

Brief Operating Instructions GammapiLOT FMG50 HART

Radiometric measuring technology



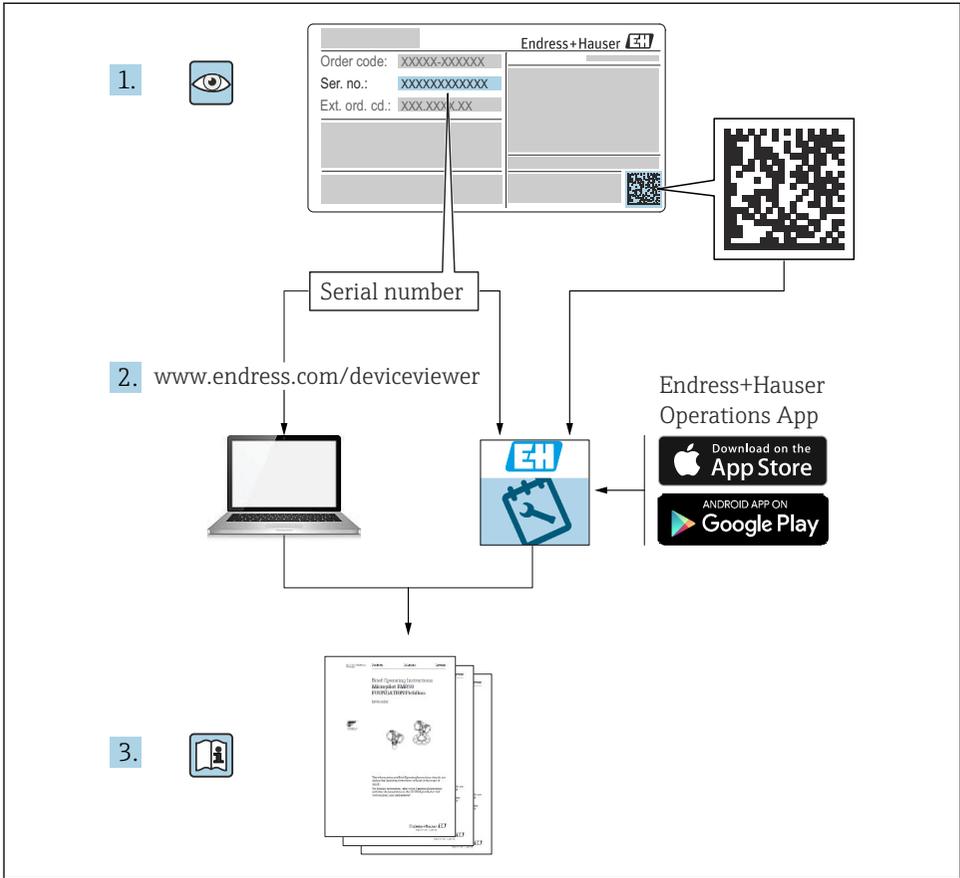
These are Brief Operating Instructions; they do not replace the Operating Instructions included in the scope of supply. Detailed information can be found in the Operating Instructions and the additional documentation.



Available for all device versions via:

- Internet: www.endress.com/deviceviewer
- Smartphone/tablet: Endress+Hauser Operations app

1 Associated documentation



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2 About this document

2.1 Symbols

2.1.1 Safety symbols



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



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.

2.1.2 Symbols for certain types of information and graphics



Warning of radioactive substances or ionizing radiation sources



Permitted

Procedures, processes or actions that are permitted



Forbidden

Procedures, processes or actions that are forbidden



Tip

Indicates additional information



Reference to documentation



Notice or individual step to be observed



Series of steps



Result of a step

1, 2, 3, ...

Item numbers

A, B, C, ...

Views



Visual inspection



Symbol for recycling electronic assemblies

In accordance with German law regulating the use of batteries (BattG §28 Para 1 Number 3), this symbol is used to denote electronic assemblies that must not be disposed of as household waste.

2.2 Documentation

The following document types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads):



For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* (www.endress.com/deviceviewer): Enter serial number from nameplate.
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

2.2.1 Technical Information (TI)

Planning aid

The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.

2.2.2 Operating Instructions (BA)

Your reference guide

These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

2.2.3 Safety Instructions (XA)

Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.



The nameplate indicates the Safety Instructions (XA) that are relevant to the device.

2.2.4 Functional Safety Manual (FY)

Depending on the SIL approval, the Functional Safety Manual (FY) is an integral part of the Operating Instructions and applies in addition to the Operating Instructions, Technical Information and ATEX Safety Instructions.



The different requirements that apply for the protective function are described in the Functional Safety Manual (FY).

2.3 Registered trademarks

HART®

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

Apple®

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Android®

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

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3 Basic safety instructions

3.1 Requirements for the personnel

The personnel responsible for installation, commissioning, diagnostics, and maintenance must meet the following conditions:

- Trained, qualified specialists must have a relevant qualification for this specific function and task
- They must be authorized by the plant owner/operator
- They must be familiar with federal/national regulations
- Before beginning work, the specialist staff must have read and understood the instructions in the manuals and supplementary documentation as well as in the certificates (depending on the application)
- They must follow instructions and comply with general policies

The operating personnel must meet the following conditions:

- They must be instructed and authorized according to the requirements of the task by the plant operator.
- They must follow the instructions in these Operating Instructions.

3.2 Intended use

The Gammapilot FMG50 is a compact transmitter for non-contact level, point level, density and concentration measurement. The detector is up to 3 m (9.84 ft) in length. The Gammapilot FMG50 is certified according to IEC 61508 for safety-related operation up to SIL 2/3.

3.3 Hazardous area

If the measuring system is used in hazardous areas, the corresponding national standards and regulations must be observed. The device is accompanied by separate "Ex documentation", which is an integral part of these Operating Instructions. The installation specifications, connection values and safety instructions listed in this supplementary documentation must be observed.

- Technical personnel must be qualified and trained for the hazardous area.
- Comply with the metrological and safety-related requirements for the measuring point.

WARNING

- ▶ Observe the safety instructions associated with the device. These instructions depend on the certificate ordered.

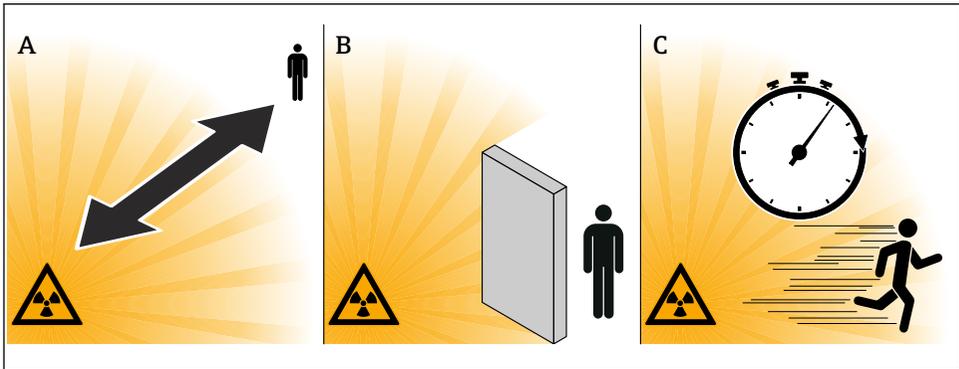
3.4 Radiation protection

The Gammapilot FMG50 is used in conjunction with a radiation source, fitted in a source container. The Gammapilot FMG50 does not emit any ionizing radiation. Observe the following instructions when handling radiation sources:

3.4.1 Basic radiation protection guidelines

⚠ WARNING

- ▶ When working with radiation sources, avoid any unnecessary exposure to radiation. All unavoidable radiation exposure must be kept to a minimum. Three basic concepts apply to achieve this:



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- A *Shielding*
- B *Time*
- C *Distance*

⚠ CAUTION

- ▶ When working with source containers, all the instructions for mounting and usage outlined in the following documents must be observed:

**Source container documentation****■ FQG60:**

- TI00445F
- BA02521F

■ FQG61, FQG62:

- TI00435F
- BA02577F

■ FQG63:

- TI00446F
- BA02594F

■ FQG66:

- TI01171F
- BA01327F

■ FQG74:

- TI01798F
- BA02365F
- BA02361F

Shielding

Ensure the best possible shielding between the radiation source and yourself and all other person. Effective shielding is provided by source containers (FQG60, FQG61/ FQG62, FQG63, FQG66, FQG74) and all high-density materials (lead, iron, concrete etc.).

