

Special Documentation

Remote display FHX50B

Accessories



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1 About this document

1.1 Document function

This manual is a supplement to the Operating Instructions included in the scope of delivery for the transmitter.

It is part of the Operating Instructions and provides additional information that is required in various phases of the life cycle of the device:

- Safety instructions
- Use
- Scope of delivery
- Technical data
- Installation
- Electrical connection
- Operation
- Maintenance
- Repair

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

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

1.2 Symbols

1.2.1 Safety symbols

CAUTION

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

DANGER

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

NOTICE

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

WARNING

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

1.2.2 Symbols for certain types of information and graphics

Tip

Indicates additional information

1, 2, 3 Series of steps

1, 2, 3, ...

Item numbers

2 Basic safety instructions

WARNING

Dust explosion hazard

- ▶ The version with a M12 plug must not be used in potentially explosive dust atmospheres.

2.1 Requirements for personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Personnel must be authorized by the plant owner/operator.
- ▶ Be familiar with federal/national regulations.
- ▶ Before starting work: personnel must read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Personnel must follow instructions and comply with general policies.

The operating personnel must fulfill the following requirements:

- ▶ Personnel are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Personnel follow the instructions in this manual.

2.2 Intended use

The device described in this manual serves as a cable-based remote control and display unit situated at a distance from the transmitter.

Incorrect use

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

Avoid mechanical damage:

- ▶ Do not touch or clean device surfaces with pointed or hard objects.

Clarification of 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.

2.3 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.

2.4 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 modifications are nevertheless required, consult with the manufacturer.

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 only original spare parts and accessories from the manufacturer.

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 put to its intended use in the hazardous area.
- ▶ Observe the specifications in the separate supplementary documentation, which is an integral part of this manual.

2.5 Product safety

This 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 EU directives listed in the device-specific EU Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

2.6 Functional Safety SIL (optional)

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

2.7 IT security

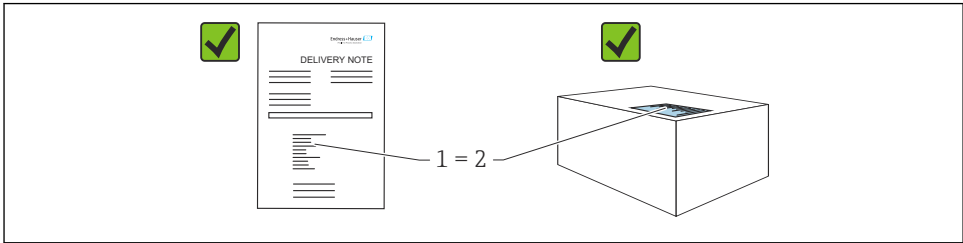
We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings. IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

2.8 Device-specific IT security

The device offers specific functions to support protective measures by the operator. These functions can be configured by the user and guarantee greater in-operation safety if used correctly. An overview of the most important functions is provided in the following section:

- Write protection via hardware write protection switch
- Access code (applies for operation via display, Bluetooth or FieldCare, DeviceCare, ASM, PDM)

3 Incoming acceptance



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Check the following during incoming acceptance:

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



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

4 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
- ▶ *Device Viewer*(www.endress.com/deviceviewer); manually enter the serial number from the nameplate.
 - ↳ All the information about the measuring device is displayed.
- ▶ *Endress+Hauser Operations app*; manually enter the serial number indicated on the nameplate or scan the 2D matrix code on the nameplate.
 - ↳ All the information about the measuring device is displayed.

4.1 Nameplate

The information that is required by law and is relevant to the device is shown on the nameplate, e.g.:

- Manufacturer identification
- Order number, extended order code, serial number
- Technical data, degree of protection
- Firmware version, hardware version
- Approval-related information, reference to Safety Instructions (XA)
- DataMatrix code (information about the device)

4.2 Manufacturer address

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

Place of manufacture: See nameplate.

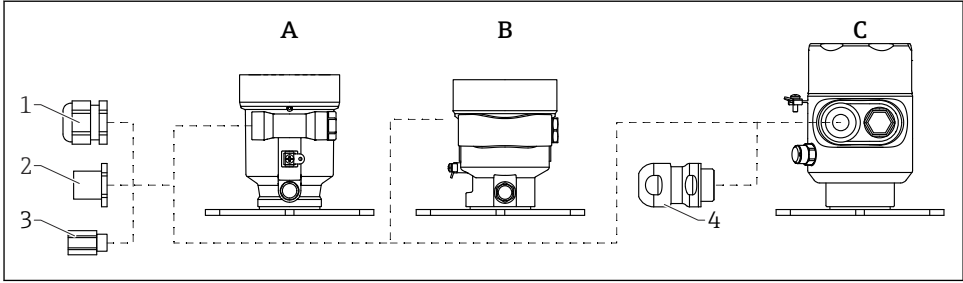
5 Use

The remote display is ordered via the Product Configurator.

