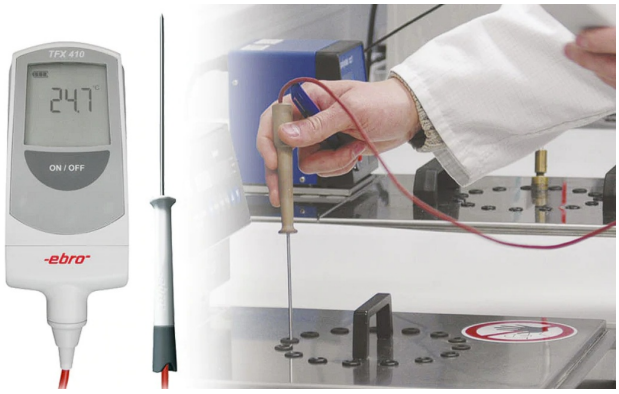


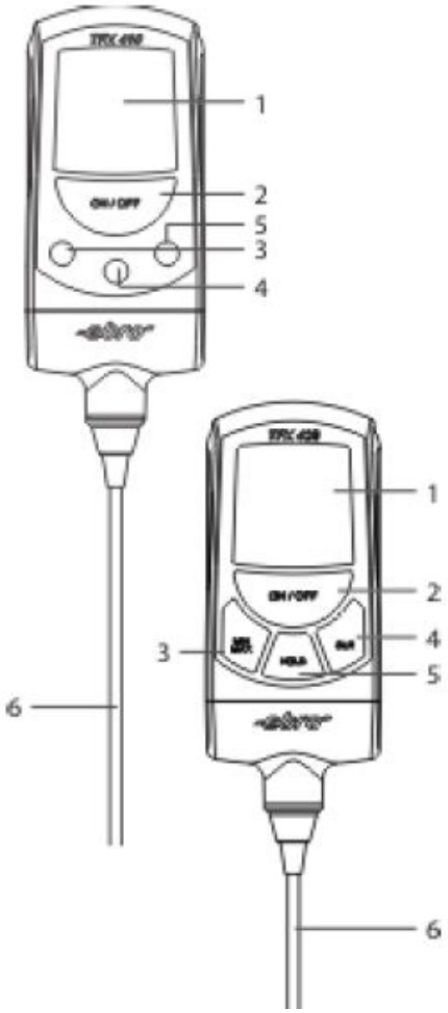
ebro TFX Series TFX 410 Precision Core Thermometer User Manual

Contents

ebro TFX Series TFX 410 Precision Core Thermometer

Overview

Powered by a replaceable lithium battery, the precision thermometer is a handy, watertight temperature measurement device for a whole range of measurement and control applications in the laboratory and in industry. A micro-processor controls the electronics, guaranteeing maximum measurement precision and linearity over the entire measurement range.
You may attach a range of ebro sensors to the thermometer TFX 410-1 and TFX 430, selecting the one most suitable for your technical measurement application. With the TFX 410 the probe is firmly attached.



TFX 410 device elements:

1. Display (LCD)
2. Key ON/OFF
3. Key required only for the user menu
4. Key required only for the user menu
5. Key required only for the user menu
6. Probe

TFX 420/430 device elements:

1. Display (LCD)
2. Key ON/OFF
3. Key MIN/MAX / User menu
4. Key HOLD / User menu
5. Key CLR / User menu
6. Probe

Safety Instructions

- Never expose the device to high temperatures (> 60°C / 140°F)!
- Under no circumstances measure live components with this device and external sensors.

- Do not use the device in explosion endangered areas!
- The instrument should only be operated within the parameters specified in the Technical data.
- The instrument should only be opened if expressly described in the instruction manual for maintenance purposes.
- Force should never be applied.
- Please dispose exhausted batteries according environment regulations.
- You can return the instrument directly to us at the end of its service life. We shall recycle it according rules.

Cautions
The thermometer TFX should be protected from the following:

- Electrostatic discharge,
- Thermal shock caused by large or abrupt ambient temperature changes —allow 30 minutes for unit to stabilize be-fore use when exposed to thermal shock,
- Do not leave the unit on or near objects of high temperature.

Unpacking / Scope of Delivery

Check the device packaging and con-tents to ensure it is complete and undamaged. You must also check that the contents of the packaging match your order.