Time

Remain as short as possible in the area exposed to radiation.

Distance

Keep as far away from the radiation source as possible. The radiation intensity decreases in proportion to the square of the distance from the radiation source.

3.5 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.

3.6 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.

3.7 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 general safety standards and legal requirements.

The manufacturer confirms successful testing of the device by affixing to it the CE mark, the UKCA mark, the C-Tick mark and the EAC mark.

3.8 Supplementary safety instructions

Devices with a NaI (TI) configuration contain more than 0.1% sodium iodide with CAS No. 7681-82-5 .

The sodium iodide is generally not accessible and fully encapsulated.

If the sodium iodide encapsulation inside the device is damaged, the safety instructions in the Safety Datasheet CAS No. 7681-82-5 must be strictly observed.

4 Incoming acceptance and product identification

4.1 Incoming acceptance

Check the following during incoming acceptance:

- Are the order codes on the delivery note and the product sticker identical?
- Are the goods undamaged?
- Does the data on the nameplate match the order specifications on the delivery note?
- If required (see nameplate), are the Safety Instructions (XA) provided?



If any one of these conditions is not met, contact your Endress+Hauser Sales Center.

4.1.1 Product identification

The following options are available for identification of the device:

- Nameplate specifications
- Extended order code with breakdown of the device features on the delivery note
- ▶ Enter serial number from nameplates in *W@M Device Viewer* (www.endress.com/deviceviewer)
 - ↳ All of the information on the measuring device and on the scope of the technical documentation pertaining to the device is displayed.
- ▶ Enter the serial number from the nameplate into the *Endress+Hauser Operations App* or scan the 2-D matrix code on the nameplate.
 - ↳ All of the information on the measuring device and on the scope of the technical documentation pertaining to the device is displayed.

4.1.2 Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany
Place of manufacture: See nameplate.

4.2 Transport, storage and disposal

4.2.1 Storage conditions

Pack the device so that it is protected against impact for storage and transport. The original packaging offers the best protection for this. The permitted storage temperature is:

NaI (TI) crystal

-40 to +80 °C (-40 to +176 °F)

PVT scintillator (standard)

-40 to +60 °C (-40 to +140 °F)

PVT scintillator (high-temperature version)

-20 to +80 °C (-4 to +176 °F)



Since the device contains a battery, it is recommended to store it at room temperature, away from direct sunlight.

4.2.2 Transportation to measuring point



Risk of injury

- ▶ Follow the safety instructions and transport conditions for devices weighing more than 18 kg (39.69 lb).

4.2.3 Disposal



If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

Battery disposal

- The end user is legally obliged to return used batteries.
- The end user can return old batteries or electronic assemblies containing these batteries free of charge to Endress+Hauser.

Disposing of devices with NaI (Tl) crystal

Devices with version NaI(Tl) contain more than 0.1% sodium iodide and are recorded in Safety Datasheet CAS No. 7681-82-5 and in small quantities of thallium iodide in Safety Datasheet CAS No. 7790-30-9 .

⚠ CAUTION

Health hazard if inhaled or swallowed!

The Gammapilot with NaI (Tl) crystal contains sodium iodide (thallium), which is harmful if inhaled or swallowed.

- ▶ Seek medical attention immediately after inhalation or swallowing.
- ▶ If the coating of the NaI (Tl) crystal is not present or is defective, wear personal protective equipment when handling the substance.

⚠ CAUTION

Substance hazardous to the aquatic environment!

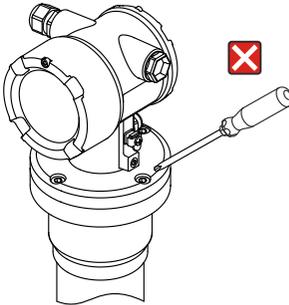
The Gammapilot NaI (Tl) crystal contains sodium iodide (thallium), which is very toxic to aquatic organisms. The product must not be disposed of together with domestic waste or allowed to enter the waste water system.

- ▶ Dispose of the product only through an officially authorized waste disposal company.

5 Installation

⚠ WARNING

- ▶ The four screws connecting the detector pipe to the terminal head may not be opened.



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5.1 Installation requirements

5.1.1 General

- The angle of emission of the source container must be exactly aligned to the measuring range of the Gammapilot FMG50. Observe the measuring range marks of the device.
- The source container and the Gammapilot FMG50 should be mounted as close to the vessel as possible. Any access to the useful beam must be blocked to ensure that it is not possible to reach into this area.
- The Gammapilot FMG50 should be protected against direct sunlight or process heat in order to increase its service life.
 - Feature 620, option PA: "Weather protection cover 316L"
 - Feature 620, option PU: "Heat shield 3500-4000 mm, PVT"
 - Feature 620, option PV: "Heat shield 1200-3000 mm, PVT"
 - Feature 620, option PW: "Heat shield NaI, 200-800 mm, PVT"
- Terminals can optionally be ordered with the device
- The mounting device must be installed in such a way as to withstand the weight of the Gammapilot FMG50 under all anticipated operating conditions (e.g. vibrations).



More information with regard to the safety-related use of the Gammapilot FMG50 can be found in the Functional Safety Manual.

In addition to the dimensions and weights, the mounting requirements for level measurement and point level measurement are described in the following section.



Mounting requirements for

- Density measurement
- Interface measurement
- Density profile measurement (DPS)
- Concentration measurement
- Concentration measurement with radiating media
- Flow measurements

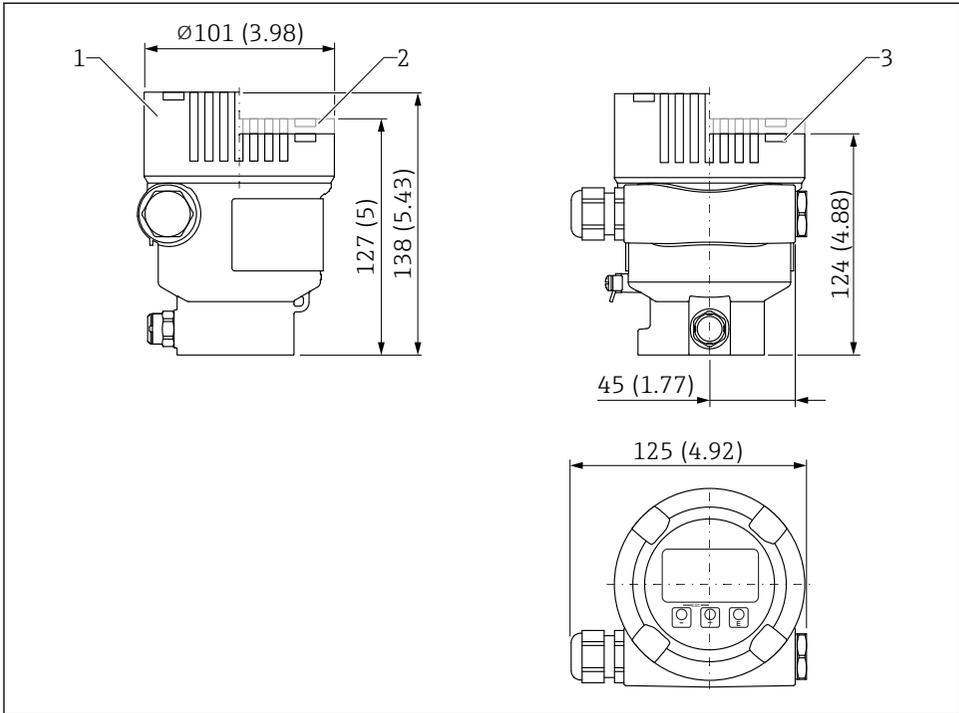
are described in the Operating Instructions.

5.1.2 Dimensions



The dimensions of the individual components must be added together for the total dimensions.

