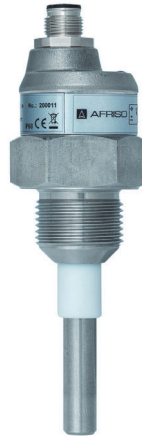


# Operation instruccions



## Capacitance level transmitter

**CapFox®**

Typ: EFT 20

---

Copyright 2020 AFRISO-EURO-INDEX GmbH. All rights reserved..



## Contents

1. About these operating instructions .....	3
2. Information on safety .....	3
3. Transport and storage .....	5
4. Product description .....	5
5. Mounting.....	9
6. Electrical connection.....	12
7. Settings.....	14
8. Coding.....	17
9. Accessories.....	18
10. Safety, Protections, Compatibility and Explosion safety.....	18
11. Operation .....	18
12. Maintenance .....	19
13. Returning the device .....	19
14. Warranty .....	19
15. Marking of lables.....	20
16. Technical Specifications .....	22

# 1. About these operating instructions

These operating instructions describe the capacitive level meter EFT 20 (also referred to as "product" in these operating instructions). These operating instructions are part of the product.

- You may only use the product if you have fully read and understood these operating instructions.
- Verify that these operating instructions are always accessible for any type of work performed on or with the product.
- Pass these operating instructions as well as all other product-related documents on to all owners of the product.
- If you feel that these operating instructions contain errors, inconsistencies, ambiguities or other issues, contact the manufacturer prior to using the product.

These operating instructions are protected by copyright and may only be used as provided for by the corresponding copyright legislation. We reserve the right to modifications.

The manufacturer shall not be liable in any form whatsoever for direct or consequential damage resulting from failure to observe these operating instructions or from failure to comply with directives, regulations and standards and any other statutory requirements applicable at the installation site of the product.

## 2. Information on safety

### 2.1. Safety messages and hazard categories

These operating instructions contain safety messages to alert you to potential hazards and risks. In addition to the instructions provided in these operating instructions, you must comply with all directives, standards and safety regulations applicable at the installation site of the product. Verify that you are familiar with all directives, standards and safety regulations and ensure compliance with them prior to using the product.

Safety messages in these operating instructions are highlighted with warning symbols and warning words. Depending on the severity of a hazard, the safety messages are classified according to different hazard categories.

#### **DANGER**

**DANGER indicates a hazardous situation, which, if not avoided, will result in death or serious injury.**

#### **NOTICE**

**NOTICE indicates a hazardous situation, which, if not avoided, can result in equipment damage.**

In addition, the following symbols are used in these operating instructions:



This is the general safety alert symbol. It alerts to injury hazards or equipment damage. Comply with all safety instructions in conjunction with this symbol to help avoid possible death, injury or equipment damage..



This symbol alerts to hazardous electrical voltage. If this symbol is used in a safety message, there is a hazard of electric shock.



This symbol alerts to general information.

## **2.2. Intended use**

This product may be used for continuous level measuring of liquids and bulk solids in open and closed container, tanks or silos.

Any use other than the application explicitly permitted in these operating instructions is not permitted and causes hazards.

Verify that the product is suitable for the application planned by you prior to using the product. In doing so, take into account at least the following:

- All directives, standards and safety regulations applicable at the installation site of the product
- All conditions and data specified for the product
- The conditions of the planned application

In addition, perform a risk assessment in view of the planned application, according to an approved risk assessment method, and implement the appropriate safety measures, based on the results of the risk assessment. Take into account the consequences of installing or integrating the product into a system or a plant.

When using the product, perform all work and all other activities in conjunction with the product in compliance with the conditions specified in the operating instructions and on the nameplate, as well as with all directives, standards and safety regulations applicable at the installation site of the product.

## **2.3. Predictable incorrect application**

The product must never be used in the following cases and for the following purposes:

- Use as overflow prevention system according to WHG
- Use with corrosive liquids (only with PFA-FEP-Beschichtung)
- Ambient temperature under -20 °C and over 50 °C

## **2.4. Qualification of personnel**

Only appropriately trained persons who are familiar with and understand the contents of these operating instructions and all other pertinent product documentation are authorized to mount, commission, maintain and decommission this product.

These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product.

All persons working on and with the product must be fully familiar with all directives, standards and safety regulations that must be observed for performing such work.

## **2.5. Personal protective equipment**

Always wear the required personal protective equipment. When performing work on and with the product, take into account that hazards may be present at the installation site which do not directly result from the product itself.

## **2.6. Modifications to the product**

Only perform work on and with the product which is explicitly described in these operating instructions. Do not make any modifications to the product which are not described in these operating instructions.

## 3. Transport and storage

The product may be damaged as a result of improper transport or storage..

### NOTICE

#### INCORRECT HANDLING

- Verify compliance with the specified ambient conditions during transport or storage of the product.
- Use the original packaging when transporting the product.
- Store the product in a clean and dry environment.
- Verify that the product is protected against shocks and impact during transport and storage.

**Failure to follow these instructions can result in equipment damage.**

Store the device in its original packaging in dry areas covered from weather conditions, with humidity of up to 85 % without effects of chemically active substances. The storage temperature range is -10 °C to +50 °C..



All products (except the type variant EFT-20\_ - 60) are equipped with protective covers at ends of electrodes (longer than 100 mm) and of reference tubes in order to prevent damage to electrode and tubes, tearing of the package or injury of persons handling them. Remove the cover prior to operation setting.!

## 4. Product description

### 4.1. Measuring principle

The product is intended for continuous level measurement of liquid and bulk solids in tanks. They are comprised of a housing with electronic module and measuring electrodes. The electronic part converts the size of the capacity to the current signal (4 ... 20 mA) or voltage signal (0 ... 10 V). Level meters are made in several modifications of measuring electrodes (rod and rope). The electrodes can be covered by an insulating coating in case level measurement of adhesive, aggressive or electrically conductive media. Rod electrodes are also available in a version with reference (coaxial) tube for level measurement of liquids in tanks made from non-conductive material.

