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Brief Operating Instructions **Deltabar S FMD77, FMD78, PMD75**

Differential pressure measurement

Fieldbus™ Foundation

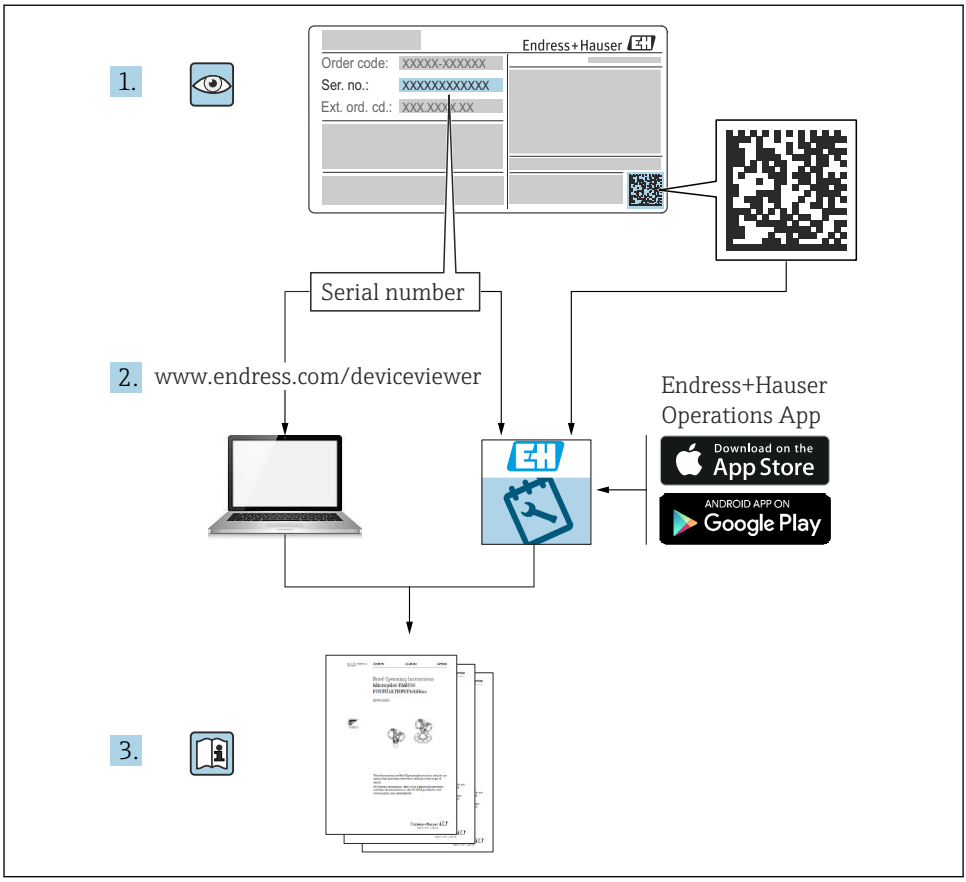
These Brief Operating Instructions are not a substitute for the Operating Instructions pertaining to the device.

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
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 used

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 dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

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

NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

2.2.2 Electrical symbols

⏚ Protective earth (PE)

Ground terminals that must be connected to ground prior to establishing any other connections.

The ground terminals are located on the interior and exterior of the device:
- Interior ground terminal: protective earth is connected to the mains supply.
- Exterior ground terminal: device is connected to the plant grounding system.

2.2.3 Symbols for certain types of information and graphics

Symbols for certain types of information and graphics

✓ Permitted
Procedures, processes or actions that are permitted

✗ Forbidden
Procedures, processes or actions that are forbidden

Tip
Indicates additional information

Reference to documentation

Reference to page

Visual inspection

▶
Notice or individual step to be observed

1, 2, 3, ...
Item numbers

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

↳
Result of a step

2.3 Registered trademarks

- **KALREZ®**
  Trademark of E.I. Du Pont de Nemours & Co., Wilmington, USA
- **TRI-CLAMP®**
  Trademark of Ladish & Co., Inc., Kenosha, USA
- **GORE-TEX®**
  Trademark of W.L. Gore & Associates, Inc., USA

3 Basic safety instructions

3.1 Requirements for the personnel

Personnel must meet the following requirements for their tasks:
- ▶ Trained, qualified specialists must be suitably qualified to perform this 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 Deltabar S is a differential pressure / pressure transmitter for measuring flow, level, pressure or differential pressure.

3.2.1 Foreseeable incorrect use

The manufacturer is not liable for damage caused by improper or non-intended 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

When working 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 the interference-free operation of the device.

Modifications 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 the repair of an electrical device.
- ▶ Use original spare parts and accessories from Endress+Hauser only.

Hazardous area

To eliminate danger to persons or the installation when the device is used in the hazardous area (e.g. explosion protection, pressure vessel safety):
- ▶ Check the nameplate to verify whether the ordered device can be used for the intended purpose in the hazardous area.
- ▶ Observe the specifications in the separate supplementary documentation, which is an integral part of this manual.

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 it is safe to operate.

