Brief Operating Instructions
Deltapilot M FMB50

Hydrostatic level measurement
IO-Link
Pressure sensor

These Brief Operating Instructions 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 additional documentation.

Available for all device versions via
- Internet: www.endress.com/deviceviewer
- Smartphone/tablet: *Endress+Hauser Operations app*

Endress+Hauser [EH]

People for Process Automation

1   Associated documentation

A0023555

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 used

2.2.1   Safety symbols

Symbol	Meaning
⚠ DANGER	**DANGER!** This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in seriousor fatal injury.
⚠ WARNING	**WARNING!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in seriousor fatal injury.
⚠ CAUTION	**CAUTION!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minoror medium injury.
NOTICE	**NOTICE!** This symbol contains information on procedures and other facts which do not result in personalinjury.

2.2.2   Electrical symbols

Symbol	Meaning	Symbol	Meaning
⏚	**Protective ground connection** A terminal which must be connected to ground prior to establishing any other connections.	⏚	**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

2.2.3   Tool symbols

Symbol	Meaning
A0011221	Allen key
A0011222	Open-ended wrench

2.2.4   Symbols for certain types of information

Symbol	Meaning
☑	**Permitted** Procedures, processes or actions that are permitted.
✗	**Forbidden** Procedures, processes or actions that are forbidden.

Symbol	Meaning
	Tip Indicates additional information.
	Visual inspection

2.2.5 Symbols in graphics

Symbol	Meaning
1, 2, 3 …	Item numbers
1. 2. 3. …	Series of steps
A, B, C, …	Views
A-A, B-B, C-C, …	Sections

2.2.6 Symbols at the device

Symbol	Meaning
 A0019159	**Safety instructions** Observe the safety instructions contained in the associated Operating Instructions.
 A0029423	**Connecting cable immunity to temperature change** Indicates that the connecting cables have to withstand a temperature of 85℃ at least.

2.3 Registered trademarks

- KALREZ®
  Registered label of E.I. Du Pont de Nemours & Co., Wilmington, USA
- TRI-CLAMP®
  Registered label of Ladish & Co., Inc., Kenosha, USA
- ⊘ **IO-**Link
  Registered trademark of the IO-Link Community.
- GORE-TEX® trademark of W.L. Gore & Associates, Inc., USA

3 Basic safety instructions

3.1 Requirements for personnel

Personnel must meet the following requirements for their 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   Designated use

The Deltapilot M is a hydrostatic pressure sensor for measuring level and pressure.

3.2.1   Incorrect use

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

Verification 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.

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 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.

3.5 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.

4 Incoming acceptance and product identification

4.1 Incoming acceptance
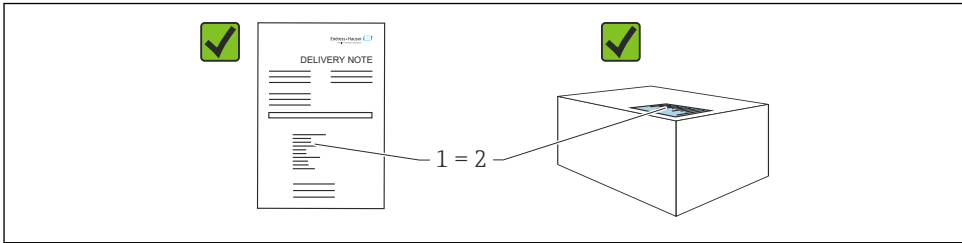
A0016870

- 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 available?
- If required (see nameplate): Are the safety instructions (XA) present?

If one of these conditions is not fulfilled, please contact your Endress+Hauser sales office.

4.2 Storage and transport

4.2.1 Storage conditions

Use original packaging.

Store the measuring device in clean and dry conditions and protect from damage caused by shocks (EN 837-2).

Storage temperature range

See the "Technical Information" document: www.endress.com → Download

4.2.2   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 measuring device to the measuring point in its original packaging or by the process connection.
▸ Follow the safety instructions and transport conditions for devices weighing more than 18 kg (39.6 lbs).

5   Installation

5.1   Mounting requirements

5.1.1   General installation instructions

• Devices with a G 1 1/2 thread:
  When screwing the device into the tank, the flat seal has to be positioned on the sealing surface of the process connection. To avoid additional strain on the process membrane, the thread should never be sealed with hemp or similar materials.
• Devices with NPT threads:
  • Wrap Teflon tape around the thread to seal it.
  • Tighten the device at the hexagonal bolt only. Do not turn at the housing.
  • Do not overtighten the thread when screwing. Max. tightening torque:
    20 to 30 Nm (14.75 to 22.13 lbf ft)
• For the following process connections, a tightening torque of max. 40 Nm (29.50 lbf ft) is specified:
  • Thread ISO228 G1/2 (Order option "GRC" or "GRJ" or "G0J")
  • Thread DIN13 M20 x 1.5 (Order option "G7J" or "G8J")

5.1.2   Mounting measuring cell modules with PVDF thread

⚠ WARNING

Risk of damage to process connection!
Risk of injury!
▸ Measuring cell modules with PVDF thread must be installed with the mounting bracket provided!