### 4.2. Variants of Level Meters

- **EFT 20\_-20** **Uncoated rod electrode** for level measurement of bulk-solids (cement, flour, sand, plastic granulate) and electrically non-conductive liquids (vegetable oil, diesel fuel, petrol).  
Maximum electrode length 2 m.
- **EFT 20\_-21** **Coated rod electrode (insulation FEP)** for level measurement of water and other electrically conductive liquids. Can also be used for polluted liquids in metal tanks, concrete sumps, etc.  
Maximum electrode length 2 m.

- **EFT 20\_-22 Coated rod electrode (insulation PFA)** with enhanced resistance to permeation (diffusion) of vapours and gases. For level measurement of water and other electrically conductive liquids in the food, pharmaceutical and chemical industries. In the short term can be used for high temperature applications (e.g. hot steam sanitation), or for volatile aggressive liquids, etc.  
Maximum electrode length 2 m.
- **EFT 20\_-40 Uncoated rod electrode with reference tube (coaxial electrode)** for accurate level measurement of unpolluted electrically non-conductive liquids (oils, diesel fuel, petrol). The measurement is not dependent on the tank shape and on the presence of objects in close proximity to the reference tube.  
Maximum electrode length 2 m.
- **EFT 20\_-41 Coated rod electrode with reference tube (coaxial electrode)** for accurate level measurement of unpolluted electrically conductive liquids in plastic and glass tanks. The measurement is not dependent on the tank shape and on the presence of objects in close proximity to the reference tube.  
Maximum electrode length 1 m.
- **EFT 20\_-60 Uncoated rope electrode with weight** for level measurement of bulk-solids (e.g. grains, sand, gravel, cement, etc.).  
Maximum electrode length 6 m.

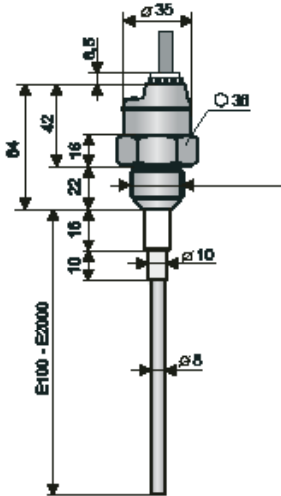
The product is produced in the following performances:

- **ST** – for non-explosive areas
- **HT** – high temperature for non-explosive areas
- **EX** – intrinsically safe explosion-proof version for use in hazardous areas (gas and dust EX)
- **MEX** – intrinsically safe explosion-proof version (mining sectors); as well as high-temperature explosion-proof version

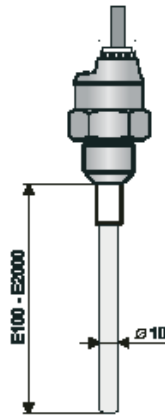
The products are offered in variants with various types of process connection (metric and pipe thread, pressure thread NPT).

### 4.3. Dimensions

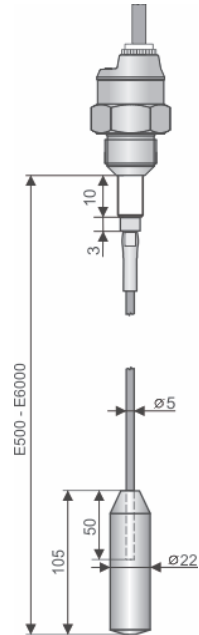
EFT 20\_-20



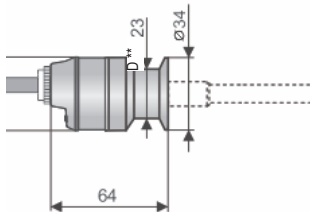
EFT 20\_-21, 22



EFT 20\_-50

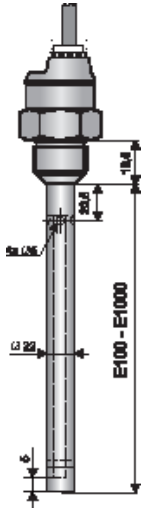


#### Process connection Tri-clamp



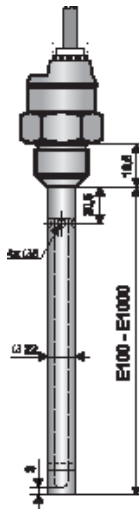
\* Type of threads: G 1", G 3/4", NPT 3/4  
 \*\* D: Tri-Clamp CI34 (ø 34 mm)  
 Tri-Clamp CI50 (ø 50,5 mm)  
 All dimensions are in mm.

EFT 20\_-40



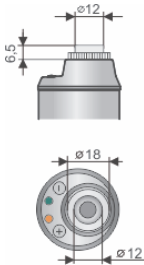
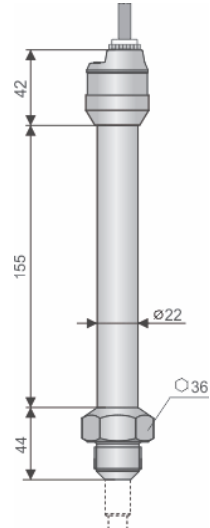
Variant „A“ with short stainless steel gland

EFT 20\_-41

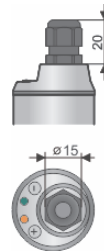
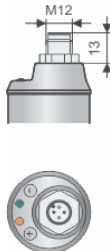


Variant "B" with plastic threaded cable gland M12 x 1,5

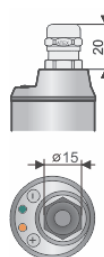
High temperatures variants



Variante "C" with plug M12 x 1, 4-pole



Variante „D" with dustproof cable outlet (ATEX)





## 5. Mounting

- ⇒ Verify that the product is protected from direct sunlight and other heat sources.
- ⇒ Verify that the product is protected from direct weather when installed outdoors.
- ⇒ Verify that the environmental conditions are observed.

The cable entries of the product must be tightened firmly. The product is fixed to the container using a suitable mounting flange.

Pay attention to the strength and tightness of the connection.

