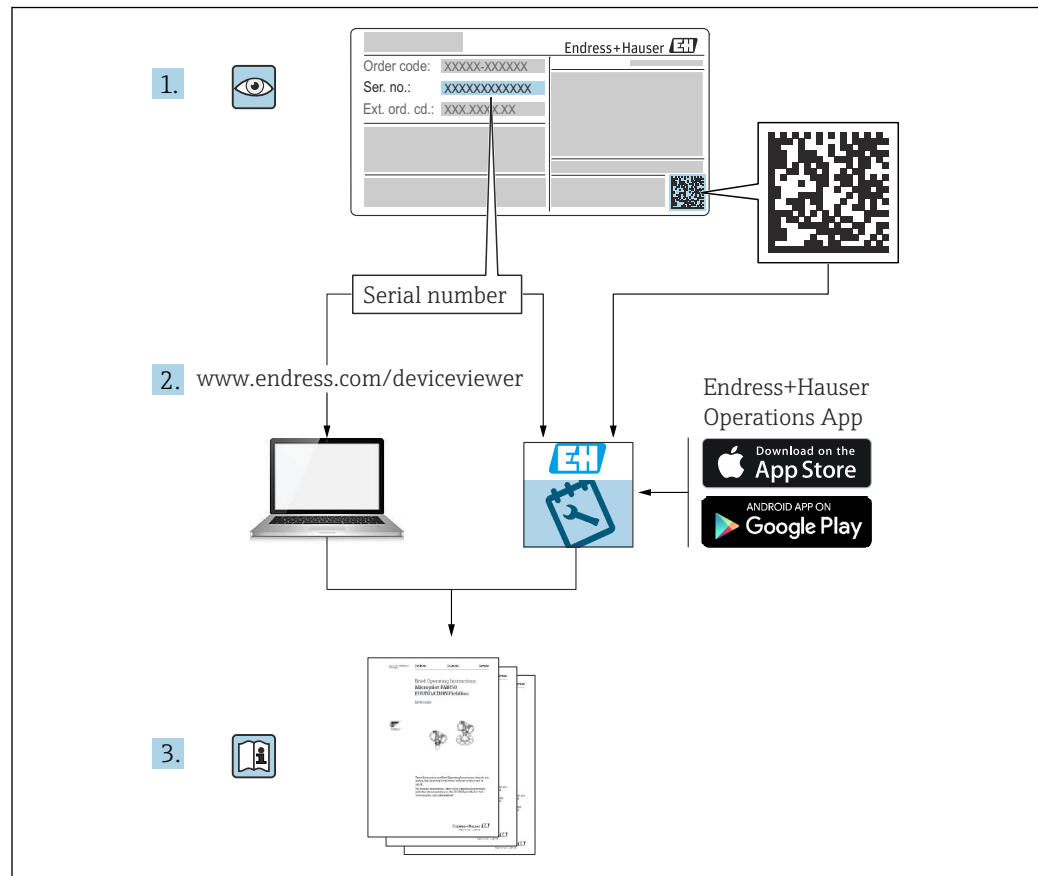


Operating Instructions

FlexView FMA90

Control unit with color display and touch control for up to two ultrasonic, radar, hydrostatic or universal 4-20 mA/HART level sensors





A0023555

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1 About this document

1.1 Symbols

1.1.1 Safety symbols

 DANGER

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

 WARNING

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

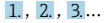
 CAUTION

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

 NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.1.2 Symbols for certain types of information

Symbol	Meaning
	Permitted Procedures, processes or actions that are permitted.
	Preferred Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Notice or individual step to be observed
	Series of steps
	Result of a step
	Help in the event of a problem
	Visual inspection

1.1.3 Electrical symbols

	Direct current		Alternating current		Direct and alternating current
	Ground connection		Protective earth (PE)		

1.1.4 Symbols in graphics

1, 2, 3,...	Item numbers	A, B, C, ...	Views
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1.1.5 Symbols on the device

	Warning Observe the safety instructions contained in the associated Operating Instructions
	Device protected all over by DOUBLE INSULATION or REINFORCED INSULATION

1.2 Documentation

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

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

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

Document type	Purpose and content of the document
Technical Information (TI)	Planning aid for your device 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.
Brief Operating Instructions (KA)	Guide that takes you quickly to the 1st measured value The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.
Operating Instructions (BA)	Your reference document The 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.
Description of Device Parameters (GP)	Reference for your parameters The document provides a detailed explanation of each individual parameter. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.
Safety instructions (XA)	Depending on the approval, safety instructions for electrical equipment in hazardous areas are also supplied with the device. These are an integral part of the Operating Instructions.  The nameplate indicates which Safety Instructions (XA) apply to the device.
Supplementary device-dependent documentation (SD/FY)	Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is a constituent part of the device documentation.

