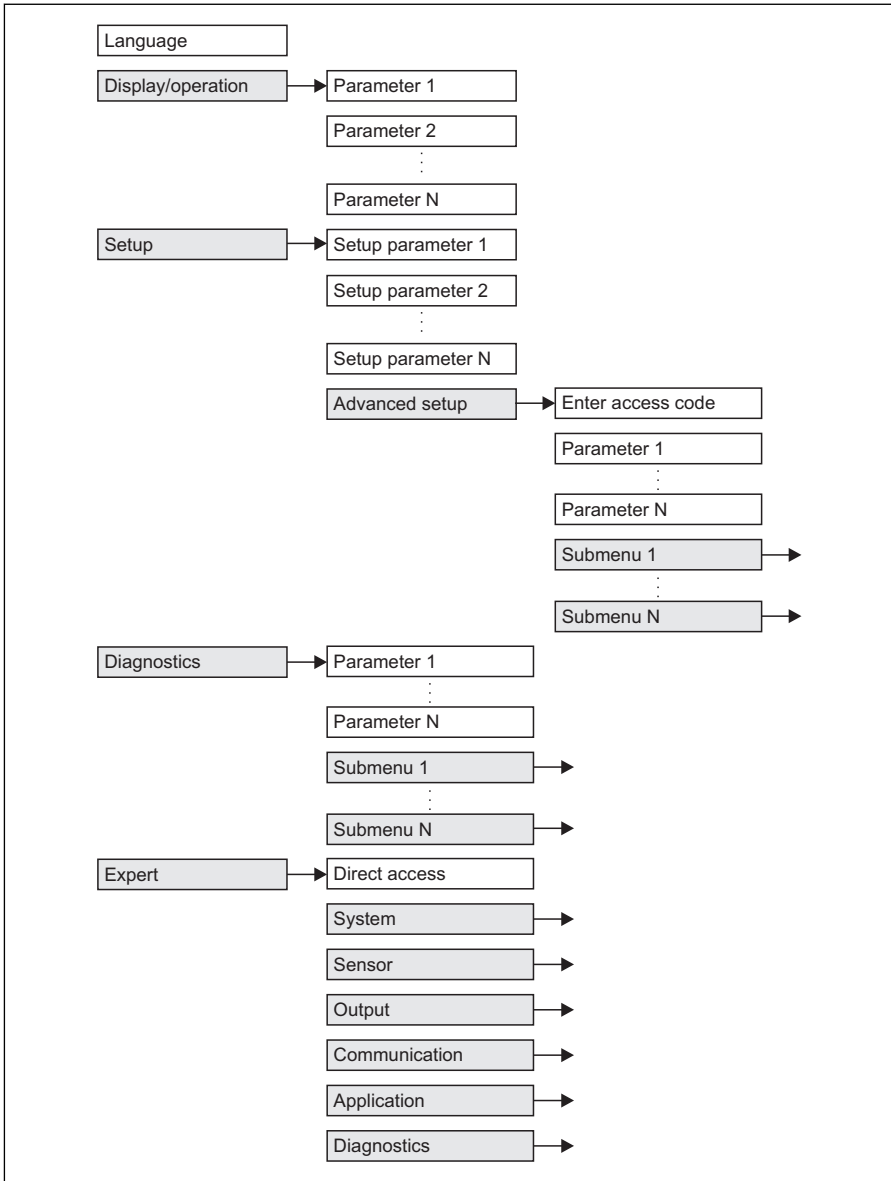
9.1.2 Navigation and selection from a list

Use the operating keys to navigate within the operating menu and to select options from a list.