### 5.1. Preparing mounting

Level meters with coated electrode have protection cover at the end of electrode.

1. Remove the protection cover before mounting.

The product consists of:

- capacitive probe (Rod or flexible probe),
- Electronic part with screw-in thread

Sensor and electronics are firmly interconnected.

Mount the product only in vertical position. The probe protrudes into the container from above.

For mounting the product to the metal tank or hopper, it is not necessary to ground the housing again.

In case of installation in concrete sumps or silos, it is appropriate to install the product onto a metallic auxiliary construction

1. Connect the metal sheet with metallic object or with the steel reinforcements in concrete. .

For level measurement of material in plastic and glass vessels by product without reference tube is necessary to connect grounding screw at housing with auxiliary electrode.

1. Attach the separate ground electrode to the outer jacket of the container.
2. Attach the earth electrode parallel to the measuring electrode inside the container. Alternatively, the earth electrode can be attached to the outer casing of the container.

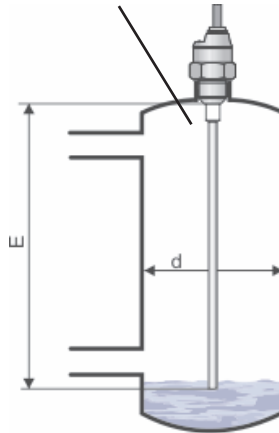
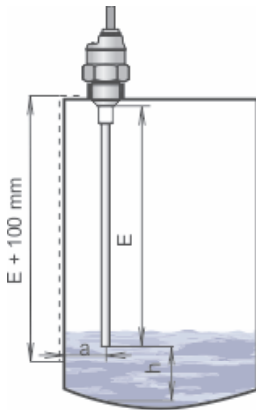
Material of auxiliary electrode must be selected with consideration for the working environment and properties of measured material.

## Variants with rod electrode

For types: EFT 20\_-20, 21, 22

Ground electrode, width = min. 30 mm  
(necessary only for non-metal vessels)

Auxiliary measuring vessel (bypass)

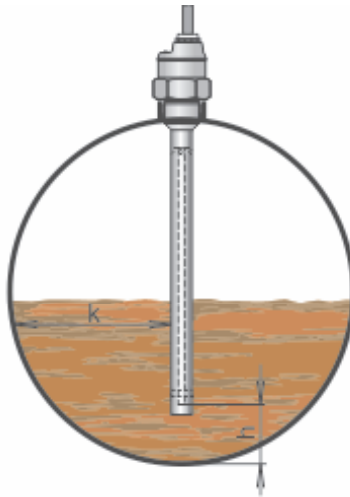


E - the length of electrode [mm] - select so that the end of the electrode is dipped min. 20 mm below the lowest measured level  
h - the distance from the bottom - min. 20 mm  
a - the distance from the wall - min. approx.  $E/20$   
d - the diameter of auxiliary tube vessel - min.  $40 + E/20$  (smaller dimension has to be discussed with producer)

Fig. 1: Installation of level meters with rod electrode

## Variants with coax probe

For types: EFT 20\_-40, 41



h - distance from bottom - min. 20 mm  
k - the distance from the wall - optional

Fig. 2: Installation with a coax probe

## Variants with rope probe

For types: EFT 20\_-50

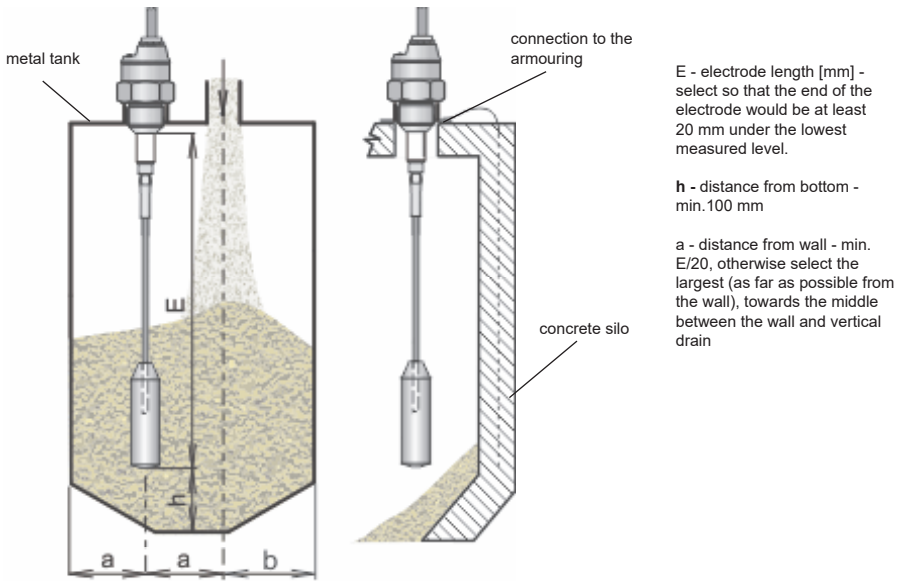


Fig. 3: Installation with a rope probe

## 6. Electrical connection

### DANGER

#### ELECTRIC SHOCK

- Verify that the degree of protection against electric shock (protection class, double insulation) is not reduced by the type of electrical installation.

**Failure to follow these instructions will result in death or serious injury.**

### DANGER

#### ELECTRIC SHOCK CAUSED BY LIVE PARTS

- Disconnect the mains voltage supply before performing the work and ensure that it cannot be switched on.
- Verify that no hazards can be caused by electrically conductive objects or media.

**Failure to follow these instructions will result in death or serious injury.**

1. Connect the wires as follows:

- +U = BN (brown) or Pin of plug Nr. 1
- 0 V = BU (blue) or Pin of plug Nr. 3
- Uout = BK (black) or Pin of plug Nr. 4

Wiring diagrams are provided in the figures below.



In case of strong ambient electromagnetic interference, paralleling of conductors with power distribution, or for the distribution to distance over 30 m, we recommend using shielded cable.

Product with type of cable outlet A, B or D is connected to assessing units permanently.