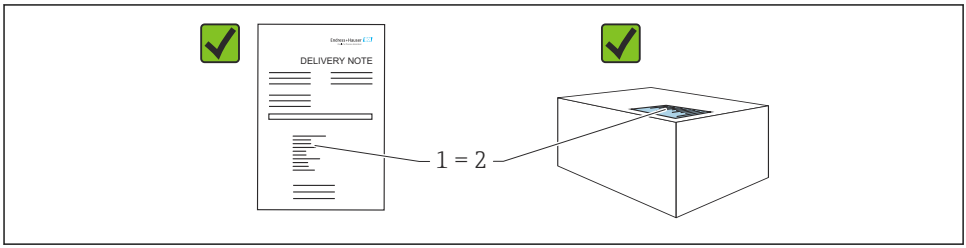
It meets the general safety standards and legal requirements. It also complies with the EC directives listed in the device-specific EC Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

3.6 Functional safety SIL3 (optional)

The Functional Safety Manual must be strictly observed for devices that are used in functional safety applications.

4 Incoming acceptance and product identification

4.1 Incoming acceptance



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- 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) provided?

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).

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).

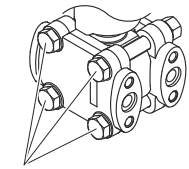
5 Mounting

NOTICE

Incorrect handling!

Damage to the device!

- The removal of the screws with item number (1) is not permissible under any circumstances and will void the warranty.



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5.1 Mounting requirements

5.1.1 Dimensions

For dimensions, please refer to the Technical Information for Deltabar S TI00382P, "Mechanical construction" section.

5.2 Mounting the device

- Due to the orientation of the Deltabar S, a zero point shift may occur, i.e. when the vessel is empty, the measured value does not display zero. You can correct this zero point shift either directly on the device via the E button or via remote operation.
- General recommendations for routing the impulse piping can be found in DIN 19210 "Methods for measurement of fluid flow; differential piping for flow measurement devices" or the corresponding national or international standards.
- Using a valve manifold allows for easy commissioning, installation and maintenance without interrupting the process.
- When routing the impulse piping outdoors, ensure that sufficient anti-freeze protection is used, e.g. by using pipe heat tracing.
- Lay the impulse piping with a monotonic gradient of at least 10 %.
- To ensure optimum readability of the local display, it is possible to rotate the housing by up to 380°.
- Endress+Hauser offers a mounting bracket for installation on pipes or walls.

5.2.1 Installation for flow measurement

Flow measurement in gases with PMD75

Mount the Deltabar S above the measuring point so that the condensate can drain into the process pipe.

Flow measurement in vapors with PMD75

- Mount the Deltabar S below the measuring point.
- Mount the condensate traps at the same level as the tapping points and at the same distance to the Deltabar S.
- Prior to commissioning, fill the impulse piping to the height of the condensate traps.

Flow measurement in liquids with PMD75

- Mount the Deltabar S below the measuring point so that the impulse piping is always filled with liquid and gas bubbles can run back into the process piping.
- When measuring in media with solid parts, such as dirty liquids, installing separators and drain valves is useful for capturing and removing sediment.

5.2.2 Installation for level measurement

Level measurement in an open vessel with PMD75

- Mount the Deltabar S below the lower measuring connection so that the impulse piping is always filled with liquid.
- The negative side is open to atmospheric pressure.
- When measuring in media with solid parts, such as dirty liquids, installing separators and drain valves is useful for capturing and removing sediment.

Level measurement in an open vessel with FMD77

- Mount the Deltabar S directly on the vessel.
- The negative side is open to atmospheric pressure.

Level measurement in a closed vessel with PMD75

- Mount the Deltabar S below the lower measuring connection so that the impulse piping is always filled with liquid.
- Always connect the impulse piping on the negative side above the maximum level.
- When measuring in media with solid parts, such as dirty liquids, installing separators and drain valves is useful for capturing and removing sediment.

Level measurement in a closed vessel with FMD77

- Mount the Deltabar S directly on the vessel.
- Always connect the impulse piping on the negative side above the maximum level.
- When measuring in media with solid parts, such as dirty liquids, installing separators and drain valves is useful for capturing and removing sediment.

Level measurement in a closed vessel with FMD78

- Mount the Deltabar S below the lower diaphragm seal.
- The ambient temperature should be the same for both capillaries.

Level measurement is only guaranteed between the upper edge of the lower diaphragm seal and the lower edge of the upper diaphragm seal.

Level measurement in a closed vessel with superimposed steam with PMD75

- Mount the Deltabar S below the lower measuring connection so that the impulse piping is always filled with liquid.
- Always connect the impulse piping on the negative side above the maximum level.
- The condensate trap ensures constant pressure on the negative side.
- When measuring in media with solid parts, such as dirty liquids, installing separators and drain valves is useful for capturing and removing sediment.

Level measurement in a closed vessel with superimposed steam with FMD77

- Mount the Deltabar S directly on the vessel.
- Always connect the impulse piping on the negative side above the maximum level.
- The condensate trap ensures constant pressure on the negative side.
- When measuring in media with solid parts, such as dirty liquids, installing separators and drain valves is useful for capturing and removing sediment.