⚠ WARNING

Material fatigue from pressure and temperature!
Risk of injury if parts burst! The thread can become loose if exposed to high pressure and temperature loads.
▸ The integrity of the thread must be checked regularly. Also, the thread may need to be re-tightened with the maximum tightening torque of 7 Nm (5.16 lbf ft). Teflon tape is recommended for sealing the ½" NPT thread.
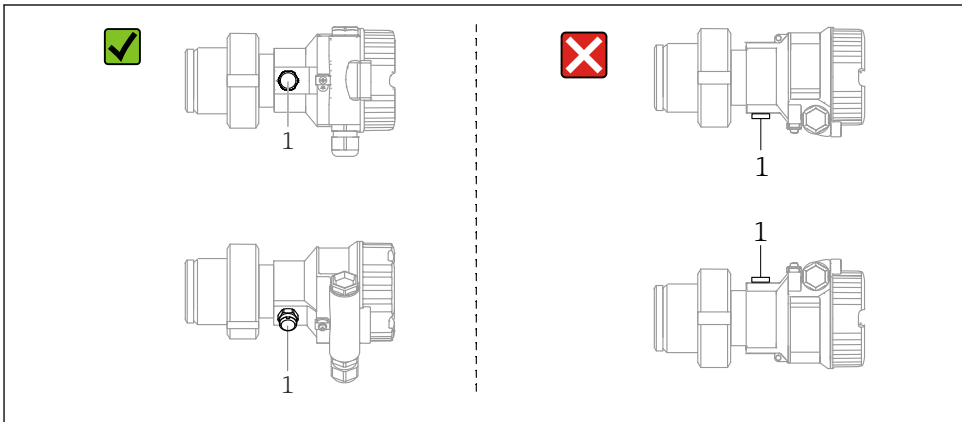
5.2   Mounting the device

5.2.1   General installation instructions

NOTICE

Damage to the device!
If a heated device is cooled during a cleaning process (e.g. by cold water), a vacuum develops
for a short time and, as a result, moisture can enter the sensor via the pressure compensation
(1).

▶ Mount the device as follows.

A0028471

- Keep the pressure compensation and GORE-TEX® filter (1) free from contamination.
- Do not clean or touch process membranes with hard or pointed objects.
- The process membrane in the rod and cable version is protected against mechanical damage
  by a plastic cap.
- The device must be installed as follows in order to comply with the cleanability
  requirements of the ASME-BPE (Part SD Cleanability):
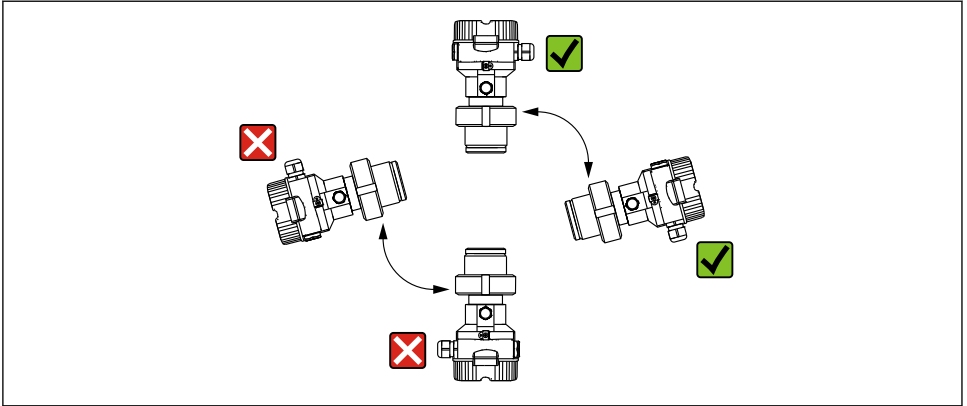
A0028472

5.2.2   FMB50

Level measurement

- Always install the device below the lowest measuring point.
- Do not install the device at the following positions:
  - in the filling curtain
  - in the tank outlet
  - in the suction area of a pump
  - at a point in the tank which could be affected by pressure pulses from the agitator.
- The calibration and functional test can be carried out more easily if you mount the device downstream from a shutoff device.
- The Deltapilot M must also be insulated in the case of media that can harden when cold.

Pressure measurement in gases

Mount the Deltapilot M with the shutoff device above the tapping point so that any condensate can flow into the process.

Pressure measurement in vapors

- Mount the Deltapilot M with the siphon above the tapping point.
- Fill the siphon with liquid before commissioning. The siphon reduces the temperature to almost ambient temperature.

Pressure measurement in liquids

Mount the Deltapilot M with the shutoff device below or at the same level as the tapping point.

5.2.3 Supplementary installation instructions

Seal the probe housing
- No moisture may enter the housing when installing or operating the device, or when establishing the electrical connection.
- Always firmly tighten the housing cover and the cable entries.

