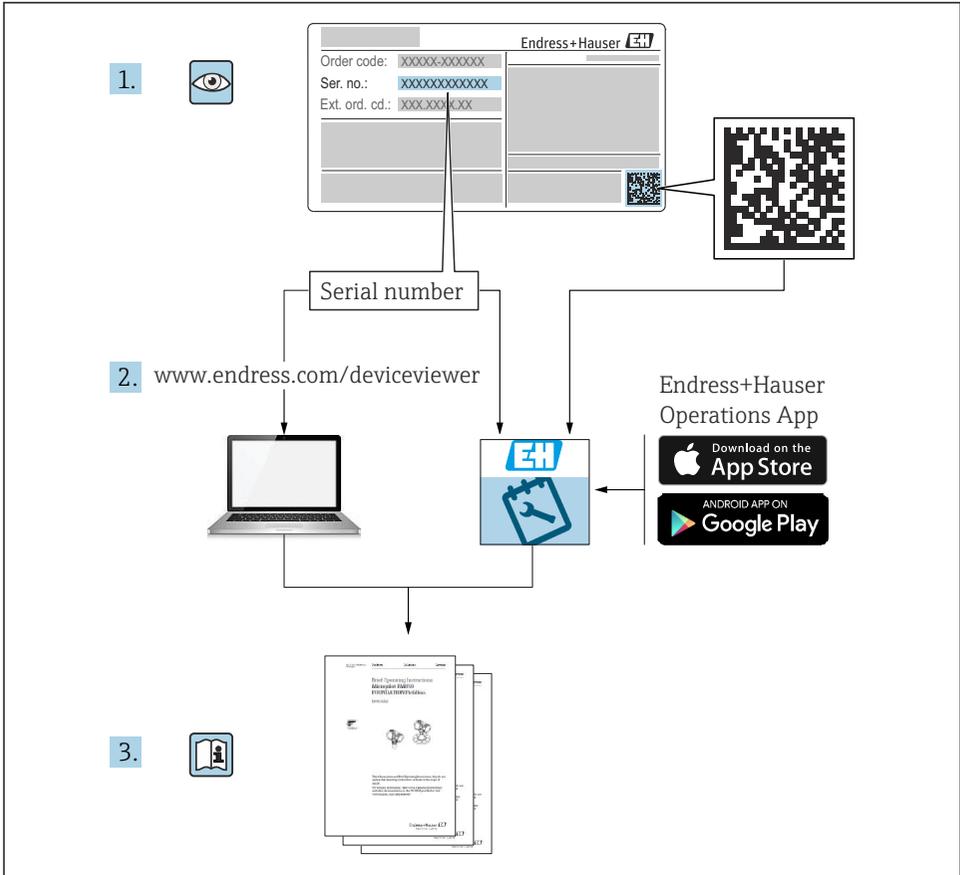


# Brief Operating Instructions

## Waterpilot FMX11

Hydrostatic level measurement  
4 to 20 mA Analog





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

##### CAUTION

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

##### NOTICE

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

### 1.1.2 Electrical symbols

**Ground connection:** 

A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

### 1.1.3 Symbols for certain types of information

**Permitted:** 

Procedures, processes or actions that are permitted.

**Forbidden:** 

Procedures, processes or actions that are forbidden.

**Additional information:** 

**Series of steps:** , , 

**Result of an individual step:** 

### 1.1.4 Symbols in graphics

**Item numbers:** 1, 2, 3 ...

**Series of steps:** , , 

**Views:** A, B, C, ...

## 1.2 List of abbreviations

See Operating Instructions.

## 1.3 Documentation

All available documents can be downloaded using:

- the serial number of the device (see cover page for description) or
- the data matrix code of the device (see cover page for description) or
- "Download" area of web page: [www.endress.com](http://www.endress.com)

### 1.3.1 Supplementary device-dependent documentation

Additional documents are supplied depending on the device version ordered: Always comply strictly with the instructions in the supplementary documentation. The supplementary documentation is an integral part of the device documentation.

## 2 Basic safety instructions

### 2.1 Requirements concerning the staff

The staff must fulfill the following requirements for their tasks:

- ▶ Trained staff: Must have a qualification which corresponds to their function and tasks.
- ▶ Authorized by the plant operator.
- ▶ Familiar with the national regulations.
- ▶ Before starting their work: Must have read and understood all instructions in the operating manual and supplementary documentation as well as the certificate (depending on the application).
- ▶ Must comply with all instructions and the regulatory framework.