Product with plug M12x1, 4-pole (Type C) is connected to assessing units by means of a connector socket with compression cable. The recommended cross-sectional area is 0.5 mm<sup>2</sup>.

The length of the cable for the variant EX and MEX variations must be selected with respect to the maximum permitted parameters (usually inductance and capacity) of the outside intrinsically safe circuit of supply units IRU-420.

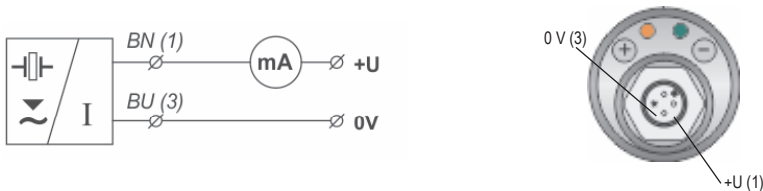


Fig. 4: Electrical connection (4-20 mA, 2-wire system)

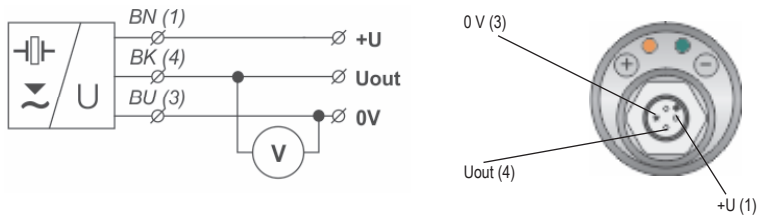


Fig. 5: Electrical connection (0-10 V, 3-wire system)

If the switch-mode power supply is equipped with a PE safety terminal, it must be unconditionally grounded!

The intrinsically safe systems of the types EFT-20\_EX (MEX) must be operated with an intrinsically safe circuit.



Due to the possible occurrence of an electrostatic charge on the non-conductive parts of the sensor, it is necessary to ground all sensors intended for use in environments with an explosion hazard EFT-20\_EX (MEX). This can be performed by grounding electrical conductive tanks or electrical conductive tank lids, and in the case of electrical non-conductive tanks using and grounding an auxiliary plate electrode.

If the level meter (sensor) is installed in an outdoor environment (in a distance greater than 20 m from the outdoor switchboard, or from an enclosed building), an overvoltage protection must be used.

Use a shielded cable (min.  $2 \times 0,75\text{mm}^2$ ).

## 7. Settings



- 0 % adjustment
- 4 mA (0 V) setting
- Decrease values in predefined steps



- 100 % adjustment
- 20 mA (10 V) setting
- Increase values in predefined steps

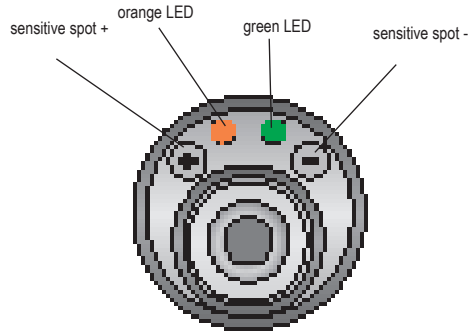


Fig. 6: View of the level sensor from above

### 7.1. Status and error signals (LED)

The system is set up after installation by applying the test magnet (magnetic pen) to the spots and . The progress of the setting is marked with an orange LED.


1. Connect the product to the supply voltage.
2. Check the output value (current or voltage) with a measuring device or a downstream device.

Colour	Function
green	<p><b>Status of the measuring function</b></p> <p><b>flashing:</b> correct functioning of the level measuring</p> <p><b>LED is not lit:</b> incorrect installation or malfunction. when setting up 0% or 100 % adjustment LED is not lit.</p> <p><b>Green and orange LED flashes alternately</b> = limit values incorrectly set</p>
orange	<p><b>View settings</b></p> <p><b>slow flashing:</b> 4 mA (0 V) setting</p> <p><b>fast flashing:</b> 20 mA (10 V) setting</p> <p><b>Lights up permanently:</b> Confirm the 0% or 100 % point with the test magnet.</p> <p><b>3 x short flashing:</b> confirm the setting The green and orange LEDs light up when the test magnet is used.</p>

### 7.2. Basic setting for minimum and maximum level (direct)



Setting lower limit 4 mA (0 V) – direct

1. Empty the tank to the level of the minimum measured level (empty container) To achieve the required linearity the end of the electrode has to be dipped, see FigFig. 1.
2. Touch the test magnet for **approx. 5 seconds** on the sensitive spot . After 3 seconds, the orange LED starts slow flashing. Keep the test magnet in touch with the sensitive spot. After 2 more seconds the value 4 mA (0V) is set.

3. Remove the test magnet.
4. Wait until the orange LED lights up continuously.
5. Confirm the setting by short touch of the test magnet on the sensitive spot .
6. Remove the test magnet, when both LEDs light up.

The orange LED will briefly flash 3x to confirm the setting of the limit.

### **Setting the upper limit 20 mA (10 V) – direct**

1. Fill the tank to the level of the maximum measured level.
2. Touch the test magnet for **approx. 5 seconds** on the sensitive spot .  
After 3 seconds, the orange LED starts slow flashing. Keep the test magnet in touch with the sensitive spot. After 2 more seconds the value 20 mA (10 V) is set.
3. Remove the test magnet.
4. Wait until the orange LED lights up continuously.
5. Confirm the setting by short touch of the test magnet on the sensitive spot .
6. Remove the test magnet, when both LEDs light up.

The orange LED will briefly flash 3x to confirm the setting of the limit value.


**If both LEDs flash alternately, the product does not detect the two selected fill levels (incorrectly set limit values).**



1. Repeat the setting.

### **Setting procedure for any two filling levels (indirect)**

This setting is used if it is not possible to bring the level to the minimum or maximum level. After setting of any two limit values, the electronics of the level meter automatically calculates the full measuring range 4 to 20 mA or 0 to 10 V).