2 Safety instructions

2.1 Requirements for the 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.
- ▶ 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.

The operating personnel must fulfill the following requirements:

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

2.2 Intended use

The device is designed for the water and wastewater industry for the evaluation of measured values and device status, as well as for the configuration of the following Endress+Hauser sensors:

- Radar time-of-flight method: Micropilot FMR10B ¹⁾, FMR20B, FMR30B
- Hydrostatic level measurement: Waterpilot FMX11 ¹⁾, FMX21

Universal level sensors can also be connected to the 4 to 20 mA/HART inputs.

Typical measuring tasks

- Level measurement and linearization
- Flow measurement at open flumes and weirs
- Pump control
- Rake control

2.2.1 Product liability

The manufacturer does not accept any responsibility for damage that results from non-designated use and from failure to comply with the instructions in this manual.

2.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to federal/national regulations.

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 interference-free operation of the device.

1) 4 to 20 mA only, configuration via HART not possible

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 facility when the device is used in the hazardous area (e.g. explosion protection):

- ▶ Check the nameplate to verify if the device ordered can be put to its intended use in the hazardous area.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of these instructions.

2.5 Product safety

This product is designed in accordance with good engineering practice to meet state-of-the-art safety requirements and has been tested and left the factory in a condition in which it is safe to operate.

2.6 IT security

The manufacturer warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

2.7 Device-specific IT security

The device was developed in accordance with the requirements of the IEC 62443-4-1 "Secure product development lifecycle management" standard.

Link to the cybersecurity website: <https://www.endress.com/cybersecurity>



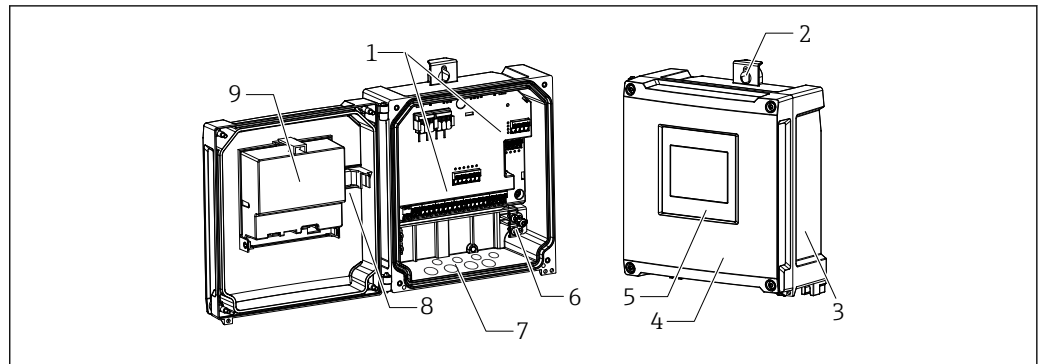
Further information on cybersecurity: see product-specific security manual (SD).

3 Product description



The following diagrams each show a possible version of the device. Depending on the device version, there may be more or fewer terminals.

3.1 Product layout: polycarbonate field housing

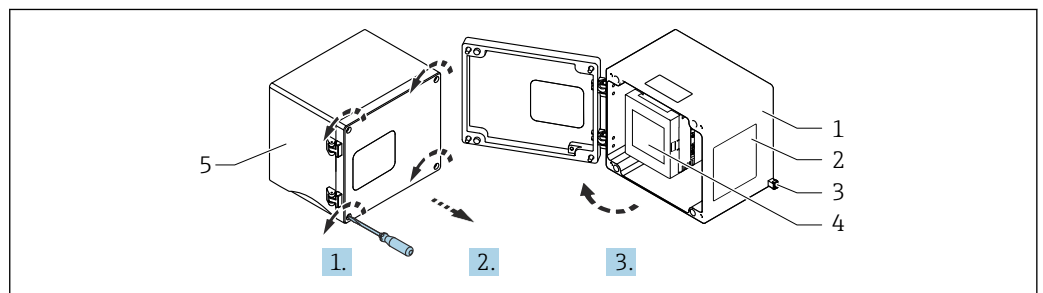


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1 Structure of polycarbonate field housing