### 2.2 Designated use

#### 2.2.1 Application and media

The Waterpilot FMX11 is a hydrostatic pressure sensor for level measurement, for example, in the area of untreated water extraction and drinking water storage.

#### 2.2.2 Incorrect use

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

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

For work on and with the device:

- ▶ Wear the required protective equipment according to federal or national regulations.
- ▶ Switch off the supply voltage before connecting the device.

### 2.4 Operational safety

Risk of injury!

- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for interference-free operation of the device.

#### Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers.

- ▶ If, despite this, modifications are required, consult with Endress+Hauser.

#### Repairs

To ensure continued operational safety and reliability,

- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to repair of an electrical device.

- ▶ Use original spare parts and accessories from Endress+Hauser only.

### Hazardous area

To eliminate danger to persons or the facility when the device is used in the approval-related area (e.g. explosion protection, pressure vessel safety):

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

## 2.5 Product safety

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

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

## 3 Product description

See Operating Instructions.

## 4 Incoming acceptance and product identification

### 4.1 Incoming acceptance

- Is the order code on the delivery note identical to the order code on the product sticker?
- Do the data on the nameplate correspond to the order specifications and the delivery note?
- Is the documentation provided?
- Are the goods undamaged?

 If one of these conditions is not satisfied, contact the Endress+Hauser Sales Center.

### 4.2 Product identification

The following options are available for the identification of the measuring device:

- Nameplate specifications
- 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](http://www.endress.com/deviceviewer)): all the information about the measuring device is displayed.

For an overview of the technical documentation provided, enter the serial number from the nameplates in *W@M Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer))

#### 4.2.1 Nameplates

See Operating Instructions.

### 4.3 Storage and transport

#### 4.3.1 Storage conditions

See Operating Instructions.

#### 4.3.2 Transporting the product to the measuring point

#### **⚠ WARNING**

#### **Incorrect transport!**

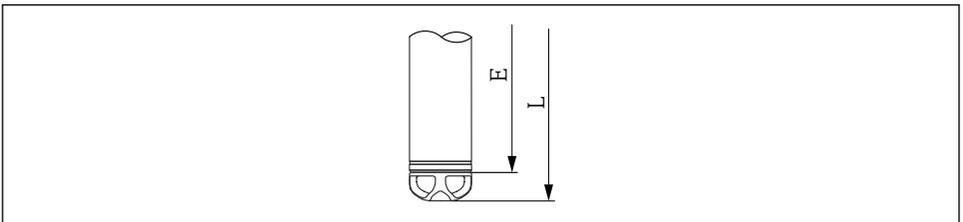
Device or cable may become damaged, and there is a risk of injury!

- ▶ Transport measuring device in the original packaging.