#### **Setting the lower limit value – indirekct**

1. Bring the level in the tank close to the minimum level to be measured.
2. Touch the test magnet for **approx. 3 seconds** on the sensitive spot .  
After 3 seconds, the orange LED starts slow flashing.
3. Remove the test magnet.


If the orange LED flashes slow, the output value can be set step by step by applying the test magnet to the sensitive spots  and . The size of the setting steps is calculated according to the following formula:



- for current output ...  $I_{out} = 4 + (0,16 \times \text{current level in \%}) \text{ [mA]}$
- for voltage output ...  $U_{out} = 0,1 \times \text{current level in \% [V]}$

If the test magnet is held permanently on the sensitive spot, the step rate increases continuously.

4. Remove the test magnet, when the lower output value is reached.
5. Wait until the orange LED lights up continuously.
6. Confirm the setting by short touch of the test magnet on the sensitive spot .
7. Remove the test magnet, when both LEDs light up.

### Setting the upper limit value – indirekt


1. Bring the level in the tank close to the maximum level to be measured.
2. Touch the test magnet for **approx. 3 seconds** on the sensitive spot .  
After 3 seconds, the orange LED starts fast flashing.
3. Remove the test magnet.

If the orange LED flashes fast, the output value can be set step by step by applying the test magnet to the sensitive spots  and . The size of the setting steps is calculated according to the following formula:

- for current output ...  $I_{out} = 4 + (0,16 \times \text{current level in \%})$  [mA]

- for voltage output ...  $U_{out} = 0,1 \times \text{current level in \%}$  [V]

If the test magnet is held permanently on the sensitive spot, the step rate increases continuously.

4. Remove the test magnet, when the upper output value is reached.
5. Wait until the orange LED lights up continuously.
6. Confirm the setting by short touch of the test magnet on the sensitive spot .

The orange LED will briefly flash 3x to confirm the setting of the limit value.



# 8. Coding

<b>1 Capacitance level transmitter</b>								
56550 CapFox® EFT 20								
<b>2 Probe type / max. measuring range / application / base price incl. 1 m electrode</b>								
20	Mono probe rigid without insulation EFT 20 MS, max. 2,000 mm, for non-conductive media							
21	Mono probe rigid with FEP insulation EFT 20 MS, max. 2,000 mm, for conductive media and food							
22	Mono probe rigid with PFA insulation EFT 20 MS, max. 2,000 mm, for conductive media							
40	Coax probe without insulation, EFT 20 KX, max. 1,000 mm, for non-conductive liquids							
41	Coax probe with FEP-insulated measuring electrode, EFT 20 KX, max. 1,000 mm, for non-conductive liquids							
60	Mono probe flexible, with weight Ø 22 mm, EFT 20 MF, max. 6,000 mm, for bulk solids							
<b>3 Temperature range</b>								
ST	Standard for max. flange temperature $t_p$ 85 °C (EX version 75 °C)							
HT	High temperature version for max. flange temperature $t_p$ 200 °C							
<b>4 Probe length (L)      Extra charge for each 100 mm probe length for lengths &gt; 1,000 mm</b>								
2000	Length in mm e.g. 2,000 mm							
	Rigid mono probe without insulation for EFT 20 MS							
	Rigid mono probe with FEP insulation for EFT 20 MS							
	Rigid mono probe with PFA insulation for EFT 20 MS							
	Flexible mono probe without insulation for EFT 20 MS							
<b>5 Process connection</b>								
1	G1B							
2	G¾B							
3	¾ NPT							
4	Tri-Clamp DIN 32676, Ø 34 mm							
5	Tri-Clamp DIN 32676, Ø 50.5 mm							
<b>6 Electrical connection</b>								
A	Short stainless steel cable gland							
B	Plastic cable gland M12 x 1.5							
C	Connector M 12 x 1, 4-pin							
D	Dust-tight cable gland (ATEX)							
<b>7 Output signal</b>								
01	4–20 mA / 2-wire / DC 9–34 V							
02	0–10 V / 3-wire / DC 12–34 V							
EX	4–20 mA (ia) / 2-wire / DC 9–28 V (gas and dust EX) U <sub>i</sub> =30 V DC; I <sub>i</sub> =132 mA; P <sub>i</sub> =0.99 W; C <sub>i</sub> =35 nF; L <sub>i</sub> =10 mH							
MEX	4–20 mA (ia) / 2-wire / DC 9–28 V (mining) U <sub>i</sub> =30 V DC; I <sub>i</sub> =132 mA; P <sub>i</sub> =0.99 W; C <sub>i</sub> =35 nF; L <sub>i</sub> =10 mH							
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>56550</td> <td>21</td> <td>ST</td> <td>1000</td> <td>1</td> <td>A</td> <td>01</td> </tr> </table>		56550	21	ST	1000	1	A	01
56550	21	ST	1000	1	A	01		

## 9. Accessories

Standard (scope of delivery)

- 1 x Magnetic pen MP-8
- 1 x Non-asbestos gasket \*

\* For pressure resistance see table in the data sheet for the accessories in the seal range.

## 10. Safety, Protections, Compatibility and Explosion safety

The Product is equipped with protection against electric shock on the electrode, reverse polarity, output current overload, short circuit and against current overload on output.

Protection against dangerous contact is provided by low safety voltage according to EN 33 2000-4-41. The EMC its compliance with the standards EN 55022 / B, EN 61326-1, EN 61000-4-2 bis -8.

The exposition safety of the variants EFT 20 ... EX (MEX) is ensured by compliance with standards EN 60079-0, EN 60079-11, EN 60079-26.

The explosion safety EFT 20 ... EX (MEX) is certified by FTZÚ – AO 210 Ostrava – Radvanice: FTZÚ 16 ATEX 0140X.

A declaration of conformity according to EU directives is drawn up for this device. Supplied electrical equipment matches the requirements of valid European directives for safety and electromagnetic compatibility.

### **Special conditions for safe use of variant EFT 20..EX (MEX)**

The product EFT 20 ... EX (MEX) is designed for connection in approved intrinsically safe circuits of the power supply units (isolating transducers) with galvanic isolation. If using the devices without galvanic isolation are used (Zener barriers), it is necessary to balance the potential between the sensor, resp. level meter and the barrier grounding location.