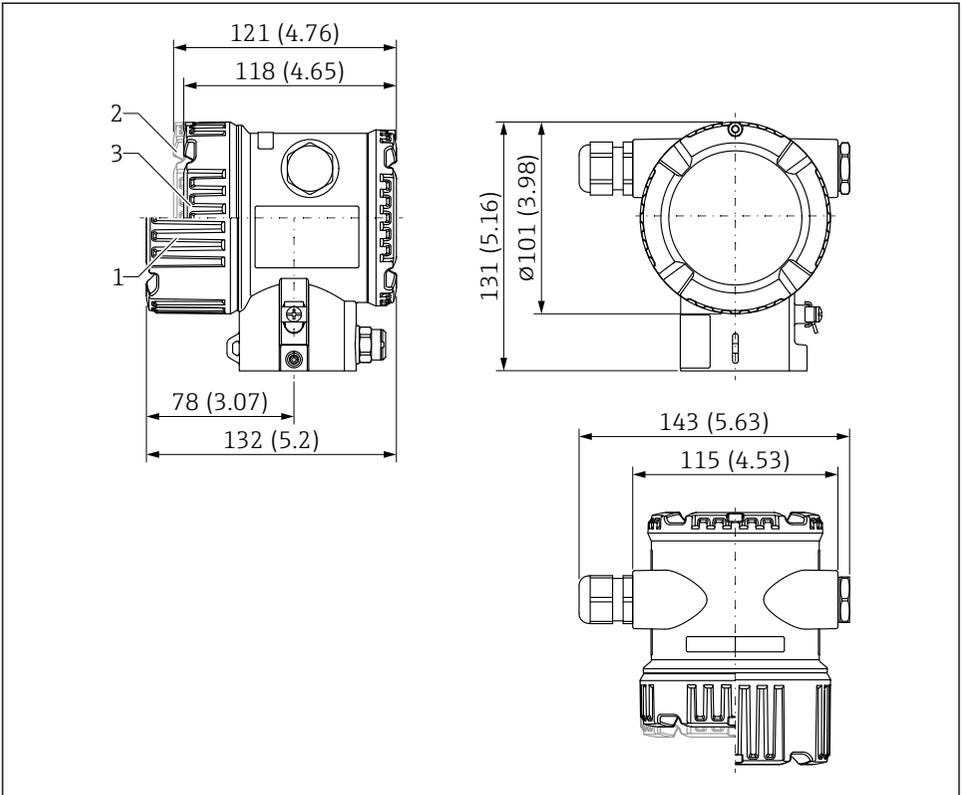
Single compartment housing, aluminum, coated



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- 1 Dimensions; single compartment housing, aluminum, coated; incl. M20 coupling and plug, plastic.
Unit of measurement mm (in)
- 1 Height with cover comprising glass sight glass (devices for Ex d/XP, dust Ex)
- 2 Height with cover comprising plastic sight glass
- 3 Cover without sight glass

Dual compartment housing, aluminum, coated

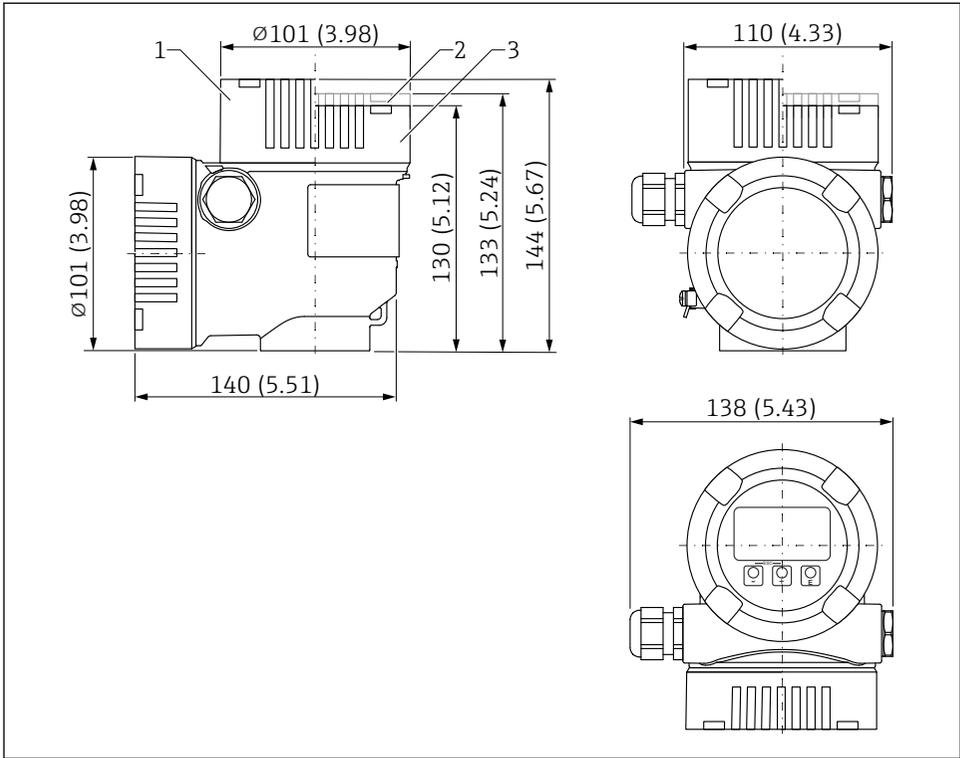


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2 Dimensions; dual compartment housing, aluminum, coated; incl. M20 coupling and plug, plastic.
Unit of measurement mm (in)

- 1 Height with cover comprising glass sight glass (devices for Ex d/XP, dust Ex)
- 2 Height with cover comprising plastic sight glass
- 3 Cover without sight glass

Dual compartment housing, L-shaped, aluminum, coated



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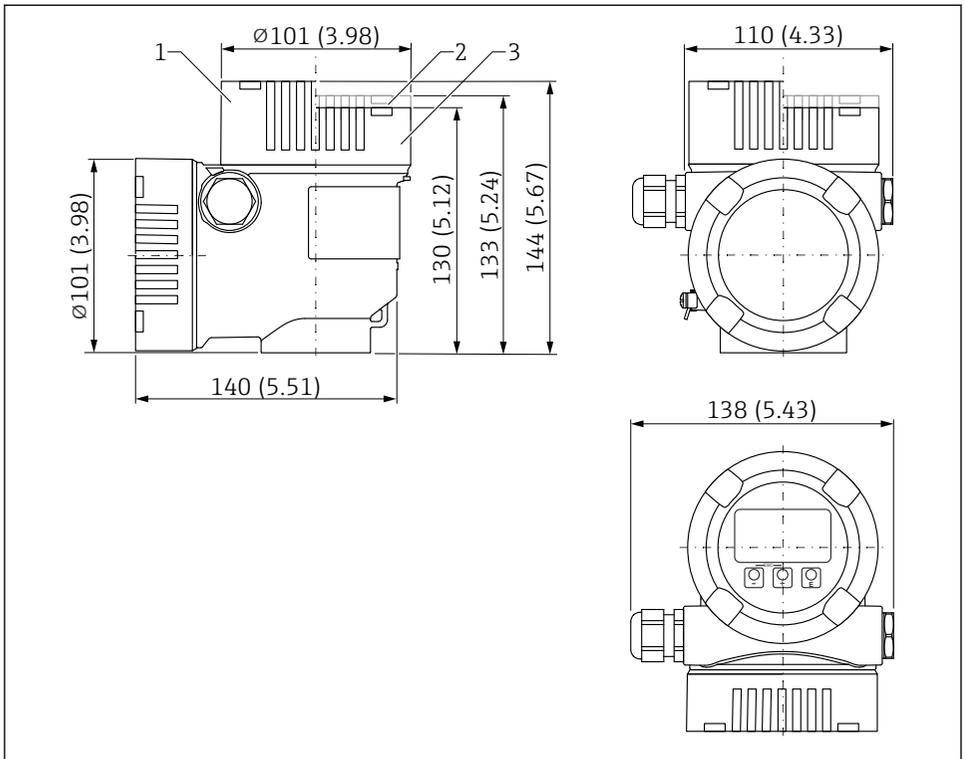
3 Dimensions; dual compartment housing L-shaped, aluminum, coated; incl. M20 coupling and plug, plastic. Unit of measurement mm (in)

