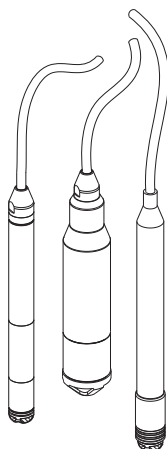


Brief Operating Instructions

Waterpilot FMX21

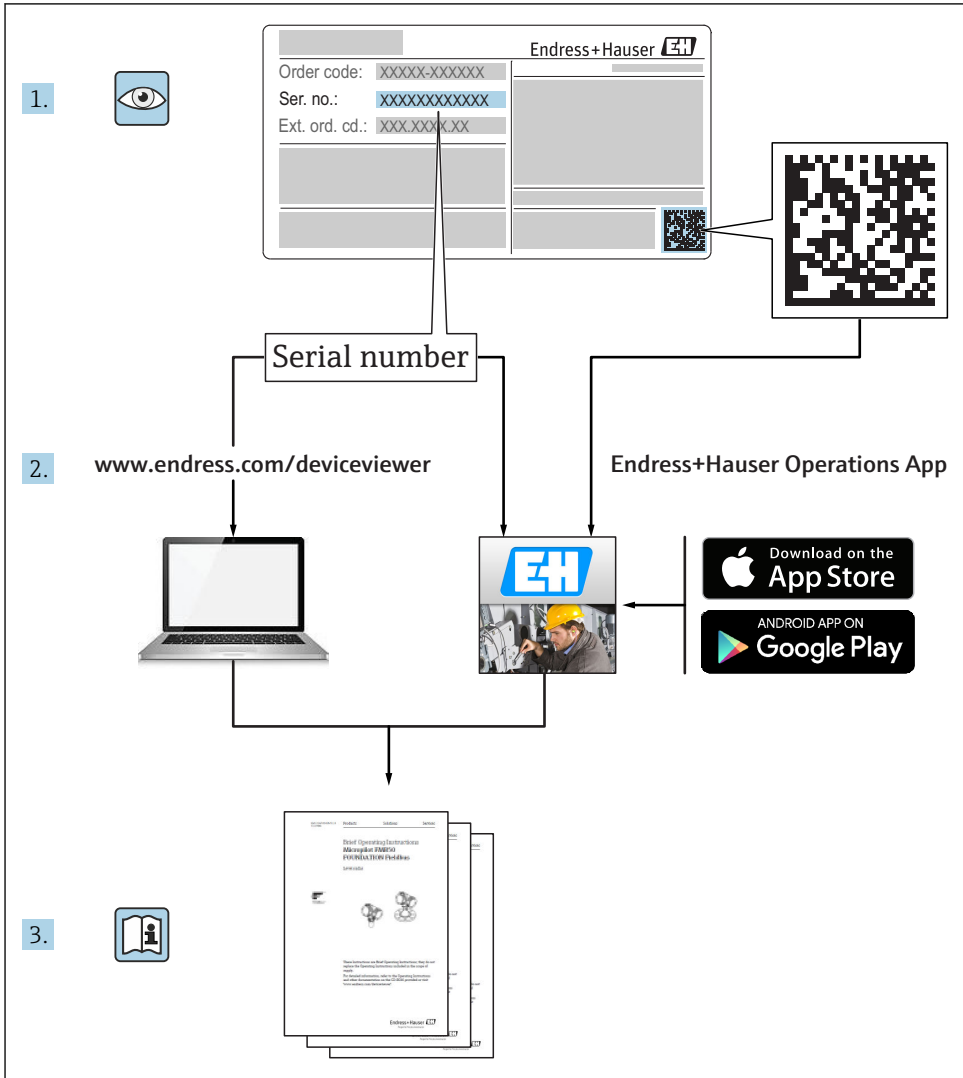
Hydrostatic level measurement
4 to 20 mA Analog



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

Detailed information about the device can be found in the Operating Instructions and the other documentation:
Available for all device versions via:

- Internet: www.endress.com/deviceviewer
- Smart phone/tablet: *Endress+Hauser Operations App*



A0023555

Table of contents

1	Document information	4
1.1	Document function	4
1.2	Symbols used	4
1.3	Documentation	5
1.4	Terms and abbreviations	7
1.5	Turn down calculation	8
2	Basic safety instructions	9
2.1	Requirements concerning the staff	9
2.2	Designated use	9
2.3	Workplace safety	9
2.4	Operational safety	9
2.5	Product safety	10
3	Product description	10
4	Incoming acceptance and product identification	10
4.1	Incoming acceptance	10
4.2	Product identification	12
4.3	Nameplates	13
4.4	Storage and transport	14
4.5	Scope of delivery	15
5	Installation	16
5.1	Installation conditions	16
5.2	Additional mounting instructions	17
5.3	Dimensions	17
5.4	Mounting the Waterpilot with a mounting clamp	18
5.5	Mounting the Waterpilot with a cable mounting screw	19
5.6	Mounting the terminal box	20
5.7	Mounting the TMT181 temperature head transmitter with terminal box	20
5.8	Cable marking	22
5.9	Cable shortening kit	22
5.10	Post-installation check	23
6	Electrical connection	24
6.1	Connecting the device	24
6.2	Supply voltage	27
6.3	Cable specifications	27
6.4	Power consumption	27
6.5	Current consumption	28
6.6	Maximum load for FMX21 4 to 20 mA Analog	28
6.7	Connecting the measuring unit	28
6.8	Post-connection check	30
7	Operation options	30
7.1	Overview of operating options	30





1 Document information

1.1 Document function







The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

1.2 Symbols used





1.2.1 Safety symbols

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











1.2.2 Electrical symbols

Symbol	Meaning	Symbol	Meaning
	Direct current		Alternating current
	Direct current and alternating current		Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	Protective ground connection A terminal which must be connected to ground prior to establishing any other connections.		Equipotential connection A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice.


1.2.3 Tool symbols

Symbol	Meaning
 A0011220	Flat blade screwdriver
 A0011219	Phillips screwdriver
 A0011221	Allen key
 A0011222	Open-ended wrench

1.2.4 Symbols for certain types of information

Symbol	Meaning	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		Series of steps
	Result of a step		Visual inspection

1.2.5 Symbols in graphics

Symbol	Meaning
1, 2, 3 ...	Item numbers
	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections

1.3 Documentation



The document types listed are available:

In the Downloads area of the Endress+Hauser website: www.endress.com → Downloads

1.3.1 **Technical Information (TI): planning aid for your device**

TI00431P:

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.