| Key | Meaning |
|--|--|
|  <p style="text-align: right; font-size: small;">A0011971</p> | <p>"Minus" key</p> <p>Henceforth represented by .</p> <ul style="list-style-type: none"> ■ In a selection list: Moves the selection bar upward. ■ In an input matrix: Moves the selection bar backward. |
|  <p style="text-align: right; font-size: small;">A0011972</p> | <p>"Plus" key</p> <p>Henceforth represented by .</p> <ul style="list-style-type: none"> ■ In a selection list: Moves the selection bar downward. ■ In an input matrix: Moves the selection bar forward. |
|  <p style="text-align: right; font-size: small;">A0011973</p> | <p>"Enter" key</p> <p>Henceforth represented by .</p> <ul style="list-style-type: none"> ■ Opens the marked submenu or parameter. ■ Confirms a changed parameter value. |
|  <p style="text-align: right; font-size: small;">A0012661</p> | <p>"Escape" key combination (press keys simultaneously)</p> <p>Henceforth represented by  + .</p> <ul style="list-style-type: none"> ■ Closes a parameter without accepting the changes. ■ Quits the current menu layer and returns to the next higher layer. |

9.2 Operating concept

9.2.1 Structure




A0011407-EN

11 Basic structure of the operating menu; gray: submenus; white: parameters

9.2.2 Submenus and user roles

The submenus are designed for different user roles. A user role is defined by typical tasks within the lifecycle of the device.

| User role | Typical tasks | Submenu |
|-------------|--|--|
| Operator | Tasks in the ongoing process: <ul style="list-style-type: none"> ■ Configuration of the display. ■ Reading measuring values. | "Language" Defines the operating language (→  34). |
| | | "Display/Operation" Contains all parameters which are needed during the ongoing process: configuration of the display (display values, display format, display contrast ...). |
| Maintenance | Commissioning: <ul style="list-style-type: none"> ■ Configuration of the measurement. ■ Configuration of the measured value processing (scaling, linearization, limit detection etc.). ■ Configuration of the measured value output (analog and digital communication interface). | "Setup" Contains all commissioning parameters . |
| | Error handling | "Diagnostics" Contains all parameters needed to detect and analyze operational errors. |
| Expert | Tasks which require detailed knowledge about the instrument: <ul style="list-style-type: none"> ■ Commissioning of measurements under demanding conditions. ■ Optimization of the measurement under demanding conditions. ■ Detailed configuration of the communication interface. ■ Error diagnosis in difficult cases. | "Expert" |

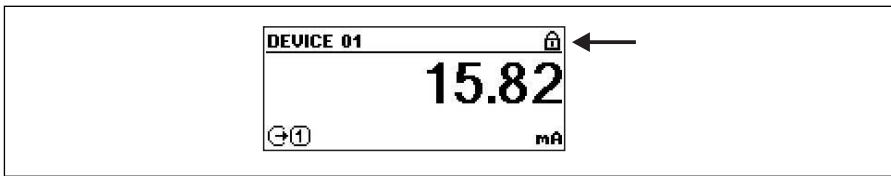
9.3 Adjust the display contrast

- + (pressed simultaneously): increases the contrast.
- + (pressed simultaneously): decreases the contrast.

9.4 Unlock the device

If the device has been locked, it must be unlocked before the measurement can be configured.