If the remote display is to be used, the device version "Prepared for display FHX50B..." must be ordered.

6 Scope of delivery

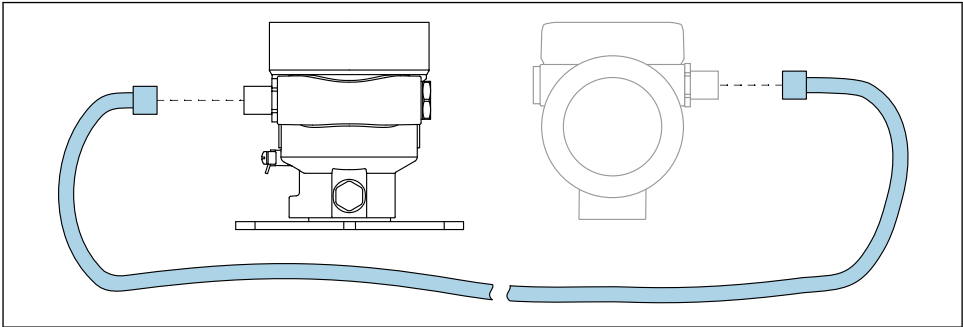
The scope of delivery depends on the version ordered according to the product structure.



A0046879

1 Housing with cable entries (available for order)

- A Single compartment housing, plastic with wall mounting plate
 B Single compartment housing, aluminum with wall mounting plate
 C Single compartment housing, hygiene with wall mounting plate
 1 M20 gland
 2 M12 plug
 3 Thread M20, thread G1/2, thread NPT1/2
 4 Gland M20, 316L, hygiene

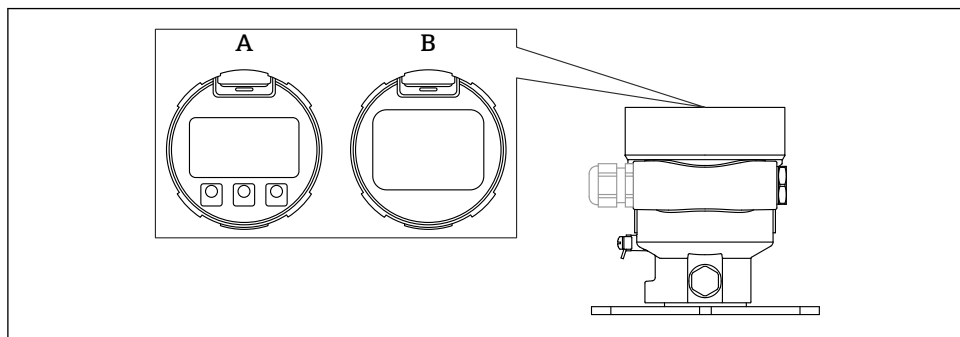


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2 Housing with cable (available for order)

- i** Cable length available in 5 m (16 ft), 10 m (33 ft), 20 m (66 ft) and 30 m (98 ft) with M12 plug and M12 socket
- Cable supplied by customer (maximum 60 m (197 ft)) for all available cable entries

6.1 Display module, installed in the housing



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 3 *Display module, installed in the housing*

- A *Graphic display with operating keys*
 B *Segment display without operating keys*

Operation via Bluetooth® wireless technology (optional)

Prerequisite

- Display including Bluetooth
- Smartphone or tablet with Endress+Hauser SmartBlue app or PC with DeviceCare from version 1.07.05 or FieldXpert 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 the device is connected via Bluetooth.

7 Technical data

7.1 Environment

7.1.1 Ambient temperature range

- -20 to +60 °C (-4 to +140 °F) can be used without limitations
- -40 to +85 °C (-40 to +185 °F) with limitations in optical properties such as display speed and contrast

-  If operating outdoors in strong sunlight:
- Mount the device in a shaded location
 - Avoid direct sunlight, particularly in warmer climatic regions

7.1.2 Storage temperature

-40 to +85 °C (-40 to +185 °F)

7.1.3 Climate class

DIN EN 60068-2-38 (test Z/AD)

7.1.4 Installation height as per IEC61010-1 Ed.3

Generally up to 5 000 m (16 404 ft) above sea level

7.1.5 Degree of protection

Test as per IEC 60529 and NEMA 250-2014

Housing

IP66/68, NEMA TYPE 4X/6P

IP68 test condition: 1.83 m under water for 24 hours.