1 Height with cover comprising glass sight glass (devices for Ex d/XP, dust Ex)

2 Height with cover comprising plastic sight glass

3 Cover without sight glass

Dual compartment housing, L-shaped, 316L

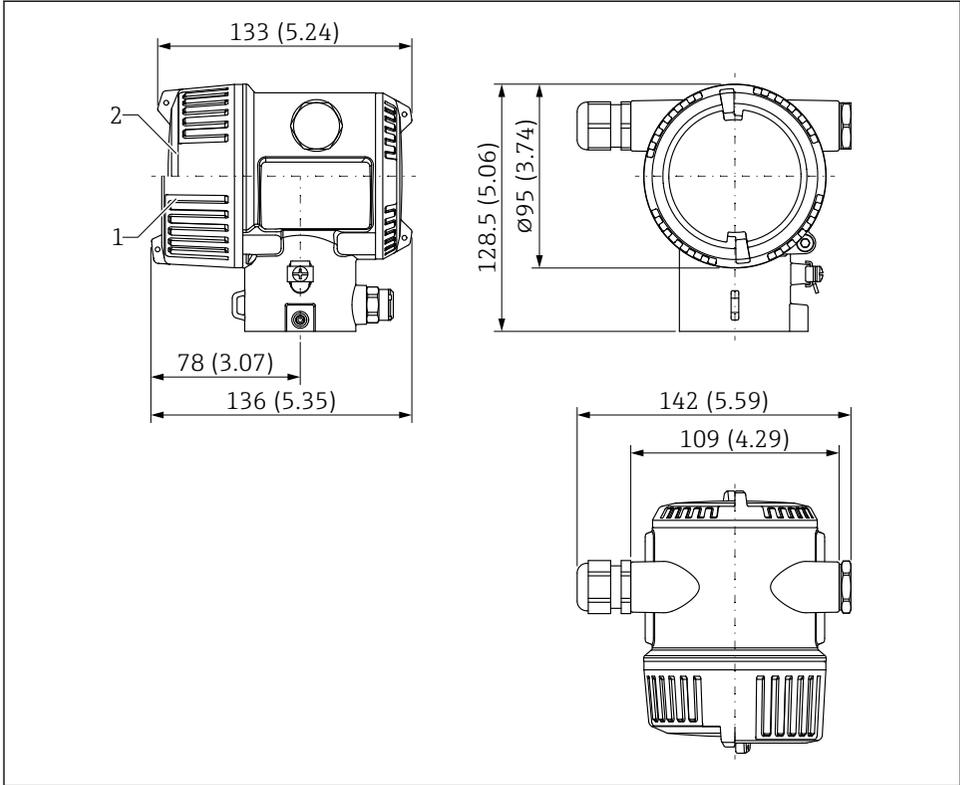


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4 Dimensions; dual compartment housing L-shaped, 316L; incl. M20 coupling and plug, plastic. Unit of measurement mm (in)

- 1 Height with cover comprising glass sight glass (devices for Ex d/XP, dust Ex)
- 2 Height with cover comprising plastic sight glass
- 3 Cover without sight glass

Stainless steel dual-compartment housing, precision cast

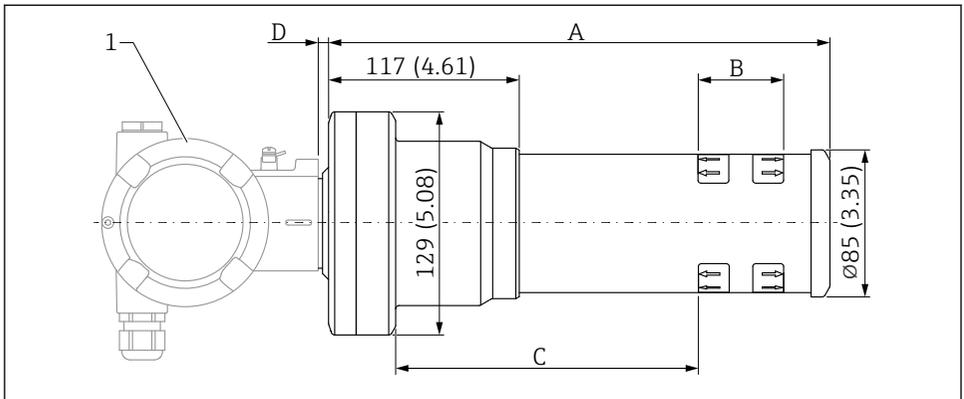


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Unit of measurement mm (in)

- 1 Device with display, cover with sight glass made of glass (devices for Ex d/XP, dust Ex):
136 mm (5.35 in)
- 2 Device without display, cover without sight glass: 133 mm (5.24 in)

Detector tube



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1 Housing

A Overall length of detector tube

B Position and length of the measuring range

C Distance between device flange and start of measuring range - PVT, distance: 171 mm (6.73 in)

C Distance between device flange and start of measuring range - NaI (TI), distance: 178 mm (7.01 in)

D Distance between device flange and housing: 6 mm (0.24 in)

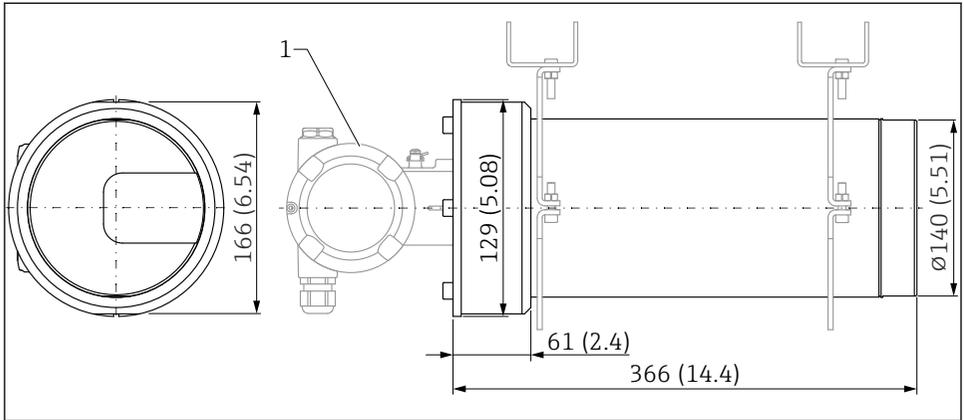
- **Version NaI (TI) 2" :**
 - Total length A: 292 mm (11.5 in)
 - Measuring range length B: 51 mm (2 in)
- **Version NaI (TI) 4" :**
 - Total length A: 341 mm (13.4 in)
 - Measuring range length B: 102 mm (4 in)
- **Version NaI (TI) 8" :**
 - Total length A: 451 mm (17.8 in)
 - Measuring range length B: 204 mm (8 in)
- **Version PVT 50 :**
 - Total length A: 292 mm (11.5 in)
 - Measuring range length B: 50 mm (1.96 in)
- **Version PVT 100 :**
 - Total length A: 341 mm (13.4 in)
 - Measuring range length B: 100 mm (3.94 in)
- **Version PVT 200 :**
 - Total length A: 451 mm (17.8 in)
 - Measuring range length B: 200 mm (8 in)
- **Version PVT 400 :**
 - Total length A: 651 mm (25.6 in)
 - Measuring range length B: 400 mm (16 in)

- **Version PVT 800 :**
 - Total length A: 1 051 mm (41.4 in)
 - Measuring range length B: 800 mm (32 in)
- **Version PVT 1200 :**
 - Total length A: 1 451 mm (57.1 in)
 - Measuring range length B: 1 200 mm (47 in)
- **Version PVT 1600 :**
 - Total length A: 1 851 mm (72.9 in)
 - Measuring range length B: 1 600 mm (63 in)
- **Version PVT 2000 :**
 - Total length A: 2 251 mm (88.6 in)
 - Measuring range length B: 2 000 mm (79 in)
- **Version PVT 2400 :**
 - Total length A: 2 651 mm (104 in)
 - Measuring range length B: 2 400 mm (94 in)
- **Version PVT 3000 :**
 - Total length A: 3 251 mm (128 in)
 - Measuring range length B: 3 000 mm (118 in)
- **Version PVT 3500 :**
 - Total length A: 3 751 mm (148 in)
 - Measuring range length B: 3 500 mm (137.8 in)
- **Version PVT 4000 :**
 - Total length A: 4 251 mm (167 in)
 - Measuring range length B: 4 000 mm (157.48 in)
- **Version PVT 4500 :**
 - Total length A: 4 751 mm (187 in)
 - Measuring range length B: 4 500 mm (177 in)



If using a collimator, pay attention to the documentation SD02822F.