5.2.3 Installation for pressure measurement (160 bar (2400 psi) and 250 bar (3750 psi) measuring cell)

The negative side is open to atmospheric pressure via the reference air filters screwed into the LP side flange.

Mount the Deltabar S above the measuring point so that the condensate can drain into the process pipe.

5.2.4 Installation for differential pressure measurement

Differential pressure measurement in gases and vapors with PMD75

Mount the Deltabar S above the measuring point so that the condensate can drain into the process pipe.

Differential pressure measurement in liquids with PMD75

- Mount the Deltabar S below the measuring point so that the impulse piping is always filled with liquid and gas bubbles can run back into the process piping.
- When measuring in media with solid parts, such as dirty liquids, installing separators and drain valves is useful for capturing and removing sediment.

Differential pressure measurement in gases, vapors and liquids with FMD78

- Mount diaphragm seals with capillaries on pipes at the top or side.
- For vacuum applications: mount the Deltabar S below the measuring point.
- The ambient temperature should be the same for both capillaries.

5.2.5 Installation instructions for devices with diaphragm seals (FMD78)

- Please note that the hydrostatic pressure of the liquid columns in the capillaries can cause zero point shift. The zero point shift can be corrected.
- Do not clean or touch the process membrane of the diaphragm seal with hard or pointed objects.
- Do not remove the protection on the process membrane until just before installation.

NOTICE

Incorrect handling!

Damage to the device!

- A diaphragm seal and the pressure transmitter together form a closed, calibrated system that has been filled through openings in the diaphragm seal and in the pressure transmitter's measurement system. These openings are sealed and must not be opened!
- If a mounting bracket is used, sufficient strain relief must be ensured for the capillaries in order to prevent them from buckling (bending radius > 100 mm (3.94 in)).
- Please observe the application limits of the diaphragm seal fill fluid as detailed in the Technical Information for Deltabar S TI00382P, "Planning instructions for diaphragm seal systems" section.

NOTICE

In order to obtain more precise measurement results and to avoid a defect in the device, mount the capillaries as follows:

- Mount capillaries vibration-free (in order to avoid additional pressure fluctuations).
- Do not mount capillaries in the vicinity of heating or cooling lines.
- Insulate capillaries if the ambient temperature is below or above the reference temperature.
- Mount capillaries with a bending radius > 100 mm (3.94 in)
- Do not use capillaries as a carrying aid for the diaphragm seals!
- In the case of two-sided diaphragm seal systems, the ambient temperature and the length of both capillaries should be identical.
- Two identical diaphragm seals (e.g. diameter, material etc.) should always be used for the negative and positive side (standard delivery).

5.2.6 Seal for flange mounting

NOTICE

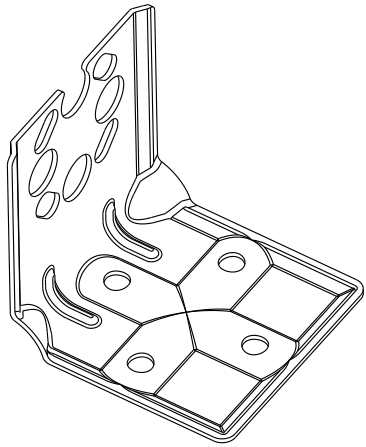
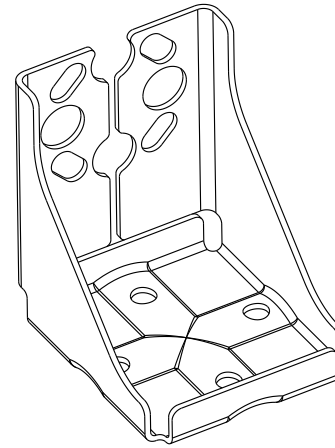
Incorrect measurement results.

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.

5.2.7 Wall and pipe mounting (optional)

Endress+Hauser offers the following mounting brackets to install the device on pipes or walls:

Standard version	Heavy-duty version
 A0031326	 A0031327

The standard mounting bracket version is **not** suitable for use in an application subject to vibrations.

The heavy-duty version of the mounting bracket has been tested for vibration resistance according to IEC 61298-3, see the "Vibration resistance" section of the Technical Information.

If a valve manifold is used, its dimensions should also be taken into consideration.

Bracket for wall and pipe mounting including retaining bracket for pipe mounting and two nuts.

For the technical data (such as the dimensions or order numbers for screws), see the Accessories Document SD01553P/00/EN.