Scope of Delivery

The delivery includes these parts:

- Thermometer
- This user manual
- Calibration certificate

The delivery may also include various accessories.

Possible Accessory Items

Description	Identification
Artificial leather case, long	AG120
Portable case	AG130
Protective casing	AG140
Synthetic material mount	AG150
Wall mount, stainless steel	AG160
Battery changing set	AG170
Silicone extension wire 1.0 m	AX110

If you have any reason for complaint, do not hesitate to contact us. You will find our contact data on the back of this manual.

Operation

Switching the device on/off

- To switch the thermometer on, keep key ON/OFF (2) pressed for approx. 1 second.

The device performs a system test first, displaying all segments used by this thermometer model for approx. 1 second.
After the automatic test, the thermometer switches to measuring mode and the first measurement reading is displayed in °C. The thermometer is now ready for use.
If an error message is displayed, please refer to page 31, “What to do, if…”.

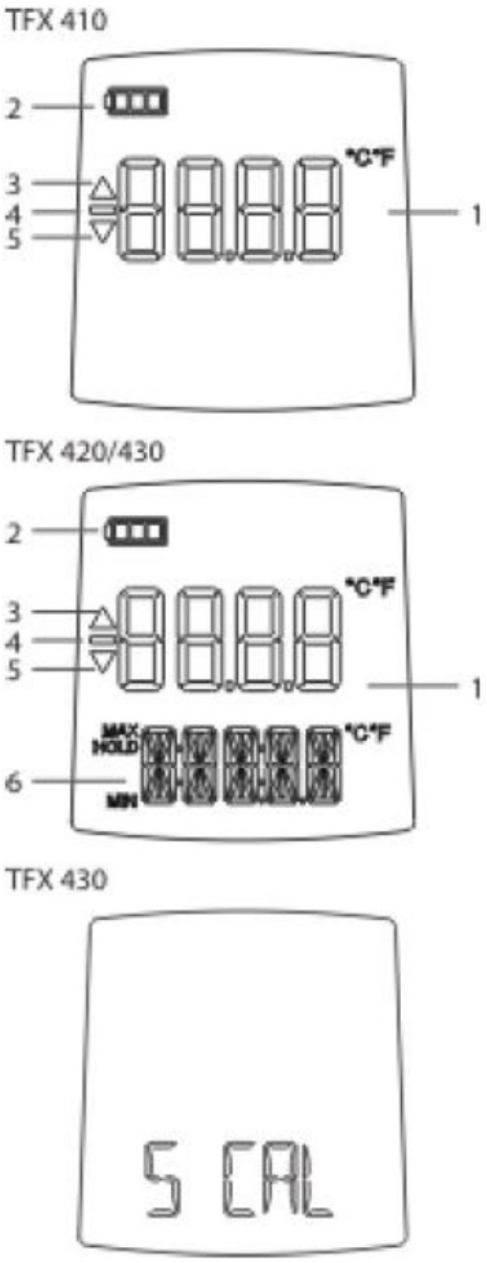
- To turn the device off, press the ON/OFF key.

Display

All necessary information is displayed on an LCD (Liquid Crystal Display).
The individual symbols have the following meanings:

1. Display for current measured values
2. Battery status indicator
3. Trend display positive
4. Minus sign (negative measured values)
5. Trend display negative
6. Stored measurement and text display

If special adjustment is activated “SCAL” will be shown in display for a short while



Measuring Temperature

- Select the required unit of measurement, °C or °F, from the user menu.
- Position the measuring sensor.
  NOTE: Use the measuring sensor only as intended so as to eliminate erroneous measurements.
- Wait until the measured value has stabilized. The trend display shows a downward pointing triangle for de-creasing (4) temperatures and an upward-pointing triangle for increasing (3) temperatures.
- The trend display disappears once the measurement value becomes stable.
- Switch the device off with ON/OFF when measurements are complete.

User Menu

You must call up the User-Menu to change the device setting. For this, proceed as follows:

- Make sure that the device is switched off
- Press ON/OFF key (2) and keep de-pressed. The segment test is dis-played for approx. 1 second.
- Release the ON/OFF key (2) as soon as device model “TFX” is dis-played.

- Then keep the lower key depressed until “USER“, followed by “MENU” is displayed.

