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2025-05-19

Brief Operating Instructions
Micropilot FMR43
IO-Link

Free-space radar

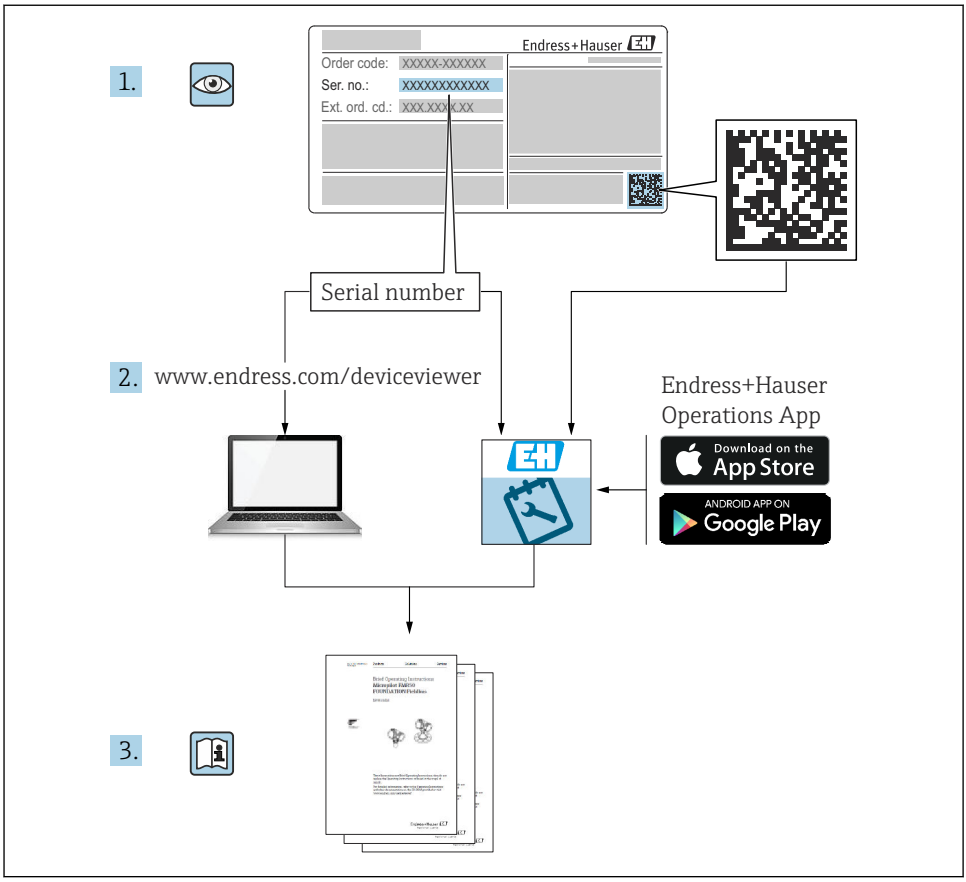
IO-Link

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.

IO-Link: IO-Link
Communications system for connecting intelligent sensors and actuators to an automation system. In the IEC 61131-9 standard, IO-Link is standardized under the description "Single-drop digital communication interface for small sensors and actuators (SDCI)".

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 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.

2.4 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.

IO-Link®
Is a registered trademark. It may only be used in conjunction with products and services by members of the IO-Link Community or by non-members who hold an appropriate license. For more detailed information on its use, refer to the rules of the IO-Link Community at: www.io.link.com.

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 measuring device described in these Operating Instructions is intended for continuous, non-contact level measurement in liquids, pastes, sludges and bulk solids.

Incorrect use
The manufacturer is not liable for damage 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 media 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
Due to the transfer of heat from the process and power dissipation within the electronics, the temperature of the housing may increase to up to 80 °C (176 °F) during operation. 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 as per 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 approval-related 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.
- ▶ Observe the specifications in the separate supplementary documentation included as an integral part of these instructions.

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 local display, Bluetooth or FieldCare, DeviceCare, asset management tools e.g. AMS, PDM).

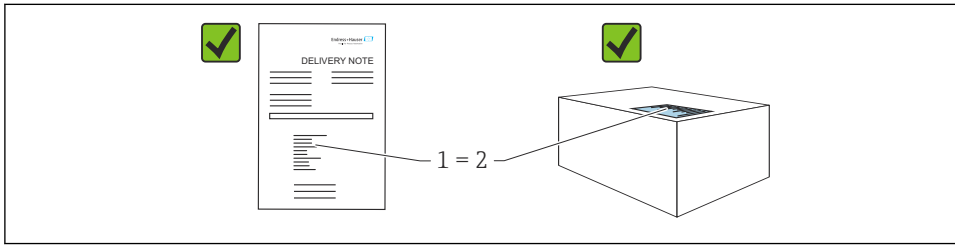
3.7.1 Access via Bluetooth® wireless technology

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 onsite operation or via SmartBlue.

4 Incoming acceptance and product identification

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

4.2 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.

4.2.1 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.

4.2.2 Manufacturer address

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

Place of manufacture: See nameplate.