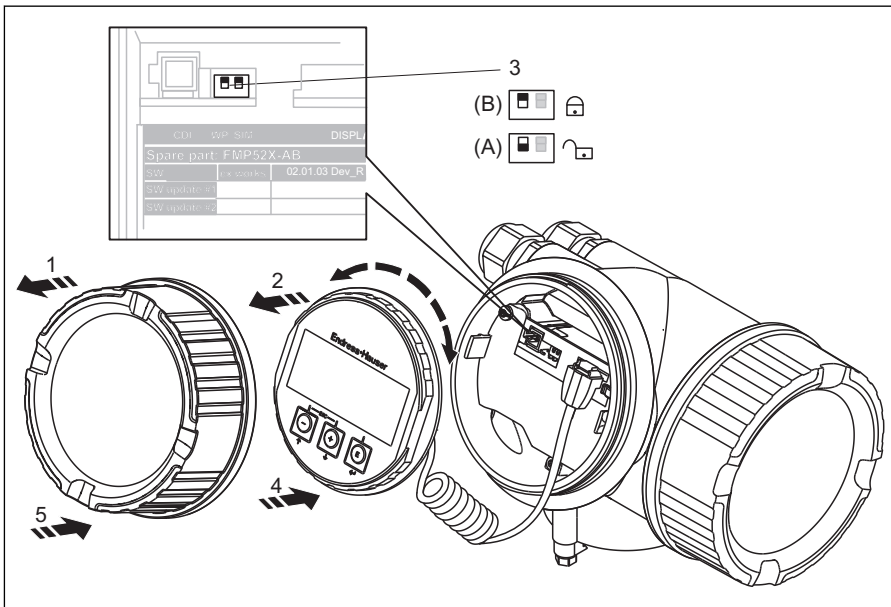
9.4.1 Revoke hardware locking



A0013649

12 Measured value screen of a hardware-locked device

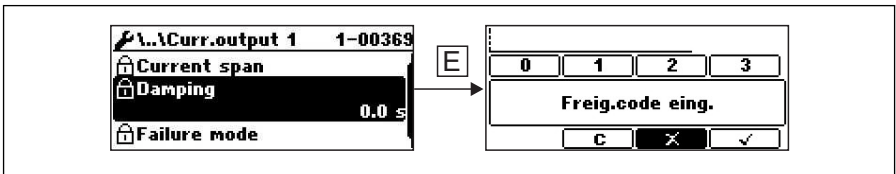
The padlock in the header of the measured value screen indicates that the device is hardware-locked. In order to unlock the device, shift the locking switch (which is located below the display module) into the "unlocked" position.



A0013132

1. Unscrew the lid from the compartment for the display and operating module.
2. Slightly turn the display and operating module to remove it from the compartment.
3. Set the locking switch (WP: Write Protection) into the desired position. (A): unlocked; (B): locked.
4. Attach the display and operating module in the desired orientation until it closes with a snap.
5. Screw the lid onto the compartment.

9.4.2 Revoke software locking



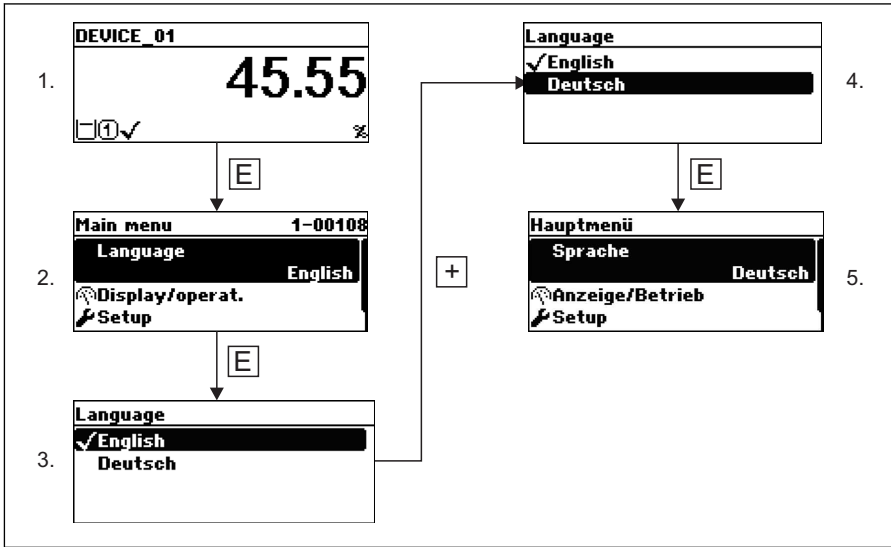
A0013651

13 Input prompt for the access code to unlock software-locked parameters.

Parameters affected by the software lock are marked by a padlock in front of the parameter name. After pressing an input prompt appears. Enter the user defined locking code to unlock the device.