5.2.4 Seal for flange mounting

NOTICE

Incorrect measurement results.
The seal is not allowed to press against the process membrane as this could affect the measurement result.
▶ Ensure that the seal is not touching the process membrane.

5.2.5 Closing the housing covers

NOTICE

Devices with EPDM cover seal - leaking transmitter!
Mineral-, animal- or plant-based lubricants cause the EPDM cover seal to swell and the transmitter to leak as a result.
▶ It is not necessary to grease the thread due to the coating applied to the thread at the factory.

NOTICE

The housing cover can no longer be closed.
Damaged thread!
▶ When closing the housing covers make sure that the threads on the covers and the housing are free from dirt, such as sand. If you encounter resistance when closing the covers, then check the threads again for dirt or fouling.

6   Electrical connection

6.1   Connecting the device

⚠ WARNING

Supply voltage might be connected!
Risk of electric shock and/or explosion!
▸ Make sure that no uncontrolled processes are triggered on the system.
▸ Switch off the supply voltage before connecting the device.
▸ When using the measuring device in hazardous areas, ensure compliance with the corresponding national standards and regulations and the Safety Instructions or Installation or Control Drawings.
▸ A suitable circuit breaker must be provided for the device in accordance with IEC/EN61010.
▸ Devices with integrated overvoltage protection must be grounded.
▸ Protective circuits against reverse polarity, HF influences and overvoltage peaks are integrated.
▸ The power unit must be tested to ensure it meets safety requirements (e.g., PELV, SELV, Class 2).

Connect the device in the following order:

1. Check that the supply voltage corresponds to the supply voltage indicated on the nameplate.

2. Switch off the supply voltage before connecting the device.

3. Connect the device in accordance with the following diagram.

4. Switch on the supply voltage.
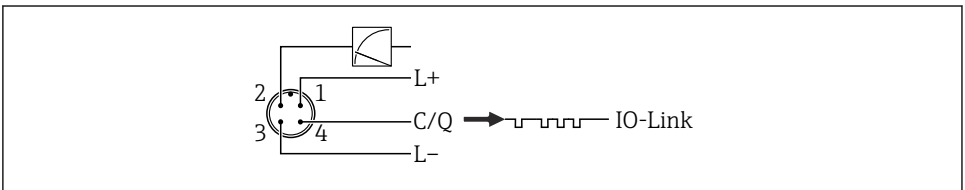
A0045628

1   Supply voltage +
2   4-20 mA
3   Supply voltage -
4   C/Q (IO-Link communication)

6.2   Connecting the measuring unit

6.2.1   Supply voltage

IO-Link

• 11.5 to 30 V DC if only the analog output is used
• 18 to 30 V DC if IO-Link is used

6.2.2   Current consumption

IO-Link < 60 mA

6.3   Terminals

• Supply voltage: 0.5 to 2.5 mm² (20 to 14 AWG)
• External ground terminal: 0.5 to 4 mm² (20 to 12 AWG)

6.4   Cable specification

6.4.1   IO-Link

Endress+Hauser recommends using twisted, four-core cable.

6.5   Load for current output

In order to guarantee sufficient terminal voltage, a maximum load resistance R_L (including line resistance) must not be exceeded depending on the supply voltage U_B of the supply unit.

$$2 \rightarrow R_{Lmax} \leq \frac{U_B - 6.5V}{23mA}$$
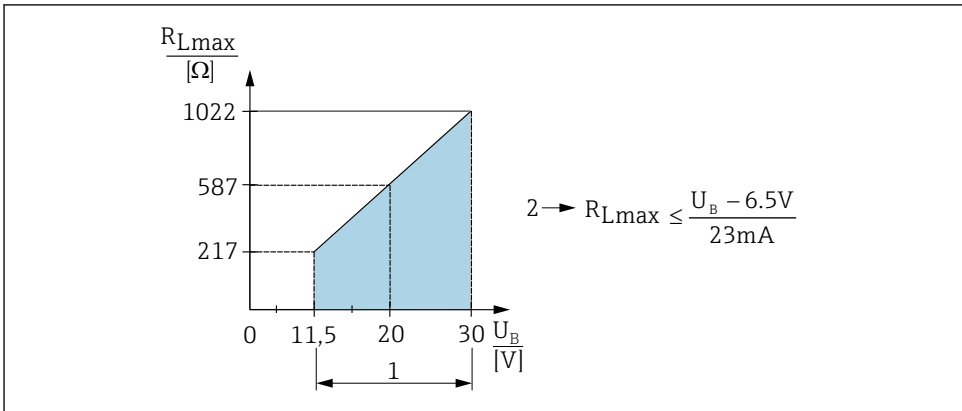
A0045615

1   Power supply 11.5 to 30 V_{DC}
2 R_{Lmax} maximum load resistance
U_B Supply voltage

If the load is too high, the device performs the following points:
• Output of failure current and display of "M803" (Output: MIN alarm current)
• Periodic checking to establish if it is possible to quit fault state

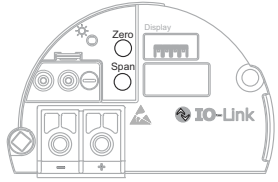## 6.6   Field Xpert SMT70, SMT77

See the Operating Instructions.