4.3 Storage and transport

4.3.1 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)

4.3.2 Transporting the product to the measuring point

⚠ WARNING

Incorrect transport!

The housing or sensor can be damaged or pull off. Risk of injury!

▶ Transport the device to the measuring point in its original packaging or by the process connection.

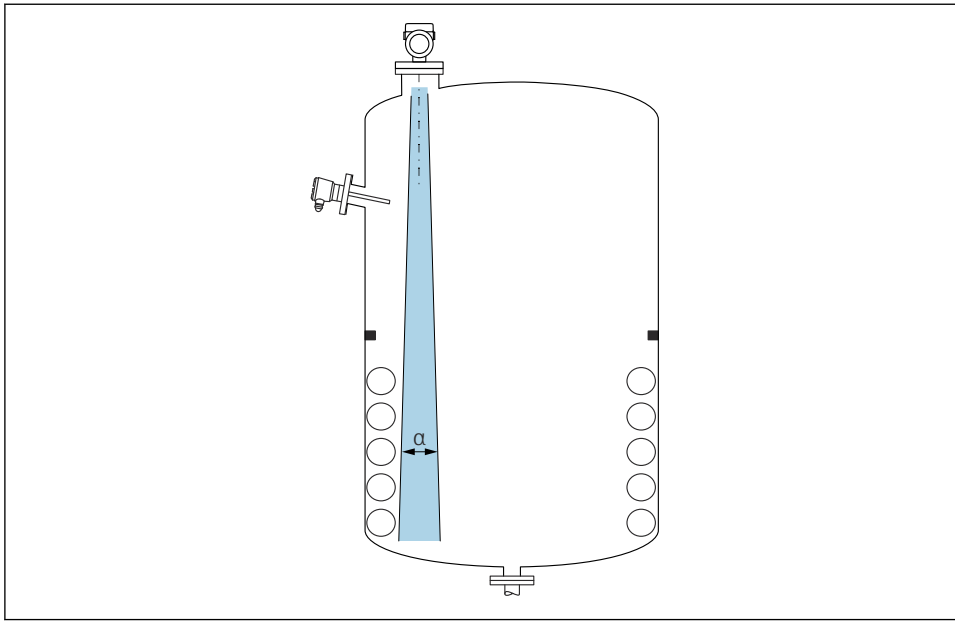
5 Installation

5.1 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 61010-1
- Use the operating menu to position the local display to ensure optimum readability
- The onsite display can be adapted to the light conditions (for color scheme, see operating menu)
- Protect the housing against impact

5.1.1 Internal vessel fittings



Avoid internal fittings (level switches, temperature sensors, struts, vacuum rings, heating coils, baffles etc.) inside the signal beam. Pay attention to the beam angle **α**.

5.1.2 Aligning the antenna axes

See Operating Instructions.

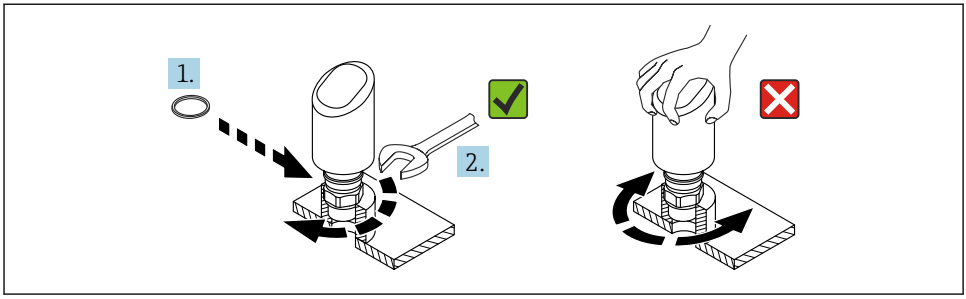
5.2 Installing the device

5.2.1 Screwing in the device

- Turn by the hex bolt only; max. torque 50 Nm (37 lbf ft)
- M24 sensors: Mount with tool only on the parallel spanner flat, max. torque 30 Nm (22 lbf ft)
- Do not turn at the housing!

Open-ended wrench 32 mm

Open-ended wrench 55 mm (for process connections MNPT/G 1½)



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1 Screwing in the device

5.2.2 Information concerning threaded connections

In the case of longer nozzles, reduced measuring performance must be expected.

Please note the following:
- The end of the nozzle must be smooth and free from burrs.
- The edge of the nozzle should be rounded.
- Mapping must be performed.
- Please contact the manufacturer's support department for applications with nozzles that are higher than indicated in the table.

5.2.3 Process connections

See Operating Instructions.

5.2.4 Post-mounting checks

❑ Is the device undamaged (visual inspection)?

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

❑ Is the device properly secured?

❑ Does the device comply with the measuring point specifications?