The limit output parameters of intrinsically safe units (isolating transducers) must correspond to the limit input parameters of the product. When assessing the intrinsic safety of the circuit, the parameters of the connection cable must also be taken into account (especially its inductance and capacitance).

The EFT 20 ... EX configuration may be located in zone 0 and Zone 20. With the EFT 20 ... EX configuration it is only possible to located the electrode part in zone 0 and in zone 20, and then the head with the electronics in zone 1 or zone 21.

Ambient temperature: Tamb = -40 °C to +75 °C.

The temperature of the measured material according to the variant configuration, see chapter "Technical specifications". The maximum temperature of the electrodes equals the temperature of the measured material.

Variant EFT 20 ... MEX t is necessary to observe that temperature of any surface of apparatus, when coal dust can from a layer, do not exceed 150 °C.

## 11. Operation

The product does not require any service during operation.

## **12. Maintenance**

Maintenance on the product may only be performed by a specialised company

## **13. Returning the device**

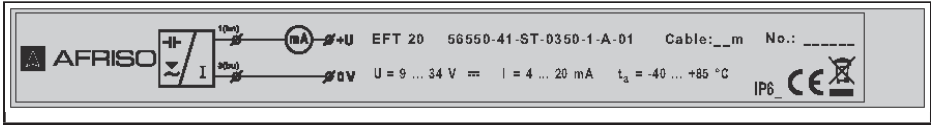
Get in touch with us before returning your product ([service@afribo.de](mailto:service@afribo.de)).

## **14. Warranty**

See our terms and conditions at [www.afribo.com](http://www.afribo.com) or your purchase contract for information on warranty.

# 15. Marking of lables

Labels for device of the type **EFT 20- ...**:



Manufacturer's label: AFRISO®-Logo

Internet: [www.afriso.de](http://www.afriso.de)

Country of origin: Made in Czech Republic

Connection diagram and cable designation : + U, 0 V.

Sensor type: EFT 20

Cable length: cable: \_\_ m

Serial number of the device: no. : \_\_\_\_ - (from the left: year of manufacture, serial number)

Supply voltage: U = 9 ... 34 V =

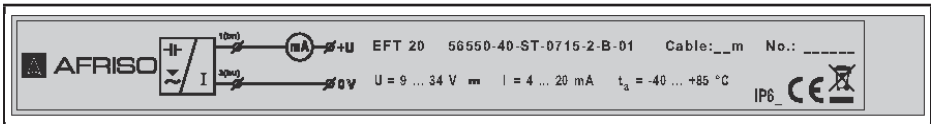
Current output: I = 4 ... 20 mA

Operating temperature range: ta = -40 ... +85 ° C.

Protection class: IP6\_ (see Protection class according to electrical connection); Compliance mark: CE

Labeling for the return of electric waste: ~~♻~~

Information on the label of the sensor of the series **EFT 20- ...**:



Manufacturer's label: AFRISO®-Logo

Internet: [www.afriso.de](http://www.afriso.de)

Country of origin: Made in Czech Republic

Connection diagram and cable designation: + U, Uout, 0 V.

Sensor type: EFT 20

Cable length: cable: \_\_ m

Serial number of the device: no. : \_\_\_\_ - (from the left: year of manufacture, serial number)

Supply voltage: U = 12 ... 34 V =

Output voltage range: Uout = 0 ... 10 V.

Operating temperature range: ta = -40 ... +85 ° C.

Protection class: IP6\_ (see. Protection class according to electrical connection); Compliance mark: CE

Labeling for the return of electric waste: ~~♻~~

Information on the label of the sensor of the series **EFT 20 EX- ...**:

**in preparation  
TYPE PLATE Afriso**

Manufacturer's label: AFRISO®-Logo

Contact: AFRISO-EURO-INDEX GmbH, Lindenstraße 20, 74363 Güglingen, Deutschland www.afriso.de

Connection diagram and cable designation: + U, 0 V.

Sensor type: EFT 20- ... EX

Cable length: cable: \_\_ m

Serial number of the device: no. : \_\_\_\_\_ - (from the left: year of manufacture, serial number)

Mark of non-explosive device:

Design (Xi): II 1 G Exia IIB T4 Ga; II 1 D Ex ia IIIC T120 ° C Da

Design (XiT): II 1/2 G Exia IIB T4 Ga / Gb; II 1/2 D Ex ia IIIC T120 ° C Da / Db

Output voltage range: I = 4 ... 20 mA

Limit parameters:  $U_i = 30\text{ V}$ ,  $I_i = 132\text{ mA}$ ;  $P_i = 0,99\text{ W}$ ;  $C_i = 35\text{ nF}$ ;  $L_i = 10\text{ uH}$

Operating temperature range:  $t_a = -40 \dots +75\text{ ° C}$ .

Type Examination Certificate: in preparation

Protection class: IP6\_; Compliance mark:  $\text{C}\text{C}$

Notified Body (Identif. No.): 1026

Labeling for the return of electric waste: ~~X~~

Information on the label of the sensor of the series **EFT 20- ... MEX**:

**in preparation  
TYPE PLATE Afriso**

Manufacturer's label: AFRISO®-Logo

Contact: AFRISO-EURO-INDEX GmbH, Lindenstraße 20, 74363 Güglingen, Deutschland www.afriso.de

Connection diagram and cable designation: + U, 0 V.

Sensor type: EFT 20- ... MEX

Cable length: cable: \_\_ m

Serial number of the device: no. : \_\_\_\_\_ - (from the left: year of manufacture, serial number)

Mark of non-explosive device: I M1 Ex ia I Ma

Output voltage range: I = 4 ... 20 mA

Limit parameters:  $U_i = 30\text{ V}$ ,  $I_i = 132\text{ mA}$ ;  $P_i = 0,99\text{ W}$ ;  $C_i = 35\text{ nF}$ ;  $L_i = 10\text{ uH}$

Operating temperature range:  $t_a = -40 \dots +75\text{ ° C}$ .