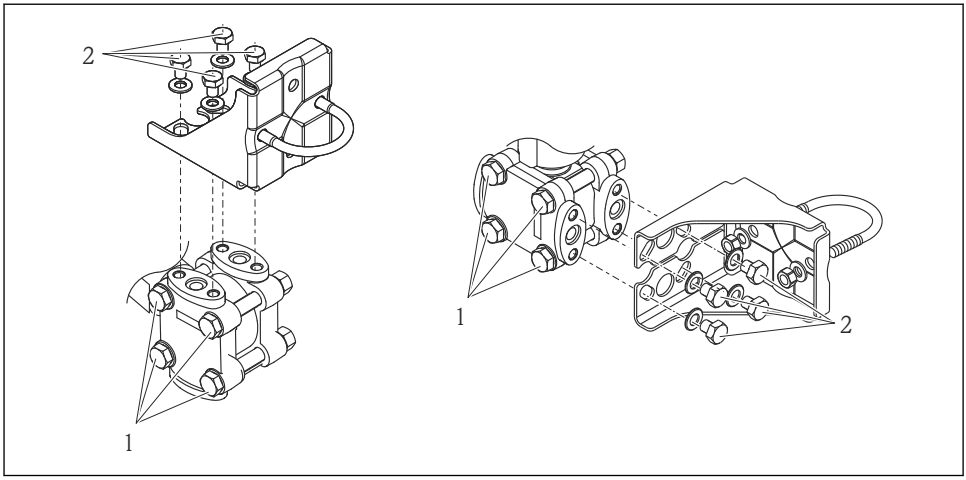
Please note the following when mounting:
- To prevent the mounting screws from scoring, they must be lubricated with a multi-purpose grease before mounting.
- When mounting on a pipe, tighten the nuts on the bracket uniformly with a torque of at least 30 Nm (22.13 lbf ft).
- For installation purposes, only use the screws with item number (2) (see the following diagram).

NOTICE

Incorrect handling!

Damage to the device!

▶ The removal of the screws with item number (1) is not permissible under any circumstances and will void the warranty.



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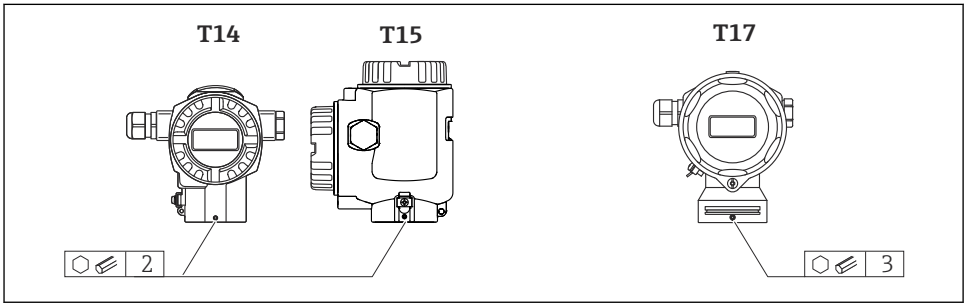
5.2.8 Turning the housing

The housing can be rotated by up to 380° by loosening the setscrew.



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1. T14 and T15 housing: loosen the setscrew with a 2 mm (0.08 in) Allen key. T17 housing: loosen the setscrew with a 3 mm (0.12 in) Allen key.
2. Rotate the housing (max. up to 380 °).
3. Retighten the setscrew with 1 Nm (0.74 lbf ft).

5.2.9 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, for example sand. If you encounter resistance when closing the covers, then check the threads again for dirt.

Closing the covers on the hygienic stainless steel housing (T17)

The covers for the terminal compartment and electronics compartment are hooked into the housing and closed with a screw in each case. These screws should be tightened handtight (2 Nm (1.48 lbf ft)) to the stop to ensure that the covers sit tightly.

6 Electrical connection

6.1 Connecting requirements

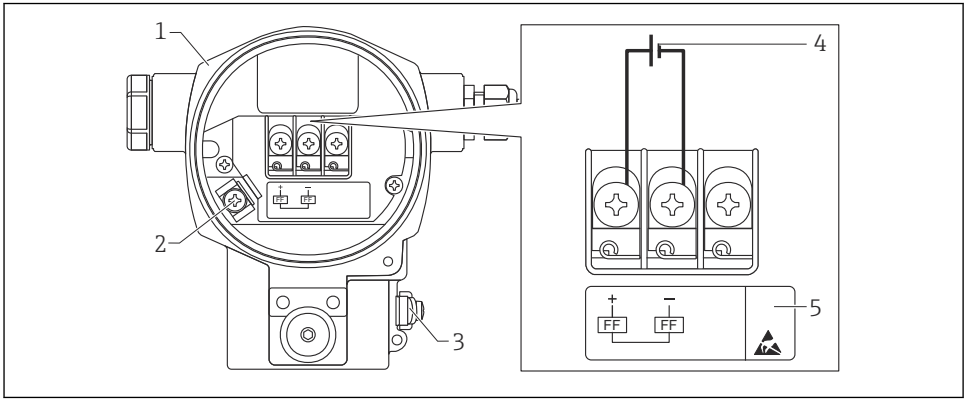
⚠ WARNING

Risk of electric shock!
If the operating voltage is > 35 VDC: Dangerous contact voltage at terminals.
- ▶ In a wet environment, do not open the cover if voltage is present.

⚠ WARNING

An incorrect connection compromises electrical safety!