For example:

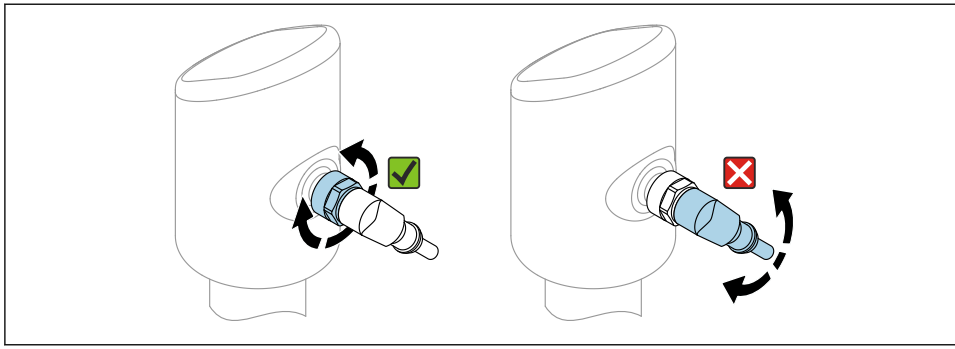
❑ Process temperature
❑ Process pressure
❑ Ambient temperature
❑ Measuring range

6 Electrical connection

6.1 Connecting the device

6.1.1 Notes for M12 plug

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



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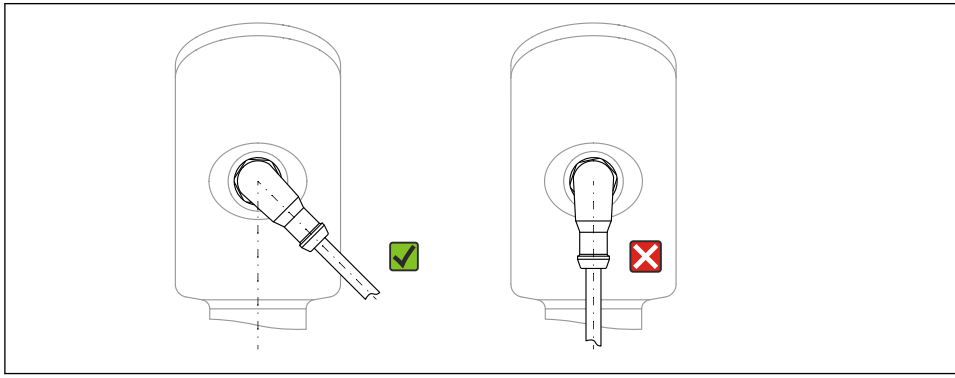
2 M12 plug connection

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



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3 Alignment of M12 plug

6.1.2 Potential equalization

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

6.1.3 Supply voltage

DC 12 to 30 V on a DC power unit
IO-Link communication is guaranteed only if the supply voltage is at least 18 V.

The power unit must be tested to ensure it meets safety requirements (e.g. PELV, SELV, Class 2) and must comply with the relevant protocol specifications.

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

6.1.4 Power consumption

To meet device safety specifications according to the IEC 61010 standard, the installation must ensure that the maximum current is limited to 500 mA.

6.1.5 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.

6.1.6 Range of adjustment

Switch points can be configured via IO-Link.

6.1.7 Switching capacity

- Switch status ON: $I_a \leq 200$ mA [1]; Switch status OFF: $I_a < 0.1$ mA [2]
- Switch cycles: $> 1 \cdot 10^7$
- Voltage drop PNP: ≤ 2 V
- Overload protection: Automatic load testing of switching current;
  - Max. capacitive load: 1 µF at max. supply voltage (without resistive load)
  - Max. cycle duration: 0.5 s; min. t_{on}: 40 µs
  - Periodic disconnection from protective circuit in the event of overcurrent (f = 1 Hz)

6.1.8 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.

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1) If the "1 x PNP + 4 to 20 mA" outputs are used at the same time, the switch output OUT1 can be loaded with up to 100 mAload current over the entire temperature range. The switching current may be up to 200 mA up to an ambient temperature of 50 °C (122 °F) and up to a process temperature of 85 °C (185 °F). If the "1 x PNP" or "2 x PNP" configuration is used, the switch outputs can be loaded with a total of up to 200 mA over the entire temperature range.

2) Different for switch output OUT2, for switch status OFF: $I_a < 3.6$ mA and $U_a < 2$ V and for switch status ON: voltage drop PNP: ≤ 2.5 V

⚠ 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.

NOTICE

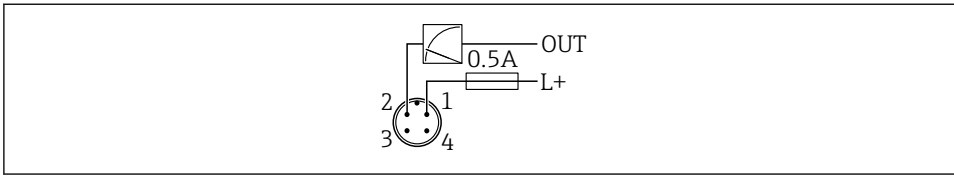
Damage to analog input of PLC resulting from incorrect connection

► Do not connect the active PNP switch output of the device to the 4 to 20 mA input of a PLC.