Gammapilot FMG50 with collimator



5 Version NaI (Tl) 2" with collimator on sensor side

1 Housing

Version NaI (Tl) 2" with collimator on sensor side:

Total length: 498 mm (19.6 in)

5.1.3 Weight



The weights of the individual components must be added together for the total weight.

Housing

Weight including electronics and display.

Single-compartment housing

Aluminum: 1.2 kg (2.65 lb)

Dual-compartment housing

- Aluminum: 1.4 kg (3.09 lb)
- Stainless steel: 3.2 kg (7.06 lb)

Dual-compartment housing, L-form

- Aluminum: 1.7 kg (3.75 lb)
- Stainless steel: 4.5 kg (9.9 lb)

Detector tube

- **Version NaI (Tl) 2" :**
Total weight: 8.31 kg (18.32 lb)
- **Version NaI (Tl) 4" :**
Total weight: 8.9 kg (19.62 lb)
- **Version NaI (Tl) 8" :**
Total weight: 9.71 kg (21.41 lb)

- **Version PVT 50 :**
Total weight: 7.91 kg (17.44 lb)
- **Version PVT 100 :**
Total weight: 8.21 kg (18.1 lb)
- **Version PVT 200 :**
Total weight: 8.81 kg (19.43 lb)
- **Version PVT 400 :**
Total weight: 9.97 kg (21.98 lb)
- **Version PVT 800 :**
Total weight: 12.25 kg (27.01 lb)
- **Version PVT 1200 :**
Total weight: 14.65 kg (32.3 lb)
- **Version PVT 1600 :**
Total weight: 16.85 kg (37.15 lb)
- **Version PVT 2000 :**
Total weight: 19.15 kg (42.23 lb)
- **Version PVT 2400 :**
Total weight: 21.45 kg (47.3 lb)
- **Version PVT 3000 :**
Total weight: 24.85 kg (54.79 lb)
- **Version PVT 3500 :**
Total weight: 27.62 kg (60.9 lb)
- **Version PVT 4000 :**
Total weight: 30.47 kg (67.19 lb)
- **Version PVT 4500 :**
Total weight: 33.32 kg (73.47 lb)

 The additional weight for small parts is: 1 kg (2.20 lb)

 If using a collimator, pay attention to the documentation SD02822F.

Gammapiilot FMG50 with collimator

Version NaI (TI) 2" with collimator on sensor side:

Weight of collimator (excluding FMG50 and excluding mounted parts): 25.5 kg (56.2 lb)

 The additional weight for small parts is: 1 kg (2.20 lb)

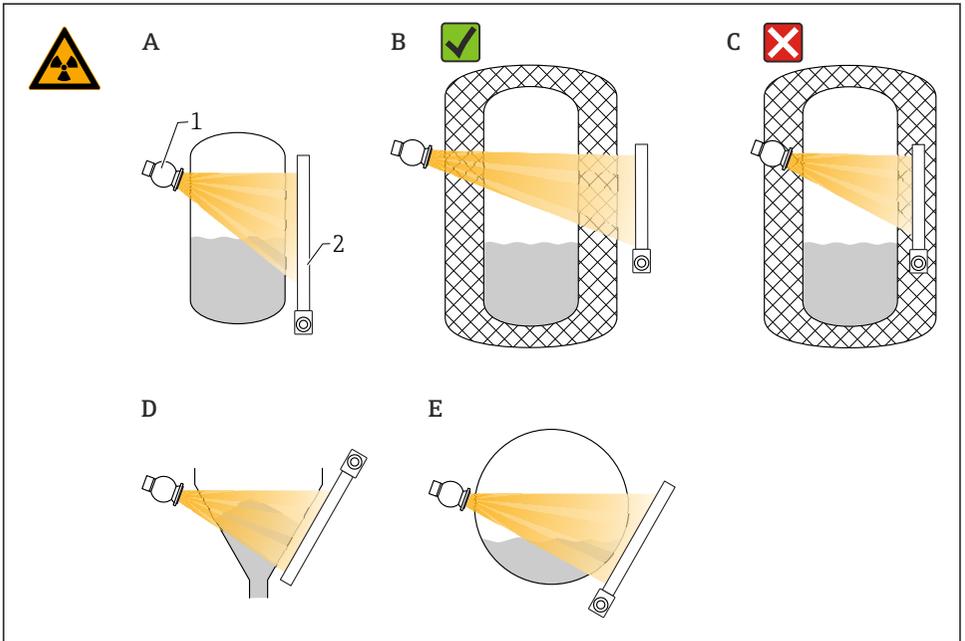
5.1.4 Mounting requirements for level measurements

Conditions

- The Gammapiilot FMG50 is mounted vertically for level measurements.
- To facilitate installation and commissioning, the Gammapiilot FMG50 can be configured and ordered with an additional support (order feature 620, option Q4: "Retaining bracket").

Examples

- ▶  **DANGER: IONIZING RADIATION WHEN OPENING THE SHUTTER!** Follow the safety instructions at the start of this section.



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- A Vertical cylinder; the Gammapilot FMG50 is mounted vertically with the detector head pointing either downwards or upwards; the gamma radiation is aligned to the measuring range.
- B Correct: Gammapilot FMG50 mounted outside the tank insulation
- C Incorrect: Gammapilot FMG50 mounted inside the tank insulation
- D Conical tank outlet
- E Horizontal cylinder
- 1 Source container
- 2 Gammapilot FMG50

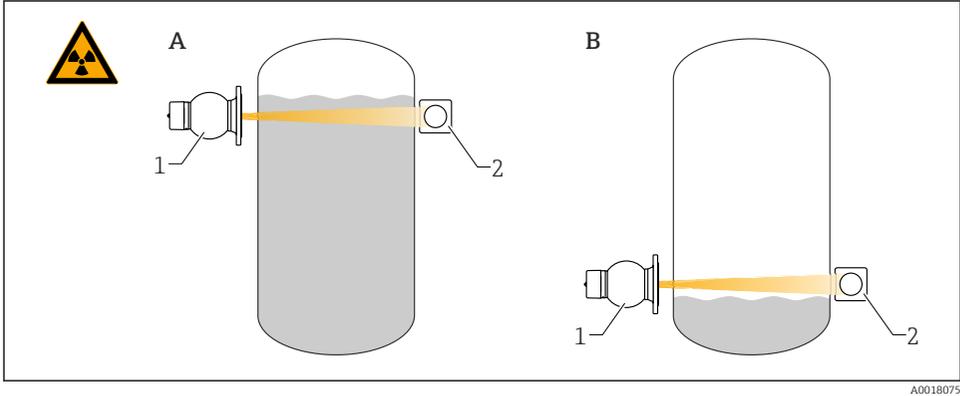
5.1.5 Mounting requirements for point level measurement

Conditions

For point level measurement, the Gammapilot FMG50 is generally mounted horizontally at the height of the desired level limit.

Measuring system arrangement

- ▶ **⚠ DANGER: IONIZING RADIATION WHEN OPENING THE SHUTTER!** Follow the safety instructions at the start of this section.



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- A *Maximum point level measurement*
 B *Minimum point level measurement*
 1 *Source container*
 2 *Gammapilot FMG50*

6 Electrical connection

6.1 Connecting requirements

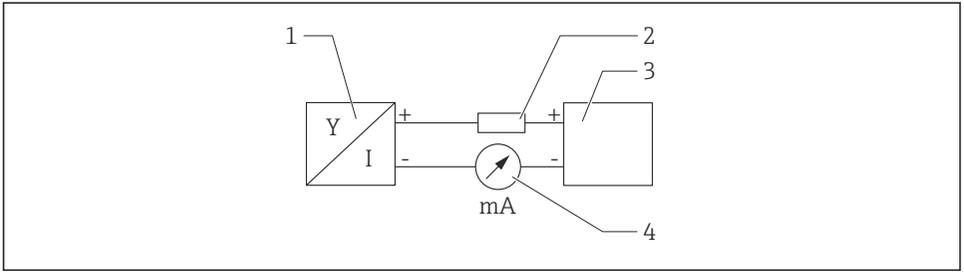
⚠ WARNING

Note the following before connecting:

- ▶ If the device is used in hazardous areas, make sure to comply with national standards and the specifications in the Safety Instructions (XAs). The specified cable gland must be used.
- ▶ The supply voltage must match the specifications on the nameplate.
- ▶ Switch off the supply voltage before connecting the device.
- ▶ Connect the potential matching line to the external ground terminal of the transmitter before connecting the device.
- ▶ Connect the protective ground to the protective ground terminal.
- ▶ 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.