- ▶ Risk of electric shock and/or explosion! Switch off the supply voltage before connecting the device.
- ▶ When using the measuring device in hazardous areas, installation must also comply with the applicable national standards and regulations and the Safety Instructions or Installation or Control Drawings.
- ▶ Devices with integrated overvoltage protection must be grounded.
- ▶ Protective circuits against reverse polarity, HF influences and overvoltage peaks are integrated.
- ▶ The supply voltage must match the power supply on the nameplate, see Operating Instructions → 📄 2.
- ▶ Switch off the supply voltage before connecting.
- ▶ Remove the housing cover of the terminal compartment.
- ▶ Guide the cable through the gland. Preferably use a twisted, shielded two-wire cable.
- ▶ Connect the device as indicated in the diagram.
- ▶ Screw down the housing cover.
- ▶ Switch on the supply voltage.



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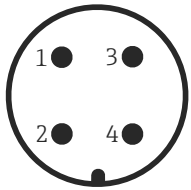
1 FOUNDATION Fieldbus electrical connection

1 Housing
2 Internal ground terminal
3 External ground terminal
4 Minimum supply voltage, for version in the non-hazardous area = 9 to 32 V DC
5 Devices with integrated overvoltage protection are labeled "OVP" (overvoltage protection) here.

6.1.1 Connection of devices with 7/8" plug

	PIN	
 A0011176	1	Signal -
	2	Signal +
	3	Not assigned
	4	Ground

6.2 Connecting the measuring unit

For further information on the network structure and grounding and for further bus system components such as bus cables, see the relevant documentation, e.g. Operating Instructions BA00013S "FOUNDATION Fieldbus Overview" and the FOUNDATION Fieldbus Guideline.

6.2.1 Supply voltage

Version for non-hazardous areas: 9 to 32 V DC

⚠ WARNING

Supply voltage might be connected!
Risk of electric shock and/or explosion!

- ▶ When using the measuring device in hazardous areas, installation must also comply with the applicable national standards and regulations and the Safety Instructions or Installation or Control Drawings.
- ▶ All explosion protection data are given in separate Ex documentation, which is available upon request. The Ex documentation is supplied as standard with all devices approved for use in explosion hazardous areas.

6.2.2 Current consumption

15.5 mA ± 1 mA, switch-on current corresponds to IEC 61158-2, Clause 21.

6.2.3 Terminals

- Supply voltage and internal ground terminal: 0.5 to 2.5 mm^2 (20 to 14 AWG)
- External ground terminal: 0.5 to 4 mm^2 (20 to 12 AWG)

6.2.4 Cable specification

- Endress+Hauser recommends using twisted, shielded two-wire cables.
- Cable diameter: 5 to 9 mm (0.2 to 0.35 in)

For further information on the cable specifications, see Operating Instructions BA00013S "FOUNDATION Fieldbus Overview", FOUNDATION Fieldbus Guideline and IEC 61158-2 (MBP).

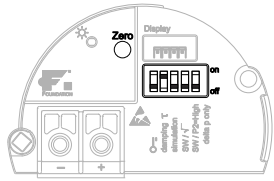
6.2.5 Grounding and shielding

The Deltabar S must be grounded, for example by means of the external ground terminal.

Different grounding and shielding installation methods are available for FOUNDATION Fieldbus networks such as:
- Isolated installation (see also IEC 61158-2)
- Installation with multiple grounding
- Capacitance installation.