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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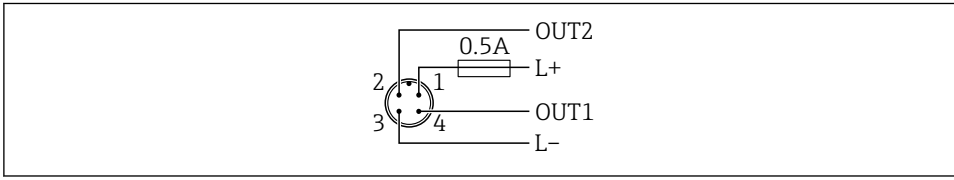
1 *Supply voltage L+, brown wire (BN)*
2 *OUT (L-), white wire (WH)*

3-wire or 4-wire



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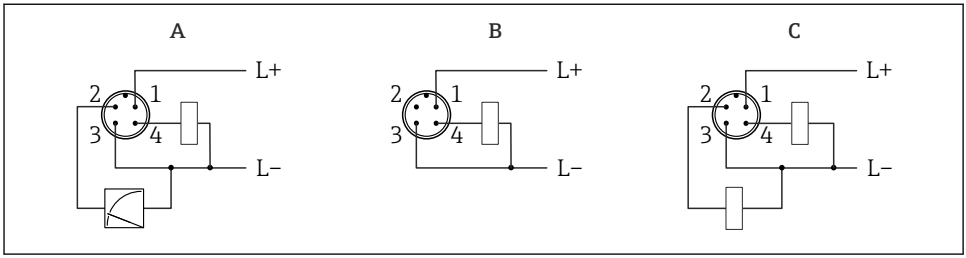
1 *Supply voltage L+, brown wire (BN)*
2 *Switch or analog output (OUT2), white wire (WH)*
3 *Supply voltage L-, blue wire (BU)*
4 *Switch output or IO-Link output (OUT1), black wire (BK)*

If the device detects an IO-Link master at OUT1, the output is used for digital IO-Link communication. If not, then OUT1 is automatically configured as a switch output (SIO mode).

Connection examples



A 1 x PNP switch and analog output
B 1 x PNP switch output (current output must be deactivated. If the current output has not been deactivated, a message appears. In the case of local display: fault is displayed. In the case of LED indicator: operating status LED permanently red), default setting
C 2 x PNP switch output (set second output to switch output)

6.2 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.

6.3 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?

7 Operation options

See Operating Instructions.

8 Commissioning

8.1 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 **Measuring mode current output** parameter.

8.2 Installation and function check

Before commissioning the measuring point, check that the post-installation and post-connection checks (checklist) have been performed, see Operating Instructions.

8.3 Switching on the device

Once the supply voltage has been switched on, the device adopts the normal mode after a maximum of 4 s. During the start-up phase, the outputs are in the same state as when switched off.

8.4 Overview of commissioning options

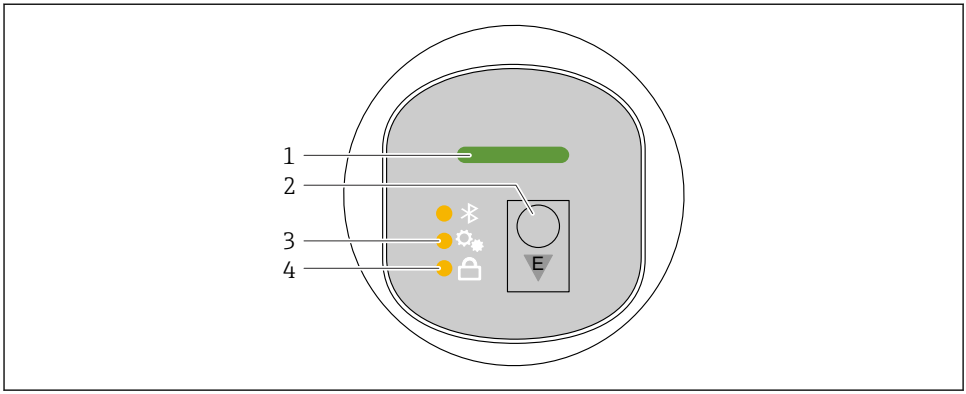
- Commissioning via LED display operating key
- Commissioning via onsite display
- Commissioning with the SmartBlue app
  (see "Operation via SmartBlue app" section)
- Commissioning via FieldCare/DeviceCare/Field Xpert
- Commissioning via additional operating tools (AMS, PDM, etc.)

8.5 Commissioning via LED display operating key

One-key commissioning is an easy way to commission the device when the vessel is empty. In this case, the vessel floor is measured and set to 0 %. 100 % corresponds to 95 % of the measured distance.

Prerequisites:

- Empty, flat, metallic tank floor or minimum level at 0 % with highly reflective (water-based) medium
- No interfering installations in field of vision
- Vessel height: 0.2 to 15 m



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1 *Operating status LED*
2 *Operating key "E"*
3 *One-key commissioning LED*
4 *Keypad lock LED*

1. If necessary, disable the keypad lock (see Operating Instructions)
2. Repeatedly press the "E" key briefly until the one-key commissioning LED flashes.
3. Press and hold the "E" key for longer than 4 seconds.
   ↳ The one-key commissioning LED is executed.
   The one-key commissioning LED flashes during this operation. The keypad lock LED and Bluetooth LED are off.