- 1 Terminals
- 2 Housing bracket
- 3 Nameplate
- 4 Cover of terminal compartment
- 5 Display and operating module
- 6 Grounding terminal block
- 7 Precut openings for cable entries
- 8 Display-to-mainboard connecting cable
- 9 Function diagram on CPU cover

3.2 Product layout: aluminum field housing

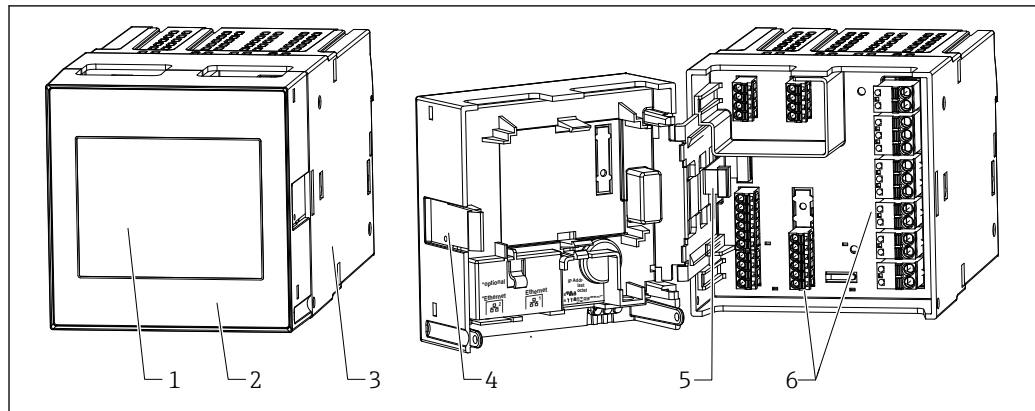


A0053240

2 Access to terminal compartment in aluminum field housing

- 1 Aluminum field housing, open
- 2 Nameplate
- 3 Terminal for protective ground
- 4 Display and operating module NOHrD FMA90 (DIN rail device)
- 5 Aluminum field housing, closed

3.3 Product design: DIN rail device

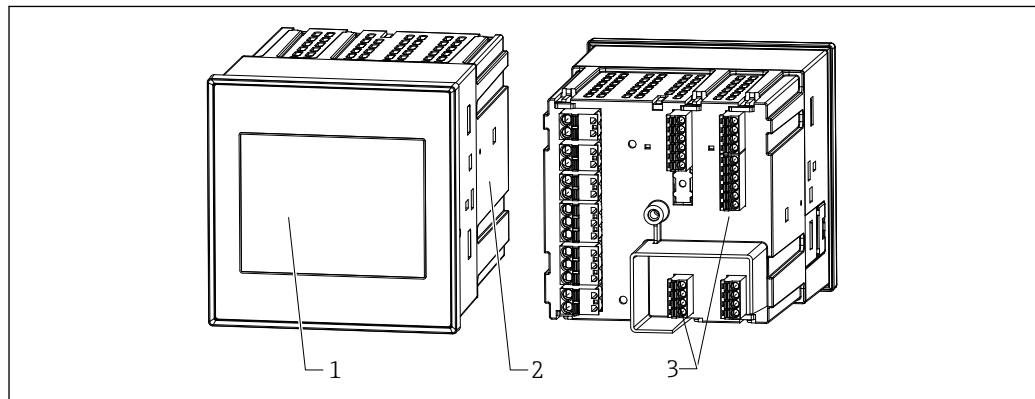


A0051693

3 Structure of the DIN rail device

- 1 Display and operating module (optional)
- 2 Cover of terminal compartment
- 3 Nameplate
- 4 Unlocking mechanism
- 5 Display-to-mainboard connecting cable
- 6 Terminals

3.4 Product design: panel-mounted device



A0051694

4 Structure of the panel-mounted device

- 1 Display and operating module
- 2 Nameplate
- 3 Terminals

4 Incoming acceptance and product identification

4.1 Incoming acceptance

On receipt of the delivery:

1. Check the packaging for damage.
 - ↳ Report all damage immediately to the manufacturer.
Do not install damaged components.
2. Check the scope of delivery using the delivery note.