Type Examination Certificate: in preparationX

Protection class: IP6\_; Compliance mark:  $\text{C}\text{C}$

Notified Body (Identif. No.): 1026

Labeling for the return of electric waste: ~~X~~

# 16. Technical Specifications

BASIC TECHNICAL SPECIFICATIONS		
Supply voltage	EFT-20N(T)-__-__-01 EFT-20N(T)-__-__-02	9 ... 34 V DC 12 ... 34 V DC
Current output Voltage output		4 ... 20 mA (2-wire) 0 ... 10 V (3-wire)
Power consumption	EFT-20__-__-__-01 EFT-20__-__-__-02	3,75 ... 20,5 mA 5 mA (voltage output open circuit )
Non-linearity		max. 1 %
Temperature error		max. 0.05 % / K
Voltage error for current and voltage output		max. 0.3 $\mu$ A/V and 0.1 mV/V
Leakage resistance (electrode - housing) / dielectric strengtht		1 M $\Omega$ / 200 V DC
Coupling capacity (housing - power) / dielectric strength		50 nF / 350 V AC
Coupling capacity (electrode - power) / dielectric strength		47 nF / 350 V AC
Ambient temperature range		- 40 ... 85 °C
Protection class	Typ EFT-20__-__-C-__-__ Typ EFT-20__-__-A(B,D)-__-__	IP67 IP68
Maximum load resistance for current output (at U = 24 V)		$R_{max} = 700 \Omega$
Weight (excluding electrode)	Variant ST Variant HT	ca. 0.3 kg ca. 0.6 kg
Cable (version with cable glands)		PVC 2 x 0.75 mm <sup>2</sup> or 3 x 0.5 mm <sup>2</sup> (according to variant)

ELECTRICAL PARAMETERS (VARIANT EX, MEX)	
Supply voltage	9 ... 30 V DC
Limit values	U <sub>i</sub> =30 V DC; I <sub>i</sub> =132 mA; P <sub>i</sub> =0.99 W; C <sub>i</sub> =35 nF; L <sub>i</sub> =10 $\mu$ H
Reference value LC for the parameters of the used cable	typic C < 150 pF/m typic L < 0.8 $\mu$ H / m

PROCESS CONNECTION		
type	size	designation
pipe thread	G 1"	G 1
	G 3/4"	G3/4
pipe-tapered thread	NPT 3/4	NPT
Tri-clamp connector	$\varnothing$ 34 mm	CI34
	$\varnothing$ 50.5 mm	CI50

## MATERIALS

Sensor part	variants	standard material *
Wetted parts:		
Housing	alle	stainless steel W.Nr. 1.4301 (AISI 304)
Rod electrode	alle außer EFT-20_-60	stainless steel W.Nr. 1.4404 (AISI 316L)
Rope electrode	EFT-20_-60	stainless steel W.Nr. 1.4401 (AISI 316)
Reference tube	EFT-20_-40, 41	stainless steel W.Nr. 1.4301 (AISI 304)
Isolating bushing	EFT-20_-20, 21, 22, 40, 41	PTFE
	EFT-20_-60	PPS + GF40
Elektrode coating	EFT-20_-21, 41	FEP
	EFT-20_-22,	PFA
Weight	EFT-20_-60	stainless steel W.Nr. 1.4301 (AISI 304)

No wetted parts:

Cable gland	EFT-20_--_--A	stainless steel W.Nr. 1.4571 (AISI 316 Ti)/NBR
	EFT-20_--_--B	plastic PA/NBR
	EFT-20_--_--D	nickel-plated brass / PA / rubber CR / NBR
Connector M12	EFT-20_--_--C	nickel-plated brass / PA

\* It is always necessary to verify the chemical compatibility of the material with the measured medium. You can also choose another type of material after agreement.

## WORKING AREAS (EN 60079-0, EN 60079-10-1(2))

EFT-20ST	Basic version for non-explosive atmospheres.
EFT-20HT	High-temperature basic version for non-explosive atmospheres.
EFT-20EX	Intrinsically safe version for use in hazardous areas (explosive gas atmospheres or explosive atmospheres with dust) Ⓢ II 1 G Ex ia IIB T4 Ga; Ⓢ II 1 D Ex ia IIIC T120°C Da, with intrinsically safe supply units, whole sensor zone 0 and 20 .
EFT-20MEX	Intrinsically safe high-temperature explosion-proof version for or use in hazardous areas (explosive gas atmospheres or explosive atmospheres with dust) Ⓢ II 1/2 G Ex ia IIB T4 Ga/ Gb; Ⓢ II 1/2 D Ex ia IIIC T120°C Da/Db, with intrinsically safe supply units, electrode part zone 0 and 20, housing zone 1 and 21.
EFT-20MEX	Intrinsically safe version for use in mining sectors with occurrence of methan or coal dust Ⓢ I M1 Ex ia I Ma, with intrinsically safe supply unit.
EFT-20MEX	Intrinsically safe high-temperature explosion-proof version for or use in mining sectors with occurrence of methan or coal dust Ⓢ I M1 Ex ia I Ma, with intrinsically safe supply unit.

