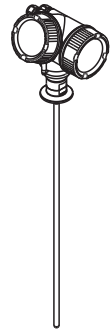
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Brief Operating Instructions

Levelflex FMP53

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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Endress+Hauser

People for Process Automation

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1 Important document information

1.1 Document conventions

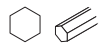
1.1.1 Safety symbols

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 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 variables: level
- ► Calculated process variables: Volume or 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.

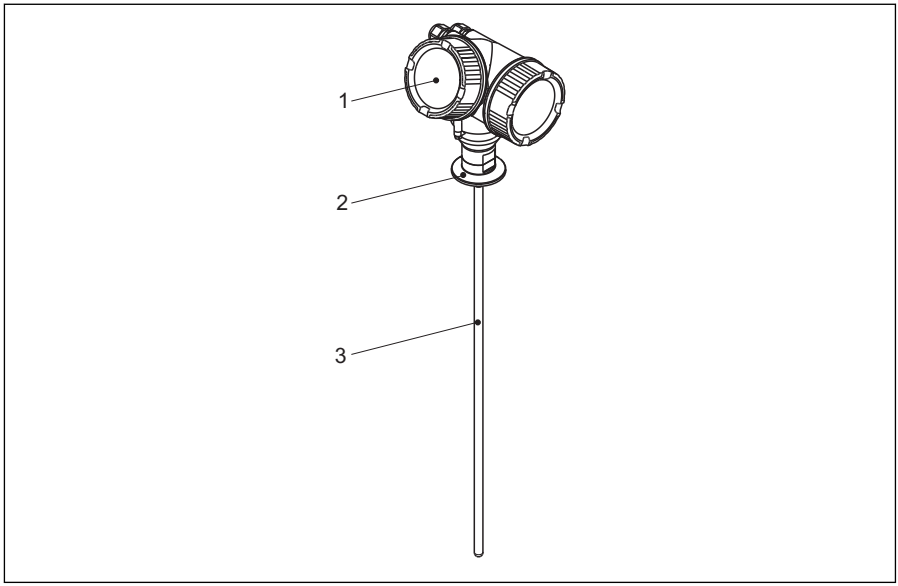
2.5 Product safety

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

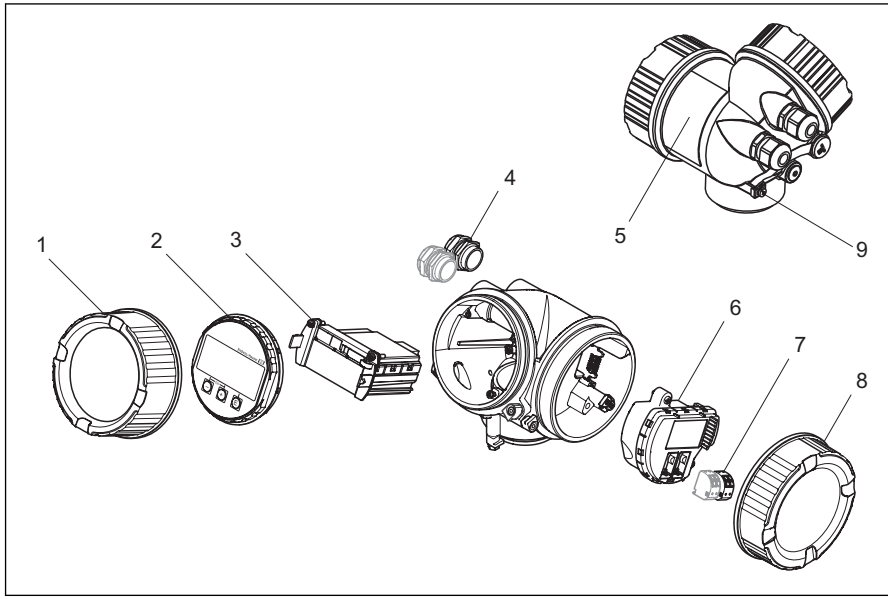
3.1 Compact device Levelflex



1 Design of the Levelflex

1 Electronics housing
2 Process connection
3 Rod probe

3.2 Electronics housing

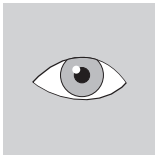


2 Design of the electronics housing

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



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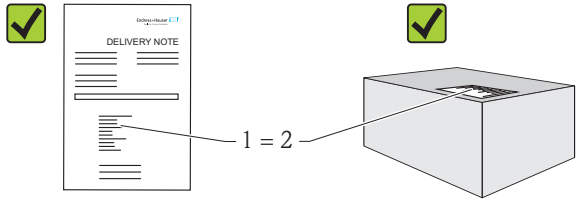

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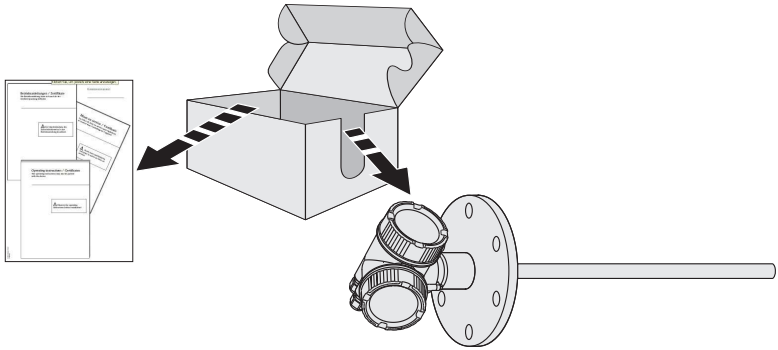

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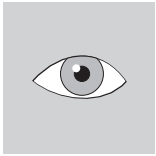

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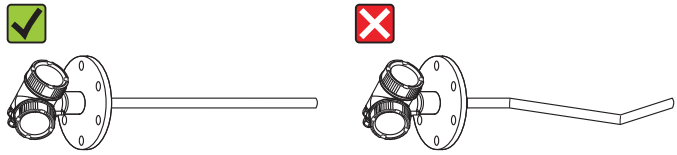

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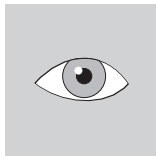