Once the operation is complete, the one-key commissioning LED is lit continuously for 12 seconds. The keypad lock LED and Bluetooth LED are off.

If the operation does not complete successfully, the one-key commissioning LED flashes quickly for 12 seconds. The keypad lock LED and Bluetooth LED are off.

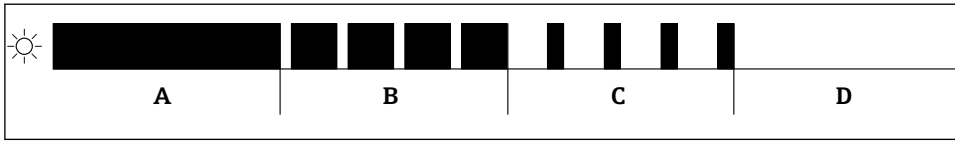
8.5.1 Operating

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

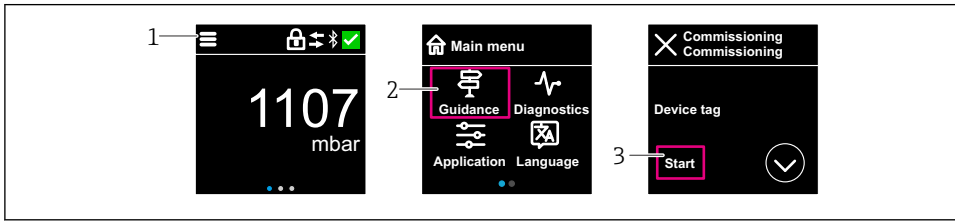
1. Press and hold down operating key "E".
   ↳ Bluetooth LED flashes.
2. Briefly press operating key "E" repeatedly until the keypad lock LED flashes.
3. Press and hold down operating key "E".
   ↳ Keypad lock is disabled.

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).

8.6 Commissioning via onsite display

1. If necessary, enable operation (see Operating Instructions).
2. Start the **Commissioning** wizard (see graphic below)



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

8.6.1 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.

8.6.2 Operation

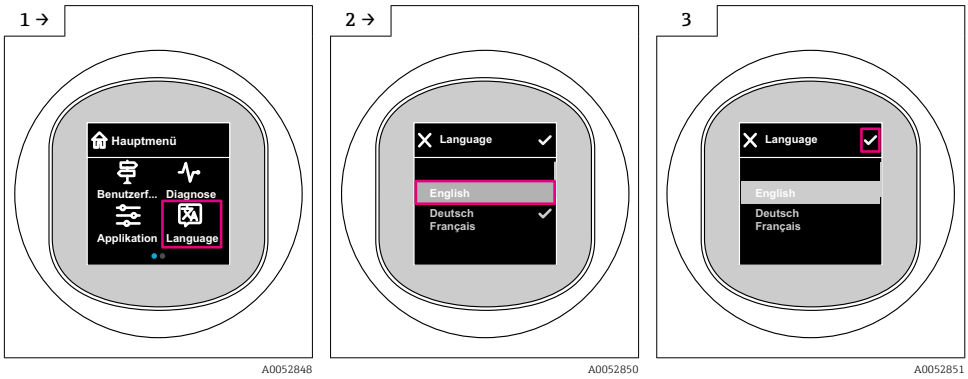
Navigation

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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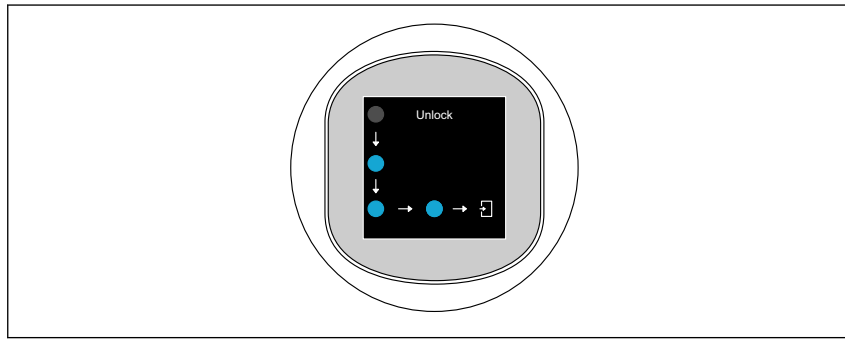
8.6.3 Onsite display, locking or unlocking procedure

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.