6.7   FieldPort SFP20

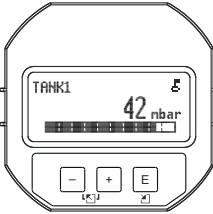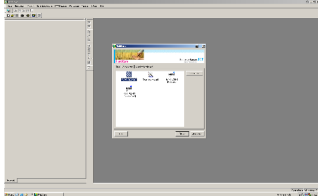See Operating Instructions.

7   Operation

7.1   Operation methods

7.1.1   Operation without an operating menu

Operation methods	Explanation	Graphic	Description
Local operation without device display	The device is operated using the operating keys on the electronic insert.	A0045577	→ 🖺 15

7.1.2 Operation with an operating menu

Operation with an operating menu is based on an operating concept with "user roles" .

Operation methods	Explanation	Graphic	Description
Local operation with device display	The device is operated using the operating keys on the device display.	A0029999	→ 🖹 16
Remote operation via FieldCare	The device is operated using the FieldCare operating tool.	A0030002	

7.1.3 IO-Link

IO-Link information

IO-Link Smart Sensor Profile 2nd Edition

Supports
- Identification
- Diagnosis
- Digital Measuring Sensor (as per SSP 4.3.3)

IO-Link is a point-to-point connection for communication between the measuring device and an IO-Link master. The measuring device features an IO-Link communication interface type 2 (pin 4) with a second IO function on pin 2. This requires an IO-Link-compatible assembly (IO-Link master) for operation. The IO-Link communication interface enables direct access to the process and diagnostic data. It also provides the option of configuring the measuring device while in operation.

Characteristics of the IO-Link interface:
- IO-Link specification: Version 1.1
- IO-Link Smart Sensor Profile 2nd Edition
- Speed: COM2; 38.4 kBaud
- Minimum cycle time: 10 ms
- Process data width: 14 Byte

- IO-Link data storage: Yes
- Block configuration: Yes
- Device operational: The measuring device is operational 5 seconds after the supply voltage is applied

IO-Link download

http://www.endress.com/download
- Select "Device Driver" from the search options shown
- For "Type", select "IO Device Description (IODD)"
  Select IO-Link (IODD)
  IODD for Deltapilot FMB50
- Under the product root, select the desired device and follow any further instructions.

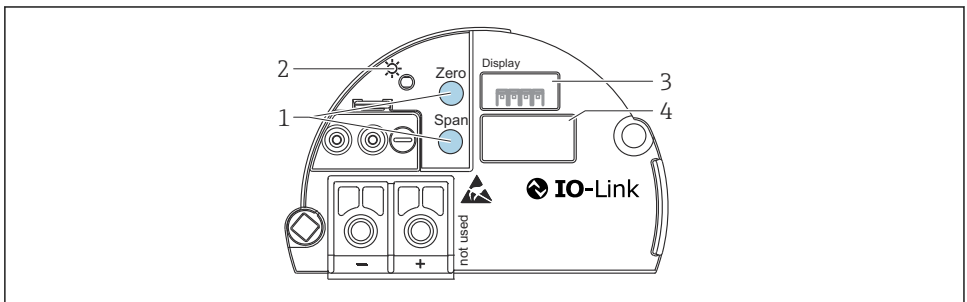https://ioddfinder.io-link.com/
Search by
- Manufacturer
- Article number
- Product type

7.2 Operation without an operating menu

7.2.1 Position of operating elements

The operating keys are located in the measuring device on the electronic insert.

IO-Link

A0045576

1 Operating keys for lower range value (zero) and upper range value (span)
2 Green LED to indicate successful operation
3 Slot for optional local display
4 Slot for M12 plug

Function of the operating elements

| Operating key(s)	Meaning

Zero pressed for at least 3 seconds	**Get LRV**
	• **"Pressure" measuring mode**
	  The pressure present is accepted as the lower range value (LRV).
	• **"Level" measuring mode, "In pressure" level selection, "Wet" calibration mode**
	  The pressure present is assigned to the lower level value ("Empty calibration").

Span pressed for at least 3 seconds	**Get URV**
	• **"Pressure" measuring mode**
	  The pressure present is accepted as the upper range value (URV).
	• **"Level" measuring mode, "In pressure" level selection, "Wet" calibration mode**
	  The pressure present is assigned to the upper level value ("Full calibration").

Zero and **Span** pressed simultaneously for at least 3 seconds	**Position adjustment** The measuring cell characteristic curve is shifted in parallel so that the pressure present becomes the zero value.
Zero and **Span** pressed simultaneously for at least 12 seconds	**Reset** All the parameters are reset to the order configuration.