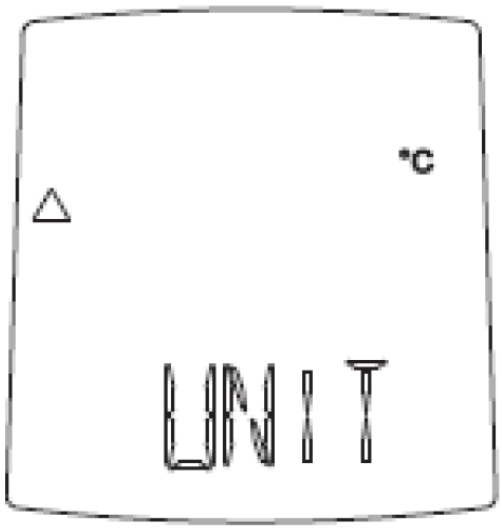
The device is now in configuration mode and displays the User Menu. This con-sists of the menus UNIT, SHDWN and RATE, ALARM, AL LO, AL HI and SCAL.

Menu Operation

- Select the next menu option with the right key (4).
- Select the previous menu option with the left key (3).
- Carry out and store the current menu option with the down key (5).
- Exit the menu with the ON/OFF key (2). The device switches itself off.

Description of the menu points:

UNIT
Active temperature unit, switchable between °C and °F

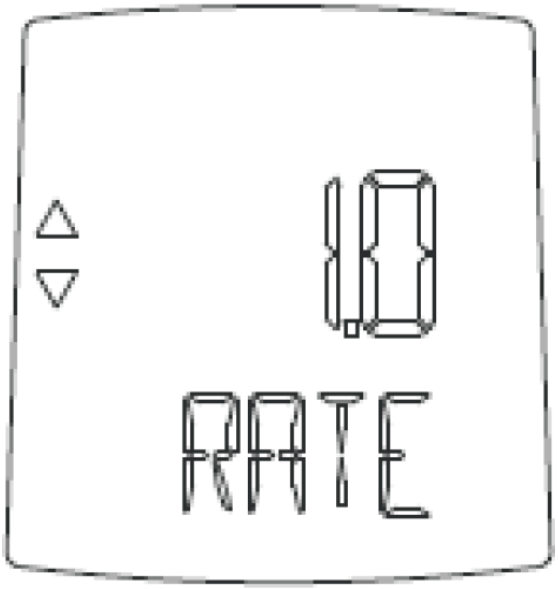


SHDWN
Automatic shutdown after 2 hours of operation

- ON = shutdown activated
- OFF = shutdown deactivated

NOTE:
Activate automatic switch-off to extend battery life. Deactivate the automatic switch-off if prolonged measurements are required with the model TFX 420 / 430.

RATE
Measurement frequency in seconds, adjustable from 1…15 seconds. The value displayed is the preset measurement frequency in seconds.



ALARM (only for TFX 430)
Turn alarm function on/ off

- ON = Alarm function turned on
- OFF = Alarm function turned off
- Press center key = Turn alarm function on/off

AL LO (only for TFX 430)
Lower limit value of desired range

- Press center key = unblock
- Press left/right keys = increase/de-crease lower limit value
- Press center key = store lower limit value and block changes

AL HI (only for TFX 430)
Upper limit value of desired range

- Press center key = unblock
- Press left/right keys = increase/de-crease upper limit value
- Press center key = store upper limit value and block changes

SCAL (only for TFX 430)
Activation/Deactivation of the special adjustment

- ON = Activated
- OFF = Deactivated

- Press center key = ON/OFF of special adjustment

Measured data storage (TFX 420/430)
The maximum and minimum measurement values are stored during a measuring. Delete the content of the measurement value memory before starting a new measuring.

Retrieving Memory Contents

- Press the MIN/MAX key once (3). “MIN” is displayed along with the lowest measurement of the current measuring.
- Press the key MIN/MAX again. “MAX” is displayed along with the largest measurement value in the current measuring.
- Press MIN/MAX again to return to the temperature measurement.

Storing Current Value

- Press key HOLD (4). “HOLD” is dis-played.
- The current measurement is now stored. It is also displayed until the HOLD function is deactivated by repressing the HOLD key.