1.3.2 **Operating Instructions (BA): your comprehensive reference**

FMX21 4 to 20 mA Analog - BA01605P:

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.

1.3.3 **Safety Instructions (XA)**

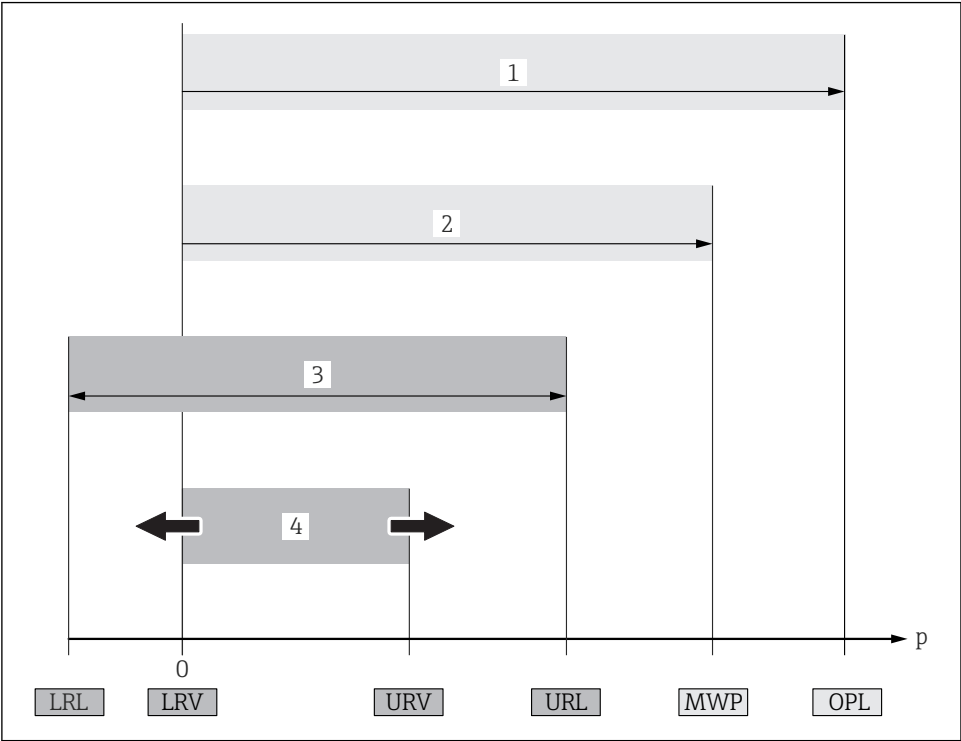
Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.

Directive	Type of protection	Category	Documentation	Option ¹⁾
ATEX	Ex ia IIC	II 2 G	XA00454P	BD
ATEX	Ex nA IIC	II 3 G	XA00485P	BE
IECEX	Ex ia IIC	n/a	XA00455P	IC
CSA C/US	Ex ia IIC	n/a	ZD00232P (960008976)	CE
FM	AEx ia IIC	n/a	ZD00231P (960008975)	FE
NEPSI	Ex ia IIC	n/a	XA00456P	NA
INMETRO	Ex ia IIC	n/a	XA01066P	MA

1) Product Configurator order code for "Approval"

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

1.4 Terms and abbreviations

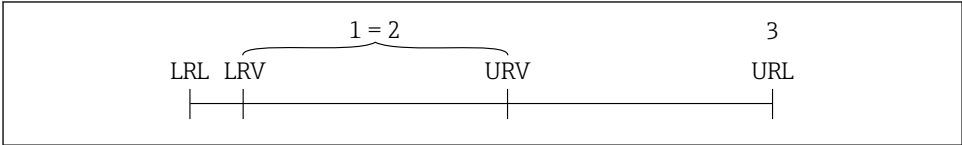


A0029505

Item	Term/abbreviation	Explanation
1	OPL	The OPL (over pressure limit = sensor overload limit) for the measuring device depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection has to be taken into consideration in addition to the measuring cell. Also observe pressure-temperature dependency. For the relevant standards and additional notes, see the "Pressure specifications" section of the Operating Instructions. The OPL may only be applied for a limited period of time.
2	MWP	The MWP (maximum working pressure) for the sensors depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection has to be taken into consideration in addition to the measuring cell. Also observe pressure-temperature dependency. For the relevant standards and additional notes, see the "Pressure specifications" section of the Operating Instructions. The MWP may be applied at the device for an unlimited period. The MWP can also be found on the nameplate.
3	Maximum sensor measuring range	Span between LRL and URL This sensor measuring range is equivalent to the maximum calibratable/adjustable span.

Item	Term/abbreviation	Explanation
4	Calibrated/adjusted span	Span between LRV and URV Factory setting: 0 to URL Other calibrated spans can be ordered as customized spans.
p	-	Pressure
-	LRL	Lower range limit
-	URL	Upper range limit
-	LRV	Lower range value
-	URV	Upper range value
-	TD (turn down)	Turn down Example - see the following section.
-	PE	Polyethylene
-	FEP	Fluorinated ethylene propylene
-	PUR	Polyurethane

1.5 Turn down calculation



A0029545

- 1 *Calibrated/adjusted span*
- 2 *Zero point-based span (4 to 20 mA Analog: customer-specific span can only be set at the factory when ordered)*
- 3 *URL sensor*

Example

- Sensor:10 bar (150 psi)
- Upper range value (URL) = 10 bar (150 psi)

- Calibrated/adjusted span: 0 to 5 bar (0 to 75 psi)
- Lower range value (LRV) = 0 bar (0 psi)
- Upper range value (URV) = 5 bar (75 psi)

Turn down (TD):

TD

=

URL

| URV - LRV |

10 bar (150 psi)

=

| 5 bar (75 psi) - 0 bar (0 psi) |

= 2

In this example, the TD is 2:1.

This span is based on the zero point.