Cable entries

- Gland M20, plastic, IP66/68 NEMA TYPE 4X/6P
- Gland M20, nickel-plated brass, IP66/68 NEMA TYPE 4X/6P
- Gland M20, 316L, IP66/68 NEMA TYPE 4X/6P
- Gland M20, hygiene, IP66/68/69 NEMA Type 4X/6P
- Thread M20, IP66/68 NEMA TYPE 4X/6P
- Thread G1/2, IP66/68 NEMA TYPE 4X/6P
If the G1/2 thread is selected, the device is delivered with an M20 thread as standard and a G1/2 adapter is included with the delivery, along with the corresponding documentation
- Thread NPT1/2, IP66/68 NEMA TYPE 4X/6P
- M12 plug
 - When housing is closed and connecting cable is plugged in: IP66/67 NEMA TYPE 4X
 - When housing is open or connecting cable is not plugged in: IP20, NEMA TYPE 1

NOTICE

M12 plug: Loss of IP protection class due to incorrect installation!

- ▶ The degree of protection only applies if the connecting cable used is plugged in and screwed tight.
- ▶ The degree of protection only applies if the connecting cable used is specified according to IP66/67 NEMA 4X.
- ▶ The protection classes are only maintained if the dummy cap is used or the cable is connected.

7.1.6 Vibration resistance

DIN EN 60068-2-64 / IEC 60068-2-64 for 20 to 2 000 Hz, 1 (m/s²)²/Hz

7.1.7 Electromagnetic compatibility (EMC)

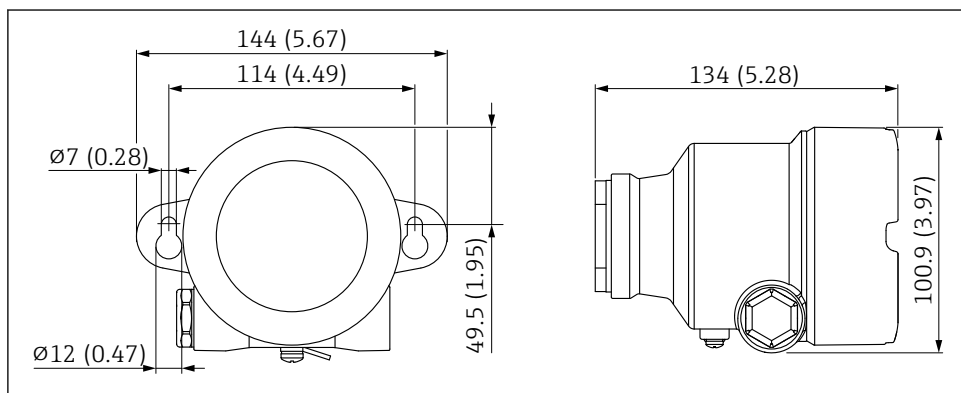
- Electromagnetic compatibility as per EN 61326 series and NAMUR recommendation EMC (NE21)
- Maximum measured error during EMC testing: < 0.5 % of the current digital measured value

For more details refer to the EU Declaration of Conformity.

7.2 Mechanical construction

7.2.1 Dimensions

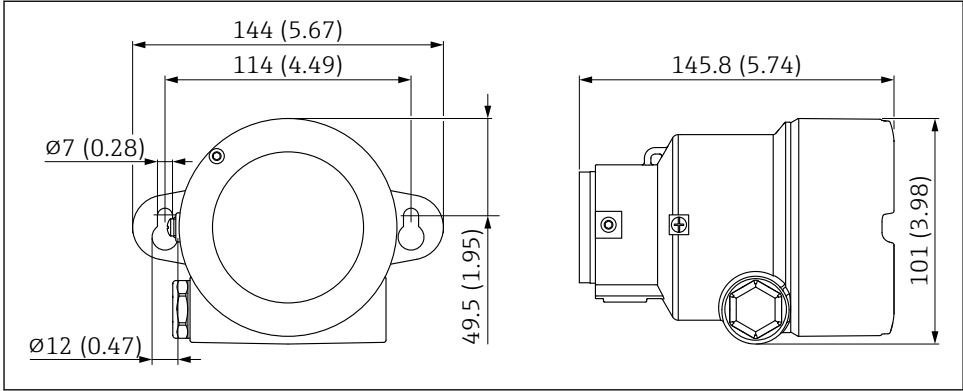
Single compartment housing, plastic



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Unit of measurement mm (in)