Deleting Measurement Value Memory

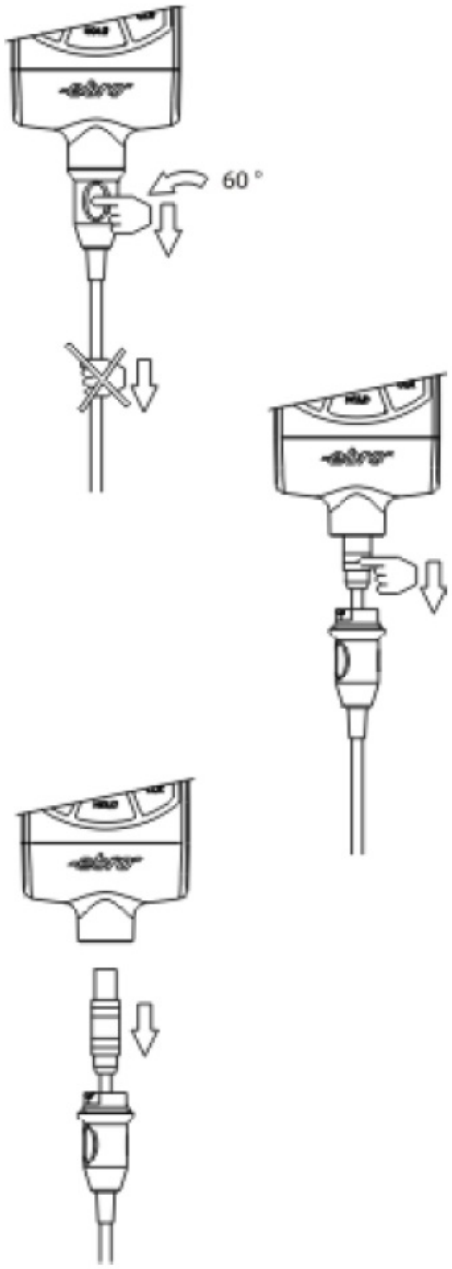
- Press key CLR (5). The memory content is deleted.

Changing the Sensor

NOTE:
The thermometer has been calibrated at the factory. Measurement precision may be impaired if a different measurement probe is attached
To change the sensor, proceed as follows:

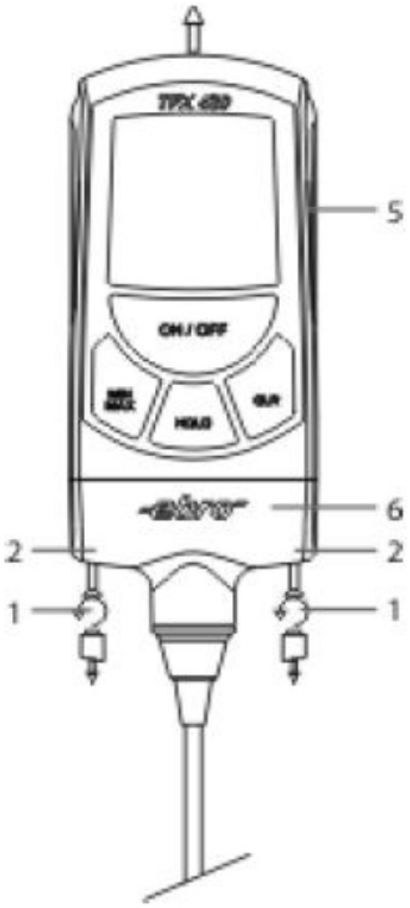
- Grab the probe cap (with TFX430, go to step 2 directly) at the recessed grip planned for it and turn this 60° anticlockwise. At the beginning of the turn a noticeable resistance is to be overcome.

- Pull the probe cap downwards.
  Do not pull the at the probe pipe!



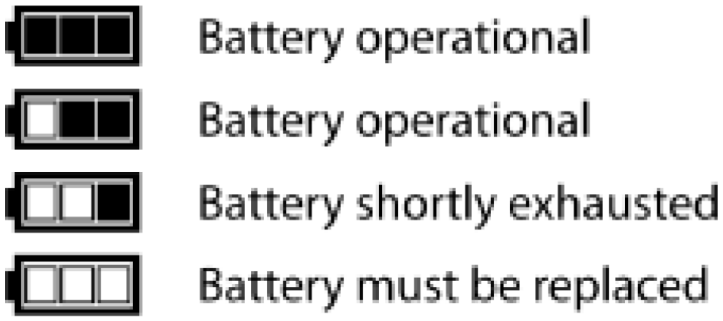
The probe plug-in connector is visible now.