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 FMX21 is a hydrostatic pressure sensor for measuring the level of fresh water, wastewater and salt water. The temperature is measured simultaneously in the case of sensor versions with a Pt100 resistance thermometer.

An optional temperature head transmitter converts the Pt100 signal into a 4 to 20 mA signal.

2.2.2 Incorrect use

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

Verification for borderline cases:

- ▶ For special fluids and fluids for cleaning, Endress+Hauser is glad to provide assistance in verifying the corrosion resistance of fluid-wetted materials, but does not accept any warranty or liability.

2.3 Workplace safety

For work 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 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

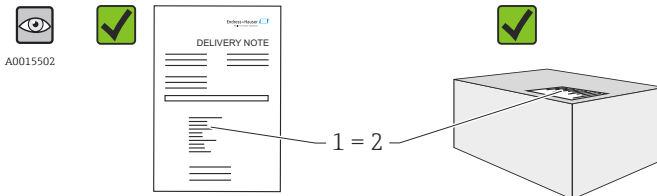
This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

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

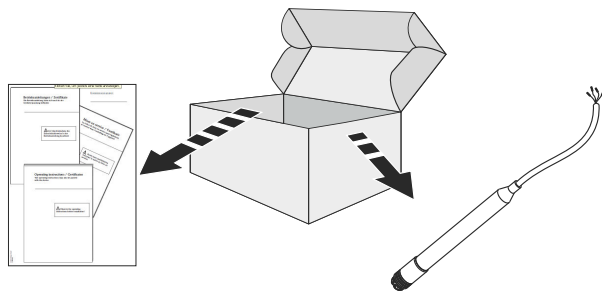
4 Incoming acceptance and product identification

4.1 Incoming acceptance



A0016870

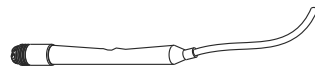
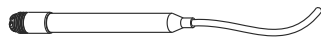
Is the order code on the delivery note (1) identical to the order code on the product sticker (2)?



A0026535



A0015502

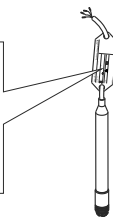
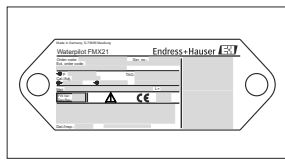
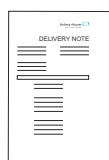


A0026536

Are the goods undamaged?



A0015502



A0026537

Do the data on the nameplate correspond to the order specifications and the delivery note?



A0015502



A0022106

Is the documentation available?
If required (see nameplate): Are the safety instructions (XA) present?



If one of these conditions does not apply, please contact your Endress+Hauser sales office.

4.2 Product identification

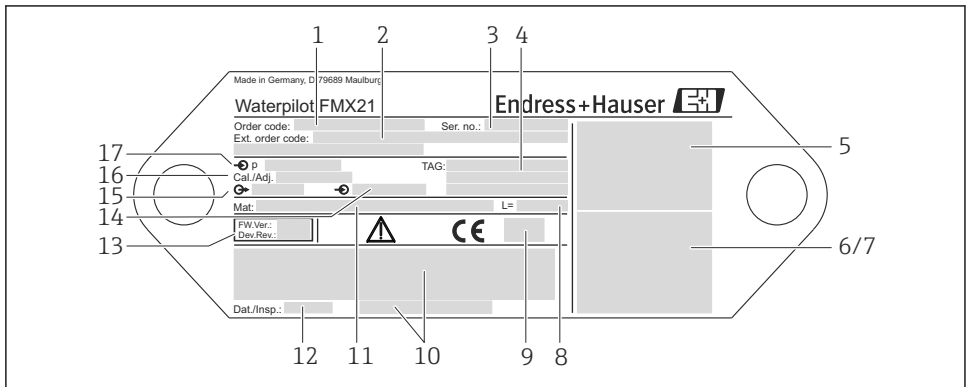
The following options are available for identification of the measuring device:

- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter serial numbers from nameplates in *W@M Device Viewer* (www.endress.com/deviceviewer): All information about the measuring device is displayed.

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

4.3 Nameplates

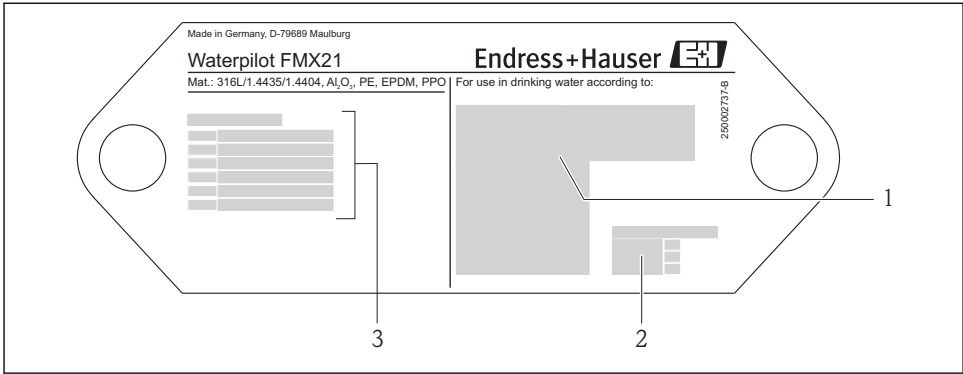
4.3.1 Nameplates on extension cable



A0018902

- 1 Order code (shortened for reordering); The meaning of the individual letters and digits is explained in the order confirmation details.
- 2 Extended order number (complete)
- 3 Serial number (for clear identification)
- 4 TAG (device tag)
- 5 FMX21 connection diagram
- 6 Pt100 connection diagram (optional)
- 7 Warning (hazardous area), (optional)
- 8 Length of extension cable
- 9 Approval symbol, e.g. CSA, FM, ATEX (optional)
- 10 Text for approval (optional)
- 11 Materials in contact with process
- 12 Test date (optional)
- 13 Software version/device version
- 14 Supply voltage
- 15 Output signal
- 16 Set measuring range
- 17 Nominal measuring range