7.2.2   Locking/unlocking operation

Once you have entered all the parameters, you can lock your entries against unauthorized and undesired access.

7.3   Operation with an operating menu

7.4   Operation with device display (optional)

A 4-line liquid crystal display (LCD) is used for display and operation. The local display shows measured values, dialog texts, fault messages and notice messages. For easy operation the display can be taken out of the housing (see figure steps 1 to 3). It is connected to the device via a 90 mm (3.54 in) long cable. The display of the device can be turned in 90° stages (see figure steps 4 to 6). Depending on the installation position of the device, this makes it easy to operate the device and read the measured values.
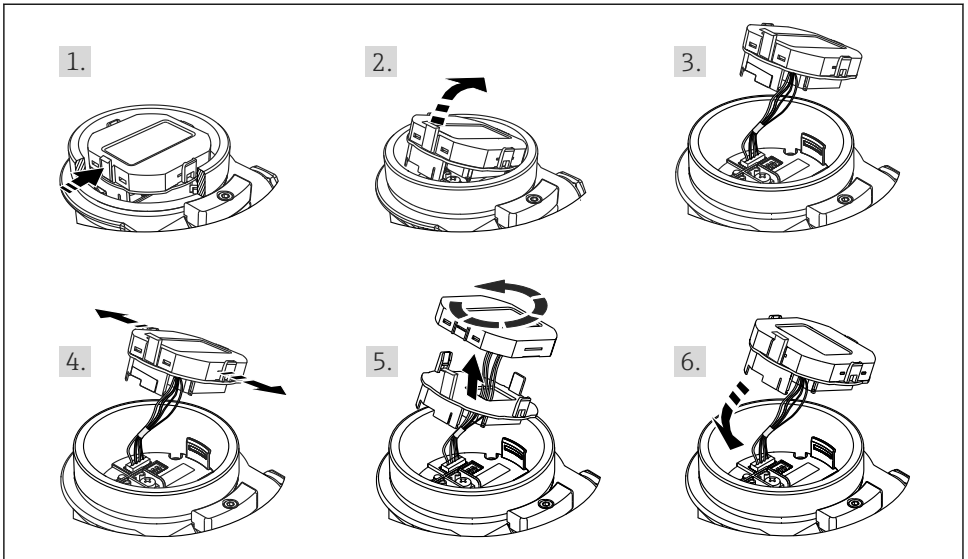
A0028500

Functions:
- 8-digit measured value display incl. sign and decimal point, bar graph for 4 to 20 mA as current display.
- Three keys for operation
- Simple and complete menu guidance as parameters are split into several levels and groups
- Each parameter is given a 3-digit parameter code for easy navigation
- Comprehensive diagnostic functions (fault and warning message etc.)
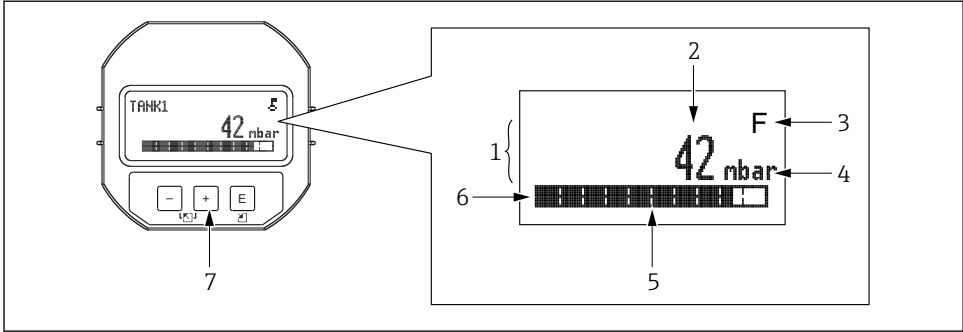
A0030013

1   Main line
2   Value
3   Symbol
4   Unit
5   Bar graph
6   Information line
7   Operating keys

The following table illustrates the symbols that can appear on the local display. Four symbols can occur at one time.

Symbol	Meaning
A0018154	**Lock symbol** The operation of the device is locked. Unlock the device, .
A0018155	**Communication symbol** Data transfer via communication
S A0013958	**Error message "Out of specification"** The device is being operated outside its technical specifications (e.g. during warm-up or cleaning).
C A0013959	**Error message "Service mode"** The device is in the Service mode (e.g. during a simulation).
M A0013957	**Error message "Maintenance required"** Maintenance is required. The measured value is still valid.
F A0013956	**Error message "Failure detected"** An operating error has occurred. The measured value is no longer valid.