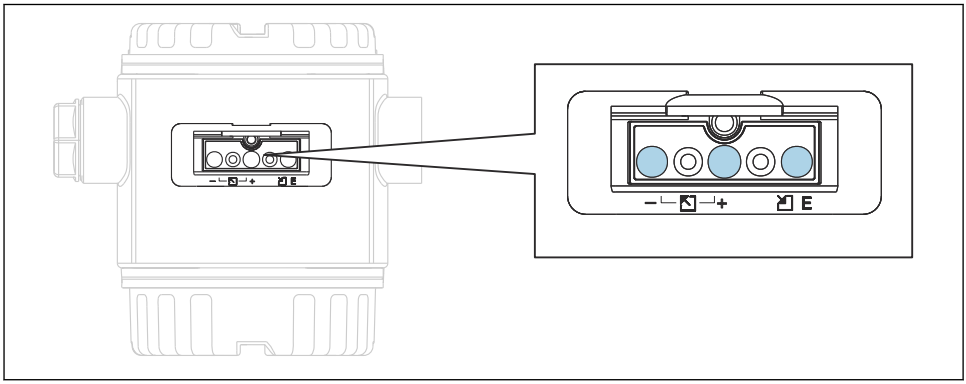
7 Operation options

7.1 Operation without an operating menu

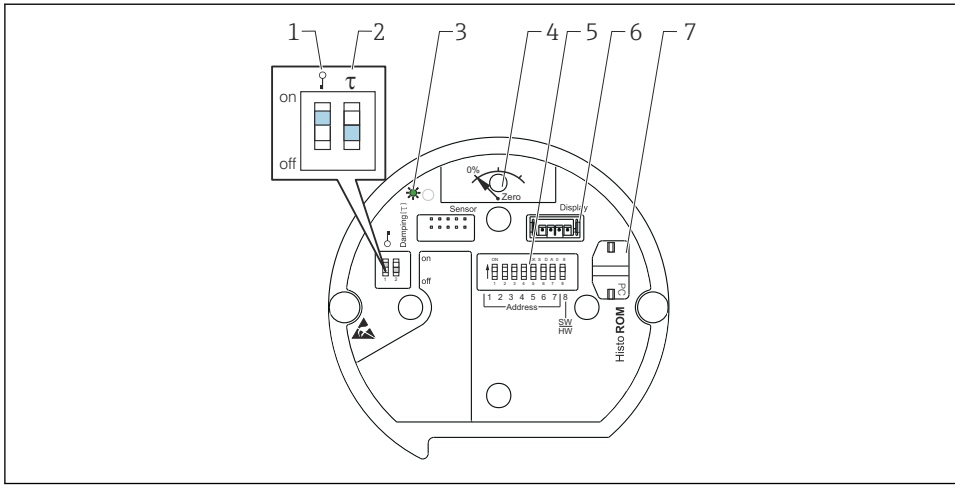
Operation options	Explanation	Graphic	Description
Local operation without device display	The device is operated using the operating keys and DIP switches on the electronic insert.		→ 16

7.1.1 Position of operating elements

In the case of the aluminum housing (T14/T15) and stainless steel housing (T14), the operating key is located either under the protective flap on the exterior of the device or inside on the electronic insert. In the case of the hygienic stainless steel housing (T17), the operating key is always inside on the electronic insert. In addition, there are three operating keys on the optional local display.



2 *Operating keys, outside*



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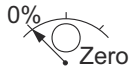
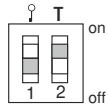
1 *DIP switch for locking/unlocking parameters relevant to the measured value*
2 *DIP switch for switching damping on/off*
3 *Green LED to indicate value being accepted*
4 *Key for position adjustment and device reset*
5 *DIP switch for bus address*
6 *Slot for optional display*
7 *Slot for optional HistoROM®/M-DAT*

Function of the DIP switches

To perform the corresponding function, press the key or key combination for at least 3 s. Press the key combination for at least 6 s for a reset.

	Meaning
	▪ Position adjustment (zero point correction): press key for at least 3 seconds. The LED on the electronic insert lights up briefly if the pressure applied has been accepted for position adjustment. ▪ Total reset: press key for at least 12 seconds. The LED on the electronic insert lights up briefly if a reset is being carried out.
	▪ DIP switch 1: to lock/unlock parameters relevant to the measured value. Factory setting: off (unlocked) ▪ DIP switch 2: damping on/off, factory setting: on (damping on)

7.1.2 FOUNDATION Fieldbus interface

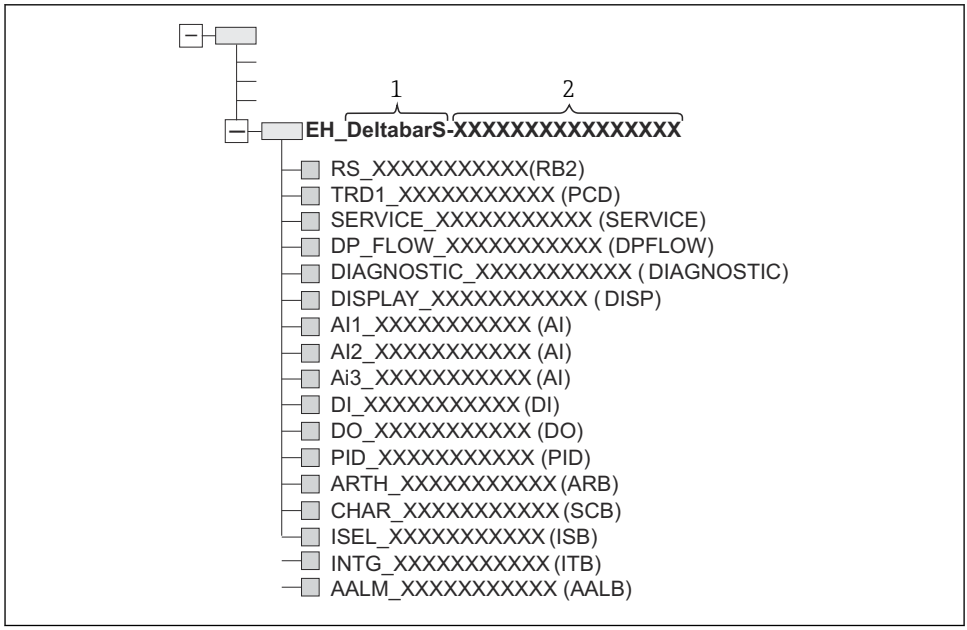
Device identification and addressing

FOUNDATION Fieldbus identifies the device using its ID code and automatically assigns it a suitable field address. The identity code cannot be changed. The device appears in the network

display once you have started the FF configuration program and integrated the device into the network. The blocks available are displayed under the device name.

If the device description has not yet been loaded, the blocks report "Unknown" or "(UNK)".