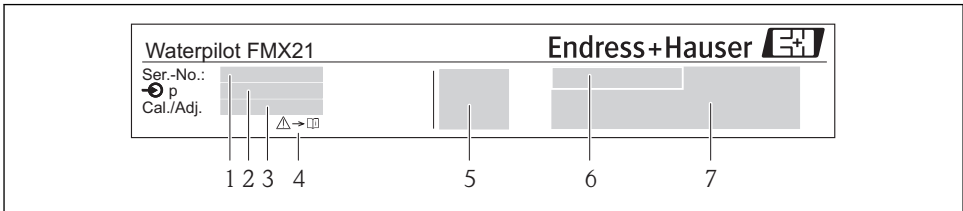
Additional nameplate for devices with approvals



A0018805

- 1 Approval symbol (drinking water approval)
- 2 Reference to associated documentation
- 3 Approval number (marine approval)

4.3.2 Additional nameplate for devices with external diameter 22 mm (0.87 in) and 42 mm (1.65 in)



A0018804

- 1 Serial number
- 2 Nominal measuring range
- 3 Set measuring range
- 4 CE mark or approval symbol
- 5 Certificate number (optional)
- 6 Text for approval (optional)
- 7 Reference to documentation

4.4 Storage and transport

4.4.1 Storage conditions

Use original packaging.

Store the measuring device in clean and dry conditions and protect from damage caused by shocks (EN 837-2).

Storage temperature range

FMX21 + Pt100 (optional)

–40 to +80 °C (–40 to +176 °F)

Cable

(when mounted in a fixed position)

- With PE: –30 to +70 °C (–22 to +158 °F)
- With FEP: –30 to +80 °C (–22 to +176 °F)
- With PUR: –40 to +80 °C (–40 to +176 °F)

Terminal box

–40 to +80 °C (–40 to +176 °F)

TMT181 temperature head transmitter (optional) for FMX21 4 to 20 mA Analog

–40 to +100 °C (–40 to +212 °F)

4.4.2 Transporting the product to the measuring point



Incorrect transport!

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

- ▶ Transport measuring device in the original packaging.
- ▶ Follow the safety instructions and transport conditions for devices weighing more than 18 kg (39.6 lbs).

4.5 Scope of delivery

The scope of delivery comprises:

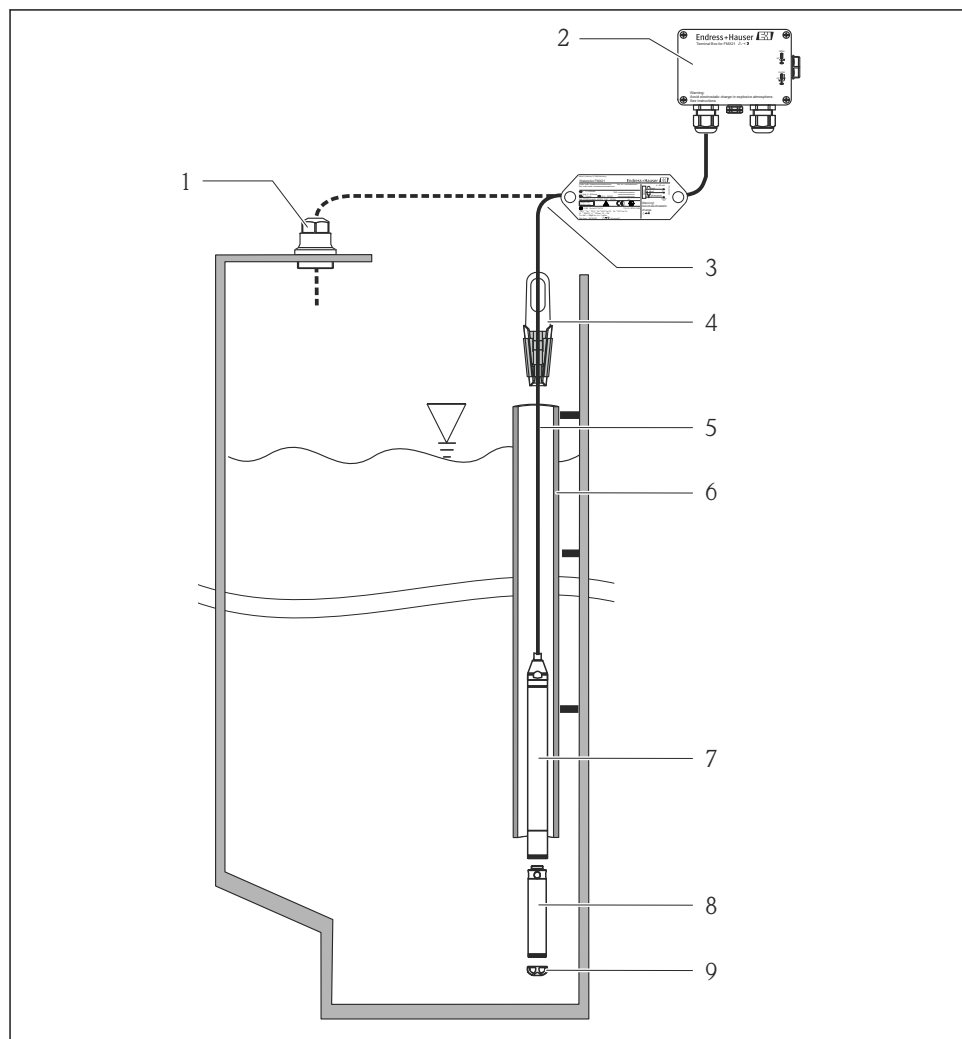
- Waterpilot FMX21, optionally with integrated Pt100 resistance thermometer
- Optional accessories

Documentation supplied:

- The Operating Instructions BA01605P are available on the internet. → see: www.de.endress.com → Downloads.
- Brief Operating Instructions KA01244P
- Final inspection report
- Drinking water approvals (optional): SD00289P, SD00319P, SD00320P
- Devices that are suitable for use in hazardous areas: Additional documentation e.g. Safety instructions (XA, ZD)