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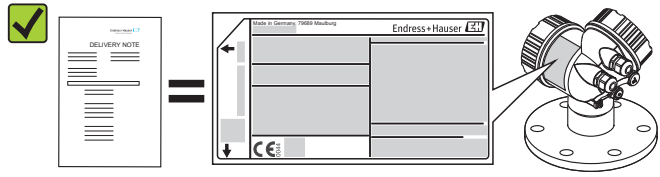

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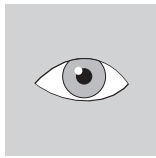

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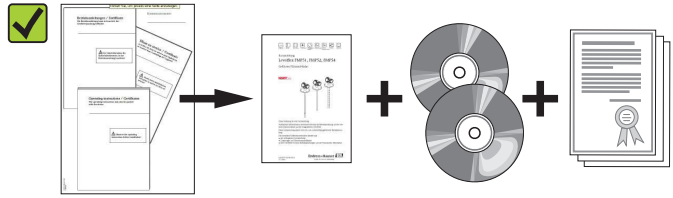

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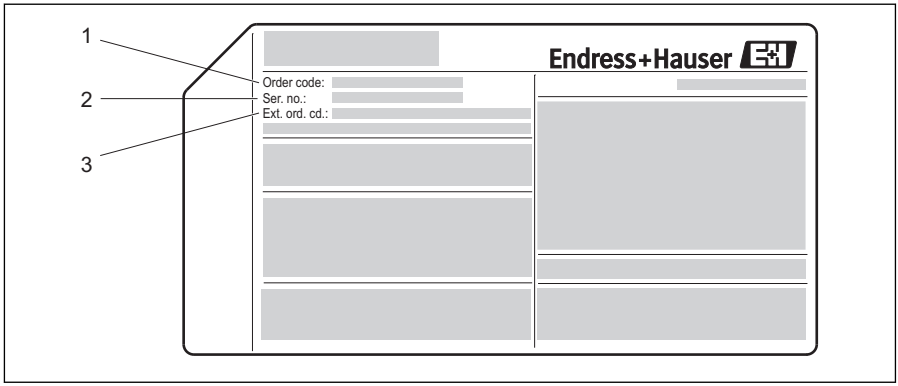
If one of the conditions does not comply, contact your Endress+Hauser distributor.

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)



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

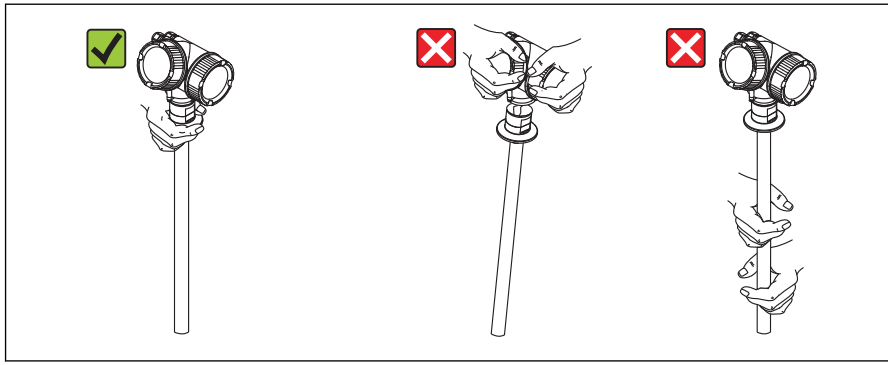
- Permitted storage temperature: –40 to +80 °C (–40 to +176 °F)
- Use the original packaging.

5.2 Transport product to the measuring point

WARNING

Risk of injury if the hosuing 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).



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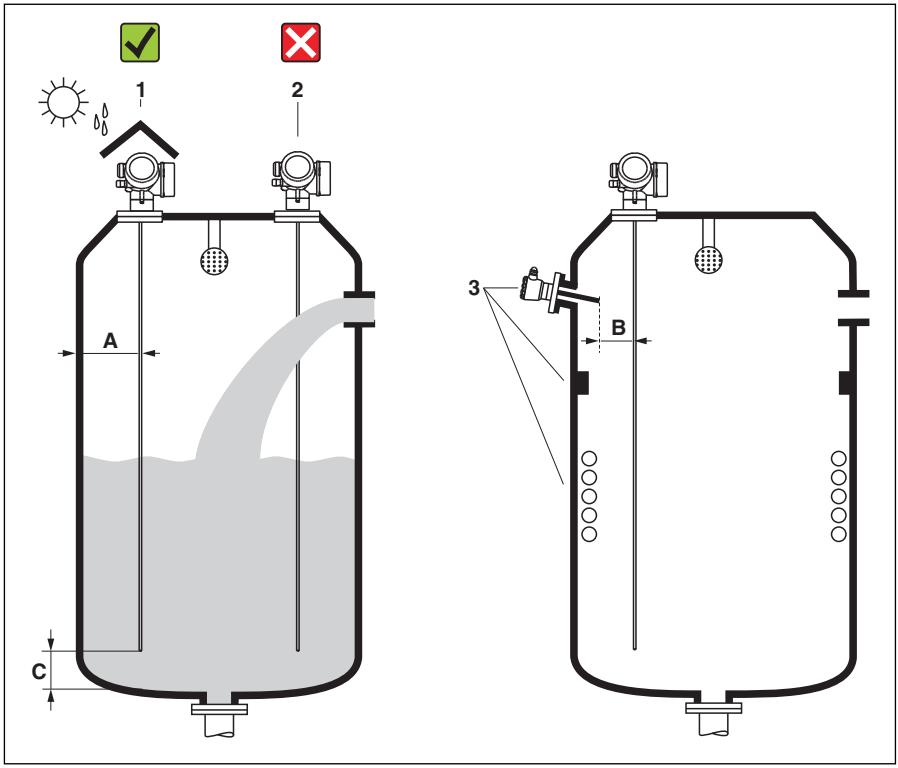
6 Mounting

6.1 Suitable mounting position



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6.1.1 Mounting distances

- Distance (A) between wall and rod probe:
  - for smooth metallic walls: > 50 mm (2")
  - for plastic walls: > 300 mm (12") mm to metallic parts outside the vessel
- Distance (B) between rod probe and internal fittings (3) in the vessel: > 300 mm (12")
- Distance (C) from end of probe to bottom of the vessel: > 10 mm (0.4 in).

