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Brief Operating Instructions
Cerabar PMP43

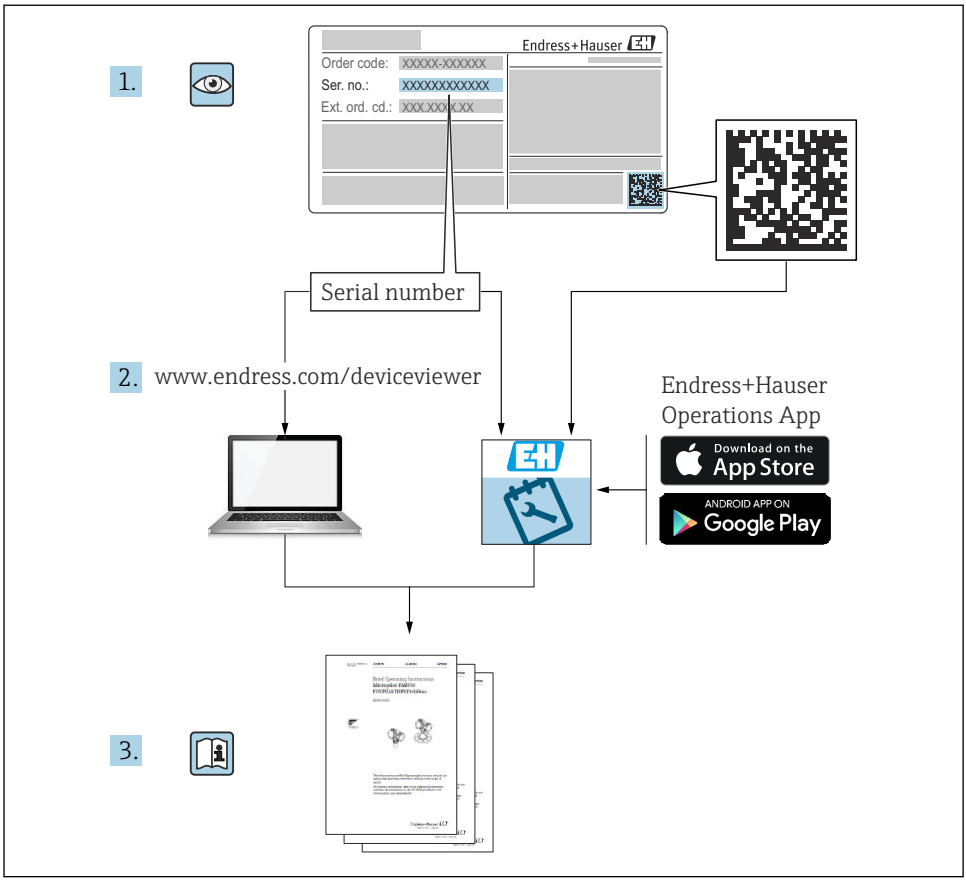
Process pressure measurement
4-20mA HART

These Instructions are Brief Operating Instructions; they are not a substitute for the Operating Instructions pertaining to the device.

Detailed information about the device can be found in the Operating Instructions and the other documentation:
Available for all device versions via:
- Internet: www.endress.com/deviceviewer
- Smart phone/tablet: *Endress+Hauser Operations App*

Endress+Hauser
People for Process Automation

1 Associated documentation



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2 About this document

2.1 Document function

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

2.2 Symbols

2.2.1 Safety symbols

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

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

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

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

2.2.2 Communication-specific symbols

Bluetooth®:
Wireless data transmission between devices over a short distance via radio technology.

2.2.3 Symbols for certain types of information

Permitted: ☑

Procedures, processes or actions that are permitted.

Forbidden: ☒

Procedures, processes or actions that are forbidden.

Additional information:

Reference to documentation:

Reference to page:

Series of steps: 1., 2., 3.

Result of an individual step:

2.2.4 Symbols in graphics

Item numbers: 1, 2, 3 ...

Series of steps: 1., 2., 3.

Views: A, B, C, ...

2.3 List of abbreviations

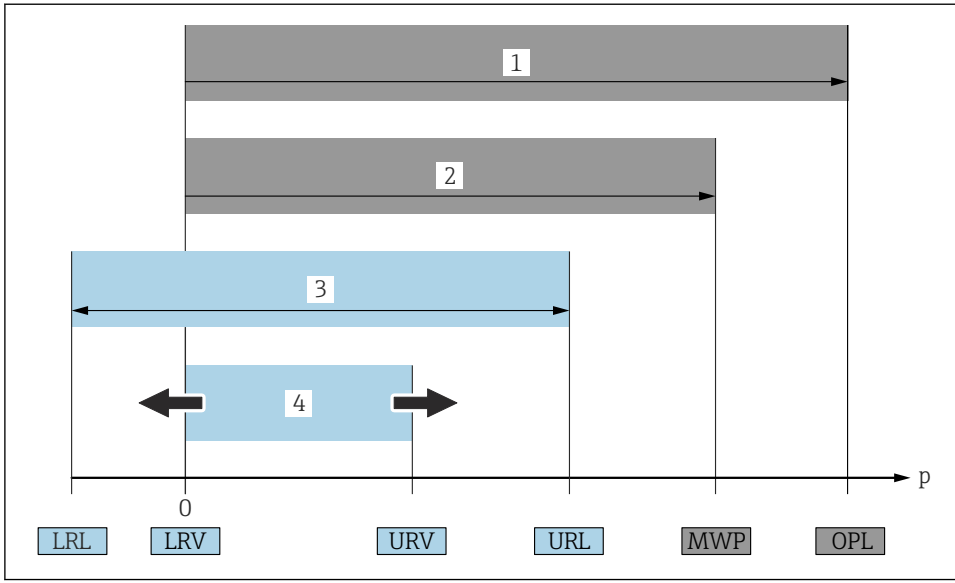
PN
Nominal pressure

DTM
Device Type Manager

Operating tool

The term "operating tool" is used in place of the following operating software:
- FieldCare / DeviceCare, for operation via HART communication and PC
- SmartBlue app for operation using an Android or iOS smartphone or tablet

PLC
Programmable logic controller (PLC)



1 *OPL: The OPL (overpressure limit = measuring cell overload limit) for the device depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection must be taken into consideration in addition to the measuring cell. Pay attention to the pressure-temperature dependency. The OPL may only be applied for a short period of time.*

2 *MWP: The MWP (maximum working pressure) for the measuring cells depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection also has to be taken into consideration besides the measuring cell. Pay attention to the pressure-temperature dependency. The maximum working pressure may be applied at the device for an unlimited period of time. The maximum working pressure can be found on the nameplate.*

3 *The maximum measuring range corresponds to the span between the LRL and URL. This measuring range is equivalent to the maximum span that can be calibrated/adjusted.*

4 *The calibrated/adjusted span corresponds to the span between the LRV and URV. Factory setting: 0 to URL. Other calibrated spans can be ordered as customized spans.*

p Pressure

LRL Lower range limit

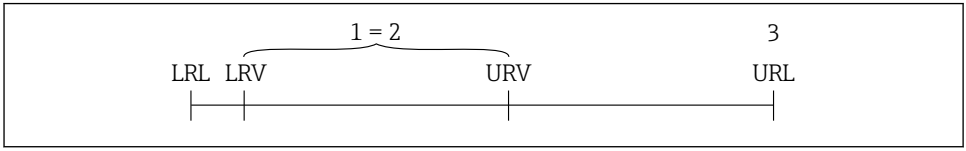
URL Upper range limit

LRV Lower range value

URV Upper range value

TD Turn down Example - see the following section.