5 Installation

5.1 Installation conditions



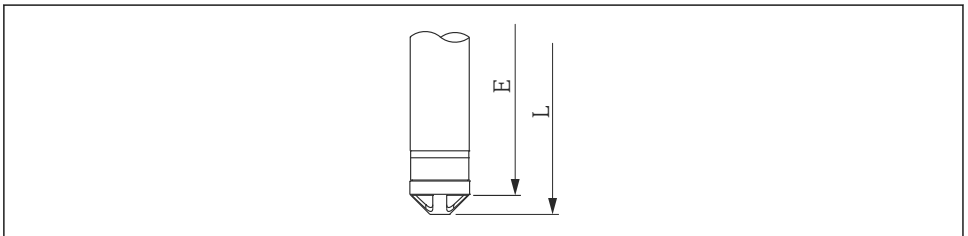
A0018770

- 1 Cable mounting screw (can be ordered as an accessory)
- 2 Terminal box (can be ordered as an accessory)
- 3 Bending radius of extension cable > 120 mm (4.72 in)
- 4 Mounting clamp (can be ordered as an accessory)
- 5 Extension cable
- 6 Guide tube

- 7 *Waterpilot FMX21*
- 8 *Additional weight can be ordered as an accessory for the FMX21 with external diameter of 22 mm (0.87 in) and 29 mm (1.14 in)*
- 9 *Protection cap*

5.2 Additional mounting instructions

- Cable length
 - Customer-specific in meters or feet.
 - Limited cable length when performing installation with freely suspended device with cable mounting screw or mounting clamp, as well as for FM/CSA approval: max. 300 m (984 ft).
- Sideways movement of the level probe can result in measuring errors. For this reason, install the probe at a point free from flow and turbulence, or use a guide tube. The internal diameter of the guide tube should be at least 1 mm (0.04 in) greater than the external diameter of the selected FMX21.
- 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: < 5 m (16 ft): ± 17.5 mm (0.69 in); > 5 m (16 ft): ± 0.2 %
- If the cable is shortened, the filter at the pressure compensation tube must be reattached. Endress+Hauser offers a cable shortening kit for this purpose (documentation SD00552P/00/A6).
- Endress+Hauser recommends using twisted, shielded cable.
- In shipbuilding applications, measures are required to restrict the spread of fire along cable looms.
- The length of the extension cable depends on the intended level zero point. The height of the protection 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).

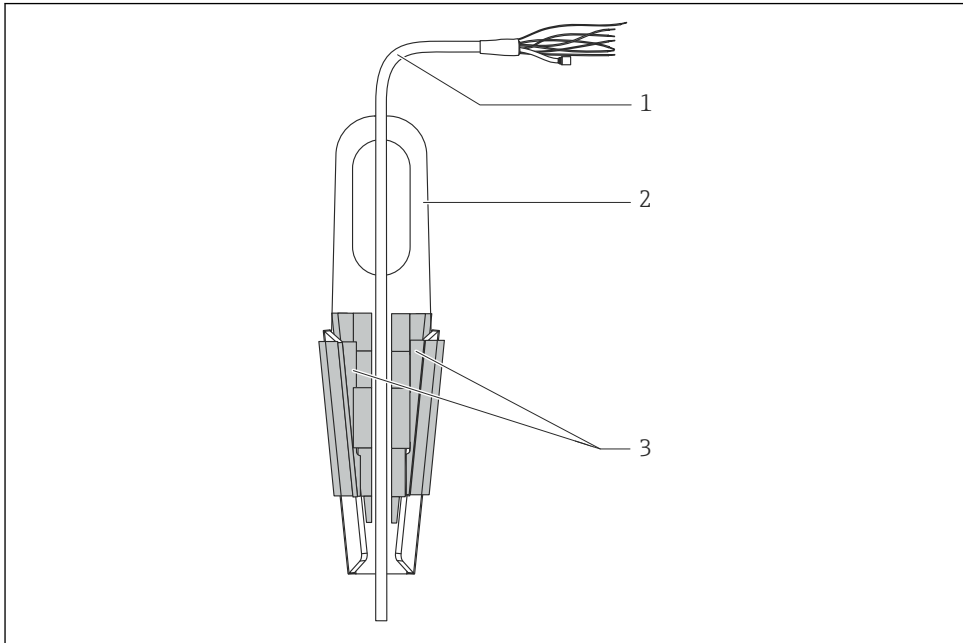


A0026013

5.3 Dimensions

For dimensions, please refer to the Technical Information TI00431P/00/EN, "Mechanical construction" section (see also: www.de.endress.com → Downloads → Media Type: Documentation).

5.4 Mounting the Waterpilot with a mounting clamp



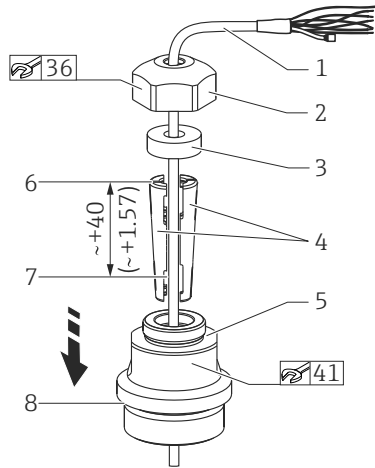
A0018793

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

5.4.1 Mounting the suspension clamp:

1. Mount the suspension clamp (item 2). Take the weight of the extension cable (item 1) and the device into account when selecting the fastening point.
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.

5.5 Mounting the Waterpilot with a cable mounting screw



A0018794

- 1 Extension cable
- 2 Cover for cable mounting screw
- 3 Sealing ring
- 4 Clamping sleeves
- 5 Adapter for cable mounting screw
- 6 Top edge of clamping sleeve
- 7 Desired length of extension cable and Waterpilot probe prior to assembly
- 8 After assembly, item 7 is located next to the mounting screw with G 1½" thread: height of sealing surface of the adapter or NPT 1½" thread height of thread run-out of adapter

Engineering unit mm (in). Illustrated with G 1½" thread.



If you want to lower the level probe to a certain depth, position the top edge of the clamping sleeve 40 mm (4.57 in) higher than the required depth. Then push the extension cable and the clamping sleeve into the adapter as described in Step 6 in the following section.