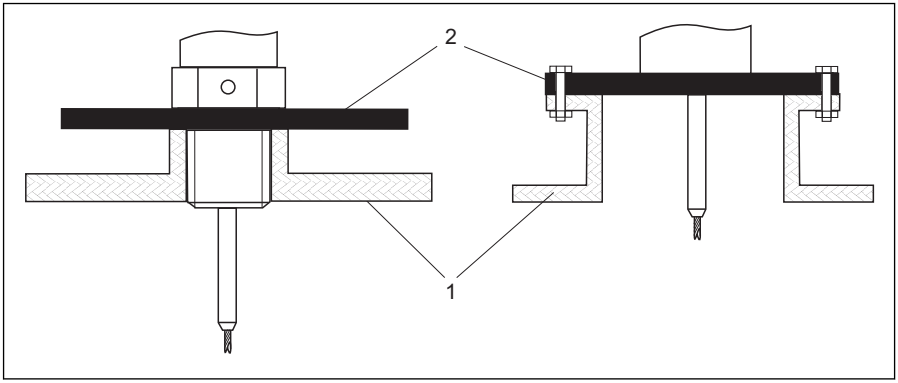
6.1.2 Additional conditions

- When mounting in the open, a weather protection cover (1) may be installed to protect the device against extreme weather conditions.
- Do not mount the probe in the filling curtain (2).

When mounting the electronics housing into a recess (e.g. in a concrete ceiling), observe a minimum distance of 100 mm (4 inch) between the cover of the terminal compartment / electronics compartment and the wall. Otherwise the connection compartment / electronics compartment is not accessible after installation.

6.2 Special mounting conditions

6.2.1 Non-metallic vessels

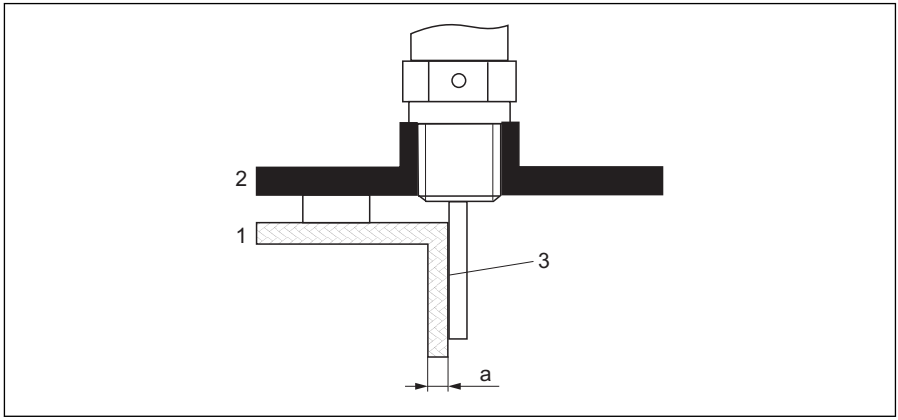


1 Non-metallic vessel
2 Metal sheet or metal flange

To measure, Levelflex with a rod or rope probe needs a metallic surface at the process connection. Therefore:

Mount a metal sheet with a diameter of at least 200 mm (8") to the probe at the process connection. Its orientation must be perpendicular to the probe.

6.2.2 Plastic or glass tanks: Mounting the probe externally at the wall



1 Plastic or glass tank
2 Metall sheet with threaded sleeve
3 No free space between tank wall and probe!

Requirements
- The dielectric constant of the medium must be at least DC > 7.
- The tank wall must be non-conductvie.
- Maximum wall thickness (a):
  – Plastic: < 15 mm (0.6")
  – Glass: < 10 mm (0.4")
- There may be no metallic reinforcements fixed to the tank.

Mounting conditions:
- The probe must be mounted directly to the tank wall (no open space)
- A plastic half pipe with a diameter of approx. 200 mm (8"), or some other protective unit, must be affixed externally to the probe to prevent any influences on the measurement.
- If the tank diameter is less than 300 mm (12"):
  A metallic grounding sheet must be installed at the opposite side of the tank. The sheet must be conductively connected to the process connection and cover about the half of the vessel's circumference.
- If the tank diameter exceeds 300 mm (12"):
  A metal sheet with a diameter of at least 200 mm (8") must be mounted to the probe at the process connection. Its orientation must be perpendicular to the probe (see above).

Calibration for external probe mounting

If the probe is mounted externally at the wall of the tank, the speed of signal propagation will be reduced. There are two possibilities to compensate for this effect.

Compensation with the gas phase compensation factor

The effect of the dielectric wall can be compared to the effect of a dielectric gas phase. Thus it can be compensated for in the same manner. The compensation factor if given by the quotient of the actual probe length LN and the probe length meausred when the tank is empty.

The device looks for the end of probe signal in the subtracted curve. Thus, the value of the measured probe length depends on the mapping. In order to obtain an exact value, it is advisable to determine the probe length manually using the envelope curve display in FieldCare.

Step	Parameter	Action
1	Expert → Sensor → Gas phase compensation → GPC mode	Select **Constant GPC factor** option.
2	Expert → Sensor → Gas phase compensation → Constant GPC factor	Enter quotient: "(Actual probe length)/(Measured probe length)".

Compensation via the calibration parameters

If an acutal gas phase has to be compensated for, the gas phase compensation functionality is no longer available for a correction of the external mounting. In this case the calibration parameters (**Empty calibration** and **Full calibration**) must be adjusted and a value longer than the actual probe length has to be entered into the **Present probe length** parameter. The correction factor for these three parameters is given by the quotient of the probe length measured when the tank is empty and the acutal probe length LN.

The device looks for the end of probe signal in the subtracted curve. Thus, the value of the measured probe length depends on the mapping. In order to obtain an exact value, it is advisable to determine the probe length manually using the envelope curve display in FieldCare.