6.1.1 4 to 20 mA HART connection

Connection of the device with HART communication, power source and 4 to 20 mA display



A0028908

6 Block diagram of HART connection

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



Power supply

- Non-Ex: supply voltage: 16 to 35 VDC
- Ex i: supply voltage: 16 to 30 VDC



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

The voltage drop to be taken into account is:

Max. 6 V for 250 Ω communication resistor

6.1.2 Rated cross-section

Protective ground or grounding of the cable shield: rated cross-section > 1 mm² (17 AWG)

Rated cross-section of 0.5 mm² (AWG20) to 2.5 mm² (AWG13)

6.2 Connecting the device

⚠ WARNING

- ▶ Please refer to the separate documentation on applications in hazardous areas for the safety instructions

i For optimum electromagnetic compatibility, the potential matching line should be as short as possible and at least 2.5 mm² (14 AWG) in cross-section.

i Connecting cables should be routed away from the housing from below to prevent moisture from penetrating the connection compartment. Otherwise, a drip loop should be provided or a weather protection cover should be used.

i Please follow the enclosed installation instructions if a G1/2 entry is used.

i Housing thread

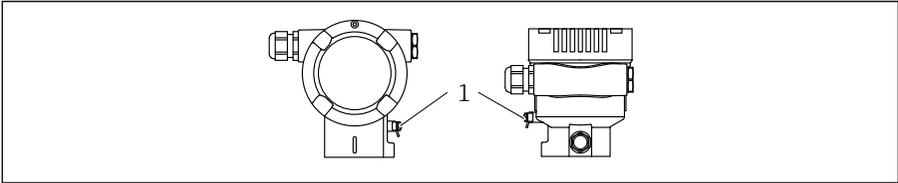
The threads of the electronics and connection compartment can be coated with an anti-friction coating.

The following applies for all housing materials:

⊗ Do not lubricate the housing threads.

6.2.1 Direct connection

1.

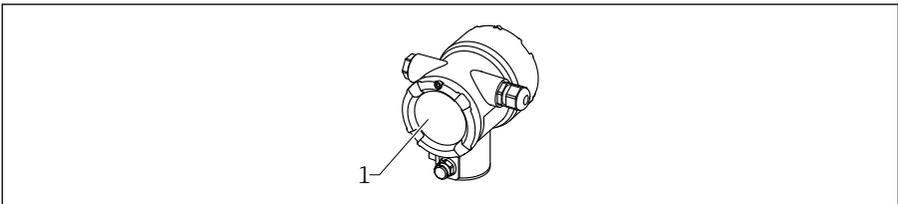


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1 Ground terminal for connecting the potential matching line

Connect the potential matching line to the ground terminal.

2.



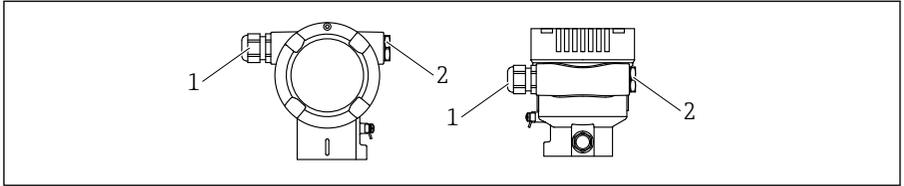
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1 Connection compartment

Release the cover lock to the connection compartment.

3. Unscrew the cover.

4.

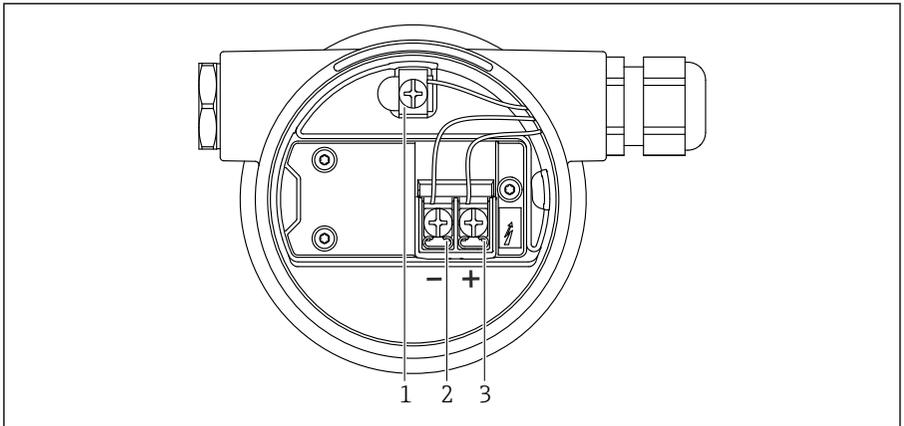


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- 1 Cable entry
- 2 Dummy plug

Guide the cables into the cable glands or cable entries.

5.



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- 7 Connection terminals and ground terminal in the connection compartment
- 1 Internal ground terminal (to ground the cable shield)
- 2 Negative terminal
- 3 Positive terminal

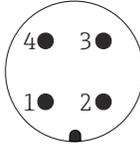
Connect the cable.

- 6. Tighten the cable glands or cable entries so that they are leak-tight.
- 7. Screw the cover securely back onto the connection compartment.
- 8. Tighten the cover lock.

6.2.2 Connection with fieldbus connector

In the case of device versions with a fieldbus connector, the housing does not have to be opened to establish the connection.

Pin assignment for connector M12-A

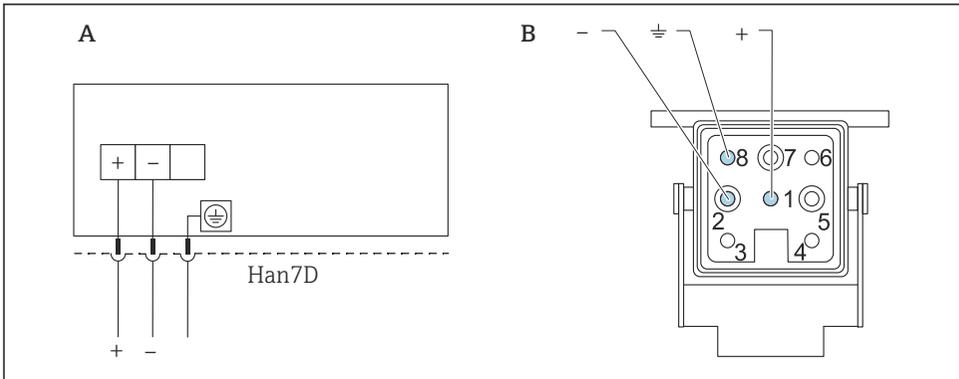


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- Pin 1: Signal +
- Pin 2: Not used
- Pin 3: Signal -
- Pin 4: Ground

Material: CuZn, gold-plated contacts of the plug-in jack and plug

6.2.3 Connection with a Harting plug Han7D



A0019990

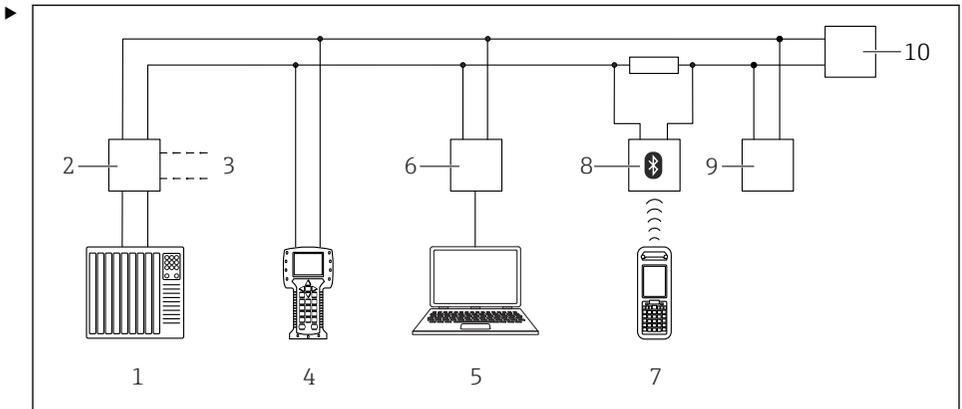
- A Electrical connection for devices with Harting plug Han7D
- B View of the connection on the device

Material: CuZn, gold-plated contacts of the plug-in jack and plug

6.3 Connecting an operating unit

 For descriptions on the individual operating units, see the Operating Instructions.