5.5.1 Mounting the cable mounting screw with a G 1½" or NPT 1½" thread:

1. Mark the desired length of extension cable on the extension cable.
2. Insert the probe through the measuring aperture and carefully lower on the extension cable. Fix the extension cable to prevent it from slipping.
3. Slide the adapter (item 5) over the extension cable and screw it tightly into the measuring aperture.
4. Slide the sealing ring (item 3) and cover (item 2) onto the cable from above. Press the sealing ring into the cover.
5. Place the clamping sleeves (item 4) around the extension cable (item 1) at the marked point as illustrated in the graphic.

6. Slide the extension cable with the clamping sleeves (item 4) into the adapter (item 5)
7. Fit the cover (item 2) with the sealing ring (item 3) onto the adapter (item 5) and securely screw together with the adapter.



To remove the cable mounting screw, perform this sequence of steps in reverse.

⚠ CAUTION

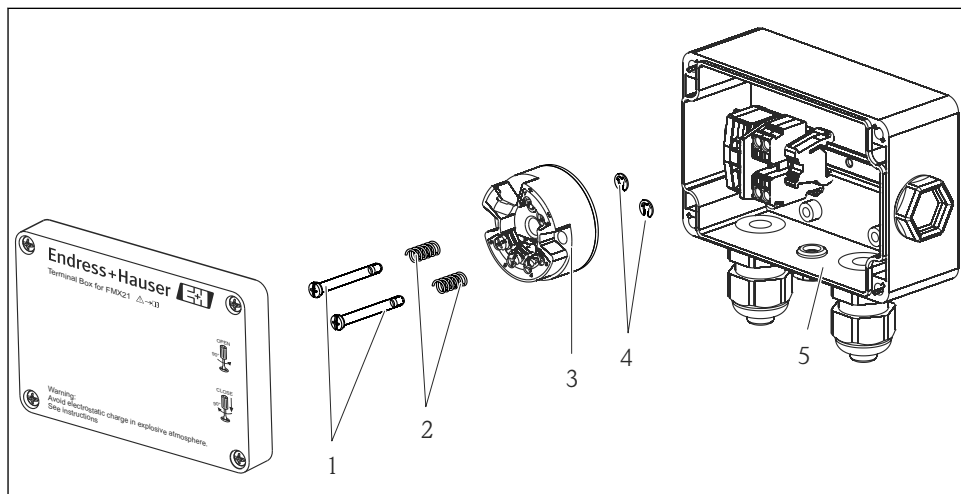
Risk of injury!

- Use only in unpressurized vessels.

5.6 Mounting the terminal box

The optional terminal box is mounted using four screws (M4). For the dimensions of the terminal box, please see the Technical Information TI00431P/00/ EN, "Mechanical construction" section (see also: www.de.endress.com → Downloads → Media Type: Documentation).

5.7 Mounting the TMT181 temperature head transmitter with terminal box



A0018813

- 1 Mounting screws
- 2 Mounting springs
- 3 TMT181 temperature head transmitter
- 4 Circlips
- 5 Terminal box



Only open the terminal box with a screwdriver.

⚠ WARNING

Risk of explosion!

- ▶ The TMT181 is not designed for use in hazardous areas.

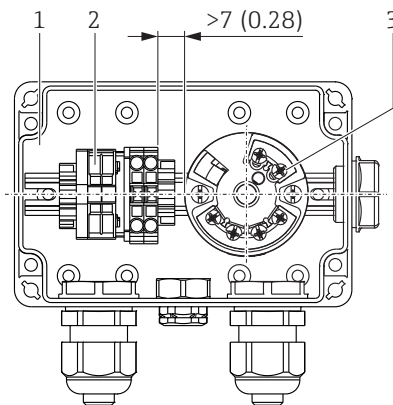
5.7.1 Mounting the temperature head transmitter:

1. Guide the mounting screws (item 1) with the mounting springs (item 2) through the bore of the temperature head transmitter (item 3)
2. Secure the mounting screws with the circlips (item 4). Circlips, mounting screws and springs are included in the scope of delivery for the temperature head transmitter.
3. Screw the temperature head transmitter into the field housing tightly. (Width of screwdriver blade max. 6 mm (0.24 in))

NOTICE

Avoid damage to the temperature head transmitter.

- ▶ Do not overtighten the mounting screw too.



A0018696

- 1 Terminal box
2 Terminal strip
3 TMT181 temperature head transmitter

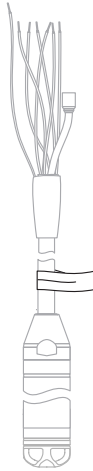
Engineering unit mm (in)

NOTICE

Incorrect mounting!

- ▶ A distance of $>7\text{ mm}$ (>0.28) must be maintained between the terminal strip and the TMT181 temperature head transmitter.

5.8 Cable marking



A0030955

- To make installation easier, Endress+Hauser marks the extension cable if a customer-specific length has been ordered.
Ordering information: Product Configurator order code for "Service", option "IR" or "IS".
- Cable marking tolerance (distance to lower end of level probe):
Cable length < 5 m (16 ft): ± 17.5 mm (0.69 in)
Cable length > 5 m (16 ft): ± 0.2 %
- Material: PET, stick-on label: acrylic
- Immunity to temperature change: -30 to $+100$ °C (-22 to $+212$ °F)

NOTICE

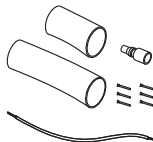
The marking is used exclusively for installation purposes.

- The mark must be thoroughly removed without trace in the case of devices with drinking water approval. The extension cable must not be damaged in the process.



Not for use of the FMX2.1 in hazardous areas.

5.9 Cable shortening kit



A0030948

The cable shortening kit is used to shorten a cable easily and professionally.



The cable shortening kit is not designed for the FMX21 with FM/CSA approval.

- Ordering information: Product Configurator order code for "Accessories enclosed", option "PW"
- Associated documentation SD00552P/00/A6.


5.10 Post-installation check

<input type="checkbox"/>	Is the device undamaged (visual inspection)?
<input type="checkbox"/>	<div>Does the device conform to the measuring point specifications? For example:<ul style="list-style-type: none">■ Process temperature■ Process pressure■ Ambient temperature■ Measuring range</div>
<input type="checkbox"/>	Are the measuring point identification and labeling correct (visual inspection)?
<input type="checkbox"/>	Check that all screws are firmly seated.

6 Electrical connection

WARNING



Electrical safety is compromised by an incorrect connection!