Step	Parameter	Action
1	Setup → Empty calibration	Increase parameter value by "(Measured probe length)/(Actual probe length)".
2	Setup → Full calibration	Increase parameter value by "(Measured probe length)/(Actual probe length)".
3	Expert → Sensor → Sensor properties → Probe length correction → Confirm probe length	Select **Manual input** option.
4	Expert → Sensor → Sensor properties → Probe length correction → Present probe length	Enter measured probe length.

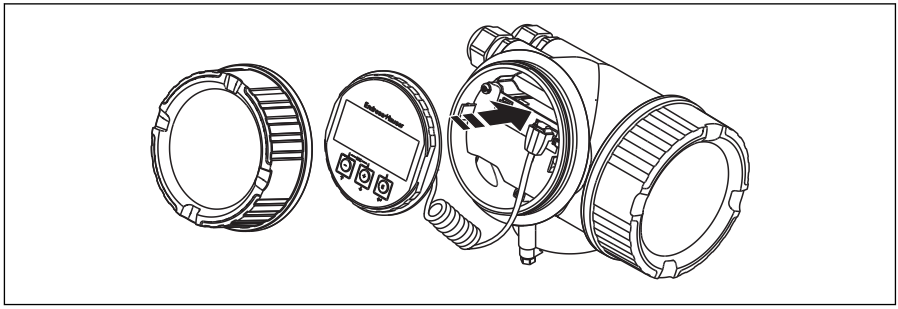
6.3 Mounting the device

6.3.1 Required mounting tools

- To shorten rod or coax probes: Saw
- For flanges and other process connections: appropriate mounting tools
- To turn the housing: Hexagonal wrench 8 mm

6.3.2 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.



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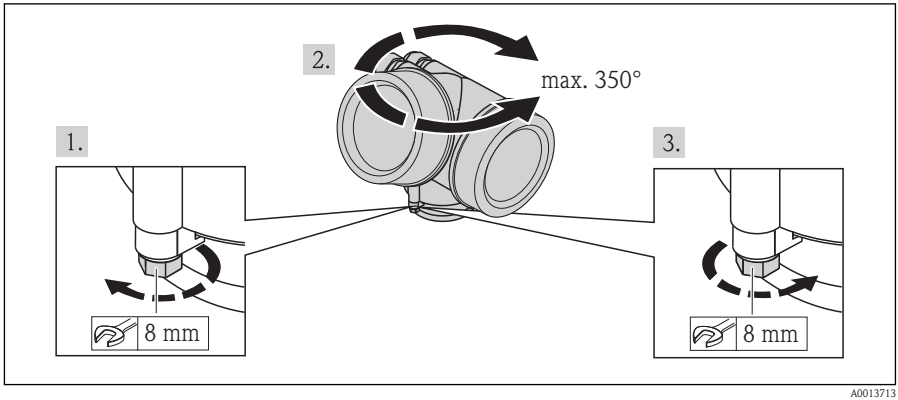
Shortening rod probes

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.

6.3.3 Turning the transmitter housing

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



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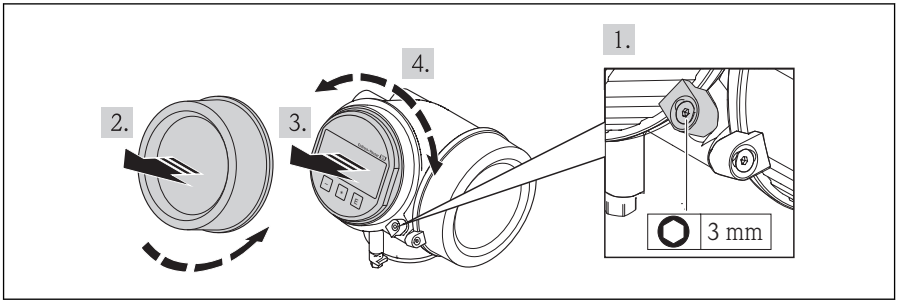
1. Unscrew the securing screw using an open-ended wrench.
2. Rotate the housing in the desired direction.

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

6.3.4 Turning the display module



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1. Loosen the screw of the securing clamp of the electronics compartment cover using an Allen key and turn the clamp 90° conterclockwise.
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 × 45 ° 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.

6.4 Post-installation check

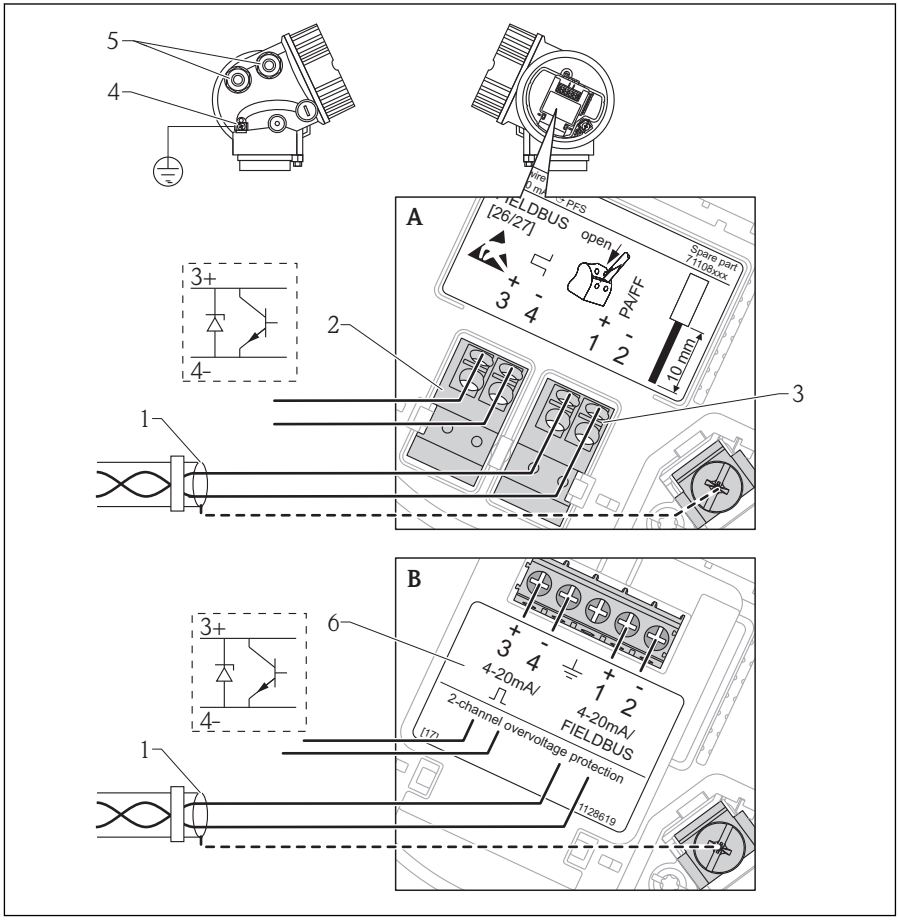
❍	Is the device undamaged (visual inspection)?
❍	Does the device conform to the measuring point specifications? For example: ■ Process temperature ■ Process pressure (refer to the chapter on "Material load curves" of the "Technical Information" document) ■ Ambient temperature range ■ Measuring range
❍	Are the measuring point identification and labeling correct (visual inspection)?
❍	Is the device adequately protected from precipitation and direct sunlight?
❍	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