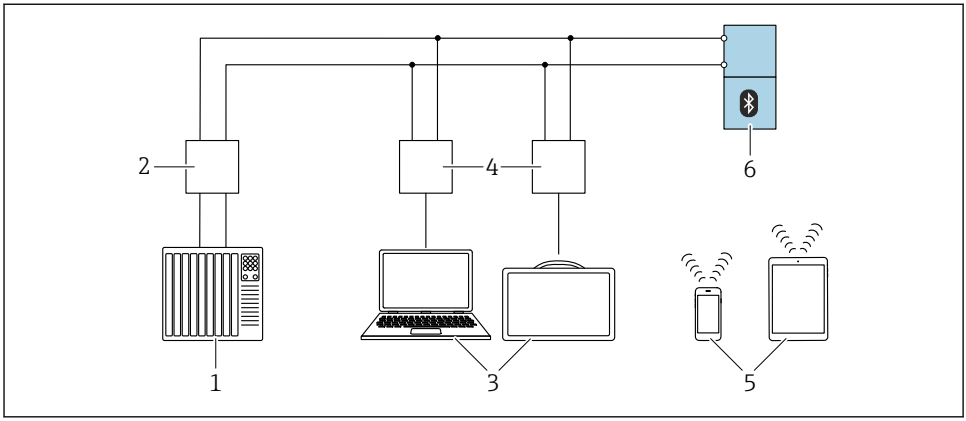
Locking procedure

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

8.7 Commissioning via FieldCare/DeviceCare, Field Xpert

1. Download IO-Link IODD Interpreter DTM: https://www.software-products.endress.com.
2. Download IODD: https://ioddfinder.io-link.com/.
3. Integrate the IODD (IO Device Description) in IODD Interpreter. Then start FieldCare and update the DTM catalog.

8.7.1 Connecting via FieldCare, DeviceCare, Field Xpert and SmartBlue app



5 Options for remote operation via IO-Link

1 *PLC (programmable logic controller)*
2 *IO-Link master*
3 *Computer with operating tool, e.g. DeviceCare/FieldCare or Field Xpert SMT70/SMT77*
4 *FieldPort SFP20*
5 *Smartphone or tablet with SmartBlue app (iOS and Android)*
6 *Transmitter*

8.7.2 Information on the IODD

The following parameters are relevant for basic commissioning:

"Basic settings" submenu

Medium type parameter

Empty calibration parameter

Full calibration parameter

Application parameter

8.7.3 Operating

See Operating Instructions.

8.8 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.

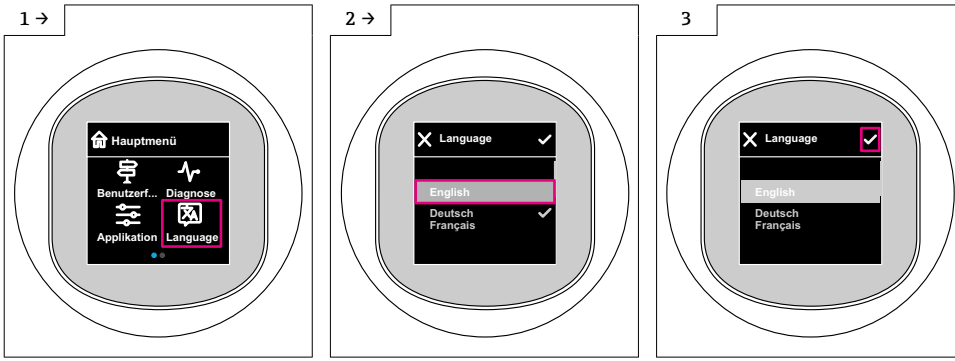
8.9 Configuring the operating language

8.9.1 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.



A0052848 A0052850 A0052851

8.9.2 Operating tool

Set display language

System → Display → Language

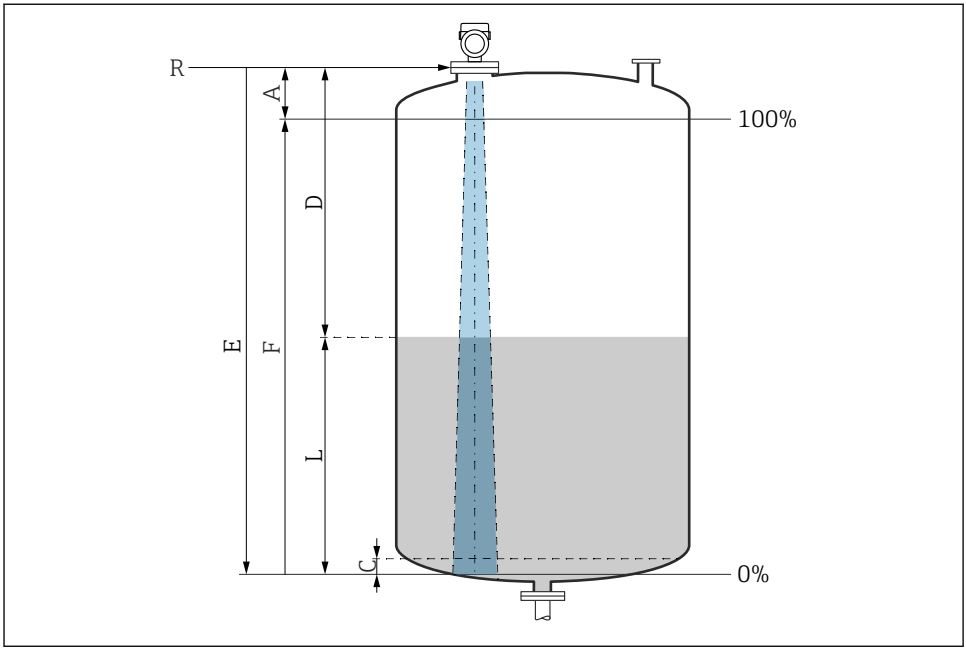
8.10 Configuring the device

Commissioning via the Commissioning wizard is recommended.