2.4 Turn down calculation



1 *Calibrated/adjusted span*
2 *Zero point-based span*
3 *Upper range limit*

Example:
- Measuring cell: 10 bar (150 psi)
- Upper range limit (URL) = 10 bar (150 psi)
- Calibrated/adjusted span: 0 to 5 bar (0 to 75 psi)
- Lower range value (LRV) = 0 bar (0 psi)
- Upper range value (URV) = 5 bar (75 psi)

$$TD = \frac{URL}{|URV - LRV|}$$

In this example, the TD is therefore 2:1. This measuring span is based on the zero point.

2.5 Documentation

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

2.6 Registered trademarks

Apple®
Apple, the Apple logo, iPhone, and iPod touch are trademarks of Apple Inc., registered in the U.S. and other countries. App Store is a service mark of Apple Inc.

Android®
Android, Google Play and the Google Play logo are trademarks of Google Inc.

Bluetooth®
The *Bluetooth®* word mark and logos are registered trademarks owned by the Bluetooth SIG, Inc. and any use of such marks by Endress+Hauser is under license. Other trademarks and trade names are those of their respective owners.

HART®
Registered trademark of the FieldComm Group, Austin, Texas USA

3 Basic safety instructions

3.1 Requirements for the personnel

The personnel must fulfill the following requirements for its tasks:
- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

3.2 Intended use

The Cerabar is a pressure transmitter for measuring level and pressure.

Incorrect use
The manufacturer is not liable for harm caused by improper or unintended use.

Avoid mechanical damage:
- ▶ Do not touch or clean device surfaces with pointed or hard objects.

Clarification for borderline cases:
- ▶ For special fluids and fluids for cleaning: Endress+Hauser is glad to provide assistance in verifying the corrosion resistance of fluid-wetted materials, but does not accept any warranty or liability.

Residual risks
During operation, the housing can heat up to 80 °C (176 °F) due to heat transfer from the process and power loss in the electronics. When in operation, the sensor can reach a temperature close to the medium temperature.

Danger of burns from contact with surfaces!
- ▶ In the event of elevated fluid temperatures, ensure protection against contact to prevent burns.

3.3 Workplace safety

For work on and with the device:
- ▶ Wear the required personal protective equipment according to federal/national regulations.
- ▶ Switch off the supply voltage before connecting the device.

3.4 Operational safety

Risk of injury!
- Operate the device only if it is in proper technical condition, free from errors and faults.
- The operator is responsible for ensuring that the device is in good working order.

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers:
- If modifications are nevertheless required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability:
- Only use original accessories.

Hazardous area

To eliminate the risk of danger to persons or the facility when the device is used in the hazardous area (e.g. explosion protection, pressure equipment safety):
- Check the nameplate to verify if the device ordered can be put to its intended use in the hazardous area.
- Comply with the instructions in the separate supplementary documentation, which is an integral part of this manual.

3.5 Product safety

This state-of-the-art device is designed and tested in accordance with good engineering practice to meet operational safety standards. It left the factory in a condition in which it is safe to operate.

The device fulfills general safety requirements and legal requirements. It also complies with the EU directives listed in the device-specific EU declaration of conformity. Endress+Hauser confirms this fact by affixing the CE mark to the device.

3.6 IT security

The manufacturer warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

3.7 Device-specific IT security

The device offers specific functions to support protective measures by the operator. These functions can be configured by the user and guarantee greater in-operation safety if used correctly. The user role can be changed with an access code (applies to operation via the onsite display, Bluetooth or FieldCare, DeviceCare, asset management tools e.g. AMS, PDM).

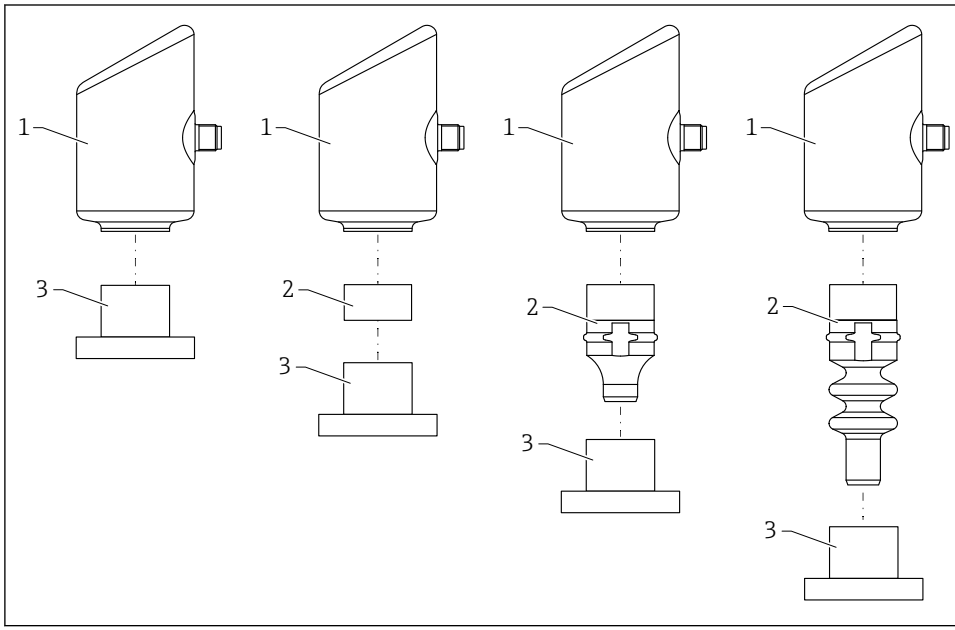
3.7.1 Access via Bluetooth® wireless technology

Secure signal transmission via Bluetooth® wireless technology uses an encryption method tested by the Fraunhofer Institute.

- Without the SmartBlue app, the device is not visible via Bluetooth® wireless technology.
- Only one point-to-point connection is established between the device and a smartphone or tablet.
- The Bluetooth® wireless technology interface can be disabled via local operation or via SmartBlue/FieldCare/DeviceCare.

4 Product description

4.1 Product design



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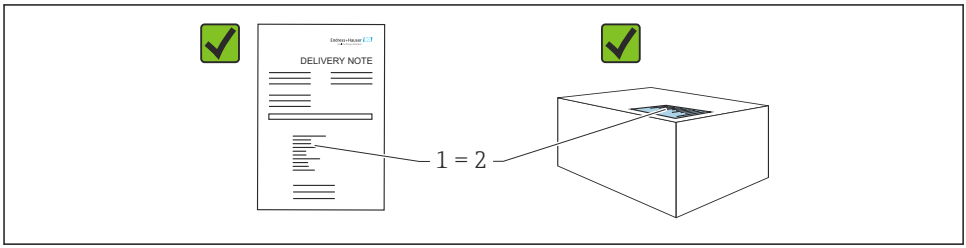
1 Housing
2 Configuration-dependent mounted parts
3 Process connection

5 Incoming acceptance and product identification

5.1 Incoming acceptance



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Check the following during incoming acceptance:
- Is the order code on the delivery note (1) identical to the order code on the product sticker (2)?
- Are the goods undamaged?
- Do the data on the nameplate correspond to the order specifications and the delivery note?
- Is the documentation provided?
- If required (see nameplate), are the Safety Instructions (XA) provided?