3. Compare the data on the nameplate with the order specifications on the delivery note.
4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.



If one of the conditions is not satisfied, contact the manufacturer.

4.2 Product identification

The following options are available for identification of the device:

- Nameplate specifications
- Extended order code with breakdown of the measuring instrument features on the delivery note
- Enter the serial number on the nameplate into *Device Viewer* (www.endress.com/deviceviewer): all the information about the device and an overview of the Technical Documentation supplied with the device are displayed.

4.2.1 Nameplate

Do you have the correct device?

The nameplate provides you with the following information on the device:

- Manufacturer identification, device designation
- Order code
- Extended order code
- Serial number
- Tag name (TAG) (optional)
- Technical values, e.g. supply voltage, current consumption, ambient temperature, communication-specific data (optional)
- Degree of protection
- Approvals with symbols
- Reference to Safety Instructions (XA) (optional)

- Compare the information on the nameplate with the order.

4.2.2 Name and address of manufacturer

Name of manufacturer:	Endress+Hauser Wetzer GmbH + Co. KG
Address of manufacturer:	Obere Wank 1, D-87484 Nesselwang
Model/type reference:	FMA90

4.3 Storage and transport

Storage temperature: -40 to +80 °C (-40 to +176 °F)

Maximum relative humidity: < 95%



Pack the device for storage and transportation in such a way that it is reliably protected against impact and external influences. The original packaging provides the best protection.

Avoid the following environmental influences during storage:

- Direct sunlight
- Proximity to hot objects
- Mechanical vibration
- Aggressive media

5 Mounting

5.1 Mounting requirements

NOTICE

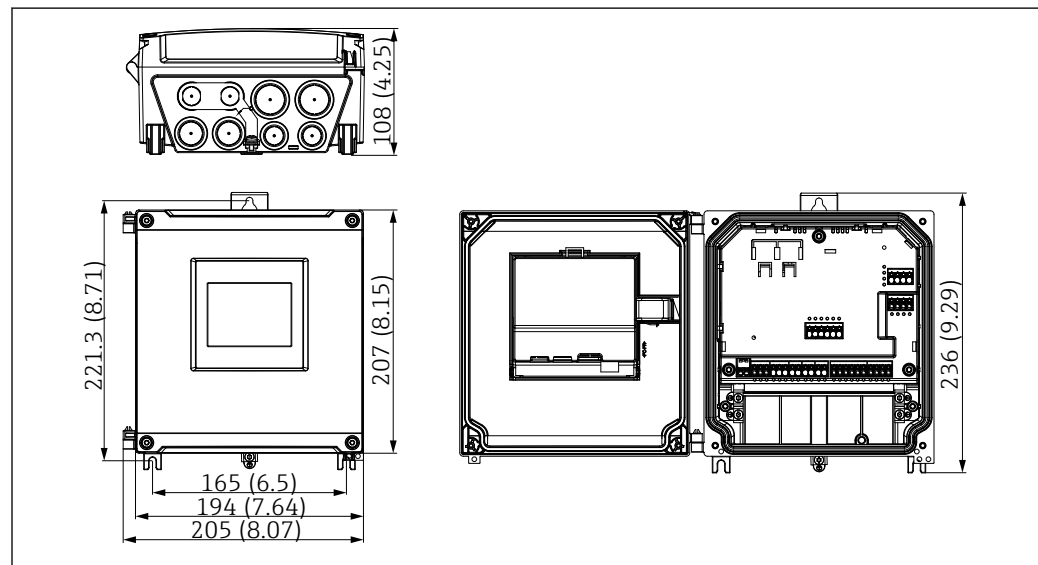
- ▶ When using in hazardous areas, the limit values of the certificates and approvals must be observed.

 For information on ambient conditions, see the "Technical data" section.