See "Commissioning via local display" section

For commissioning parameters, see "Commissioning via FieldCare/DeviceCare, Field Xpert" > "Information on the IODD"

8.10.1 Level measurement in liquids

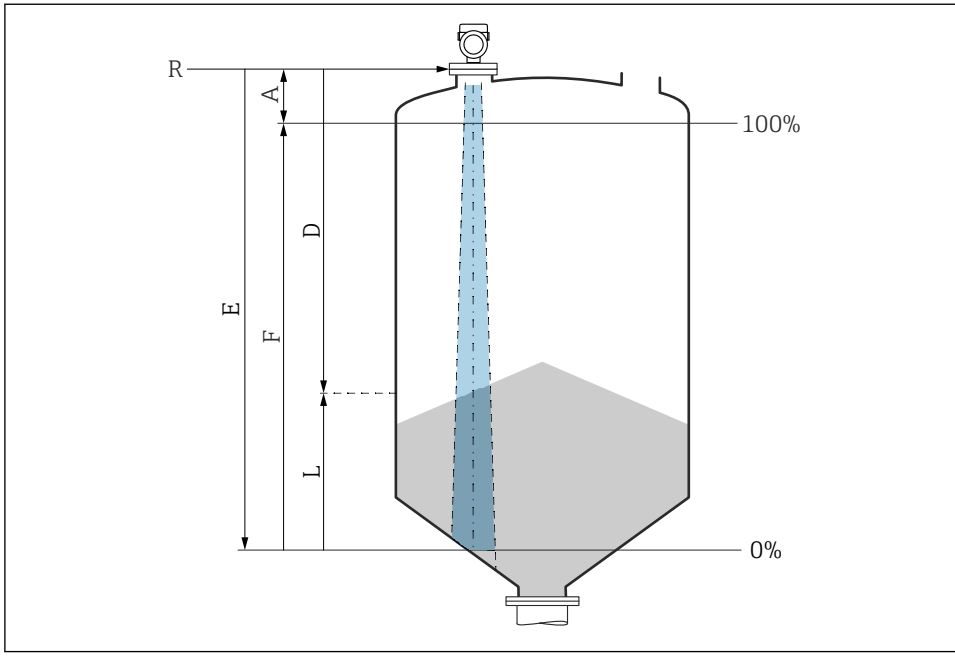


6 *Configuration parameters for level measurement in liquids*

R Reference point of measurement
A Length of antenna + 10 mm (0.4 in)
C 50 to 80 mm (1.97 to 3.15 in); medium εr < 2
D Distance
L Level
E "Empty calibration" parameter (= 0 %)
F "Full calibration" parameter (= 100 %)

In the case of media with a low dielectric constant, εr < 2 , the tank floor may be visible through the medium at very low levels (lower than level C). Reduced accuracy must be expected in this range. If this is not acceptable, the zero point should be positioned at a distance C above the tank floor for these applications (see figure).

8.10.2 Level measurement in bulk solids



7 *Configuration parameters for level measurement in bulk solids*

R Reference point of measurement
A Length of antenna + 10 mm (0.4 in)
D Distance
L Level
E "Empty calibration" parameter (= 0 %)
F "Full calibration" parameter (= 100 %)

8.10.3 Configuring the "Frequency mode" parameter

The **Frequency mode** parameter is used to define country or region-specific settings for the radar signals.

The **Frequency mode** parameter must be configured at the start of commissioning in the operating menu using the appropriate operating tool.

Application → Sensor → Advanced settings → Frequency mode

Operating frequency 80 GHz:
- **Mode 1** option: Continent of Europe, USA, Australia, New Zealand, Canada
- **Mode 2** option: Brazil, Japan, South Korea, Taiwan, Thailand, Mexico
- **Mode 3** option: Russia, Kazakhstan
- **Mode 5** option: India, Malaysia, South Africa, Indonesia

Operating frequency 180 GHz:
- **Mode 9** option: Continent of Europe
- **Mode 10** option: USA

The metrological properties of the device may vary, depending on the mode set. The specified measuring properties are related to the as-delivered state (at operating frequency 80 GHz: mode 1 and at operating frequency 180 GHz: mode 9).

8.10.4 Configuring process monitoring

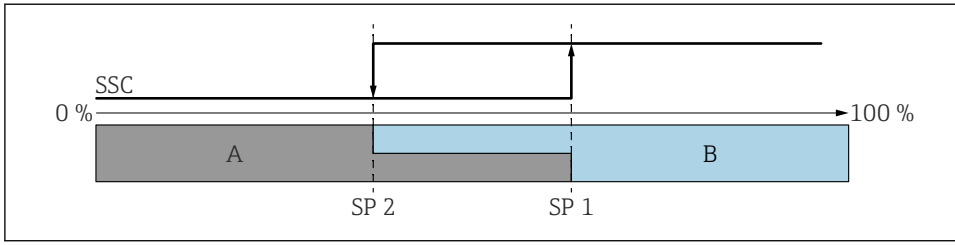
Digital process monitoring (switch output)

It is possible to select defined switch points and switchback points which act as NO or NC contacts depending on whether a window function or hysteresis function is configured.