## 5 Installation

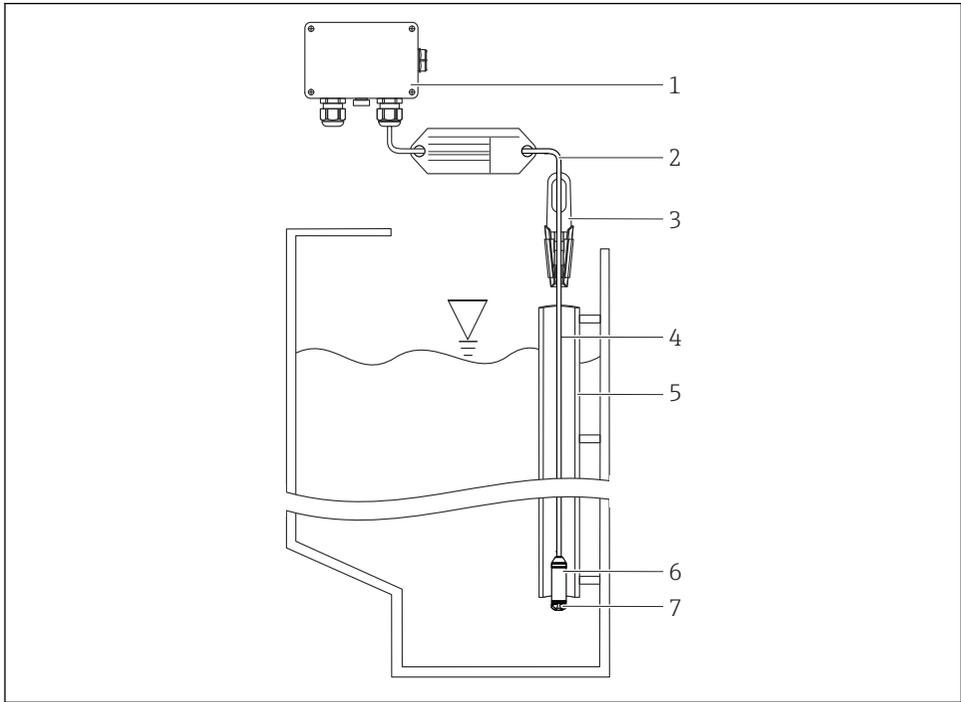
### 5.1 Installation conditions

- Sideways movement of the level probe can result in measuring errors. Install the probe at a point free from flow and turbulence or use a guiding tube. The internal diameter of the guiding tube should be at least 1 mm (0.04 in) greater than the outer diameter of the FMX11.
- To avoid mechanical damage to the measuring cell, the device is equipped with a protection cap.
- The cable must end in a dry room or a suitable terminal box. The terminal box from Endress+Hauser provides humidity and climatic protection and is suitable for installation outdoors.
- Cable length tolerance:  $\pm < 50$  mm (1.97 in)
- Endress+Hauser recommends using twisted, shielded cable.
- The length of the extension cable depends on the intended level zero point. The height of the protective cap must be taken into consideration when designing the layout of the measuring point. The level zero point (E) corresponds to the position of the process isolating diaphragm. Level zero point = E; tip of probe = L (see the following diagram).



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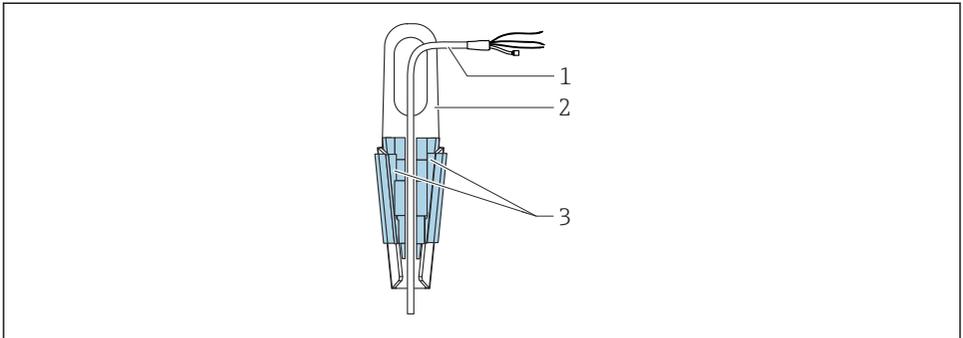
## 5.2 Mounting the measuring device



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- 1 Terminal box can be ordered separately
- 2 Bending radius of extension cable
- 3 Suspension clamp can be ordered as an accessory
- 4 Extension cable, cable length
- 5 Guiding tube
- 6 Waterpilot FMX11
- 7 Protection cap

### 5.2.1 Mounting the Waterpilot with a mounting clamp



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- 1 Extension cable
- 2 Suspension clamp
- 3 Clamping jaws

#### Mounting the suspension clamp

1. Mount the suspension clamp (item 2). Take the weight of the extension cable (item 1) into account.
2. Push up the clamping jaws (item 3). Place the extension cable (item 1) between the clamping jaws as shown in the graphic.
3. Hold the extension cable (item 1) in position and push the clamping jaws (item 3) back down. Tap the clamping jaws gently from above to fix them in place.

### 5.2.2 Mounting the terminal box

The optional terminal box is mounted using four screws (M4).

## 5.3 Post-installation check

- Is the device undamaged (visual inspection)?
- Does the device comply with the measuring point specifications?
  - Process temperature
  - Process pressure
  - Ambient temperature
  - Measuring range
- Check that all screws are firmly seated.