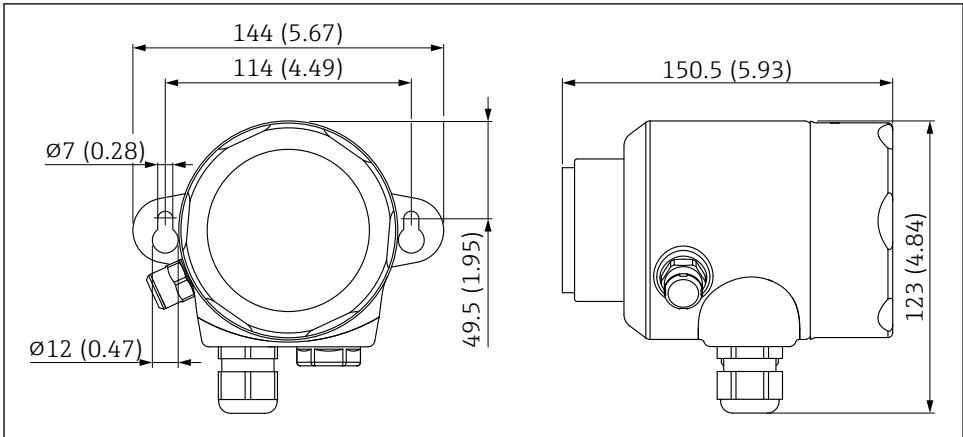
Single compartment housing, aluminum coated



A0046884

Unit of measurement mm (in)

Single compartment housing, 316L, hygiene



A0050365

Unit of measurement mm (in)

7.2.2 Weight

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

Housing

Weight data including installed display.

Single compartment housing, plastic

1.2 kg (2.65 lb)

Single compartment housing, aluminum coated

1.9 kg (4.19 lb)

Single compartment housing, 316L, hygiene

1.9 kg (4.19 lb)

Connecting cable with M12 plug and M12 socket**Cable length 5 m (16.4 ft)**

0.45 kg (0.99 lb)

Cable length 10 m (32.8 ft)

0.85 kg (1.87 lb)

Cable length 20 m (65.6 ft)

1.62 kg (3.57 lb)

Cable length 30 m (98.4 ft)

2.4 kg (5.29 lb)

7.2.3 Materials**Plastic housing**

- Housing: PBT/PC
- Cover with window: PBT/PC and PC
- Cover seal: EPDM
- Potential equalization: 316L
- Seal under potential equalization: EPDM
- Plug: PBT-GF30-FR
- M20 cable gland: PA
- Seal on plug and cable gland: EPDM
- Threaded adapter as replacement for cable glands: PA66-GF30
- Nameplate: plastic foil
- TAG plate: plastic foil, metal or provided by customer

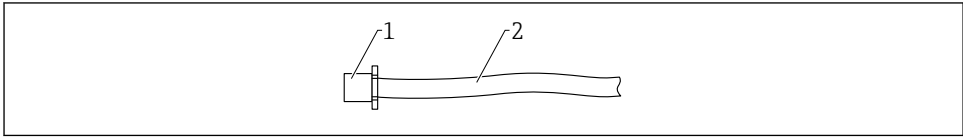
Aluminum housing, coated

- Housing: aluminum EN AC 44300
- Housing, cover coating: polyester
- Cover aluminum EN AC 44300 with PC Lexan 943A window
For Ex d, Dust-Ex applications, the window is always made from borosilicate
- Cover seal materials: HNBR
- Nameplate: plastic foil
- TAG plate: plastic foil, stainless steel or provided by the customer
- M20 cable glands: select material (stainless steel, nickel-plated brass, polyamide)

Stainless steel housing, 316L hygiene

- Housing: stainless steel 316L (1.4404)
- 316L (1.4404) stainless steel cover with PC Lexan 943A window
For Dust-Ex applications, the window is always made from borosilicate.
- Cover seal materials: EPDM
- Nameplate: stainless steel housing, labeled directly
- TAG plate: plastic foil, stainless steel or provided by the customer
- M20 cable glands: select material (stainless steel, nickel-plated brass, polyamide)

Cable



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4 Material, cable

- 1 M12 plug, M12 socket; PP, stainless steel, FPM, CuSn, Ni/AU
- 2 Cable material, PE-X, PP yarn, Cu

8 Mounting

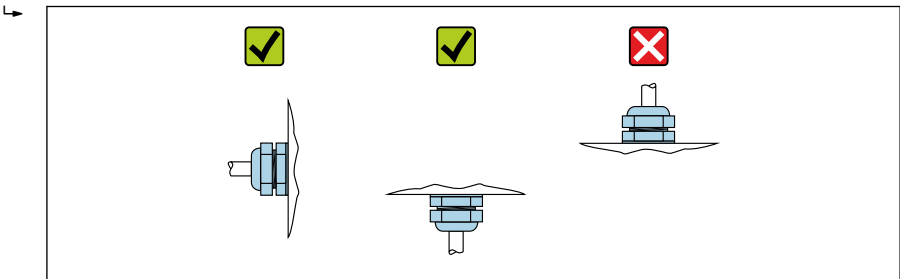
8.1 General instructions

⚠ WARNING

Loss of protection rating if the device is opened in a wet environment.

- ▶ Only open the device in a dry environment!