If one of these conditions is not met, please contact the manufacturer's sales office.

5.2 Product identification

The following options are available for identification of the device:
- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter the serial numbers from the nameplates in *Device Viewer* (www.endress.com/deviceviewer): all the information about the device is displayed.

5.2.1 Nameplate

The information that is required by law and is relevant to the device is shown on the nameplate, e.g.:
- Manufacturer identification
- Order number, extended order code, serial number
- Technical data, degree of protection
- Firmware version, hardware version
- Approval-specific information
- DataMatrix code (information about the device)

Compare the data on the nameplate with your order.

5.2.2 Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany

Place of manufacture: See nameplate.

5.3 Storage and transport

5.3.1 Storage conditions

- Use the original packaging
- Store the device in clean and dry conditions and protect from damage caused by shocks

Storage temperature

−40 to +85 °C (−40 to +185 °F)

5.3.2 Transporting the product to the measuring point

⚠ WARNING

Incorrect transport!
Housing and membrane may become damaged, and there is a risk of injury!
► Transport the device to the measuring point in the original packaging.

6 Installation

6.1 Installation requirements

During installation, it is important to ensure that the sealing element used has a permanent operating temperature that corresponds to the maximum temperature of the process.

- Devices in North America are intended for indoor use
- Devices are suitable for use in wet environments in accordance with IEC/EN 61010-1
- Use the operating menu to position the local display to ensure optimum readability
- The local display can be adapted to the light conditions (for color scheme, see operating menu)
- The devices are mounted according to the same guidelines as manometers
- Protect the housing against impact

6.2 Installing the device

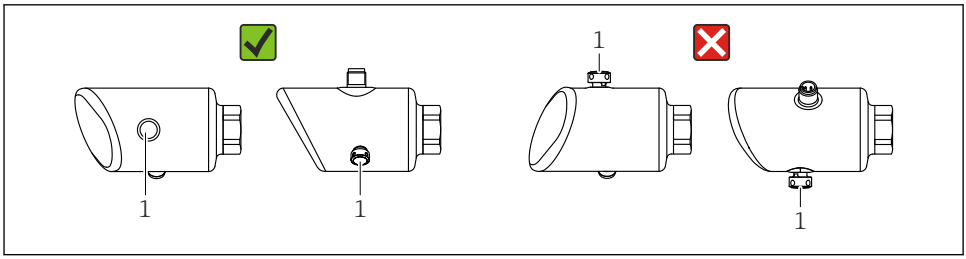
6.2.1 Orientation

NOTICE

If a heated device is cooled during a cleaning process (e.g. by cold water), a vacuum develops for a short time. Moisture can get into the measuring cell via the pressure compensation filter (1) as a result of the vacuum. Whether or not a filter element is installed depends on the device version.

Device could be destroyed!

► Mount the device as follows.



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- Keep the filter element (1) free from contamination.
- The orientation of the device depends on the measuring application.
- A position-dependent zero point shift (when the vessel is empty the measured value does not display zero) can be corrected

6.3 Post-mounting checks

❑ Is the device undamaged (visual inspection)?

❑ Are the measuring point identification and labeling correct (visual inspection)?

❑ Is the device properly secured?

❑ Is the filter element pointing downwards at an angle or to the side?

❑ Does the device comply with the measuring point specifications?

For example:

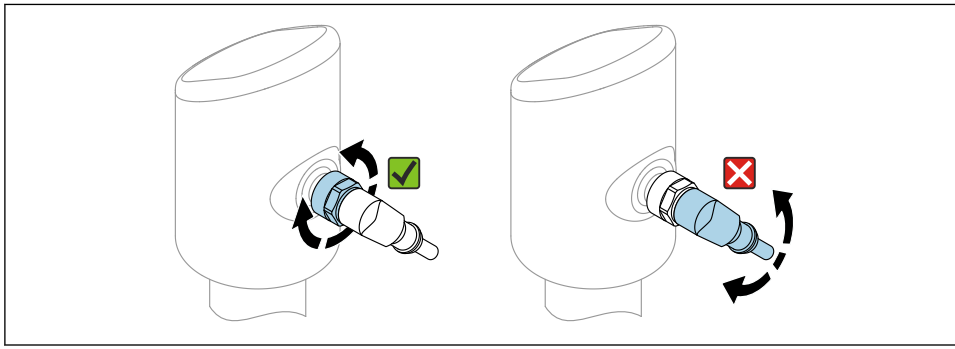
❑ Process temperature
❑ Pressure
❑ Ambient temperature
❑ Measuring range

7 Electrical connection

7.1 Connecting the device

7.1.1 Notes for M12 plug

Turn the plug by the nut only, maximum torque 0.6 Nm (0.44 lbf ft).



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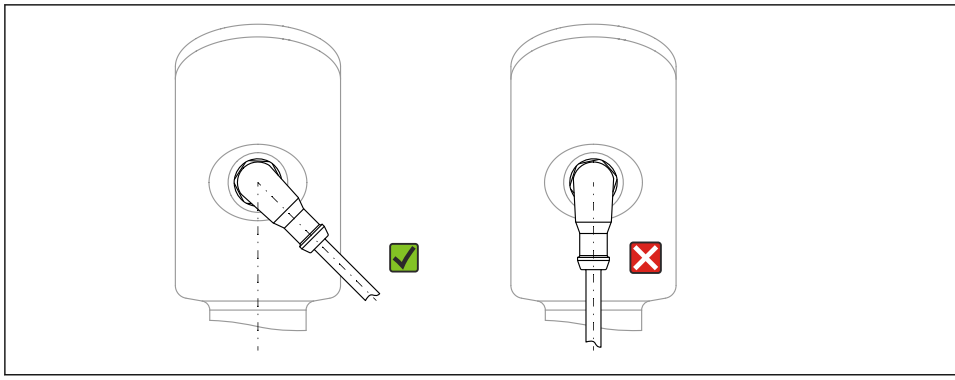
1 M12 plug connection

Correct alignment of the M12 plug: Approx. 45° to the vertical axis.



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2 Alignment of M12 plug

7.1.2 Potential equalization

If necessary, establish potential equalization using the process connection or the grounding clamp supplied by the customer.

7.1.3 Supply voltage

DC 12 to 30 V on a DC power unit

The power unit must be safety-approved (e.g. PELV, SELV, Class 2) and must comply with the relevant protocol specifications.

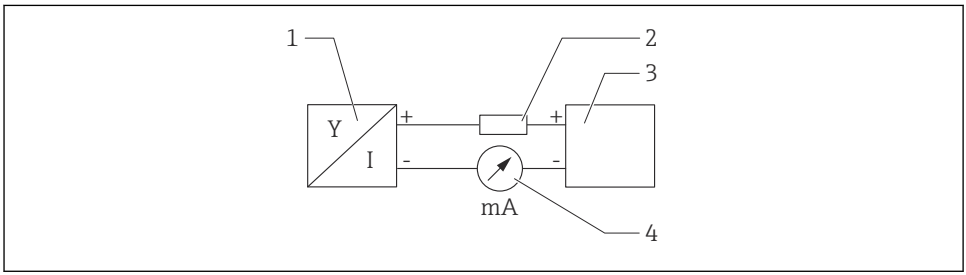
For 4 to 20 mA, the same requirements apply as for HART. A galvanically isolated active barrier must be used for devices approved for use in explosion hazardous areas.