Deltabar S reports as follows:



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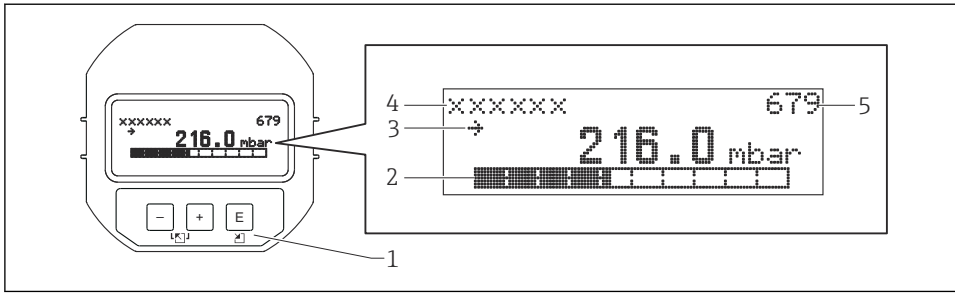
7.2 Operation with device display (optional)

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. The device display can be turned in 90 ° steps. Depending on the installation position of the device, this makes it easy to operate the device and read the measured values.

Functions:

- 8-digit measured value display including sign and decimal point, unit display, bar graph for displaying current
- Simple and complete menu guidance due to breakdown of parameters into several levels and groups
- Each parameter is assigned a 3-digit ID number for easy navigation
- Possibility of configuring the display according to individual wishes and requirements e.g. language, alternating display, display of other measured values, such as sensor temperature, contrast setting
- Comprehensive diagnostic functions (fault and warning message, maximum/minimum indicators, etc.)
- Rapid and safe commissioning using Quick Setup menus



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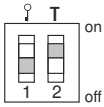
The following table illustrates the symbols that can appear on the local display. Four symbols may appear at the same time.

Symbol	Meaning
	Alarm symbol ▪ Symbol flashing: warning, device continues measuring ▪ Symbol permanently lit: error, device does not continue measuring *Note:* The alarm symbol may overlie the tendency symbol.
	Lock symbol The operation of the device is locked. Unlock the device.
	Communication symbol Data transfer via communication.
	Tendency symbol (increasing) The measured value increases.
	Tendency symbol (decreasing) The measured value decreases.
	Tendency symbol (constant) The measured value has remained constant throughout the last few minutes.

7.2.1 Operating keys on the display and operating module

Operating key(s)	Meaning
+	▪ Navigate up in the picklist ▪ Edit the numerical values or characters within a function
–	▪ Navigate down in the picklist ▪ Edit the numerical values or characters within a function
E	▪ Confirm entry ▪ Jump to the next item

Operating key(s)	Meaning
⊞ + E	Contrast setting of local display: darker
⊟ + E	Contrast setting of local display: brighter
⊟ + ⊞	**ESC functions:** ▪ Exit the editing mode without saving the modified value ▪ You are in the menu within a function group: the first time you press the keys simultaneously, you go back one parameter in the function group. Every subsequent time you press the keys simultaneously, you go up one level in the menu. ▪ You are in the menu at a selection level: each time you press the keys simultaneously, you go up a level in the menu. *Note:*For the terms function group, level, selection level, see the "Menu structure".
	▪ DIP switch 1: to lock/unlock parameters relevant to the measured value. Factory setting: off (unlocked) ▪ DIP switch 2: for the simulation mode, factory setting: off (simulation mode off)

7.2.2 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 option that is currently active.
2	Deutsch ✔ English	Select "Deutsch" with ⊞ or ⊟.
3	✔ Deutsch English	▪ Select Ⓔ to confirm. A ✔ in front of the menu text indicates the active option ("Deutsch" is now selected as the menu language). ▪ Use Ⓔ to exit the edit mode for the parameter.

7.2.3 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 changed here.

	Set URV 014	Operation
2	**1** 0 0 . 0 0 0 mbar	Press ⊞ or ⊟ to enter the edit 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 Ⓔ key to confirm "5". The cursor jumps to the next position (highlighted in black). Confirm "0" with Ⓔ (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 Ⓔ 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 Ⓔ to exit the edit mode for the parameter. Use ⊞ or ⊟ to return to the edit mode.

7.2.4 Operating example: Accepting the pressure present

Example: Setting position adjustment.

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

	Position adjustment 007	Operation
1	✔ Cancel Confirm	The pressure for position 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 Ⓔ key to accept the applied pressure for position adjustment. The device confirms the adjustment and goes back to the "Position adjustment" parameter.
4	✔ Cancel Confirm	Use Ⓔ to exit the edit mode for the parameter.

8 Commissioning

The device is configured for the "Pressure" measuring mode as standard. The measuring range and the unit in which the measured value is transmitted correspond to the data 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 that is greater than the maximum permitted pressure is present at the device, messages "E115 sensor overpressure" and "E727 sensor pressure error - overrange" are output in succession. Only use the device within the sensor range limits!

NOTICE

The permitted process pressure is undershot!