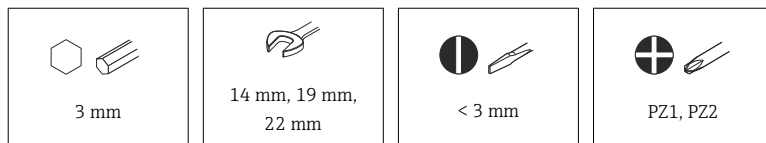
1. Install the device or turn the housing so that the cable entries do not point upwards.



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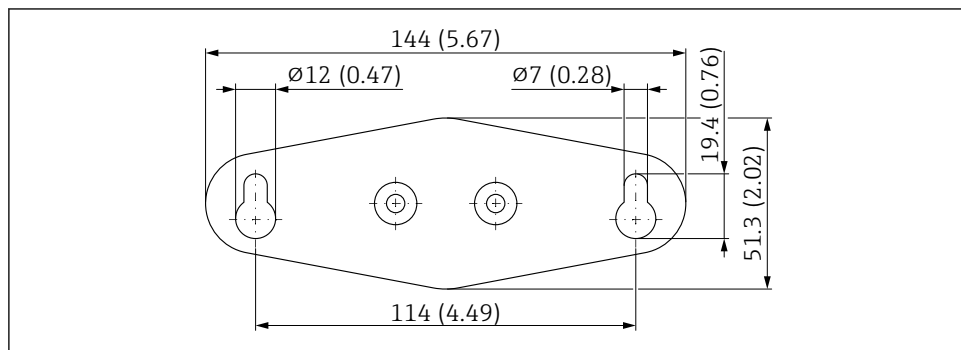
2. Always firmly tighten the housing cover and the cable entries.
3. Counter-tighten the cable entries.
4. A drip loop must be provided when laying the cables.

8.2 Tools



8.3 Wall mounting

For wall mounting, the mounting plate mounted on the device can be used.

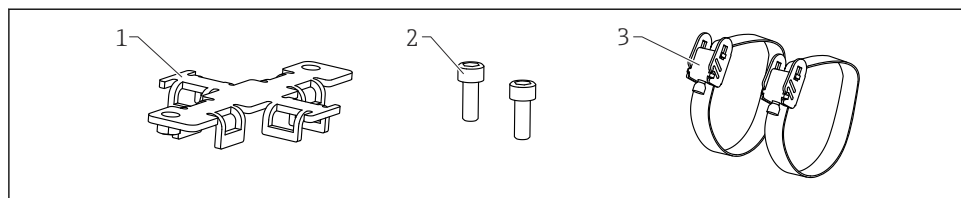


A0048522

5 Dimensions of mounting plate. Unit of measurement mm (in)

8.4 Pipe mounting

To mount on pipes with an outer diameter of 1" / 2", a mounting bracket can be ordered together with the device via the product structure "Accessory enclosed".



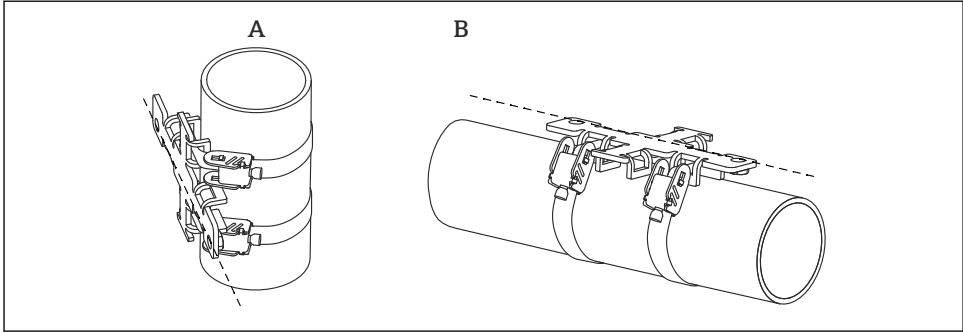
A0019381

6 Scope of delivery, mounting bracket, pipe 1" / 2"

- 1 Mounting bracket, 304 (1.4301)
- 2 2 × screws, A2
- 3 2 × hose clip, 304 (1.4301)

Order number for accessories:

71132890



A0050396

7 Mounting options

- A Vertical pipe - align the mounting bracket crosswise in relation to the pipe
 B Horizontal pipe - align the mounting bracket parallel to the pipe

9 Electrical connection

⚠ CAUTION

Guarantee electrical safety:

- ▶ 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.
- ▶ Switch off the supply voltage before connecting the device.
- ▶ The potential equalization line must be connected at both the device and the housing of the remote display. If potential differences are expected, route a conductor for potential matching between the device and the display housing.
- ▶ 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.



Housing thread

The housing threads are coated with an anti-friction coating.