4 Terminal assignment PROFIBUS PA / FOUNDATION Fieldbus

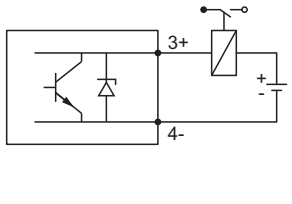
A Without integrated overvoltage protection
B With integrated overvoltage protection
1 Cable screen: Observe cable specifications (→ 20)
2 Terminals for switch output (open collector)
3 Terminals PROFIBUS PA / FOUNDATION Fieldbus

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

Connection examples for the switch output

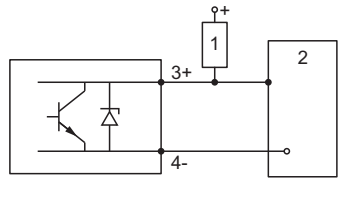
For HART devices, the switch output is available as an option. See product structure, feature 20: "Power Supply, Output", option B: "2-wire; 4-20mA HART, switch output"

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



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



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.

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
■ Standard ■ Ex ia ■ Ex ic	Plastics M20x1,5	5 to 10 mm (0.2 to 0.39 in)	0.5 to 2.5 mm² (20 to 14 AWG)
■ 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 µs), 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 µs)	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

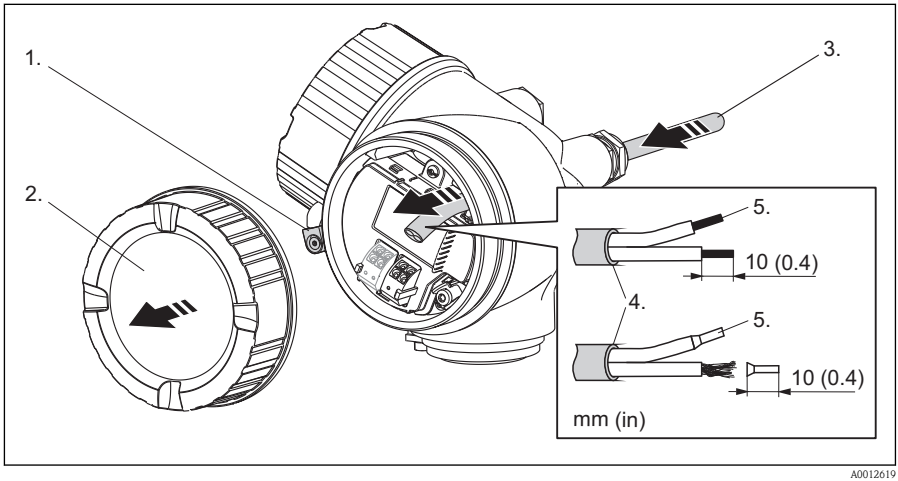
⚠ WARNING

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:

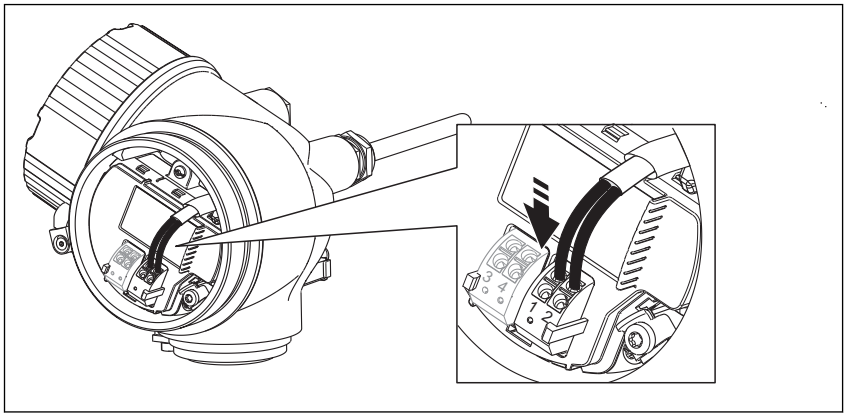
- For instruments with safety pin for the lid: AF 3 Allen key
- Wire stripping pliers
- When using stranded wires: Wire end sleeves.



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

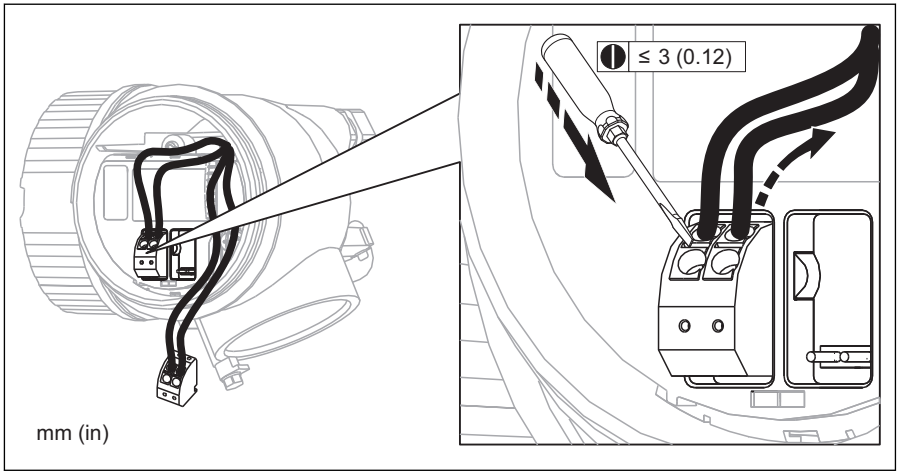
Connect the cable in accordance with the terminal assignment (→ 18).