Protective circuits against reverse polarity, HF influences and overvoltage peaks are installed.

7.1.4 Power consumption

- Non-hazardous area: To meet device safety specifications according to the IEC 61010 standard, the installation must ensure that the maximum current is limited to 500 mA.
- Hazardous area: The maximum current is restricted to Ii = 100 mA by the transmitter power supply unit when the measuring instrument is used in an intrinsically safe circuit (Ex ia).

7.1.5 4 to 20 mA HART



3 Block diagram of HART connection

1 Device with HART communication
2 HART communication resistor
3 Power supply
4 Multimeter or ammeter

The HART communication resistor of 250 Ω in the signal line is always necessary in the case of a low-impedance power supply.

Take the voltage drop into consideration:
Maximum 6 V for a communication resistor of 250 Ω

7.1.6 Overvoltage protection

The device satisfies the IEC 61326-1 product standard (Table 2 Industrial environment). Depending on the type of connection (DC power supply, input line, output line), different test levels are used to prevent transient overvoltages (IEC 61000-4-5 Surge) in accordance with IEC EN 61326-1: Test level for DC power supply lines and IO lines: 1000 V wire to ground.

Overvoltage category

In accordance with IEC 61010-1, the device is intended for use in networks with overvoltage protection category II.

7.1.7 Terminal assignment

⚠ WARNING

Supply voltage might be connected!

Risk of electric shock and/or explosion

- ▶ Ensure that no supply voltage is applied when connecting.
- ▶ The supply voltage must match the specifications on the nameplate.
- ▶ A suitable circuit breaker should be provided for the device in accordance with IEC 61010.
- ▶ The cables must be adequately insulated, with due consideration given to the supply voltage and the overvoltage category.
- ▶ The connecting cables must offer adequate temperature stability, with due consideration given to the ambient temperature.
- ▶ Protective circuits against reverse polarity, HF influences and overvoltage peaks are installed.

⚠ WARNING

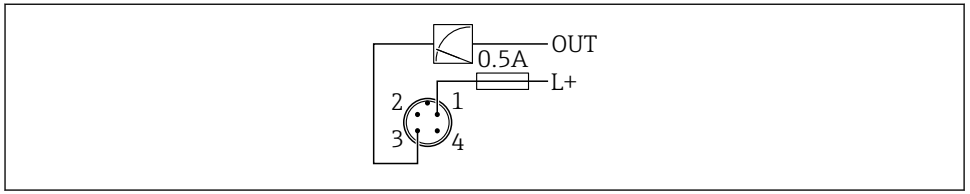
An incorrect connection compromises the electrical safety!

- ▶ Non-hazardous area: To meet device safety specifications according to the IEC 61010 standard, the installation must ensure that the maximum current is limited to 500 mA.
- ▶ Hazardous area: The maximum current is restricted to Ii = 100 mA by the transmitter power supply unit when the measuring instrument is used in an intrinsically safe circuit (Ex ia).
- ▶ When using the device in hazardous areas, comply with the corresponding national standards and the information in the Safety Instructions (XAs).
- ▶ All explosion-protection information is provided in separate explosion-protection (Ex) documentation. This Ex documentation can be requested. The Ex documentation is supplied as standard with all devices approved for use in explosion hazardous areas.

Connect the device in the following order:

1. Check that the supply voltage corresponds to the supply voltage indicated on the nameplate.
2. Connect the device as indicated in the following diagram.
3. Switch on the supply voltage.

2-wire



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1 Supply voltage L+, brown wire (BN)
3 OUT (L-), blue wire (BU)

7.2 Ensuring the degree of protection

For mounted M12 connecting cable: IP66/68/69, NEMA type 4X/6P

NOTICE

Loss of IP protection class due to incorrect installation!

- ▶ The degree of protection only applies if the connecting cable used is plugged in and screwed tight.
- ▶ The degree of protection only applies if the connecting cable used is specified according to the intended protection class.

7.3 Post-connection check

❑ Is the device or cable undamaged (visual check)?

❑ Does the cable used comply with the requirements?

❑ Is the mounted cable strain-relieved?

❑ Is the screw connection properly mounted?

❑ Does the supply voltage match the specifications on the nameplate?

❑ No reverse polarity, terminal assignment correct?

❑ If supply voltage is present: is the device ready for operation and does an indication appear on the onsite display or is the green operating status LED lit?

8 Operation options

8.1 Overview of operation options

- Operation via LED indicator operating key
- Operation via onsite display
- Operation via Bluetooth®
- Operation via Endress+Hauser operating tool
- Operation via handheld, Fieldcare, DeviceCare, AMS and PDM

8.2 Structure and function of the operating menu

The differences between the structure of the operating menus of the onsite display and the Endress+Hauser FieldCare or DeviceCare operating tools can be summarized as follows:

The onsite display has a reduced menu to configure basic settings on the device.

The complete operating menu is available via the operating tools (FieldCare, DeviceCare, SmartBlue) in order to make more complex settings on the device.

Wizards help the user to commission the various applications. The user is guided through the individual configuration steps.

8.2.1 Overview of the operating menu

"Guidance" menu

The Guidance main menu contains functions that enable the user to carry out basic tasks quickly, e.g. commissioning. This menu primarily consists of guided wizards and special functions covering multiple areas.

"Diagnostics" menu

Diagnostic information and settings as well as help for troubleshooting.

"Application" menu

Functions for detailed adjustment of the process for optimum integration of the device into the application.

"System" menu

System settings for device management, user administration or safety.

8.2.2 User roles and related access authorization

This device supports 2 user roles: **Maintenance** and **Operator**
- The **Maintenance** user role (as delivered to customer) has read/write access.
- The **Operator** user role has read access only.

The current user role is displayed in the main menu.

The device parameters can be fully configured with the **Maintenance** user role. Afterwards, access to the configuration can be locked by assigning a password. This password acts as an access code and protects device configuration from unauthorized access.

Blocking changes the **Maintenance** user role to the **Operator** user role. The configuration can be accessed again by entering the access code.

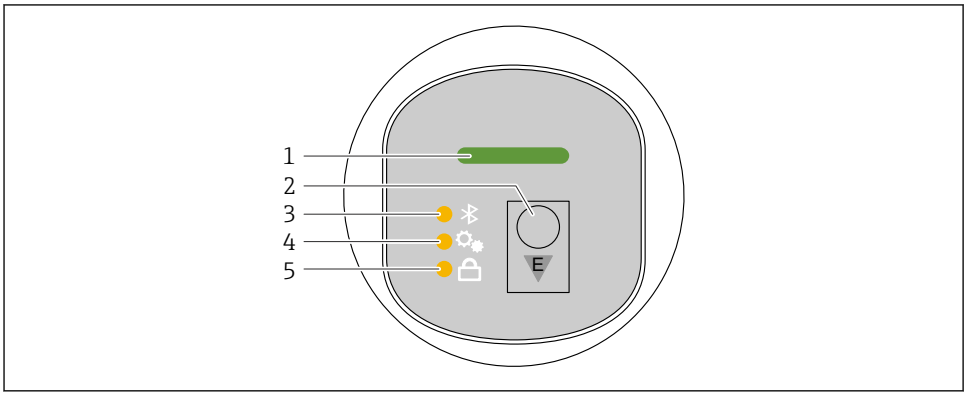
If an incorrect access code is entered, the user obtains the access rights of the**Operator** role.