7.4.1   Operating keys on the display and operating module

Operating key(s)	Meaning
+ A0017879	• Navigate down in the picklist • Edit the numerical values or characters within a function
− A0017880	• Navigate up in the picklist • Edit the numerical values or characters within a function
E A0017881	• Confirm entry • Jump to the next item • Select a menu item and activate the edit mode
+ and **E** A0017879 A0017881	Contrast setting of local display: darker
− and **E** A0017880 A0017881	Contrast setting of local display: brighter
+ and **−** A0017879 A0017880	**ESC functions:** • Exit the edit mode for a parameter without saving the changed value • You are in the menu at a selection level: each time you press the keys simultaneously, you go up a level in the menu.

7.4.2   Operating example: Parameters with a picklist

Example: selecting "Deutsch" as the language of the menu.

	Language 000	Operation
1	✔ English Deutsch	"English" is set as the menu language (default value). A ✔ in front of the menu text indicates the active option.
2	Deutsch ✔ English	Select "Deutsch" with ⊞ or ⊟.
3	✔ Deutsch English	• Select Ⓔ to confirm. A ✔ in front of the menu text indicates the option that is currently active ("Deutsch" is the language selected). • Use Ⓔ to exit the edit mode for the parameter.

7.4.3   Operating example: User-definable parameters

Example: setting the "Set URV (014)" parameter from 100 mbar (1.5 psi) to 50 mbar (0.75 psi).

Menu path: Setup → Extended setup→ Current output → Set URV

	Set URV 014	Operation
1	1 0 0 . 0 0 0 mbar	The local display shows the parameter to be changed. The "mbar" unit is defined in another parameter and cannot be modified here.
2	**1** 0 0 . 0 0 0 mbar	Press ⊞ or ⊟ to enter the editing mode. The first digit is highlighted in black.
3	**5** 0 0 . 0 0 0 mbar	Use the ⊞ key to change "1" to "5". Press the 𝔼 key to confirm "5". The cursor jumps to the next position (highlighted in black). Confirm "0" with 𝔼 (second position).
4	5 0 **0** . 0 0 0 mbar	The third digit is highlighted in black and can now be edited.
5	5 0 ⌟ . 0 0 0 mbar	Use the ⊟ key to change to the "⌟" symbol. Use 𝔼 to save the new value and exit the edit mode. See next graphic.
6	5 0 . 0 0 0 mbar	The new value for the upper range value is 50 mbar (0.75 psi). Use 𝔼 to exit the edit mode for the parameter. Use ⊞ or ⊟ to return to the edit mode.

7.4.4 Operating example: Accepting the pressure present

Example: Setting pos. zero adjustment.

Menu path: Main menu → Setup → Pos. zero adjust

	Pos. zero adjust 007	Operation
1	✔ Cancel Confirm	The pressure for pos. zero adjustment is present at the device.
2	Cancel ✔ Confirm	Use ⊞ or ⊟ to switch to the "Confirm" option. The active option is highlighted in black.
3	Adjustment has been accepted!	Use the 𝔼 key to accept the applied pressure for pos. zero adjustment. The device confirms the adjustment and goes back to the "Pos. zero adjust" parameter.
4	✔ Cancel Confirm	Use 𝔼 to exit the edit mode for the parameter.

8   System integration

See the Operating Instructions.

9   Commissioning

The device is configured for the "Pressure" measuring mode (Cerabar) or "Level" measuring mode (Deltapilot) as standard.

The measuring range and the unit in which the measured value is transmitted correspond to the specifications on the nameplate.

> ⚠ **WARNING**
>
> **The permitted process pressure is exceeded!**
> Risk of injury if parts burst! Warnings are displayed if the pressure is too high.
> ▸ If a pressure smaller than the minimum permitted pressure or greater than the maximum permitted pressure is present at the device, the following messages are output in succession (depending on the setting in the "Alarm behavior" (050) parameter): "S140 Working range P" or "F140 Working range P" "S841 Sensor range" or "F841 Sensor range" "S971 Adjustment"
> ▸ Only use the device within the measuring cell range limits!

> **NOTICE**
>
> **The permitted process pressure is undershot!**
> Messages are displayed if the pressure is too low.
> ▸ If a pressure smaller than the minimum permitted pressure or greater than the maximum permitted pressure is present at the device, the following messages are output in succession (depending on the setting in the "Alarm behavior" (050) parameter): "S140 Working range P" or "F140 Working range P" "S841 Sensor range" or "F841 Sensor range" "S971 Adjustment"
> ▸ Only use the device within the measuring cell range limits!

9.1   Commissioning without an operating menu

9.1.1   Pressure measuring mode

The following functions are possible via the keys on the electronic insert:
- Position adjustment (zero point correction)
- Setting the lower range value and upper range value
- Device reset

ℹ
- Operation must be unlocked
- The device is configured for the "Pressure" measuring mode as standard. You can change the measuring mode via the "Measuring mode" parameter → 🕮 24.
- The pressure applied must be within the nominal pressure limits of the measuring cell. See information on the nameplate.

⚠ WARNING

Changing the measuring mode affects the span (URV)!

This situation can result in product overflow.

▶ If the measuring mode is changed, the span setting (URV) must be verified and, if necessary, reconfigured!