Possible setting				Output (OUT1/OUT2)
Function (Config. Mode)	**Invert (Config. Logic)**	**Switch points (Param.SPx)**	**Hysteresis (Config. Hyst)**	
Two point	High active (MIN)	SP1 (float32)	N/A	Normally-open contact (NO [1])
		SP2 (float32)		
	Low active (MAX)	SP1 (float32)	N/A	Normally-closed contact (NC [2])
		SP2 (float32)		
Window	High active	SP1 (float32)	Hyst (float32)	Normally-open contact (NO [1])
		SP2 (float32)		
	Low active	SP1 (float32)	Hyst (float32)	Normally-closed contact (NC [2])
		SP2 (float32)		
Single point	High active (MIN)	SP1 (float32)	Hyst (float32)	Normally-open contact (NO [1])
	Low active (MAX)	SP1 (float32)	Hyst (float32)	Normally-closed contact (NC [2])

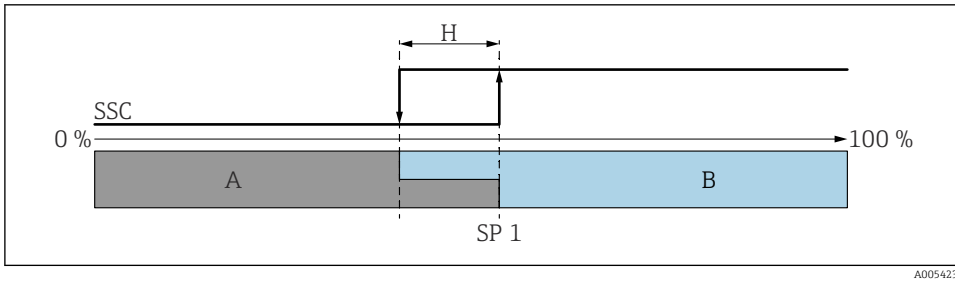
1) NO = normally open
2) NC = normally closed

If the device is restarted within the given hysteresis, the switch output is open (0 V present at the output).



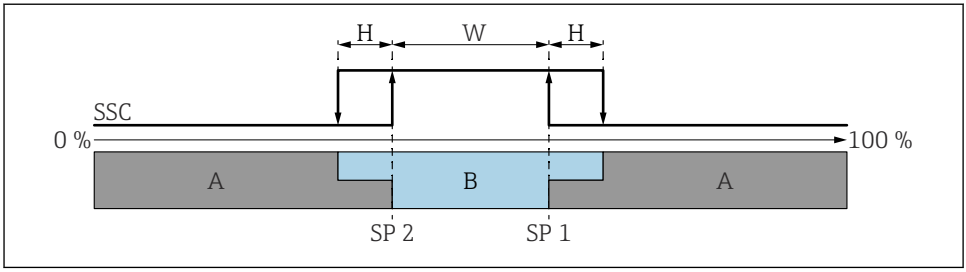
8 SSC, two point

SP 2 Switch point with lower measured value
SP 1 Switch point with higher measured value
A Inactive
B Active



9 SSC, single point

H Hysteresis
SP 1 Switch point
A Inactive
B Active



10 SSC, window

H Hysteresis
W Window
SP 2 Switch point with lower measured value
SP 1 Switch point with higher measured value
A Inactive
B Active

Teach process (IODD)

A switch point is not entered manually for the teach process, but is defined by assigning the current process value of a switching signal channel (SSC) to the switch point. To assign the process value, the corresponding switch point, e.g. "SP 1" is selected in the next step in the **Teach select** parameter.

By activating "Teach SP 1" or "Teach SP 2", the current process measured values can be adopted as switch point SP 1 or SP 2. The hysteresis is only relevant in Window mode and Single point mode. The value can be entered in the relevant menu.

Sequence in teach process

Navigation: Parameter → Application → ...

1. Define switch signal channel (SSC) via **Teach select**.
2. Set Config.Mode (choice of two point, window, single point).
   ↳ **If two point is selected:**
   → Approach switch point 1 and then trigger Teach SP1.
   → Approach switch point 2 and then trigger Teach SP2.
   If 'Window' is selected:
   → Approach switch point 1 and then trigger Teach SP1.
   → Approach switch point 2 and then trigger Teach SP2.
   → Enter hysteresis manually.
   If 'Single point' is selected:
   → Approach switch point 1 and then trigger Teach SP1.
   → Enter hysteresis manually.
3. If necessary, check the switch point of the adjusted switch signal channel.

8.11 Protecting settings from unauthorized access

8.11.1 Software locking or unlocking

Locking via password in 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 the **Maintenance** option. The device can be configured completely 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 the **Operator** option under:

System → User management

Deactivating the lock via the SmartBlue app

After entering the password, you can enable parameter configuration of the device as the **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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