Assign password, change user role:

▶ Navigation: System → User management

8.3 Access to operating menu via LED indicator

8.3.1 Overview



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1 *Operating status LED*
2 *Operating key "E"*
3 *Bluetooth LED*
4 *Position adjustment LED*
5 *Keypad lock LED*

Operation via the LED indicator is not possible if the Bluetooth connection is enabled.

Operating status LED (1)

See diagnostic events section.

Bluetooth LED (3)

- LED lit: Bluetooth® connection enabled
- LED not lit: Bluetooth® connection disabled or Bluetooth® option not ordered
- LED flashing: Bluetooth® connection established

Keypad lock LED (5)

- LED lit: Key locked
- LED not lit: Key released

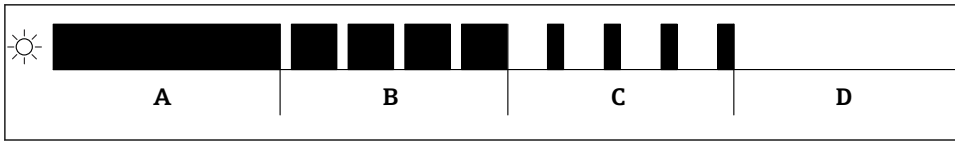
8.3.2 Operating

The device is operated by pressing operating key "E" briefly (< 2 s) or pressing and holding it (> 2 s).

Navigation and LED flashing status

Press operating key "E" briefly: Switch between the functions
Press and hold down operating key "E": Select a function

The LED flashes if a function is selected.
Different flashing states indicate whether the function is active or inactive:



4 *Graphic display of different flashing states of the LEDs when a function is selected*

A Function active
B Function active and selected
C Function inactive and selected
D Function inactive

Disabling the keypad lock

1. Press and hold down operating key "E".
   ↳ Bluetooth LED flashes.
2. Briefly press operating key "E" repeatedly until the keypad lock LED flashes.
3. Press and hold down operating key "E".
   ↳ Keypad lock is disabled.

Enabling or disabling Bluetooth® connection

1. If necessary, disable the keypad lock.
2. Repeatedly press the "E" key briefly until the Bluetooth LED flashes.
3. Press and hold down operating key "E".
   ↳ Bluetooth® connection is enabled (Bluetooth LED is lit) or Bluetooth® is disabled (Bluetooth LED goes out).

8.4 Access to operating menu via local display

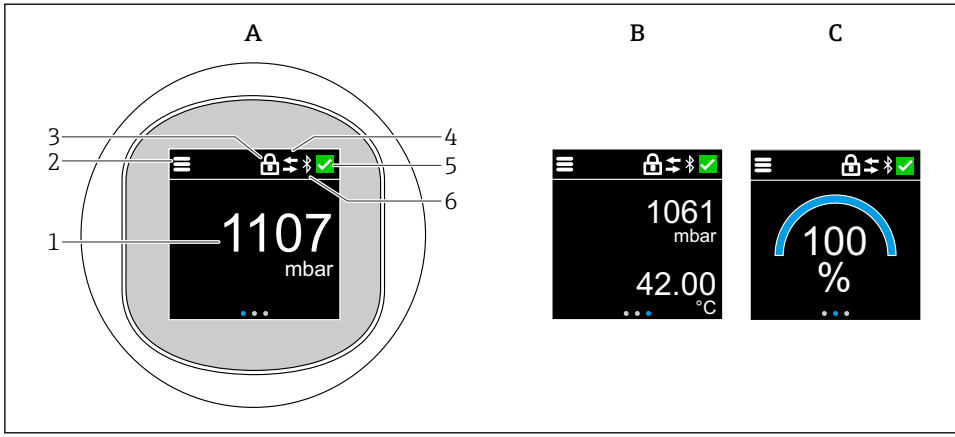
Functions:
- Display measured values and fault and notice messages
- Display a symbol in the event of an error
- Electronically adjustable local display (automatic or manual adjustment of display in 90° increments)
  The measured value display rotates automatically depending on the orientation when the device is started. [1)]
- Basic settings via the local display with touch function [2)]
  - Locking On/Off
  - Select the operating language
  - Start Heartbeat Verification with passed/failed feedback message on the local display
  - Bluetooth On/Off
  - Commissioning wizard for basic settings
  - Read the device information, such as the name, serial number and firmware version
  - Active diagnostics and status
  - Device reset
  - Invert colors for bright lighting conditions

The backlighting is reduced with lower terminal voltage.

The following figure is an example. The information displayed depends on the settings of the local display.

Optional display by swiping from left to right (see A, B and C in the following graphic). The swiping motion only works if the display has been ordered with touch control and the display has been unlocked beforehand.

1) The measured value display only rotates automatically if automatic alignment is switched on.
2) For devices without touch function, settings can be made using operating tools (FieldCare, DeviceCare, SmartBlue).



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A Standard display: 1 measured value with unit (adjustable)
B 2 measured values, each with unit (adjustable)
C Graphic measured value display in %
1 Measured value
2 Menu or home symbol
3 Locking (locking only visible if locked via the "Safety mode" wizard. The "Safety mode" wizard is available if WHG option or Heartbeat Verification option+Monitoring have been selected.)
4 Communication (symbol appears if communication is enabled)
5 Diagnostic symbol
6 Bluetooth (symbol flashes when Bluetooth connection is enabled)

The default display can be permanently set via the operating menu.

8.4.1 Operation

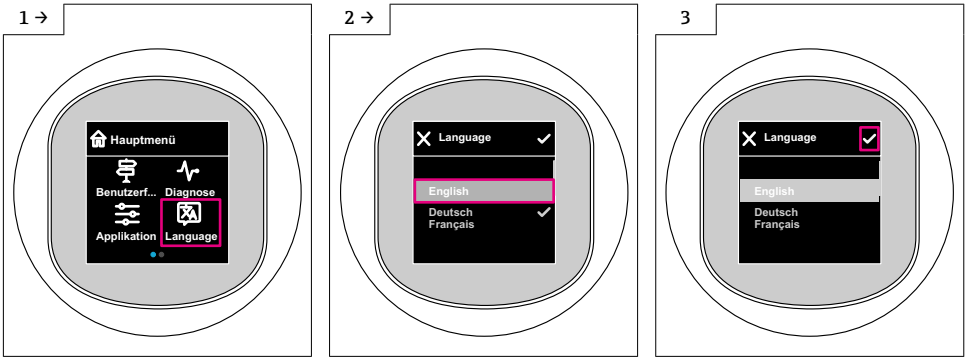
Navigation

Navigation by swiping with finger.

Operation via the LED indicator is not possible if the Bluetooth connection is enabled.

Selecting option and confirming

Select the required option and confirm using the checkmark at the top right (see screens below).