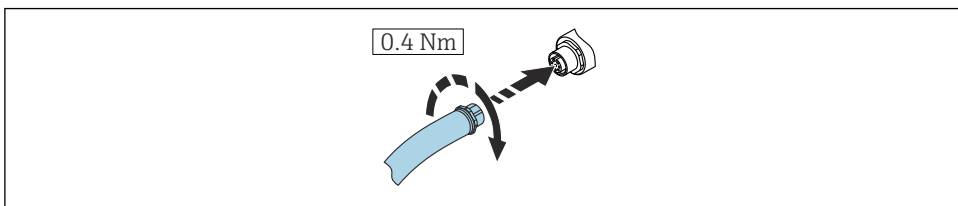
- ⊗ Avoid additional lubrication.

9.1 Supply voltage

The remote display is powered via the connected transmitter

Supply voltage	3.2 V _{DC} (max. 4 V _{DC})
Power consumption	<40 mW

9.2 Connection with M12 plug



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i Tightening torque: 0.4 Nm (0.3 lbf ft)

9.3 Connection with customer-supplied cable

9.3.1 Cable specification

Specification of customer-supplied connecting cable

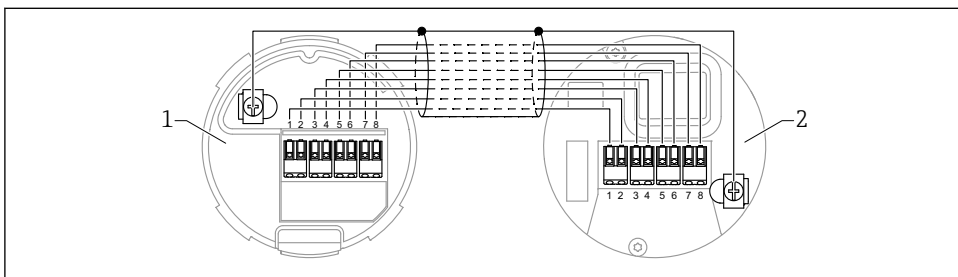
Push-in CAGE CLAMP® connection technology, push actuation

- Conductor cross-section: 0.08 to 0.5 mm² (28 to 20 AWG)
 - Solid conductor 0.2 to 0.75 mm² (24 to 18 AWG)
 - Fine-stranded conductor 0.2 to 0.75 mm² (24 to 18 AWG)
 - Fine-stranded conductor; with insulated ferrule 0.25 to 0.34 mm²
 - Fine-stranded conductor; without insulated ferrule 0.25 to 0.34 mm²
 - Stripping length 7 to 9 mm (0.28 to 0.35 in)
- Outer diameter: 6 to 10 mm (0.24 to 0.4 in)
- Maximum cable length: 60 m (197 ft)

Recommendation: EtherLine®-P CAT.5e from LAPP.

9.3.2 Terminal assignment

The terminal assignments at transmitter VU140 and receiver VU141 must match (all terminals (1 to 8)). Connect the cable shield to the ground terminals on both sides.

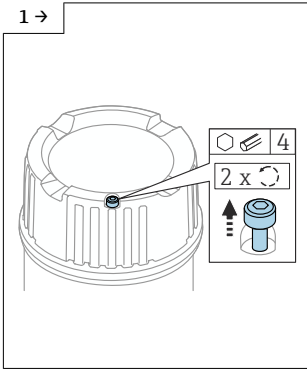


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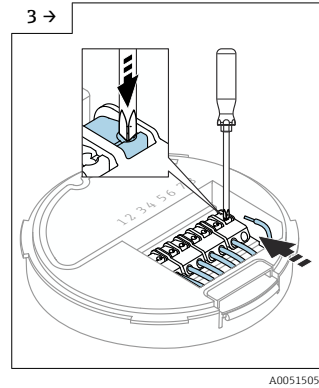
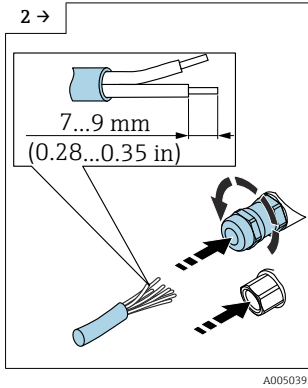
1 Transmitter VU140


2 Receiver VU141

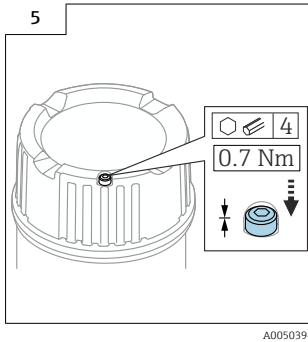
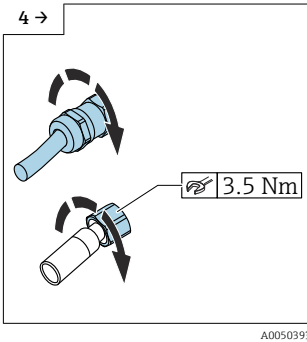
9.3.3 Connecting the transmitter