- ▶ When using the measuring device in a hazardous area, the relevant national standards and guidelines as well as the Safety Instructions (XAs) or installation or control drawings (ZDs) must be adhered to. All data relating to explosion protection can be found in separate documentation which is available on request. This documentation is supplied with the devices as standard →  6

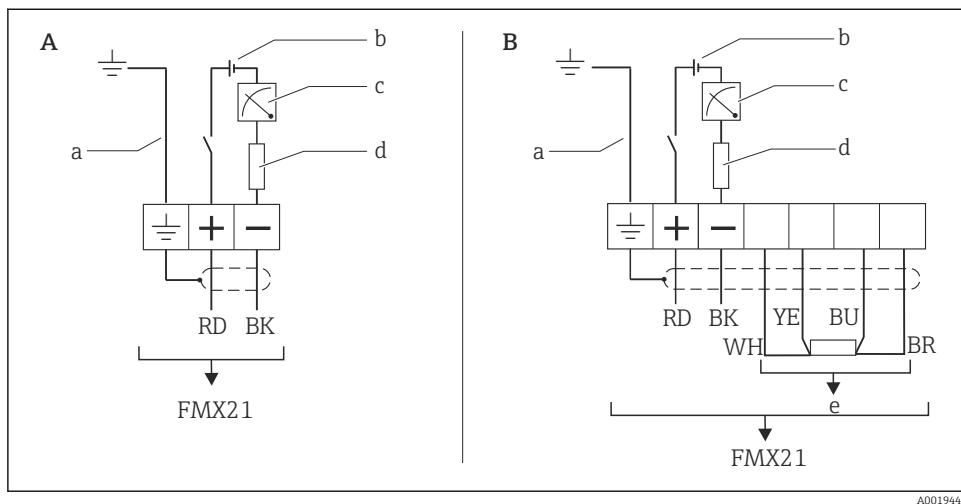
6.1 Connecting the device

WARNING

Electrical safety is compromised by an incorrect connection!

- ▶ The supply voltage must match the supply voltage specified on the nameplate →  13
- ▶ Switch off the supply voltage before connecting the device.
- ▶ The cable must end in a dry room or a suitable terminal box. The IP66/IP67 terminal box with GORE-TEX® filter from Endress+Hauser →  20 is suitable for outdoor installation.
- ▶ Connect the device in accordance with the following diagrams. Reverse polarity protection is integrated into the Waterpilot FMX21 and the temperature head transmitter. Changing the polarities will not result in the destruction of the devices.
- ▶ A suitable circuit breaker should be provided for the device in accordance with IEC/EN 61010.

6.1.1 Waterpilot with Pt100



A0019441

A Waterpilot FMX21

B Waterpilot FMX21 with Pt100 (not for use in hazardous areas); option "NB", Product Configurator order code for "Accessories"

a Not for the FMX21 with external diameter of 29 mm (1.14 in)

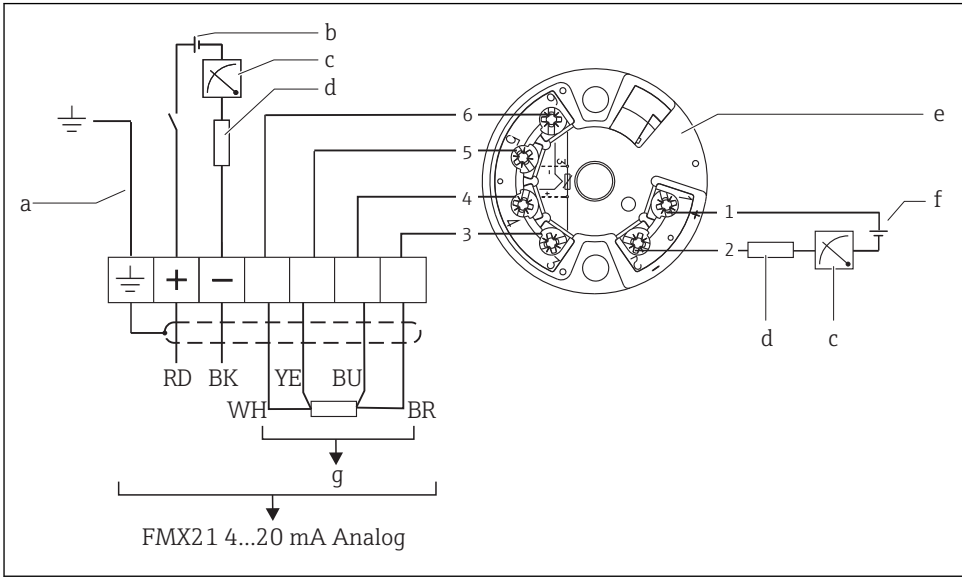
b 10.5 to 30 V DC (hazardous area), 10.5 to 35 V DC

c 4...20 mA

 d Resistance (R_L)

e Pt100

6.1.2 Waterpilot with Pt100 and TMT181 temperature head transmitter for FMX21 4 to 20 mA Analog



A0030945

- a Not for the FMX21 with external diameter of 29 mm (1.14 in)
 b 10.5 to 35 VDC
 c 4...20 mA
 d Resistance (R_L)
 e TMT181 temperature head transmitter (4 to 20 mA) (not for use in hazardous areas)
 f 8 to 35 VDC
 g Pt100
 1...6 Pin assignment

Ordering information:

Pt100: Product Configurator order code for "Accessories mounted", option "NB"

TMT181: Product Configurator order code for "Accessories enclosed", option "PX"

6.1.3 Wire colors

RD = red, BK = black, WH = white, YE = yellow, BU = blue, BR = brown

6.1.4 Connection data

Connection classification as per IEC 61010-1:

- Overvoltage category 1
- Pollution level 1

Connection data in the hazardous area

See relevant XA.

6.2 Supply voltage



WARNING

Supply voltage might be connected!

Risk of electric shock and/or explosion!

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

6.2.1 FMX21 + Pt100 (optional)

- 10.5 to 35 V (not hazardous areas)
- 10.5 to 30 V (hazardous areas)

6.2.2 TMT181 temperature head transmitter (optional) for FMX21 4 to 20 mA Analog

8 to 35 V DC

6.3 Cable specifications

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



The probe cables are shielded for device versions with outer diameters of 22 mm (0.87 in) and 42 mm (1.65 in).