5.2 Mounting the polycarbonate field housing

5.2.1 Mounting requirements

Dimensions of the polycarbonate field housing



 5 Dimensions of the polycarbonate field housing. Unit of measurement mm (in)

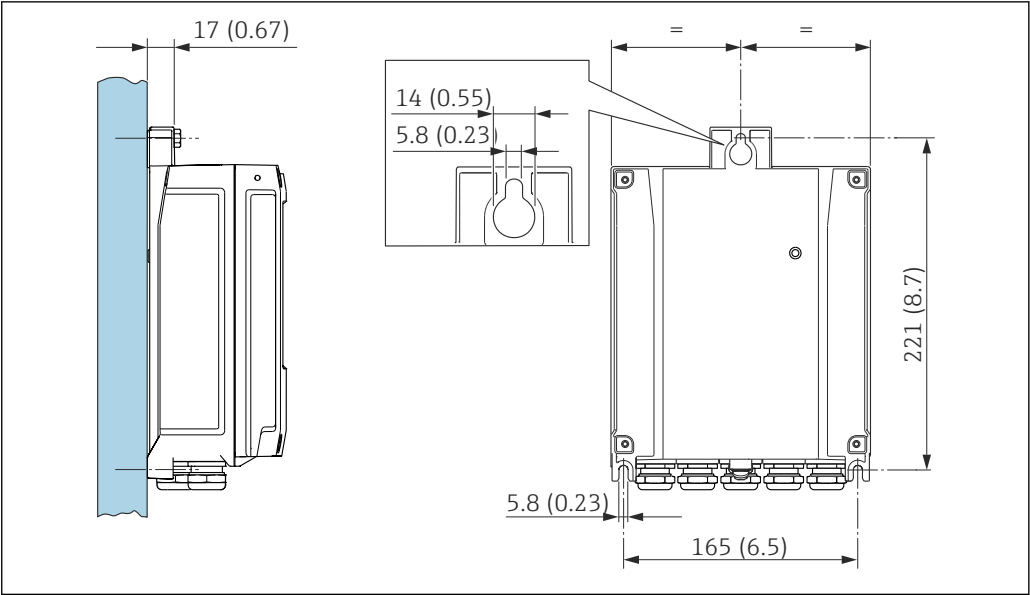
Mounting location

- Protected from direct sunlight. Use a weather protection cover if necessary.
- If mounting outdoors: use a surge arrester.
- Minimum clearance to the left: 55 mm (2.17 in); the housing cover cannot be opened otherwise.
- Orientation: vertical

5.2.2 Mounting the device

Wall mounting

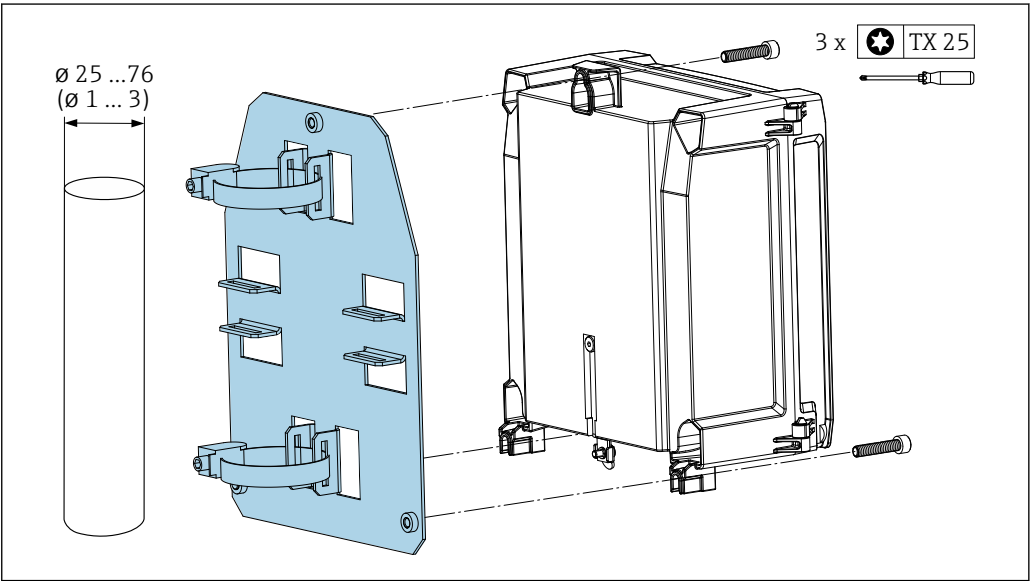
The polycarbonate field housing is mounted directly on the wall using 3 screws (ϕ 5 mm (0.20 in), L: min. 50 mm (1.97 in); suitable wall plugs are recommended; not included in the scope of delivery).