► Aluminum housing



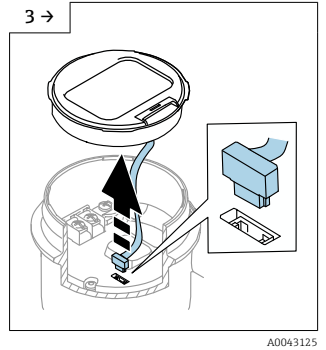
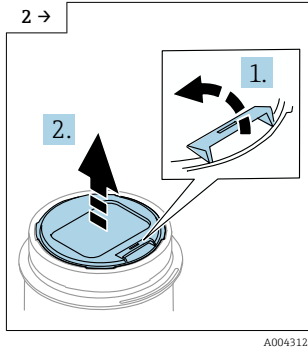
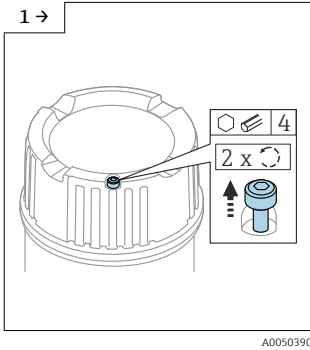
►  The terminal assignment at the device and the remote display must match.



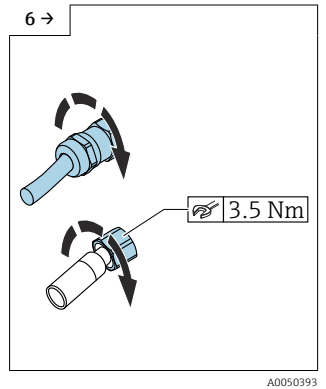
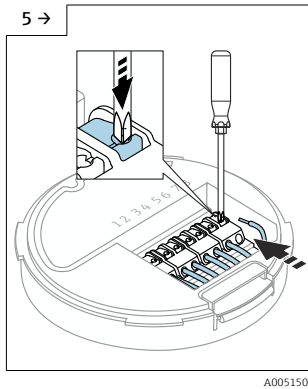
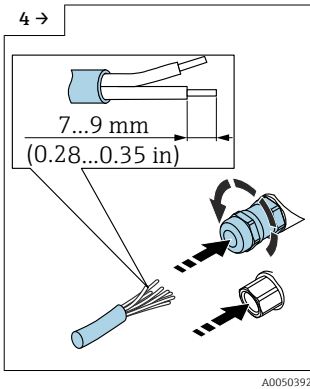
► Aluminum housing

9.3.4 Connecting the receiver (FHX50B)

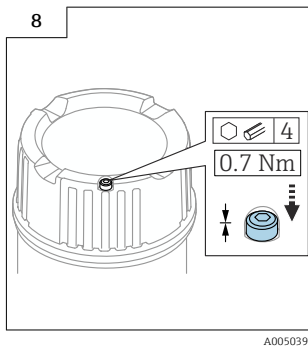
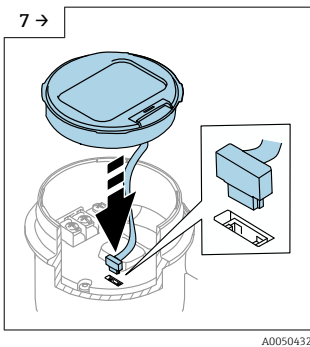
Example: version with M20 cable gland (also valid for M12 plug and NPT gland)



► Aluminum housing



► **i** The terminal assignment at the device and the remote display must match.



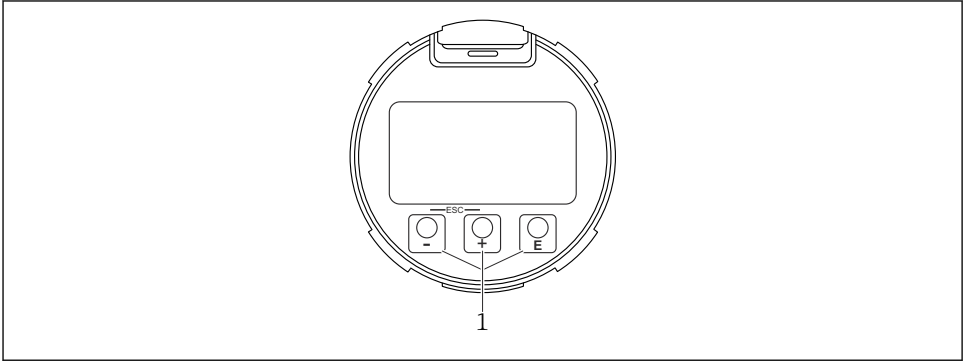
► Aluminum housing

10 Operation


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







Functions:

- Display of 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



A0039284

 8 Graphic display with optical operating keys (1)

-  key
 - Navigate down in the picklist
 - Edit the numerical values or characters within a function
-  key
 - Navigate up in the picklist
 - Edit the numerical values or characters within a function
-  key
 - Change from main display to main menu
 - Confirm entry
 - Jump to the next item
 - Select a menu item and activate the edit mode
 - Unlock/lock the display operation
 - Press and hold the  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

10.1 Operation via Bluetooth® wireless technology (optional)

Prerequisite

- Device display including Bluetooth
- Smartphone or tablet with Endress+Hauser SmartBlue app or PC with DeviceCare from version 1.07.05 or FieldXpert SMT70

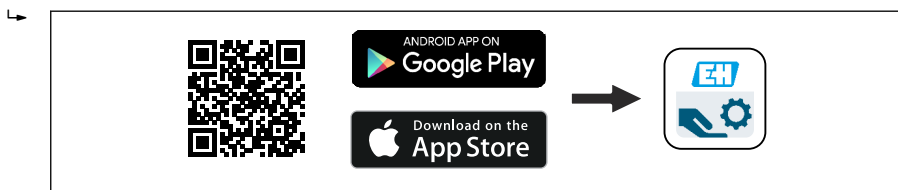
The connection has a range of up to 25 m (82 ft). The range can vary depending on environmental conditions such as attachments, walls or ceilings.

i The operating keys on the display are locked as soon as the device is connected via Bluetooth.

A flashing Bluetooth symbol indicates that a Bluetooth connection is available.

10.1.1 SmartBlue app

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



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2. Start the SmartBlue app.
3. Select device from livelist displayed.
4. Login:
 - ↳ Enter the user name: admin
Password: display ID (see back of display)
5. Change the password after logging in for the first time!

Prerequisites

System requirements

The SmartBlue app is available to download for smartphones or tablets.

Please see the "App Store (Apple)" or "Google Play Store" for information regarding the compatibility of the SmartBlue app with mobile terminals.

Initial password

The display ID serves as the initial password when the connection is established for the first time.

i Please note the following

- If the Bluetooth display is removed from one device and installed in another device:
 - All the log-in data are only saved in the Bluetooth display and not in the device
 - The password changed by the user is also saved in the Bluetooth display

11 Maintenance

No special maintenance work is required.

11.1 Exterior cleaning

Notes on cleaning

- The cleaning agents used should not corrode the surfaces and the seals
- Observe the degree of protection of the device


12 Repair

12.1 General information

12.1.1 Repair concept

Endress+Hauser repair concept

- The devices have a modular design
- Repairs can be carried out by Endress+Hauser Service or by appropriately trained customers
- Spare parts are grouped into logical kits with the associated replacement instructions

 For more information on service and spare parts, please contact your Endress+Hauser sales representative.

12.1.2 Repair of Ex-certified devices

WARNING

Incorrect repair can compromise electrical safety!

Risk of explosion!

- ▶ Only specialist personnel or the Endress+Hauser service team may carry out repairs on Ex-certified devices in accordance with national regulations.
- ▶ Relevant standards and national regulations on hazardous areas, safety instructions and certificates must be observed.
- ▶ Use only original Endress+Hauser spare parts.
- ▶ Please note the device designation on the nameplate. Only identical parts may be used as replacements.
- ▶ Carry out repairs according to the instructions.
- ▶ Only the Endress+Hauser service team is permitted to modify a certified device and convert it to another certified version.

12.2 Spare parts

- Some replaceable device components are identified by a spare part nameplate. This contains information about the spare part.
- All the spare parts for the measuring device, along with the order code, are listed in the *Device Viewer* (www.endress.com/deviceviewer) and can be ordered. If available, users can also download the associated Installation Instructions.



Device serial number or QR code:
Located on the device and spare part nameplate.

12.3 Replacement



Data upload/download is not permitted if the device is used for safety-related applications.

- ▶ After an entire device or an electronics module has been replaced, the parameters can be downloaded to the device again via the communication interface. For this, the data must have been uploaded to the PC beforehand using the "FieldCare/DeviceCare" software.

12.3.1 HistoROM

It is not necessary to perform a new device calibration after replacing the display or transmitter electronics.



The spare part is supplied without HistoROM.

After removing the transmitter electronics, remove HistoRom and insert it into the new spare part.

12.4 Return

The requirements for safe device return can vary depending on the device type and national legislation.

1. Refer to the web page for information:
<http://www.endress.com/support/return-material>
↳ Select the region.
2. Return the device if repairs or a factory calibration are required, or if the wrong device was ordered or delivered.

12.5 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.



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www.addresses.endress.com