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.



A0013661

7.5 Post-connection check

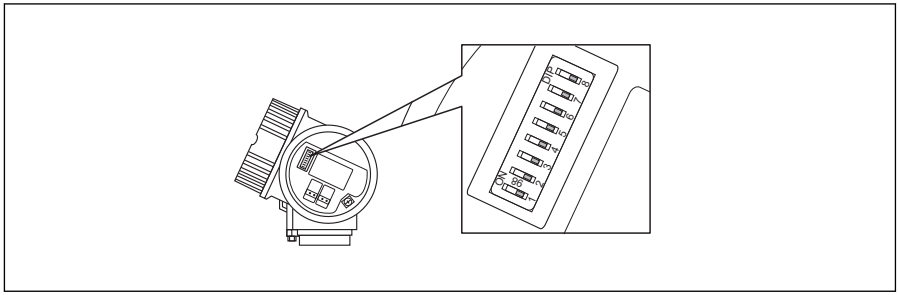
❍	Are cables or the device undamaged (visual inspection)?
❍	Do the cables comply with the requirements?
❍	Do the cables have adequate strain relief?
❍	Are all cable glands installed, firmly tightened and correctly sealed?
❍	Does the supply voltage match the specifications on the transmitter nameplate?
❍	Is the terminal assignment correct (→ 🖹 18)?
❍	If required: Is the protective earth connected correctly (→ 🖹 18)?
❍	If supply voltage is present: Is the device ready for operation and do values appear on the display module?
❍	Are all housing covers installed and firmly tightened?
❍	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: ■ www.endress.com ■ www.profibus.org
GSD file version	

8.2 Set device address



A0015686

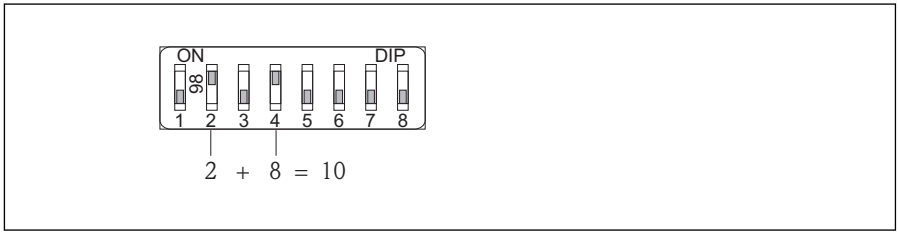
7 Address switches in terminal compartment

8.2.1 Hardware adressing

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

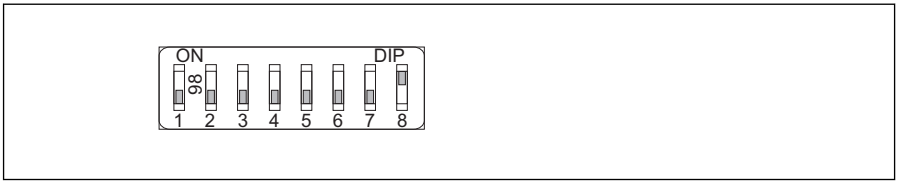


A0015902

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

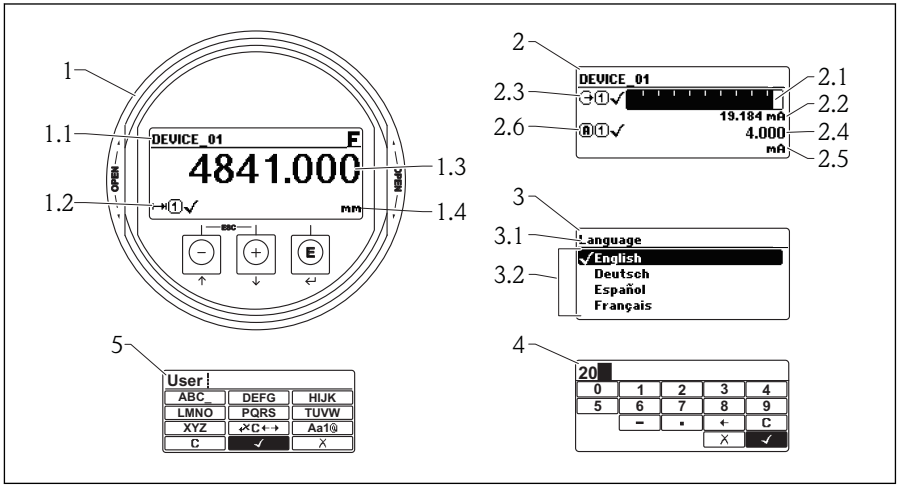


9 Example of software addressing; switch 8 is in position "ON"; the address is defined in the operating menu (Setup → Device address)