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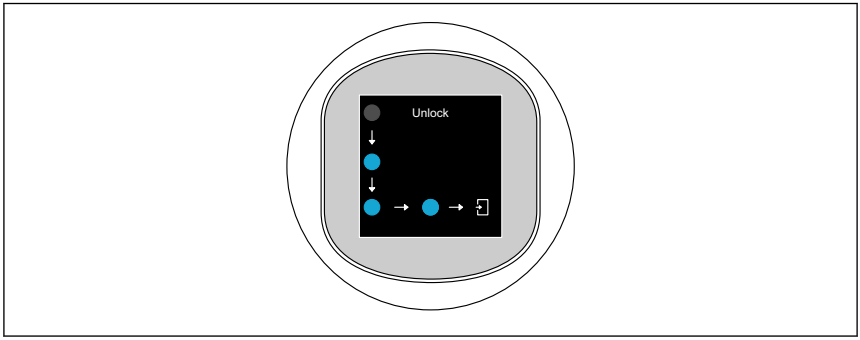
8.5 Onsite display, locking or unlocking procedure

8.5.1 Unlocking procedure

1. Tap the center of the display for the following view:



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2. Use a finger to follow the arrows without interruption.
   ↳ The display is unlocked.

8.5.2 Locking procedure

Operation locks automatically (except in **Safety mode** wizard):
- after 1 min on the main page
- after 10 min within the operating menu

8.6 Access to the operating menu via the operating tool

8.6.1 Connecting the operating tool

Access via the operating tool is possible:

- Via HART communication, e.g. Commubox FXA195
- Via Bluetooth® wireless technology (optional) with the SmartBlue app

FieldCare

Function range

FDT-based plant asset management tool from Endress+Hauser. FieldCare can configure all smart field devices in a system and helps you manage them. By using the status information, FieldCare is also a simple but effective way of checking their status and condition.

Access is via digital communication (Bluetooth, HART communication)

Typical functions:
- Configuration of transmitter parameters
- Loading and saving of device data (upload/download)
- Documentation of the measuring point
- Visualization of the measured value memory (line recorder) and event logbook


For additional information on FieldCare: See Operating Instructions for FieldCare

DeviceCare

Range of functions

Tool to connect and configure Endress+Hauser field devices.


For details, see Innovation Brochure IN01047S.

FieldXpert SMT70, SMT77

The Field Xpert SMT70 tablet PC for device configuration enables mobile plant asset management in hazardous (Ex Zone 2) and non-hazardous areas. It is suitable for commissioning and maintenance staff. It manages Endress+Hauser and third-party field instruments with a digital communication interface and documents the progress of the work. The SMT70 is designed as a complete solution. It comes with a pre-installed driver library and is an easy-to-use, touch-enabled tool for managing field devices throughout their entire life cycle.


Technical Information TI01342S

The Field Xpert SMT77 tablet PC for device configuration enables mobile plant asset management in areas categorized as Ex Zone 1.


Technical Information TI01418S

8.6.2 Operation via the SmartBlue app

The device can be operated and configured with the SmartBlue App.

- The SmartBlue App must be downloaded onto a mobile device for this purpose
- For information on the compatibility of the SmartBlue App with mobile devices, see **Apple App Store (iOS devices)** or **Google Play Store (Android devices)**
- Incorrect operation by unauthorized persons is prevented by means of encrypted communication and password encryption
- The Bluetooth® function can be deactivated after initial device setup

5 QR code for free Endress+Hauser SmartBlue App

Download and installation:

1. Scan the QR code or enter **SmartBlue** in the search field of the Apple App Store (iOS) or Google Play Store (Android).
2. Install and start the SmartBlue app.
3. For Android devices: enable location tracking (GPS) (not required for iOS devices).
4. Select a device that is ready to receive from the device list displayed.

Login:

1. Enter the user name: admin
2. Enter the initial password: serial number of the device
3. Change the password after logging in for the first time

Notes on the password and reset code

- If the user-defined password is lost, access can be restored via a reset code. The reset code is the serial number of the device in reverse. The original password is once again valid after the reset code has been entered.
- The reset code can also be changed in addition to the password.
- If the user-defined reset code is lost, the password can no longer be reset via the SmartBlue app. Contact Endress+Hauser Service in this case.

9 Commissioning

9.1 Preliminaries

WARNING

Settings on the current output can result in a safety-related condition (e.g., product overflow)!

- ► Check current output settings.
- ► The setting of the current output depends on the setting in the **Assign PV** parameter.

9.2 Installation and function check

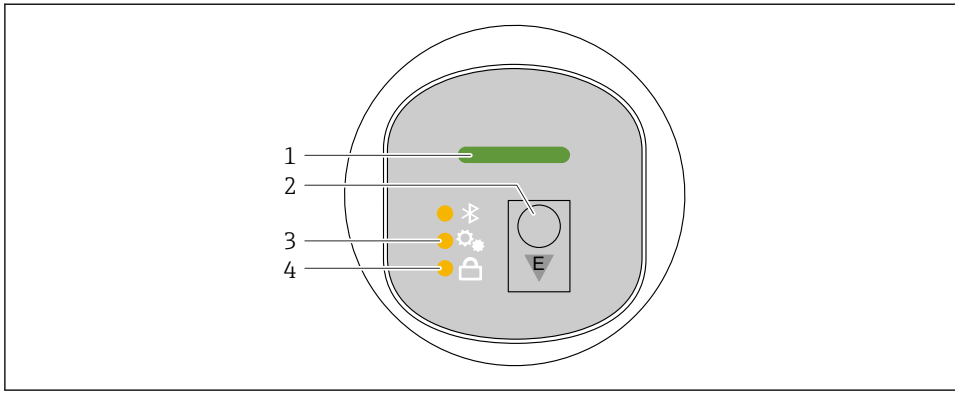
Before commissioning the measuring point, check that the post-installation and post-connection checks have been performed:

- "Post-mounting check" section
- "Post-connection check" section

9.3 Overview of commissioning options

- Commissioning via LED display operating key
- Commissioning via onsite display
- Commissioning with the SmartBlue app (see "Operation via SmartBlue app" section)
- Commissioning via FieldCare/DeviceCare/Field Xpert
- Commissioning via additional operating tools (AMS, PDM, etc.)

9.4 Commissioning via LED display operating key



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1 Operating status LED
2 Operating key "E"
3 Position adjustment LED
4 Keypad lock LED

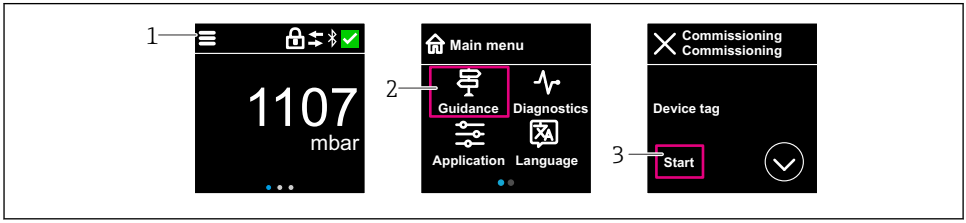
1. If necessary, disable the keypad lock (see section "Access to operating menu via LED display" > "Operation").
2. Repeatedly press the "E" key briefly until the position adjustment LED flashes.
3. Press the "E" key for longer than 4 seconds.
   ↳ Position adjustment LED is activated.
   The position adjustment LED flashes during activation. The keypad lock LED and Bluetooth LED are off.

Once activated successfully, the position adjustment LED lights up continuously for 12 seconds. The keypad lock LED and Bluetooth LED are off.

If not successfully activated, the position adjustment LED, keypad lock LED and Bluetooth LED flash quickly for 12 seconds.

9.5 Commissioning via onsite display

1. If necessary, enable operation (see section "Onsite display, locking or unlocking procedure" > "Unlocking").
2. Start **Commissioning** wizard (see graphic below).