## 6 Electrical connection

### 6.1 Connection conditions

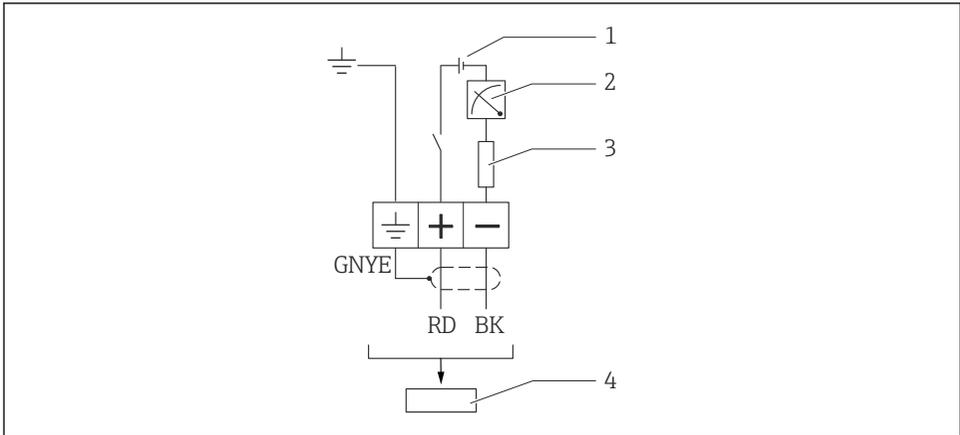
#### **⚠ WARNING**

#### Supply voltage might be connected!

Risk of electric shock!

► Switch off supply voltage.

- The supply voltage must match the supply voltage specified on the nameplate.
- The cable must end in a dry room or a suitable terminal box. The terminal box (IP66/IP67) with GORE-TEX® filter from Endress+Hauser is suitable for outdoor installation. The terminal box can be ordered separately as an accessory (order number: 52006152).
- Connect the device in accordance with the following diagrams. Reverse polarity protection is integrated in the Waterpilot FMX11. Changing the polarities will not result in damage to the device. The device is not operational.
- A suitable circuit breaker should be provided for the device in accordance with IEC/EN 61010.



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- 1 8 to 28 V<sub>DC</sub>
- 2 4 to 20 mA
- 3 Resistance (R<sub>L</sub>)
- 4 Waterpilot FMX11

### 6.2 Connecting the measuring device

#### 6.2.1 Supply voltage

8 to 28 V<sub>DC</sub>

## 6.2.2 Cable specification

### Connecting cable

Endress+Hauser recommends using shielded, twisted-pair two-wire cables.

- Commercially available instrument cable
- Terminals, terminal box: 0.08 to 2.5 mm<sup>2</sup> (28 to 14 AWG)

### Extension cable

- Total outer diameter: 6 mm (0.24 in) ±0.2 mm (0.01 in)
- PA pressure compensation tube:
  - Outer diameter 2.5 mm (0.1 in)
  - Internal diameter 1.5 mm (0.06 in)
  - Pressure compensation element outer diameter 6 mm (0.24 in)



The extension cables are shielded.

#### *Cross-section*

2 x 0.22 mm<sup>2</sup> + pressure compensation tube

#### *Cable resistance*

Per wire: ≤0.09 Ω/m

## 6.2.3 Power consumption

≤ 0.62 W at 28 V<sub>DC</sub>

## 6.2.4 Current consumption

Max. current consumption: ≤ 22 mA

Min. current consumption: ≥ 2 mA

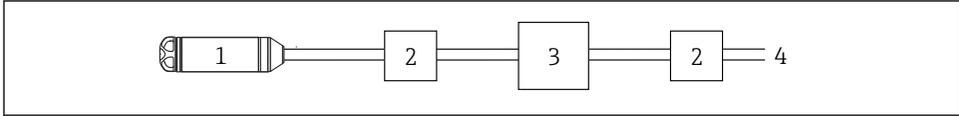
## 6.2.5 Maximum load

See Operating Instructions.

## 6.2.6 Overvoltage protection

To protect the Waterpilot from large interference voltage peaks, Endress+Hauser recommends installing overvoltage protection upstream and downstream of the display and/or evaluation unit.

- Integrated overvoltage protection to EN 61000-4-5 (2 kV asymmetrical)
- Install overvoltage protection ≥ 1.0 kV, external if necessary



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- 1 Waterpilot FMX11
- 2 Overvoltage protection (OVP), e.g., HAW from Endress+Hauser
- 3 Power supply, display and evaluation unit with one input for 4 to 20 mA
- 4 Power supply

### 6.3 Post-connection check

- Are the device or cables free from damage (visual check)?
- Do the cables comply with the requirements?
- Do the cables have adequate strain relief?
- Are all the cable glands installed, tightened and sealed?
- Does the supply voltage match the information on the nameplate?
- Is the terminal assignment correct?

## 7 Operation options

Endress+Hauser offers comprehensive measuring point solutions with display and/or evaluation units for the Waterpilot FMX11.

 Your Endress+Hauser service organization would be glad to be of service if you have any other questions. Contact addresses are available at: [www.endress.com/worldwide](http://www.endress.com/worldwide)









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[www.addresses.endress.com](http://www.addresses.endress.com)

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