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

9.1 Display and operating module

9.1.1 Display appearance



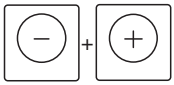
A0012635

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

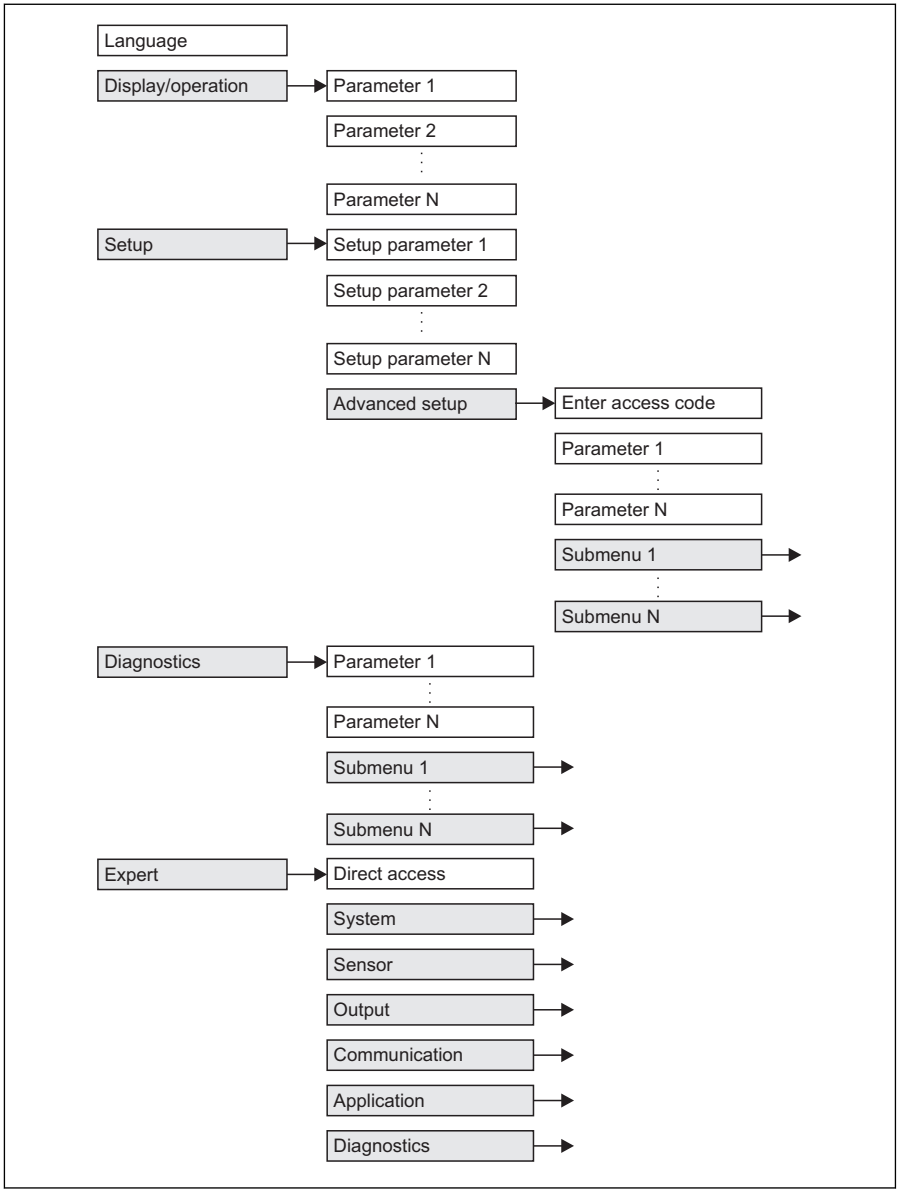
9.1.2 Navigation and selection from a list

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

Key	Meaning
 A0011971	**"Minus" key** Henceforth represented by −. ■ In a selection list: Moves the selection bar upward. ■ In an input matrix: Moves the selection bar backward.
 A0011972	**"Plus" key** Henceforth represented by +. ■ In a selection list: Moves the selection bar downward. ■ In an input matrix: Moves the selection bar forward.
 A0011973	**"Enter" key** Henceforth represented by E. ■ Opens the marked submenu or parameter. ■ Confirms a changed parameter value.
 A0012661	**"Escape" key combination (press keys simultaneously)** Henceforth represented by − + +. ■ 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



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: ■ 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: ■ 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 (→ 35).
	Error handling	"Diagnostics" Contains all parameters needed to detect an analyze operational errors.
Expert	Tasks which require detailed knowledge about the instrument: ■ Commissioning of measurements under demanding conditions. ■ Optimization of the measurement under demanding conditions. ■ Detailed configuration of the communication interface. ■ Error diagnosis in diffcult cases.	"Expert"

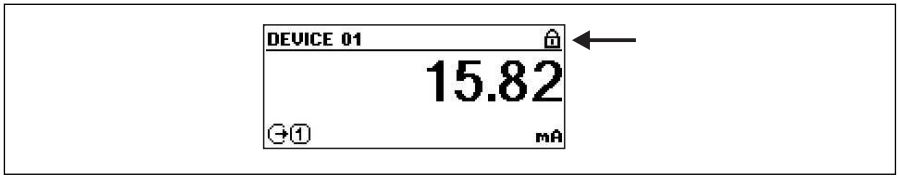
9.3 Adjust the display contrast

- ⊞ + Ⓔ (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.