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1 Press the menu icon.
2 Press "Guidance" menu.
3 Start "Commissioning" wizard.

9.5.1 Notes on "Commissioning" wizard

The **Commissioning** wizard enables simple, user-guided commissioning.

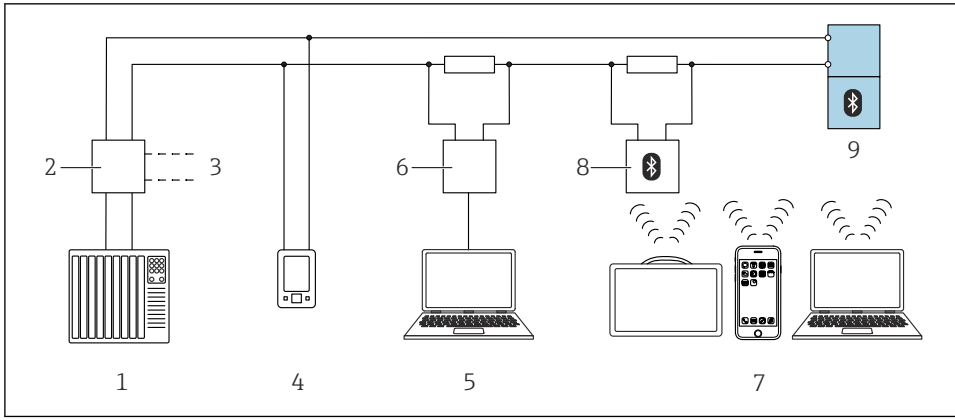
1. Once you have started the **Commissioning** wizard, enter the appropriate value in each parameter or select the appropriate option. These values are written directly to the device.
2. Click > to go to the next page.
3. Once all pages have been completed, click OK to close the **Commissioning** wizard.

If the **Commissioning** wizard is canceled before all necessary parameters have been configured, the device may be in an undefined state. In such situations, it is advisable to reset the device to the factory default settings.

9.6 Commissioning via FieldCare/DeviceCare

1. Download the DTM: http://www.endress.com/download -> Device Driver -> Device Type Manager (DTM)
2. Update the catalog.
3. Click the **Guidance** menu and start the **Commissioning** wizard.

9.6.1 Connecting via FieldCare, DeviceCare and FieldXpert



6 *Options for remote operation via HART protocol*

1 *PLC (programmable logic controller)*
2 *Transmitter power supply unit, e.g. RN42*
3 *Connection for Commubox FXA195 and AMS Trex™ device communicator*
4 *AMS Trex™ device communicator*
5 *Computer with operating tool (e.g. DeviceCare/FieldCare , AMS Device View, SIMATIC PDM)*
6 *Commubox FXA195 (USB)*
7 *Field Xpert SMT70/SMT77, smartphone or computer with operating tool (e.g. DeviceCare)*
8 *Bluetooth modem with connecting cable (e.g. VIATOR)*
9 *Transmitter*

9.7 Commissioning via additional operating tools (AMS, PDM, etc.)

Download the device-specific drivers: https://www.endress.com/en/downloads

For more details, see the help for the relevant operating tool.

9.8 Configuring the device address via software

See "HART address" parameter
Enter the address to exchange data via the HART protocol.
- Guidance → Commissioning → HART address
- Application → HART output → Configuration → HART address
- Default HART address: 0

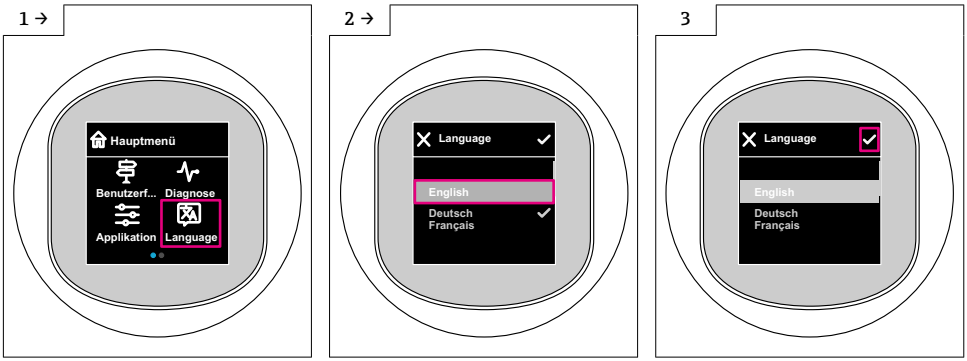
9.9 Configuring the operating language

9.9.1 Onsite display

Configuring the operating language

Before you can set the operating language, you must first unlock the onsite display:

1. Open the operating menu.
2. Select the Language button.



9.9.2 Operating tool

Set display language

System → Display → Language

9.10 Configuring the device

9.10.1 Application examples

WARNING

The settings of the current output are relevant for safety!

Incorrectly configuring the current output can result in an unsafe state of the application (e.g. the tank can overflow in a fill level application).

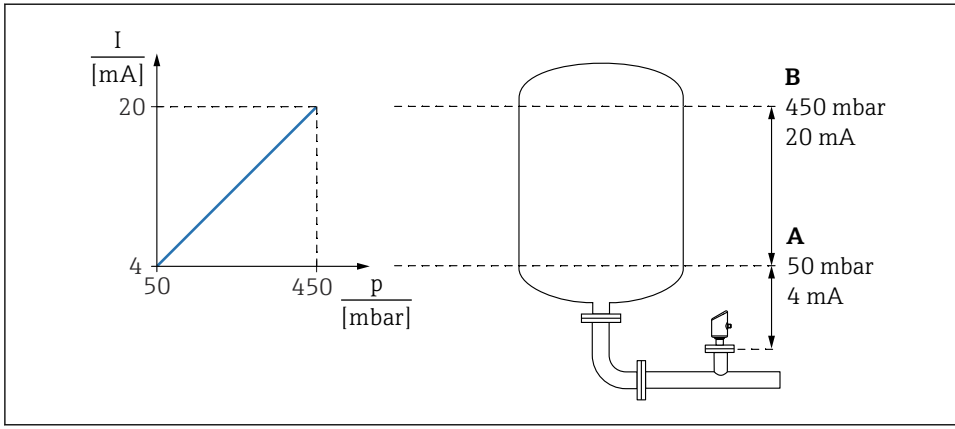
- The setting for the current output depends on the setting in the **Assign PV** parameter.
- After changing the **Assign PV** parameter, check the settings for the range (LRV and URV) and reconfigure them if necessary.

Example: Outputting of the pressure value at the current output

Pressure and temperature units are converted automatically. Other units are not converted.

In the following example, the pressure value should be measured in a tank and output on the current output. The maximum pressure of 450 mbar (6.75 psi) corresponds to the 20 mA current. The 4 mA current corresponds to a pressure of 50 mbar (0.75 psi).

Prerequisites:
- Measured variable in direct proportion to the pressure
- Due to the orientation of the device, there may be pressure shifts in the measured value (when the vessel is empty or partly filled, the measured value is not zero)
  Perform a position adjustment if necessary
- In the **Assign PV** parameter, the **Pressure** option must be selected (factory setting).



A Lower range value output
B Upper range value output

Adjustment:

1. Using the **Lower range value output** parameter, enter the pressure value for the 4 mA current (50 mbar (0.75 psi)).
2. Using the **Upper range value output** parameter, enter the pressure value for the 20 mA current (450 mbar (6.75 psi))

Result: The measuring range is set to 4 to 20 mA.