Carrying out position adjustment

1. Make sure that pressure is present at the device. In doing so, pay attention to the nominal pressure limits of the measuring cell.

2. Press the **Zero** and **Span** keys simultaneously for at least 3 s.

LED on the electronic insert is lit briefly.

The applied pressure for position adjustment has been accepted.

Setting lower range value

1. Make sure the desired pressure for the lower range value is present at the device. In doing so, pay attention to the nominal pressure limits of the measuring cell.

2. Press the **Zero** key for at least 3 s.

LED on the electronic insert is lit briefly.

The applied pressure for the lower range value has been accepted.

Setting upper range value

1. Make sure the desired pressure for the upper range value is present at the device. In doing so, pay attention to the nominal pressure limits of the measuring cell.

2. Press the **Span** key for at least 3 s.

LED on the electronic insert is lit briefly.

The applied pressure for the upper range value has been accepted.

9.1.2 Level measuring mode

The following functions are possible via the keys on the electronic insert:
- Position adjustment (zero point correction)
- Setting the lower and upper pressure value and assigning to the lower and upper level value
- Device reset

  - The "Zero" and "Span" keys only have a function with the following setting:
    "Level selection" = "In pressure", "Calibration mode" = "Wet"
    The keys have no function in other settings.
  - The device is configured for the "Pressure" measuring mode as standard. You can
    change the measuring mode via the "Measuring mode" parameter → 🗎 24.
    The following parameters are set to the following values at the factory:
    - "Level selection" = "In pressure"
    - "Calibration mode": wet
    - "Unit before lin": %
    - "Empty calib.": 0.0
    - "Full calib.": 100.0
    - "Set LRV": 0.0 (corresponds to 4 mA value)
    - "Set URV": 100.0 (corresponds to 20 mA value)
  - Operation must be unlocked .
  - The pressure applied must be within the nominal pressure limits of the measuring cell.
    See information on the nameplate.

⚠ WARNING

Changing the measuring mode affects the span (URV)!

This situation can result in product overflow.

▶ If the measuring mode is changed, the span setting (URV) must be verified and, if
  necessary, reconfigured!

Carrying out position adjustment

1. Make sure that pressure is present at the device. In doing so, pay attention to the
   nominal pressure limits of the measuring cell.

2. Press the **Zero** and **Span** keys simultaneously for at least 3 s.

LED on the electronic insert is lit briefly.

The applied pressure for position adjustment has been accepted.

Setting lower pressure value

1. Make sure that the desired lower pressure value ("Empty pressure value") is present at
   the device. In doing so, pay attention to the nominal pressure limits of the measuring
   cell.

2. Press the **Zero** key for at least 3 s.

LED on the electronic insert is lit briefly.

The applied pressure was saved as the lower pressure value ("Empty pressure") and assigned to
the lower level value ("Empty calibration").

Setting upper pressure value

1. Make sure that the desired upper pressure value ("Full pressure value") is present at the device. In doing so, pay attention to the nominal pressure limits of the measuring cell.

2. Press the **Span** key for at least 3 s.

LED on the electronic insert is lit briefly.

The applied pressure was saved as the upper pressure value ("Full pressure") and assigned to the upper level value ("Full calibration").

9.2 Commissioning with an operating menu

Commissioning comprises the following steps:
- Function check
- Selection of the language, measuring mode and pressure unit → 🖹 24
- Position adjustment/zero adjustment → 🖹 25
- Configuring measurement:
  - Pressure measurement → 🖹 27
  - Level measurement

9.2.1 Selection of the language, measuring mode and pressure unit

---

Language (000)

Navigation	🖩🖳 Main menu → Language
Write permission	Operator/Maintenance/Expert
Description	Select the menu language for the local display.
Selection	• English • Another language (as selected when ordering the device) • A third language where applicable (language of the place of manufacture)
Factory setting	English

Measuring mode (005)

Write permission	Operator/Maintenance/Expert

Description	Select the measuring mode. The operating menu is structured differently depending on the measuring mode selected.

> ⚠ **WARNING**
>
> **Changing the measuring mode affects the span (URV)**
> This situation can result in product overflow.
> ▸ If the measuring mode is changed, the setting for the span (URV) must be checked in the "Setup" operating menu and readjusted if necessary.

Selection	• Pressure • Level
Factory setting	Pressure or according to order specifications

---

Press. eng. unit (125)

Write permission	Operator/Maintenance/Expert
Description	Select the pressure unit. If a new pressure unit is selected, all pressure-specific parameters are converted and displayed with the new unit.
Selection	• mbar, bar • mmH2O, mH2O • inH2O, ftH2O • Pa, kPa, MPa • psi • mmHg, inHg • kgf/cm^2

V

Factory setting	mbar or bar depending on the nominal measuring range of the measuring cell, or as per order specifications.