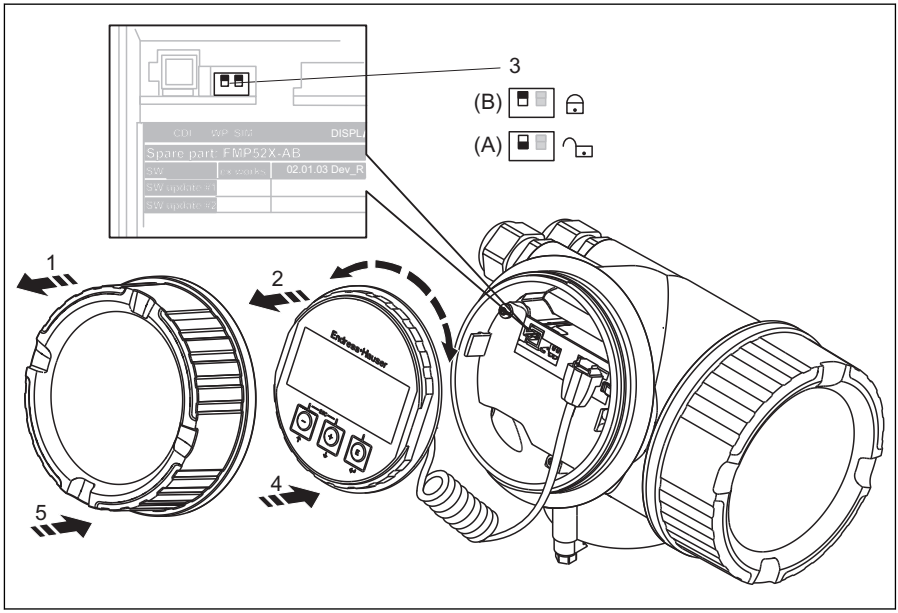
9.4.1 Revoke hardware locking



A0013649

12 *Mesured value screen of a hardware-locked device*

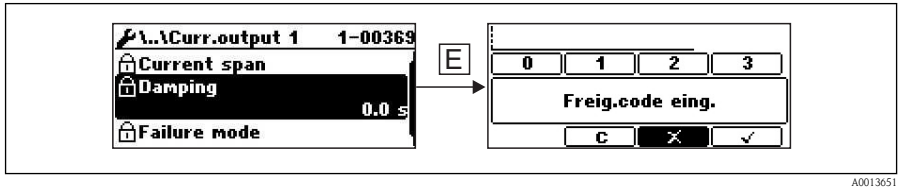
The padlock in the header of the measured value screen indicates that the device is hardware-locked. In order to unlock the device, shift the locking switch (which is located below the display module) into the "unlocked" position.



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

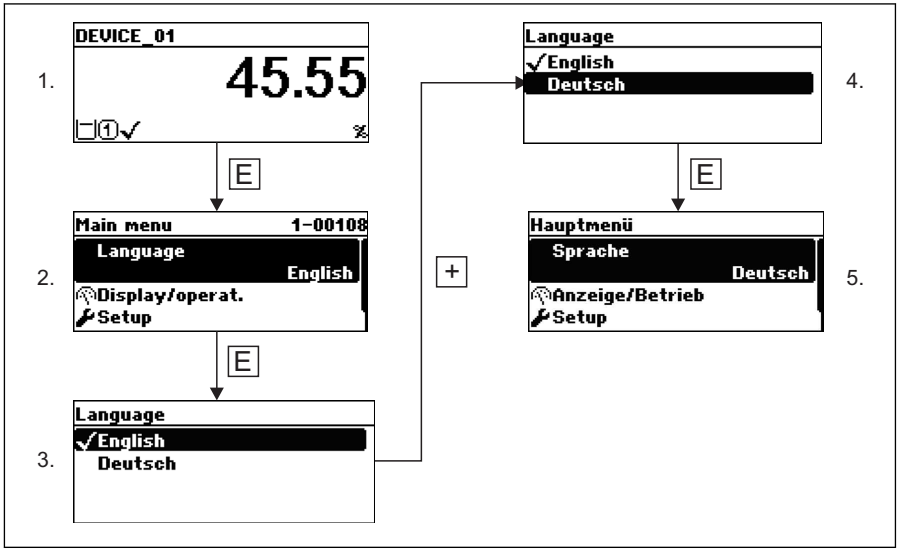


13 *Input prompt for the access code to unlock software-locked parameters.*

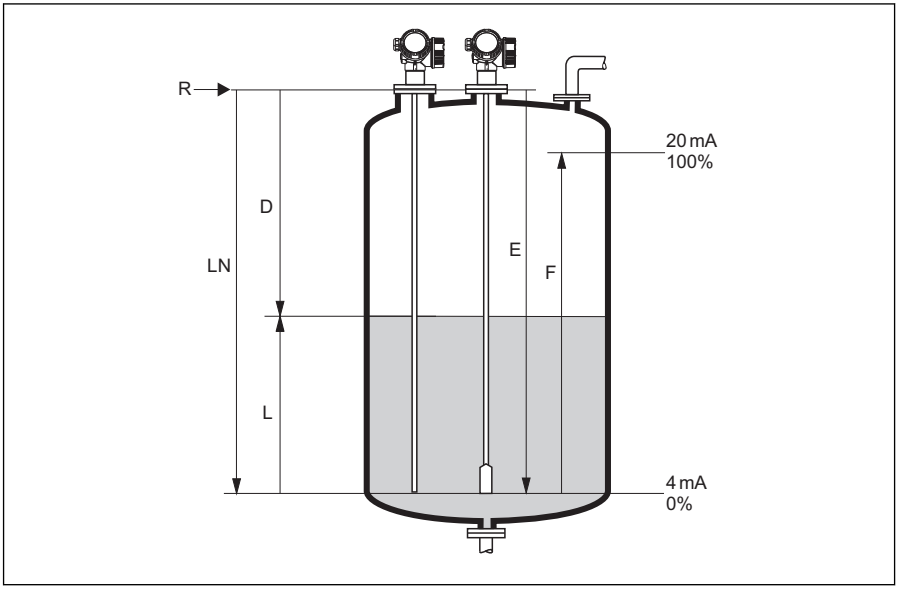
Parameters affected by the software lock are marked by a padlock in front of the parameter name. After pressing E an input prompt appears. Enter the user defined locking code to unlock the device.

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



9.6 Configuration of a level measurement



14 Configuration parameters for level measurements in liquids

LN = Length of probe
D = Distance
L = Level
R = Reference point of the measurement
E = Empty calibration (= Zero point)
F = Full calibration (= span)

Step	Parameter	Action
1	Setup → Distance unit	Select distance unit.
2	Setup → Tank type	Select tank type.
3	Setup → Tube diameter [1)]	Enter the diameter of the bypass or stilling well.
4	Setup → Medium group	Select medium group ("water based": DC>4 or "other": DC>1.9)
5	Setup → Empty calibration	Enter the distance E between the reference point R and the minimum level (0%).
6	Setup → Full calibration	Enter distance F between the minimum (0%) and maximum (100%) level.
7	Setup → Level	Displays the measured level L.
8	Setup → Distance	Displays the distance D between the reference point R and the level L.

Step	Parameter	Action
9	Setup → Signal quality	Displays the signal quality of the level echo.
10	Setup → Mapping → Confirm distance	Compare the displayed distance to the real distance in order to start the recording of the mapping curve.

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

9.7 User-specific applications (operation)

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

- Operator and Maintenance → BA01007F/00/EN (Operating Instructions)
- Experte → GP01001F/00/EN (Description of Device Parameters)

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