## TEMPERATURE RESISTIVITY (VARIANT ST, HT, EX, MEX)

Variant	Temperature tm	Temperature tp	Temperature ta
EFT-20ST-20	-40°C ... +300°C	-40°C ... +85°C	-40°C ... +85°C
EFT-20ST-21, 22, 40, 41	-40°C ... +200°C	-40°C ... +85°C	-40°C ... +85°C
EFT-20ST-60	-40°C ... +250°C	-40°C ... +85°C	-40°C ... +85°C
EFT-20HT-20,	-40°C ... +300°C	-40°C ... +200°C	-40°C ... +85°C
EFT-20HT-21, 22, 31, 40, 41	-40°C ... +200°C	-40°C ... +200°C	-40°C ... +85°C

EFT-20HT-60	-40°C ... +250°C	-40°C ... +200°C	-40°C ... +85°C
EFT-20EX, MEX-20	-40°C ... +300°C	-40°C ... +75°C	-40°C ... +75°C
EFT-20EX, MEX-21, 22, 40, 41	-40°C ... +200°C	-40°C ... +75°C	-40°C ... +75°C
EFT-20EX, MEX-60	-40°C ... +250°C	-40°C ... +75°C	-40°C ... +75°C
EFT-20XiM (XiMT) - mining sectors	max. 150°C on any surface where the coal-dust can form layers		

Note: For the correct operation of the level sensor, none of the here provided temperature ranges may be exceeded ( $t_p$ ,  $t_m$  or  $t_a$ )

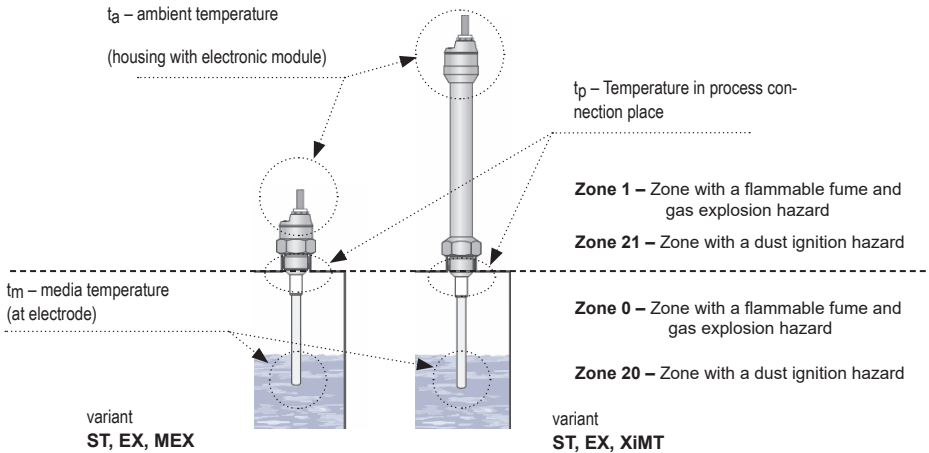


Fig. 7: Illustration of areas for temperature measurement and explosive zones



## PRESSURE RESISTIVITY

### Maximum operating pressure for temperature $t_p$

Variant	Up to 30 °C	Up to 85 °C	Up to 120 °C	Up to 150 °C	Up to 200 °C
EFT 20 MS – 20	5 MPa (50 bar)	2.5 MPa (25 bar)	–	–	–
EFT 20 MS – 21, 22 + KX	5 MPa (50 bar)	2.0 MPa (20 bar)	–	–	–
EFT 20 MF	0.1 MPa (1 bar)	0.1 MPa (1 bar)	–	–	–
EFT 20 MS – 20 HT	5 MPa (50 bar)	2.5 MPa (25 bar)	1.5 MPa (15 bar)	1 MPa (10 bar)	0.5 MPa (5 bar)
EFT 20 MS – 21, 22 + KX HT	5 MPa (50 bar)	2.0 MPa (20 bar)	1.5 MPa (15 bar)	1 MPa (10 bar)	0.1 MPa (1 bar)
EFT 20 MF – HT	0.1 MPa (1 bar)	0.1 MPa (1 bar)	0.1 MPa (1 bar)	0.1 MPa (1 bar)	0.1 MPa (1 bar)

## DEFAULT SETTINGS

4 mA (0 V)	electrode system capacity in open space
20 mA (10V)	capacity 1nF ( $\pm 20\%$ )



*his setting can not be used directly for level measurement, but it is always necessary to make setting according to chapter 7.*

*In special cases (e.g.: by using reference electrode) sensor settings can be agreed with the manufacture.*

**EU – Konformitätserklärung**

 EU-Declaration of Conformity / Déclaration EU de conformité  
 Declaración de conformidad CE / Declaração de conformidade CE

**Formblatt  
FB 27 - 03**

 Name und Anschrift des Herstellers: AFRISO-EURO-INDEX GmbH, Lindenstr. 20, 74363 Güglingen  
 Manufacturer / Fabricant / Fabricante / Nome e endereço do fabricante:

 Erzeugnis: Kapazitiver Füllstandstransmitter CapFox  
 Product / Produit / Producto / Produto:

 Typenbezeichnung: EFT 20  
 Type / Type / Tipo / Tipo:

 Betriebsdaten: Ausgangssignal 4-20 mA (2-Leiter), 0-10 V (3-Leiter)  
 Techn. Details:  
 Caractéristiques / Características / Detalhes técnicos:

Das bezeichnete Erzeugnis stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:  
 The above mentioned product meets the requirements of the following European Directives  
 Le produit mentionné est conforme aux prescriptions des Directives Européennes suivantes  
 El producto indicado cumple con las prescripciones de las Directivas Europeas siguientes  
 O produto indicado cumpre com as prescrições das seguintes Diretivas Europeias:

**Elektromagnetische Verträglichkeit (2014/30/EU)**

Directive Electromagnetic Compatibility / Directive compatibilité électromagnétique / Directiva compatibilidad electromagnética / Diretiva sobre compatibilidade eletromagnética

EN 61326-1; EN 55011 class B; EN50121-3-2
EN 61000-4-2 class A; EN 61000-4-3 class A; EN 61000-4-4 class B; EN 61000-4-5 class B
EN 61000-4-6 class A; EN 61000-4-8 class A
**RoHS-Richtlinie (2011/65/EU)**

RoHS Directive / Directive RoHS / Directiva RoHS / Diretiva RoHS

 Unterzeichner:  
 Signed / Signataire / Firmante / Assinado por:

Dr. Späth, Geschäftsführer Technik  
 Technical Director / Diretor Técnico

3. 11. 2020  
 Datum / Date / Fecha / Data


 AFRISO-EURO-INDEX GmbH  
 Lindenstr. 20, 74363 Güglingen  
 Tel. +49 7142 902-0 www.afriso.de

Unterschrift / Signature / Firma / Assinatura