9.2.2   Pos. zero adjust

Corrected press. (172)

Navigation	🖩🖵 Setup → Corrected press.
Write permission	Operator/Maintenance/Expert
Description	Displays the measured pressure after sensor trim and position adjustment.
Note	If this value is not equal to "0", it can be corrected to "0" by the position adjustment.

Pos. zero adjust (007) (gauge pressure measuring cells))

Write permission	Operator/Maintenance/Expert
Description	Pos. zero adjustment – the pressure difference between zero (set point) and the measured pressure need not be known.
Example	• Measured value = 2.2 mbar (0.033 psi) • You correct the measured value via the "Pos. zero adjust" parameter with the "Confirm" option. This means that you are assigning the value 0.0 to the pressure present. • Measured value (after pos. zero adjust) = 0.0 mbar • The current value is also corrected.
Selection	• Confirm • Cancel
Factory setting	Cancel

Pos. zero adjust (007) (gauge pressure measuring cells)

Write permission	Operator/Maintenance/Expert
Description	Pos. zero adjustment – the pressure difference between zero (set point) and the measured pressure need not be known.

Example
- Measured value = 2.2 mbar (0.033 psi)
- You correct the measured value via the "Pos. zero adjust" parameter with the "Confirm" option. This means that you are assigning the value 0.0 to the pressure present.
- Measured value (after pos. zero adjust) = 0.0 mbar
- The current value is also corrected.

Selection
- Confirm
- Cancel

Factory setting   Cancel

9.3   Configuring pressure measurement

9.3.1   Calibration without reference pressure (dry calibration)

Example:

In this example, a device with a 400 mbar (6 psi) measuring cell is configured for the 0 to +300 mbar (0 to 4.5 psi) measuring range, i.e. the 4 mA value and 20 mA value are assigned 0 mbar and 300 mbar (4.5 psi) respectively.

Prerequisite:

This is a theoretical calibration, i.e. the pressure values for the lower and upper range are known.

Due to the orientation of the device, there may be pressure shifts in the measured value, i.e. the measured value is not zero in an unpressurized state. For information on how to perform position adjustment, see → 🗎 25.

	Description
1	Select the "Pressure" measuring mode via the "Measuring mode" parameter. Menu path: Setup → Measuring mode ⚠ **WARNING** **Changing the measuring mode affects the span (URV)** This situation can result in product overflow. ▸ If the measuring mode is changed, the setting for the span (URV) must be checked in the "Setup" operating menu and readjusted if necessary.
2	Select a pressure unit via the "Press eng. unit" parameter, here "mbar" for example. Menu path: Setup → Press eng. unit
3	Select the "Set LRV" parameter. Menu path: Setup → Set LRV
	Enter the value for the "Set LRV" parameter (here 0 mbar) and confirm. This pressure value is assigned to the lower current value (4 mA).
4	Select the "Set URV" parameter. Menu path: Setup → Set URV
	Enter the value for the "Set URV" parameter (here 300 mbar (4.5 psi)) and confirm. This pressure value is assigned to the upper current value (20 mA).
5	Result: The measuring range is configured for 0 to +300 mbar (0 to 4.5 psi).

A0031032

A   See table, step 3.
B   See table, step 4.

9.3.2   Calibration with reference pressure (wet calibration)

Example:

In this example, a device with a 400 mbar (6 psi) measuring cell module is configured for the 0 to +300 mbar (0 to 4.5 psi) measuring range, i.e. the 4 mA value and 20 mA value are assigned 0 mbar and 300 mbar (4.5 psi) respectively.

Prerequisite:

The pressure values 0 mbar and 300 mbar (4.5 psi) can be specified. For example, the device is already installed.

ℹ️ For a description of the parameters mentioned, see .

	Description
1	Perform a position adjustment → 🖹 25
2	Select the "Pressure" measuring mode via the "Measuring mode" parameter. Menu path: Setup → Measuring mode ⚠️ **WARNING** **Changing the measuring mode affects the span (URV)** This situation can result in product overflow. ▸ If the measuring mode is changed, the setting for the span (URV) must be checked in the "Setup" operating menu and readjusted if necessary.
3	Select a pressure unit via the "Press eng. unit" parameter, here "mbar" for example. Menu path: Setup → Press eng. unit
4	The pressure for the lower range value (4 mA value) is present at the device, here 0 mbar for example.
	Select the "Get LRV" parameter. Menu path: Setup → Extended setup → Current output → Get LRV
	Confirm the value present at the device by selecting "Confirm". The pressure value present is assigned to the lower current value (4 mA).
5	The pressure for the upper range value (20 mA value) is present at the device, here 300 mbar (4.5 psi) for example.
	Select the "Get URV" parameter. Menu path: Setup → Extended setup → Current output → Get URV

A0031032

A   See table, step 4.
B   See table, step 5.

	Description	
	Confirm the value present at the device by selecting "Confirm". The pressure value present is assigned to the upper current value (20 mA).	
6	Result: The measuring range is configured for 0 to +300 mbar (0 to 4.5 psi).	

71581315

www.addresses.endress.com

Endress+Hauser