6.3.1 FMX21 + Pt100 (optional)

- Commercially available instrument cable
- Terminals, terminal box: 0.08 to 2.5 mm² (28 to 14 AWG)

6.3.2 TMT181 temperature head transmitter (optional) for FMX21 4 to 20 mA Analog

- Commercially available instrument cable
- Terminals, terminal box: 0.08 to 2.5 mm² (28 to 14 AWG)
- Transmitter connection: max. 1.75 mm² (15 AWG)

6.4 Power consumption

6.4.1 FMX21 + Pt100 (optional)

- ≤ 0.805 W at 35 V DC (non-hazardous area)
- ≤ 0.690 W at 30 V DC (hazardous area)

6.4.2 TMT181 temperature head transmitter (optional) for FMX21 4 to 20 mA Analog

≤ 0.875 W at 35 V DC

6.5 Current consumption

6.5.1 FMX21 + Pt100 (optional)

Max. current consumption: ≤ 23 mA

Min. current consumption: ≥ 3.6 mA

6.5.2 TMT181 temperature head transmitter (optional) for FMX21 4 to 20 mA Analog

- Max. current consumption: ≤ 25 mA
- Min. current consumption: ≥ 3.5 mA

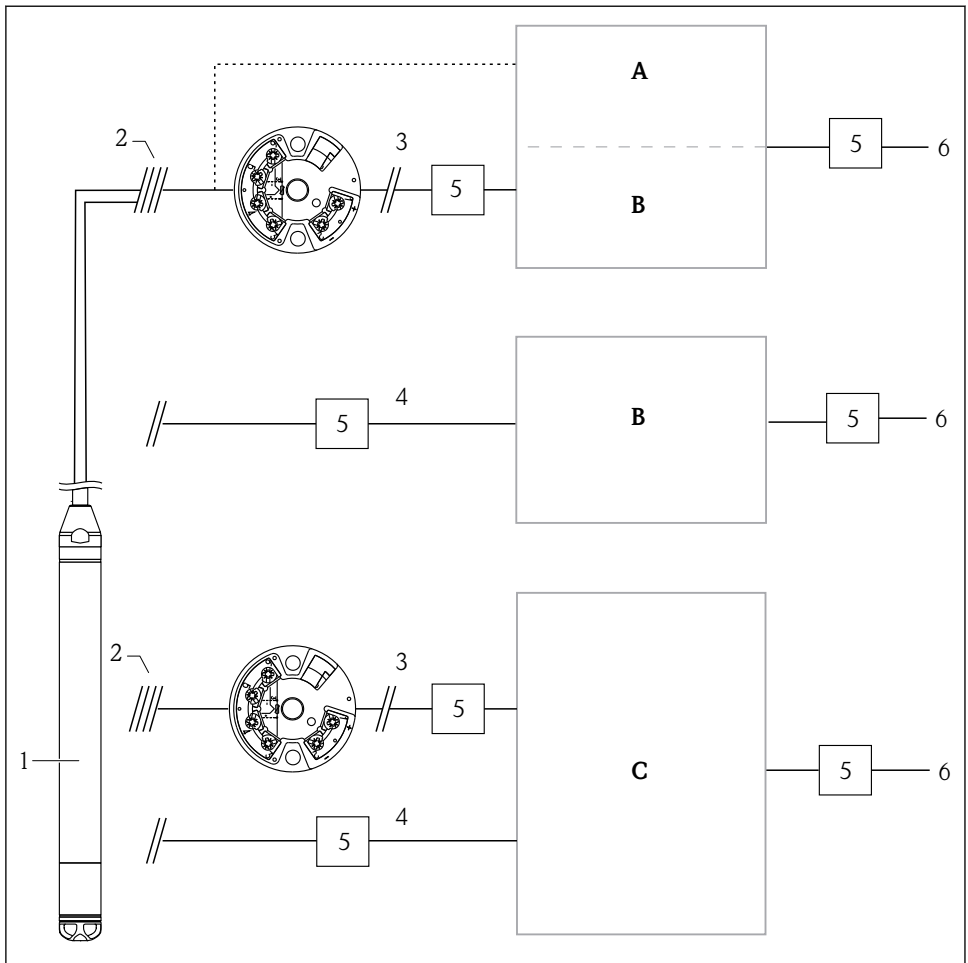
6.6 Maximum load for FMX21 4 to 20 mA Analog

See Operating Instructions.

6.7 Connecting the measuring unit

6.7.1 Overvoltage protection

To protect the Waterpilot and the TMT181 temperature head transmitter from large interference voltage peaks, Endress+Hauser recommends installing overvoltage protection upstream and downstream of the display and/or evaluation unit as shown in the graphic.



A0030206-EN


- A Power supply, display and evaluation unit with one input for Pt100
- B Power supply, display and evaluation unit with one input for 4 to 20 mA
- C Power supply, display and evaluation unit with two inputs for 4 to 20 mA
- 1 Waterpilot FMX21
- 2 Connection for integrated Pt100 in the FMX21
- 3 4 to 20 mA (temperature)
- 4 4 to 20 mA (level)
- 5 Overvoltage protection, e.g. HAW from Endress+Hauser (not for use in hazardous areas.)
- 6 Power supply

6.8 Post-connection check

<input type="checkbox"/>	Is the device or cable undamaged (visual check)?
<input type="checkbox"/>	Do the cables comply with the requirements ?
<input type="checkbox"/>	Do the cables have adequate strain relief?
<input type="checkbox"/>	Are all cable glands installed, securely tightened and leak-tight?
<input type="checkbox"/>	Does the supply voltage match the specifications on the nameplate?
<input type="checkbox"/>	Is the terminal assignment correct ?

7 Operation options

Endress+Hauser offers comprehensive measuring point solutions with display and/or evaluation units for the Waterpilot FMX21 and TMT181 temperature head transmitter.

 Your Endress+Hauser service organization would be glad to be of service if you have any other questions. Contact addresses can be found on the website at www.endress.com/worldwide

7.1 Overview of operating options

No display or other operation facility is required to operate the device.



71323919

www.addresses.endress.com