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6 Wall-mounted polycarbonate field housing. Unit of measurement mm (in)

Pipe mounting (accessories) for polycarbonate field housing



A0053940

7 Mounting plate for pipe mounting of polycarbonate field housing. Unit of measurement mm (in)

A0053172

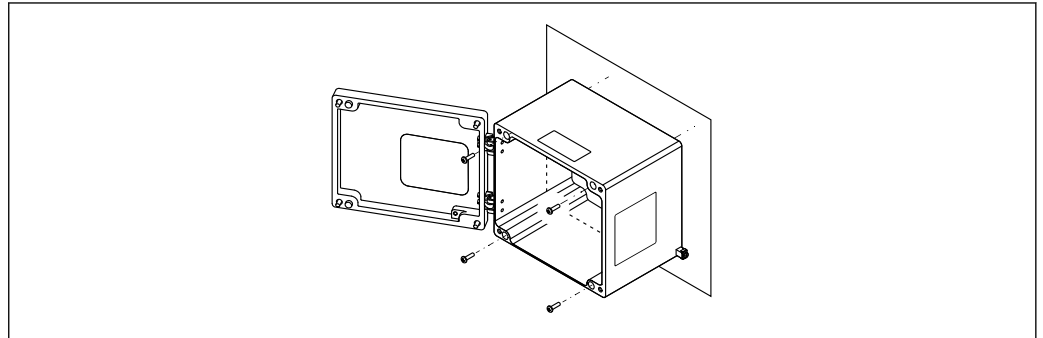
A0053123

Mounting location

- Protected from direct sunlight
- If mounting outdoors: use a surge arrester
- Minimum clearance to the left: 55 mm (2.17 in), the housing cover cannot be opened otherwise

5.3.2 Mounting the device

The aluminum field housing is mounted directly on the wall using 4 screws (ϕ 7 mm (0.28 in), L: min. 50 mm (1.97 in); not included in the scope of delivery).