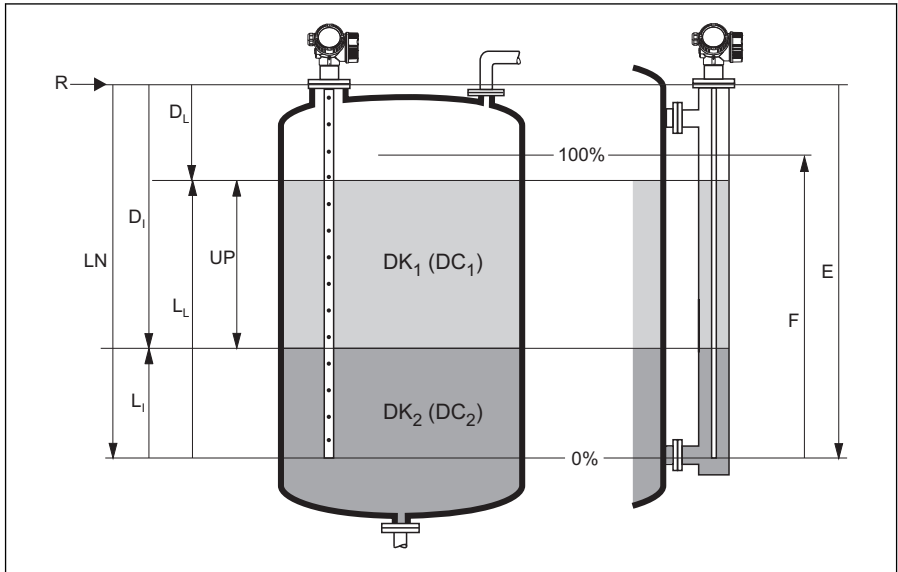
| Step | Parameter | Action |
|------|---|---|
| 1 | Setup → Advanced setup → Define access code | To lock the device: Enter a user-defined access code. |
| 2 | Setup → Advanced setup → Enter access code | To unlock the device: Enter the previously defined access code. |
| 3 | Setup → Advanced setup → Enter access code | To lock the device again: Enter a number other than the previously defined access code. |

9.5 Set the operating language



A0013637

9.6 Configuration of an interface measurement



A0011177

14 Configuration parameters for interface measurements

R = Reference point of the measurement

D₁ = Distance of interface (Distance from reference point to lower medium)

E = Empty calibration (= zero point)

L₁ = Interface level

F = Full calibration (= span)

D_L = Distance from reference point *R* to total level

LN = Length of probe

L_L = total level

UP = Thickness of upper medium

| Step | Parameter | Action |
|------|-------------------------------------|--|
| 1 | Setup → Operating mode | Select the "Interface with capacity" option. |
| 2 | Setup → Distance unit | Select distance unit. |
| 3 | Setup → Tank type | Select tank type. |
| 4 | Setup → Tube diameter ¹⁾ | Enter the diameter of the bypass or stilling well. |
| 5 | Setup → DC value | Enter dielectric constant of the upper medium. |
| 6 | Setup → Empty calibration | Enter the distance <i>E</i> between the reference point <i>R</i> and the minimum level (0%). |
| 7 | Setup → Full calibration | Enter distance <i>F</i> between the minimum (0%) and maximum (100%) level. |

| Step | Parameter | Action |
|------|------------------------------------|---|
| 8 | Setup → Level | Displays the measured level L. |
| 9 | Setup → Interface | Displays the interface height L _i . |
| 10 | Setup → Distance | Displays the distance D between the reference point R and the level L. |
| 11 | Setup → Interface distance | Displays the distance D _i between the reference point t R and the interface L _i . |
| 12 | Setup → Signal quality | Displays the signal quality of the level echo. |
| 13 | Setup → Mapping → Confirm distance | Make sure the vessel is completely empty. Then select the "Tank empty" option. |

- 1) only visible for coated probes and if "Tank type" = "Bypass/pipe"

NOTICE

Wrong dielectric constant of the lower medium may cause a measuring error.

- ▶ If the lower medium is no water, it is necessary to specify its dielectric constant (DC value): Setup → Advanced setup → Interface → DC lower medium

NOTICE

Wrong empty capacity may cause a measuring error.

- ▶ For rod and rope probes in the "Interface with capacity" measuring mode, a correct measurement is only possible after the empty capacity has been determined. To do so, make sure that the vessel is completely empty. Then select the "Tank empty" option in the "Confirm distance" parameter (Step 13 in the table above).

9.7 User-specific applications (operation)



For details of setting the parameters of user-specific applications, see separate documentation:

- Operator and Maintenance → BA01008F/00/EN (Operating Instructions)
- Experte → GP01001F/00/EN (Description of Device Parameters)

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