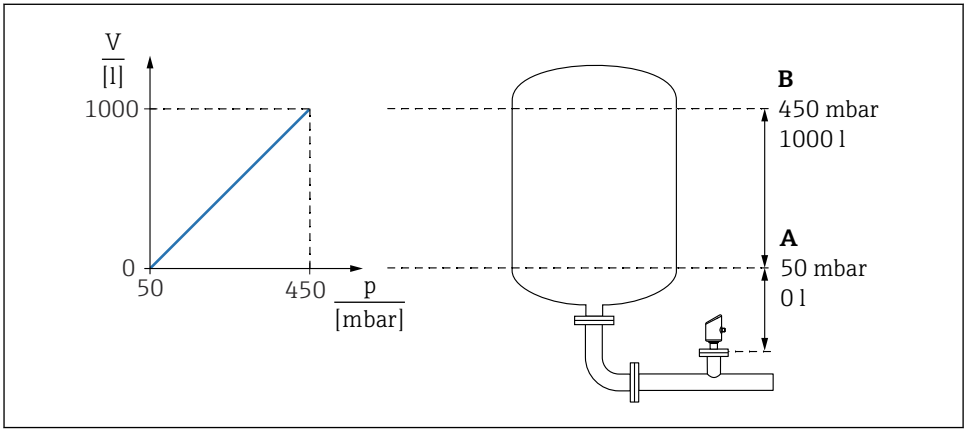
Example: Commissioning a volume measurement in the tank (dry calibration)

Pressure and temperature units are converted automatically. Other units are not converted.

In the following example, the volume in a tank should be measured in liters. The maximum volume of 1 000 l (264 gal) corresponds to a pressure of 450 mbar (6.75 psi).

The minimum volume of 0 liters corresponds to a pressure of 50 mbar (0.75 psi).

Prerequisites:
- Measured variable in direct proportion to the pressure
- Due to the orientation of the device, there may be pressure shifts in the measured value (when the vessel is empty or partly filled, the measured value is not zero)
  Perform position adjustment if necessary



A "Pressure value 1" parameter and "Scaled variable value 1" parameter
B "Pressure value 2" parameter and "Scaled variable value 2" parameter

The pressure present is displayed in the operating tool on the same settings page in the "Pressure" field.

1. Using the **Pressure value 1** parameter, enter the pressure value for the lower calibration point: 50 mbar (0.75 psi)
   ↳ Navigation: Application → Sensor → Scaled variable → Pressure value 1
2. Using the **Scaled variable value 1** parameter, enter the volume value for the lower calibration point: 0 l (0 gal)
   ↳ Navigation: Application → Sensor → Scaled variable → Scaled variable value 1
3. Using the **Pressure value 2** parameter, enter the pressure value for the upper calibration point: 450 mbar (6.75 psi)
   ↳ Navigation: Application → Sensor → Scaled variable → Pressure value 2
4. Using the **Scaled variable value 2** parameter, enter the volume value for the upper calibration point: 1 000 l (264 gal)
   ↳ Navigation: Application → Sensor → Scaled variable → Scaled variable value 2

Result: The measuring range is set for 0 to 1 000 l (0 to 264 gal). Only the **Scaled variable value 1** parameter and **Scaled variable value 2** parameter are set with this setting. This setting has no effect on the current output.

Example: Commissioning a volume measurement in the tank (wet calibration)

Wet calibration means that pressure is applied to the membrane and this applied pressure is adopted as empty or full calibration.

Example:

Tank is empty: Adopt applied pressure as empty calibration.

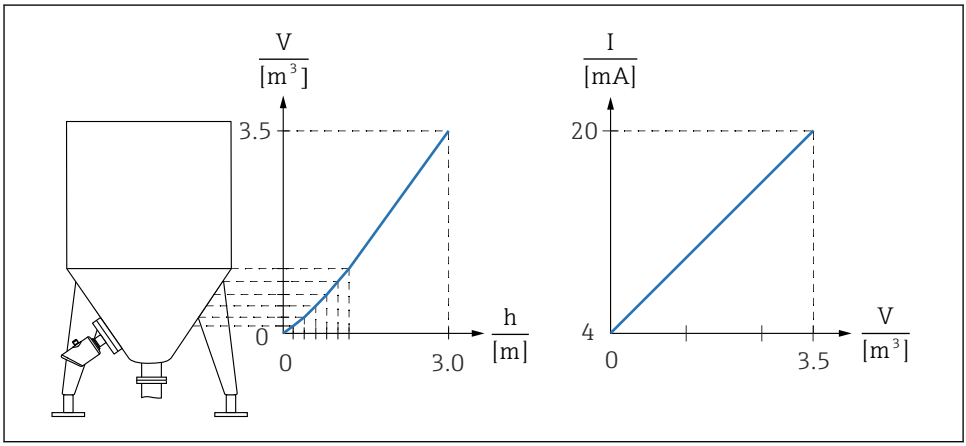
Tank is full: Adopt applied pressure as full calibration.

Description of procedure - in process.

Example: Linearization

In the following example, the volume in a tank with a conical outlet should be measured in m^3.

Prerequisites:
- Points for linearization table are known
- Level calibration is performed
- Linearization characteristic must continually increase or decrease



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1. In the **Assign PV** parameter, the **Scaled variable** option must be set.
   ↳ Navigation: Application → HART output → HART output → Assign PV
2. Set the desired unit in the **Scaled variable unit** parameter.
   ↳ Navigation: Application → Sensor → Scaled variable → Scaled variable unit
3. The linearization table can be opened via the **Go to linearization table** parameter **Table** option.
   ↳ Navigation: Application → Sensor → Scaled variable → SV - Transfer function
4. Enter the desired table values.
5. The table is activated once all the points in the table have been entered.
6. Activate the table using the **Activate table** parameter.

Result:

The measured value after linearization is displayed.

- Error message F435 "Linearization" and the alarm current appear as long as the table is being entered and until the table is activated
- The 0 % value (= 4 mA)) is defined by the smallest point in the table.
  The 100 % value (= 20 mA)) is defined by the largest point in the table.
- Assignment of the volume/mass values to the current values can be changed with the **Lower range value output** parameter and **Upper range value output** parameter.

9.10.2 "Simulation" submenu

Process variables and diagnostic events can be simulated with the **Simulation** submenu.

Navigation: Diagnostics → Simulation

During simulation of the switch output or current output, the device issues a warning message for the duration of the simulation.

9.11 Protecting settings from unauthorized access

9.11.1 Software locking or unlocking

Locking via password in FieldCare/DeviceCare/SmartBlue app

Access to parameter configuration of the device can be locked by assigning a password. When the device is delivered from the factory, the user role is set to **Maintenance** option. The device parameters can be fully configured with the **Maintenance** option user role. Afterwards, access to the configuration can be locked by assigning a password. The **Maintenance** option switches to the **Operator** option as a result of this locking. The configuration can be accessed by entering the password.

The password is defined under:

System menu **User management** submenu

The user role is changed from the **Maintenance** option to **Operator** option under:

System → User management

Canceling the locking procedure via onsite display/FieldCare/DeviceCare/SmartBlue

After entering the password, you can enable parameter configuration of the device as an **Operator** option with the password. The user role then changes to the **Maintenance** option.

If necessary, the password can be deleted in User management: System → User management

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