A wide range of operating units is available for operating the device via the HART protocol. Connection of these units is illustrated in the diagram below.



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8 Options for remote operation via HART protocol

- 1 PLC (programmable logic controller)
- 2 Transmitter power supply unit, e.g. RN221N (with communication resistor)
- 3 Connection for Commubox FXA191, FXA195 and Field Communicator 375, 475
- 4 Field Communicator 475
- 5 Computer with operating tool (e.g. DeviceCare/FieldCare, AMS Device Manager, SIMATIC PDM)
- 6 Commubox FXA191 (RS232) or FXA195 (USB)
- 7 Field Xpert SFX350/SFX370
- 8 VIATOR Bluetooth modem with connecting cable
- 9 RIA15
- 10 Device (FMG50)

Connect one or more operating units to the device.

7 Commissioning

7.1 Post-installation and post-connection check

Perform the post-installation check and the post-connection check for the FMG50 prior to commissioning the measuring point.

You can reset the device to the factory setting in the event of an error.

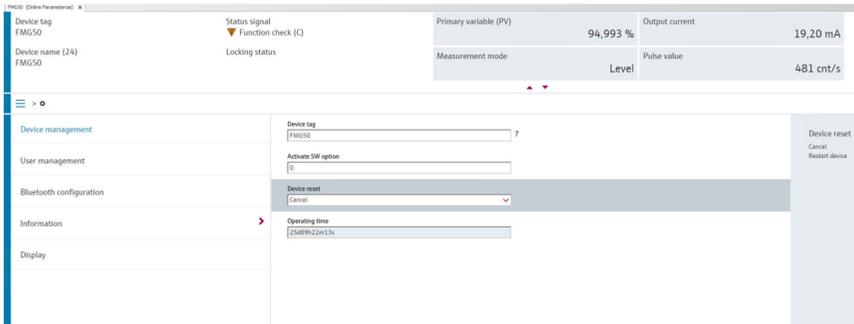
7.1.1 Resetting to the default configuration

CAUTION

- ▶ A reset may negatively impact the measurement. As a rule, a basic setup must be performed again after a reset. All calibration data are deleted after a reset. A complete recalibration is needed to put the measurement back into operation.

1. Connect the device with FieldCare or DeviceCare.

2. Open the device in FieldCare or DeviceCare.
 - ↳ The dashboard (homepage) of the device is displayed:
Click "System -> Device management"



3. Reset the device in the "Device reset" parameter

The following types of reset can be selected:

- **Restart device**
A soft reset is performed here. The device software performs all the diagnostics that would also be performed by a hard reset by switching the device on/off.
- **Reset to factory default**
It is always advisable to reset the customer parameters if you want to use a device with an unknown history, or if the operating mode is changed. When a reset is performed, all customer parameters are reset to the factory default values
- **Optional: reset to customer settings**
If the device was ordered with a customized configuration, a reset restores these customer settings configured at the factory.



A reset can also be performed on site via the operating keys (see the "Commissioning via onsite operation" section).

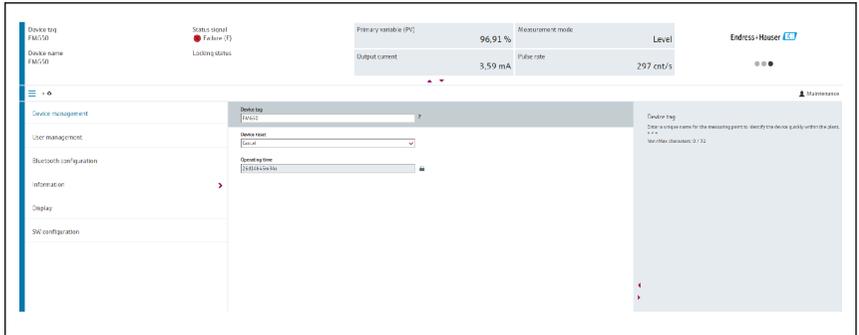
7.2 Commissioning using the wizard

A wizard is provided in FieldCare or DeviceCare ¹⁾ that guides the user through the initial commissioning process.

1. Connect the device with FieldCare or DeviceCare.

1) FieldCare and DeviceCare are available for download at www.software-products.endress.com. To download the software, it is necessary to register in the Endress+Hauser software portal.

2. Open the device in FieldCare or DeviceCare.
 - ↳ The dashboard (homepage) of the device is displayed:



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 9 Screenshot: Commissioning Wizard

3. Click "Commissioning" to launch the Wizard.
4. Enter the appropriate value in each parameter or select the appropriate option. These values are written directly to the device.
5. Click "Next" to go to the next page.
6. Once all the pages have been completed, click "Finish" to close the Wizard.



If you cancel the Wizard before all the necessary parameters have been entered, the device may be in an undefined state. In such situations, it is advisable to reset the device to the factory default settings.

7.3 Operation

7.3.1 Operation via FieldCare/DeviceCare

FieldCare/DeviceCare is an Endress+Hauser asset management tool based on FDT technology. With FieldCare/DeviceCare you can configure all Endress+Hauser devices as well as devices from other manufacturers that support the FDT standard. Hardware and software requirements can be found on the Internet:

www.de.endress.com -> Search: FieldCare -> FieldCare -> Technical data

FieldCare supports the following functions:

- Configuration of transmitters in online mode
- Loading and saving device data (upload/download)
- Documenting the measuring point

Connection options:

- HART via Commubox FXA195 and the USB port on a computer
- Commubox FXA291 via the service interface

7.3.2 Operation via SmartBlue app

Requirements

Device requirements

Commissioning via SmartBlue is only possible if the device has a Bluetooth module.

SmartBlue system requirements

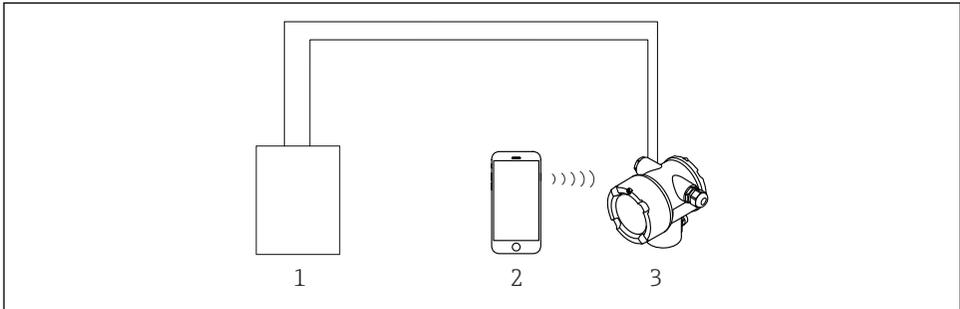
SmartBlue is available as a download from the Google Play Store for Android devices and from the iTunes Store for iOS devices.

- Devices with iOS:
 - iPhone 4S or higher from iOS9.0; iPad2 or higher from iOS9.0; iPod Touch 5th generation or higher from iOS9.0
- Devices with Android:
 - From Android 4.4 KitKat and *Bluetooth*® 4.0

Initial password

The serial number of the device is used as the initial password when establishing the connection for the first time. The serial number can be found on the nameplate.

SmartBlue app



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10 Operation via SmartBlue (app)

- 1 Transmitter power supply unit
- 2 Smartphone / tablet with SmartBlue (app)
- 3 Transmitter with Bluetooth module

1. Scan the QR code or enter "SmartBlue" in the search field of the App Store.



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11 Download link

2. Start SmartBlue.
3. Select device from livelist displayed.
4. Enter the login data:
 - ↳ User name: admin
 - Password: serial number of the device or ID number of the Bluetooth display
 - An available Bluetooth connection is indicated by a flashing Bluetooth symbol.
5. Tap the icons for more information.