Messages are displayed if the pressure is too low.

- ▶ If a pressure that is lower than the minimum permitted pressure is present at the device, messages "E120 sensor low pressure" and "E727 sensor pressure error - overrange" are output in succession. Only use the device within the sensor range limits!

8.1 Configuring messages

- The messages E727, E115 and E120 are "Error"-type messages and can be configured as a "Warning" or an "Alarm". The factory setting for these messages is "Warning". This setting prevents the current output from adopting the configured alarm current value in applications (e.g. cascade measurement) where the user knowingly accepts that the sensor range may be exceeded.
- We recommend setting messages E727, E115 and E120 to "Alarm" in the following instances:
  - It is not necessary to go outside the sensor range for the measuring application.
  - A position adjustment must be carried out that has to correct a large measured error as a result of the orientation of the device (e.g. devices with diaphragm seal).

8.2 Selecting the language and measuring mode

8.2.1 Local operation

The MEASURING MODE parameter is on the first selection level.

The following measuring modes are available:

- Pressure
- Level
- Flow

8.3 Position adjustment

Due to the orientation of the device, there may be a shift in the measured value, i.e. when the vessel is empty or partly filled, the measured value does not display zero. There are two ways to perform position adjustment.

- Menu path on local display:
  GROUP SELECTION → OPERATING MENU → SETTINGS → POSITION ADJUST
- Menu path in FieldCare:
  OPERATING MENU → SETTINGS → POSITION ADJUST

8.3.1 Performing position adjustment via the local display or FieldCare

The parameters listed in the following table can be found in the POSITION ADJUST. group (menu path: OPERATING MENU → SETTINGS → POSITION ADJUSTMENT).

Parameter name	Description
POS. ZERO ADJUST, Entry	Pos. zero adjustment – the pressure difference between zero (set point) and the measured pressure need not be known **Example:** ▪ MEASURED VALUE = 2.2 mbar (0.032 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 adjustment) = 0.0 mbar ▪ The current value is also corrected. The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. **Factory setting:** 0.0
POS. INPUT VALUE, Entry	Pos. zero adjustment – the pressure difference between zero (set point) and the measured pressure need not be known. To correct the pressure difference, a reference measurement value (e.g. from a reference device) is required. **Example:** ▪ MEASURED VALUE = 0.5 mbar (0.0073 psi) ▪ For the POS. INPUT VALUE parameter, specify the desired set point for the MEASURED VALUE, for example 2.0 mbar (0.029 psi). (The following applies: MEASURED VALUE new = POS. INPUT VALUE) ▪ For the POS. INPUT VALUE parameter, specify the desired set point for the MEASURED VALUE, for example 2.0 mbar (0.029 psi). (The following applies: MEASURED VALUE new = POS. INPUT VALUE) ▪ The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. The following applies: CALIB. OFFSET = MEASURED $VALUE_{old}$ – POS. INPUT VALUE, here: CALIB. OFFSET = 0.5 bar (0.0073 psi) - 2.0 bar (0.029 psi) = 1.5 bar (0.022 psi) **Factory setting:** 0.0
CALIB. OFFSET, Entry	Position adjustment – the pressure difference between zero (set point) and the measured pressure is known. **Example:** ▪ MEASURED VALUE = 2.2 mbar (0.032 psi) ▪ Via the CALIB. OFFSET parameter, enter the value by which the MEASURED VALUE should be corrected. To correct the MEASURED VALUE to 0.0 mbar, you must enter the value 2.2 here. (The following applies: MEASURED $VALUE_{new}$ = MEASURED $VALUE_{old}$ – CALIB. OFFSET) ▪ MEASURED VALUE (after entry for calib. offset) = 0.0 mbar **Factory setting:** 0.0

8.4 Quick Setup menu for the "Pressure" measuring mode

Local operation		FieldCare
Measured value display Switch from the measured value display to the GROUP SELECTION with E.		**Measured value display** Select the QUICK SETUP menu.
GROUP SELECTION Select the MEASURING MODE parameter.		**Measuring Mode** Select the Primary Value Type parameter.
MEASURING MODE Select the "Pressure" option.		**Primary Value Type** Select the "Pressure" option.
GROUP SELECTION Select the QUICK SETUP menu.		
POS. ZERO ADJUST Due to orientation of the device, there may be a shift in the measured value. You correct the MEASURED VALUE via the POS. ZERO ADJUST parameter with the "Confirm" option, i.e. you assign the value 0.0 to the pressure present.		**POS. ZERO ADJUST** Due to orientation of the device, there may be a shift in the measured value. You correct the MEASURED VALUE via the POS. ZERO ADJUST parameter with the "Confirm" option, i.e. you assign the value 0.0 to the pressure present.
DAMPING VALUE Enter the damping time (time constant). The damping affects the speed at which all subsequent elements, such as the local display, measured value and OUT Value of the Analog Input Block react to a change in the pressure.		**DAMPING VALUE** Enter the damping time (time constant). The damping affects the speed at which all subsequent elements, such as the local display, measured value and OUT Value of the Analog Input Block react to a change in the pressure.

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