A0053242

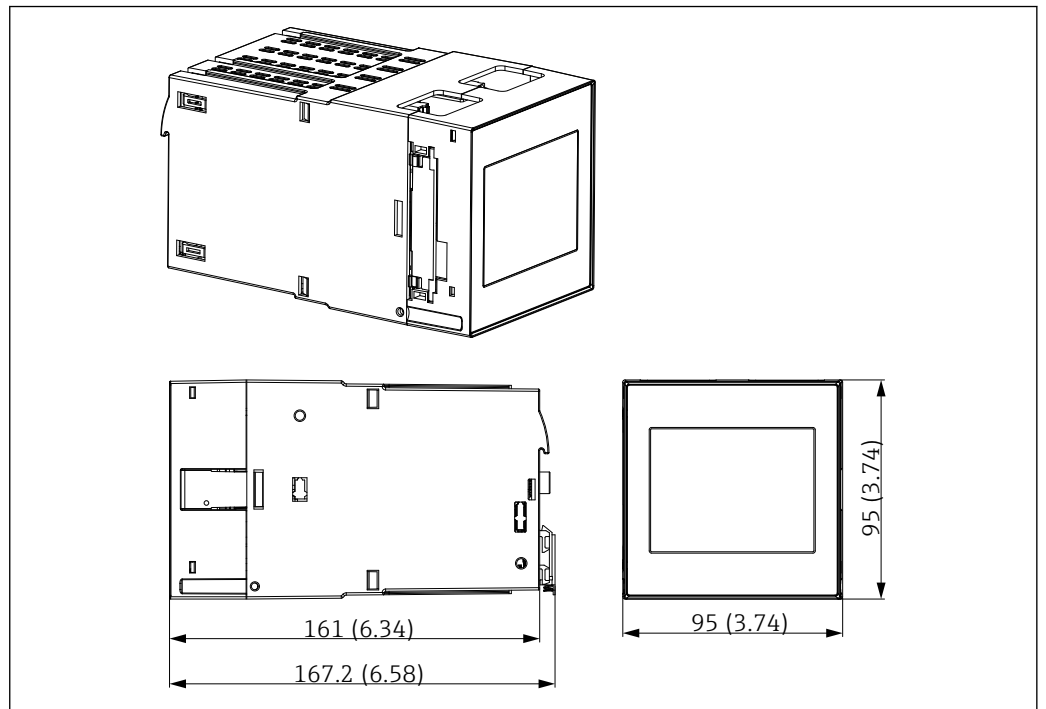
10 Wall-mounted aluminum field housing

5.4 Installing a DIN rail device

i The DIN rail device is available with or without a display unit (optional). The installation is the same.

5.4.1 Mounting requirements

Dimensions



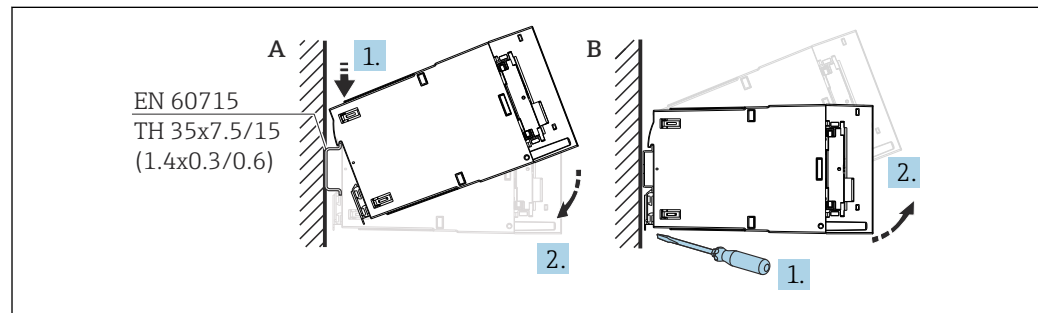
A0051669

11 Dimensions of the DIN rail device. Unit of measurement mm (in)

Mounting location

- In the cabinet outside hazardous areas
- At a sufficient distance from high-voltage electric cables, motor cables, contactors or frequency converters
- Minimum distance to the left: 20 mm (0.8 in)
To protect against overheating, keep the vents at the top and bottom free
- Orientation: vertical

5.4.2 Mounting the device



12 Mounting/disassembling the DIN rail housing. Unit of measurement mm (in)

A Mounting

B Disassembly (use a suitable tool to release the locking device at the bottom)

5.5 Mounting in a panel

5.5.1 Mounting requirements

Ensure compliance with the permitted ambient conditions during installation and operation. The device must be protected from exposure to heat.

Installation dimensions

Required panel cutout 92 mm (3.62 in) x 92 mm (3.62 in). Installation depth of 160 mm (6.3 in) for device and cable.

Mounting location

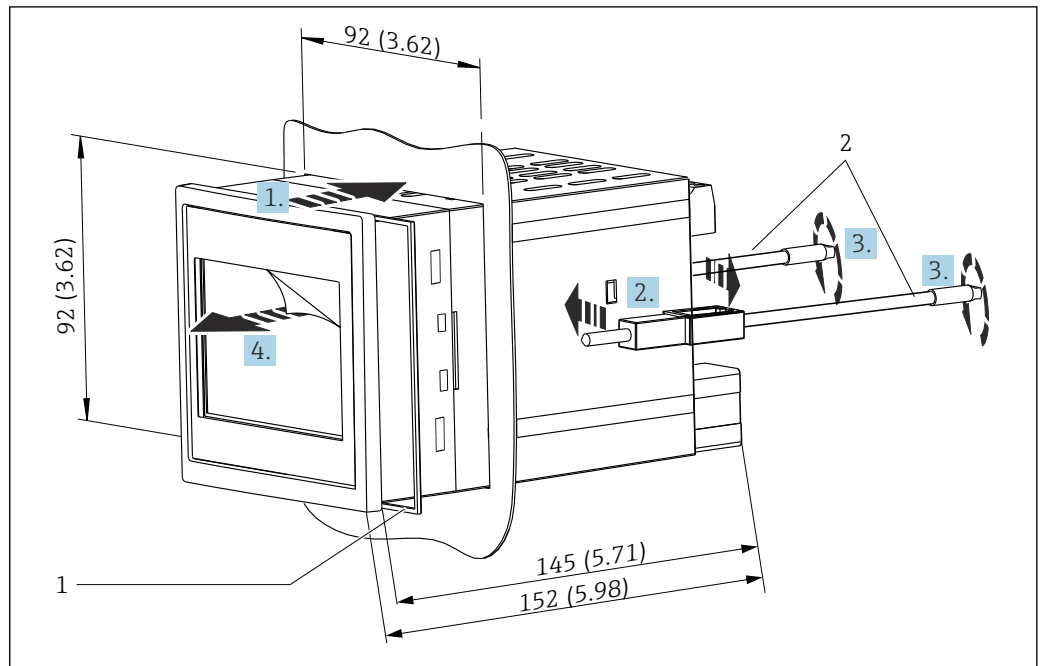
For installation in a panel. The mounting location must be free from vibrations. A suitable electrical, fire-proof and mechanical enclosure must be provided.