For commissioning, see the "Commissioning Wizard" section

 Change the password after logging in for the first time!

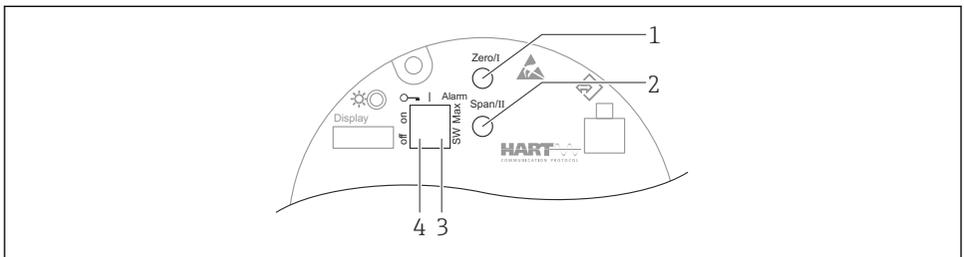
 Bluetooth is not available in all markets.

Please pay attention to the radio approvals listed in document SD02402F or contact the Endress+Hauser sales organization.

7.3.3 Operation via local display

 Operation via keys is only enabled if a display is not connected.

The device can also be operated on site using the keys. If operation is locked using the DIP switches on site, parameter entry via communication is not possible.



A0039285

- 1 *Operating key for empty calibration (function I)*
- 2 *Operating key for full calibration (function II)*
- 3 *DIP switch for alarm current (SW-defined/Min. alarm)*
- 4 *DIP switch for locking and unlocking the device*

- **Empty calibration:** Press and hold the operating key for empty calibration (I) > 3 s
- **Full calibration:** Press and hold the operating key for full calibration (II) > 3 s
- **Background calibration:** Simultaneously press and hold the operating key for empty calibration (I) and operating key for full calibration (II) > 3 s
- **Reset to factory defaults:** Simultaneously press and hold the operating key for empty calibration (I) and full calibration (II) > 12 s. The LED starts flashing. When the flashing stops, the device is reset to the factory default settings.

Level basic calibration

Calibration time per calibration: **5 min!**

1. Reset
 - ↳ Press both keys > 12 s
2. Start background calibration
 - ↳ Press both keys > 3 s
 - The green LED is lit for one second and starts flashing at an interval of 2 s
3. Start empty calibration
 - ↳ Press the "Zero / 1" key > 3 s
 - The green LED is lit for one second and starts flashing at an interval of 2 s
 - Wait 5 min until the green LED stops flashing
4. Start full calibration
 - ↳ Press the "Span / 2" key > 3 s
 - The green LED is lit for one second and starts flashing at an interval of 2 s
 - Wait 5 min until the green LED stops flashing

 **A reset deletes all calibrations!**

Status and power LED

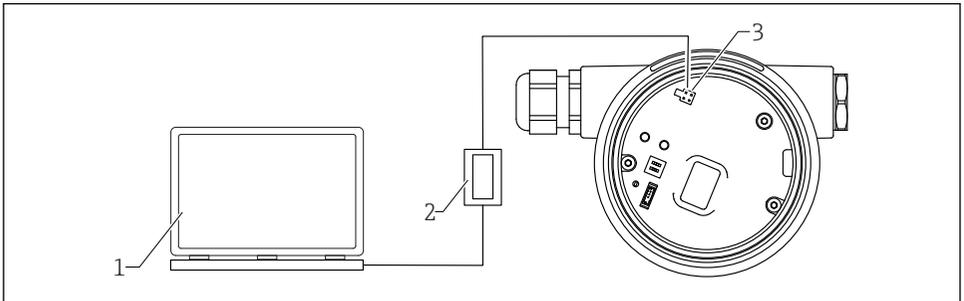
A green LED that signals the status and button activation feedback is provided on the electronic insert.

Behavior of the LED

- The LED flashes once briefly when the device is started
- When a key is pressed, the LED flashes to confirm the key activation
- When a reset is performed, the LED flashes as long as both keys are pressed and the reset is not yet active (countdown). The LED stops flashing once the reset is active.
- The LED flashes while calibration is being performed via onsite operation

7.3.4 Operation via the service interface

DeviceCare/FieldCare via service interface (CDI)



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12 DeviceCare/FieldCare via service interface (CDI)

- 1 Computer with DeviceCare/FieldCare operating tool
- 2 Commubox FXA291
- 3 Service interface (CDI) of the device (= Endress+Hauser Common Data Interface)

7.3.5 Operation via WirelessHART

SWA70 WirelessHART adapter with the Commubox FXA195 and the "FieldCare/DeviceCare" operating program

7.3.6 Access to operating menu via local display

Device display (optional)

Possible to operate the optical operating keys through the cover. No need to open the device.

Functions:

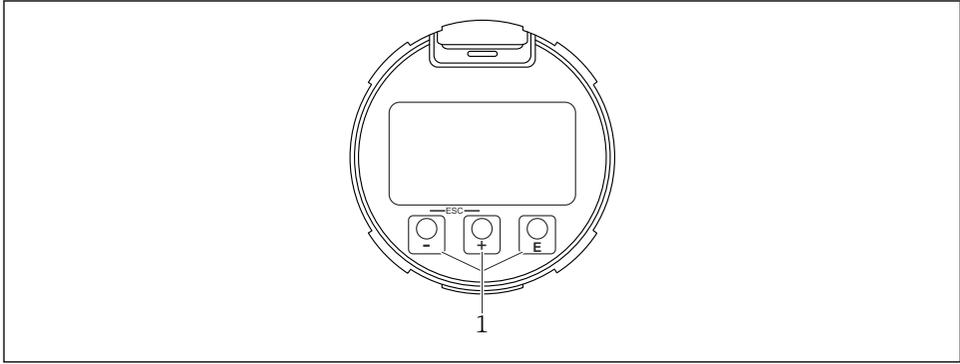
- Display measured values and fault and notice messages
- Background lighting, which switches from green to red in the event of an error
- The device display can be removed for easier operation



Backlighting is switched on or off depending on the supply voltage and the current consumption.



The device display is optionally available with Bluetooth® wireless technology.



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13 Graphic display with optical operating keys (1)

- **+** key
 - Navigate downwards in the selection list
 - Edit the numerical values and characters within a function
- **-** key
 - Navigate upwards in the selection list
 - Edit the numerical values and characters within a function
- **E** key
 - Change from main display to main menu
 - Confirm entry
 - Jump to the next item
 - Selection of a menu item and activation of edit mode
 - Unlock/lock the display operation
 - Press and hold the **E** key to display a short description of the selected parameter (if available)
- **+** key and **-** key (ESC function)
 - Exit edit mode for a parameter without saving the changed value
 - Menu at a selection level: pressing the keys simultaneously takes the user back up a level in the menu
 - Press and hold the keys simultaneously to return to the upper level

Operation via Bluetooth® wireless technology (optional)

Prerequisite

- Device with device display including Bluetooth® wireless technology
- Smartphone or tablet with Endress+Hauser SmartBlue app or PC with DeviceCare from version 1.07.05 or Field Xpert SMT70

The connection has a range of up to 25 m (82 ft). The range can vary depending on environmental conditions such as attachments, walls or ceilings.



The operating keys on the display are locked as soon as a Bluetooth® connection is established.

An available Bluetooth® connection is indicated by a flashing Bluetooth symbol.



If the Bluetooth® display is removed from one device and installed in another device.

- All login data are stored only in the Bluetooth® display and not in the device.
- The password changed by the user is also stored in the Bluetooth® display.



Special Documentation SD02530P

Operation via SmartBlue app

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

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



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14 QR code for free Endress+Hauser SmartBlue App

Download and installation:

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

Login:

1. Enter the user name: admin
2. Enter the initial password: serial number of the device

3. Change the password after logging in for the first time

Information on password and reset code

For devices that meet the requirements of IEC 62443-4-1 "Secure product development lifecycle management" ("ProtectBlue"):

- If the user-defined password is lost: refer to the user management instructions and the reset button in the operating manual.
- Refer to the associated Security Manual (SD).

For all other devices (without "ProtectBlue"):

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

7.3.7 Overview of the operating menu

A complete overview of the operating menu is provided in the "Description of Device Parameters" documentation.

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www.addresses.endress.com