Orientation

- Vertical
- Lateral clearance (arranged side-by-side) min. 10 mm (0.4 in)

When connecting Ethernet cables, observe the clearance below.

5.5.2 Mounting the device



13 Installation in a panel. Unit of measurement mm (in)

A0050162

Mounting the device in a panel

1. Push the device with the sealing ring (item 1) through the panel cutout from the front.
2. Hold the device horizontally and clip the fastening clips (item 2) into the openings provided on both sides.
3. Tighten the screws of the fastening clips uniformly using a screwdriver (fastening torque: 0.2 Nm).
4. Remove the protective film of the touch screen.

5.6 Disassembling the device

The device is disassembled by following the installation procedure in the reverse order.

5.7 Post-mounting check

Device condition and specifications	Notes
Is the device undamaged (visual inspection)?	-
Do the ambient conditions match the device specification (e.g. ambient temperature, measuring range etc.)?	See 'Technical data'
If provided: are the measuring point number and labeling correct?	-
Is the device mounted correctly? (Visual inspection)	-
Is the device adequately protected against precipitation and direct sunlight?	See Accessories

6 Electrical connection

6.1 Connecting requirements

⚠ CAUTION

Destruction of parts of the electronics

- Switch off power supply before installing or connecting the device.

i For information on the connection data, see the "Technical data" section.

i For the 85 to 253 V_{AC} version (mains connection), a switch marked as a circuit breaker, as well as an overload protection device (rated power ≤ 10 A) must be fitted in the supply line near the device (easy to reach).

i For the 10.5 to 32 V_{DC} version: The device must only be powered by a power unit that operates using an energy-limited electric circuit according to UL/EN/IEC 61010-1, Section 9.4 and the requirements in Table 18.

Apart from the relay and the AC supply voltage, only energy-limited circuits according to IEC/EN 61010-1 shall be connected.

6.1.1 Cable specification

⚠ CAUTION

Unsuitable connection cables may cause overheating and fire hazards, insulation damage, electric shock, power loss, and reduced operating life.

- Only use connection cables that comply with the specifications below.

i Minimum requirement: Cable temperature range ≥ ambient temperature +20 K

For all connections on the field device and for power and relay connections in the case of the panel-mounted and DIN rail device:

- **Conductor cross-section:** 0.2 to 2.5 mm² (26 to 14 AWG)
- **Cross-section with wire end ferrule:** 0.25 to 2.5 mm² (24 to 14 AWG)
- **Stripping length:** 10 mm (0.39 in)

For digital input, open collector and analog input/output connections in the case of panel-mounted and DIN rail device:

- **Conductor cross-section:** 0.2 to 1.5 mm² (26 to 16 AWG)
- **Cross-section with wire end ferrule (excluding collar/including collar):**
0.25 to 1 mm² (24 to 16 AWG)/ 0.25 to 0.75 mm² (24 to 16 AWG)
- **Stripping length:** 10 mm (0.39 in)

6.1.2 Terminals

The device is fitted with push-in terminals. Rigid conductors or flexible conductors with ferrules can be inserted directly into the terminal without using the lever, and create a contact automatically.

6.2 Connecting the device

6.2.1 DIN rail device

Device version: Order code 040 (housing); option A (DIN rail mounting)