- Pull out the sensor downwards by pulling at the plug-in connector. Do not turn!
- Plug in a new probe or extension cable where required. Ensure the connection is secure.
  The connector must be engaged!
- Slide the protective cover over the plug-in connector and turn 60°clockwise to lock again (not with TFX430).
  This is absolutely necessary to ensure watertightness of the probe plug-in connector!



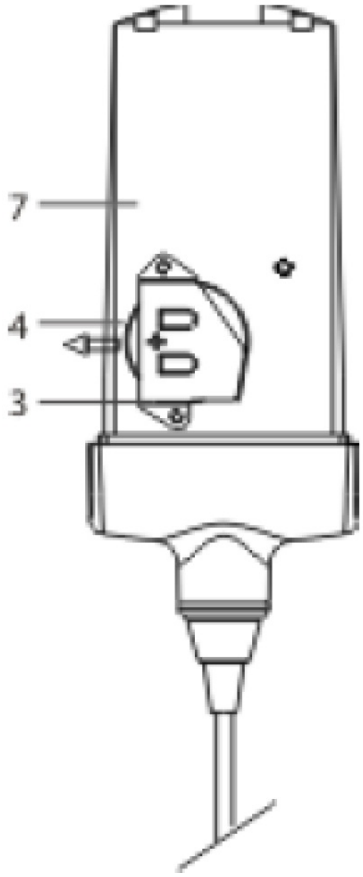
Changing the Battery

The battery symbol in the display shows the battery condition.



To change the lithium battery, the de-vice must be opened. Proceed as follows:
Use suitable precautions such as the use of a grounded wrist strap in order to prevent electrostatic discharge while changing the battery! Electrostatic dis-charges can destroy the device!

- With the Model TFH610 the sensor protection must be unscrewed first!
- First, carefully remove the two rubber stoppers (1) on the lower side of the device, e.g. using forceps.
- Now completely remove the two visible Phillips-head screws (2) with a suitable screwdriver (PZ1).
- Hold the bottom of the device (3) with one hand and carefully pull the upper part (4) off upwards with the other hand until the circuit board is exposed.



Now you can see the battery mount (3) with the battery (4) on the circuit board (7).

- Pull the spent battery from the battery mount in the direction of the arrow.
- Take the new battery with fat-free fingers and insert it into the battery mount. The plus sign on the battery must face upwards so it is visible.
- Reassemble the thermometer in re-verse order, noting the correct tightening torque of 0.4 Nm.
- To ensure device is fully water-tight-ness, make sure the seal between lower and upper housing is seated correctly in the groove.
- Finally, do not forget to insert both plastic plugs back into their drill-holes (slightly chamfered surfaces outward).

What to do, if…

The display shows HI or LO

Possible Cause	Remedy
Measurement range exceeded Probe defective Plugin connection jack – plug	Observe measurement range Call service Check connection plug has to snap in
Below measurement range Short-circuit of the sensor	Observe measurement range Call service
Disconnected probe Broken probe	Connect probe Change probe

Maintenance and Disposal

Cleaning

Clean the device with a slightly dampened cloth. Isopropyl alcohol may be used to disinfect.
Never use solvents (such as acetone) for cleaning because these may attack the plastic.

Disposal

If the device becomes no longer fit for purpose, it must be disposed of in a suit-able, environmentally-friendly manner.
Never dispose of the device in the domestic garbage. Instead please return it to us. We will take care of disposal in an environmentally sound manner.
Dispose of the battery at a designated collection point.

Calibration Service

To retain high measuring accuracy, the device should be calibrated annually. We offer a calibration service for this purpose.
We will then request your device annually for calibration. Your thermometer will be returned newly calibrated.

Technical Data

- Measuring range
  - Series 410 – -50°C…+300°C (-60°F…+580°F)
  - Series 420 – – 50°C…+400°C (-60°F…+760°F)
  - Series 430 – – 100°C…+500°C (-150°F…+930°F)
- Sensor
  - Series 410/420 – Pt 1000
  - Series 430 – Pt100
- Measuring principles
  - Series 410/420 – 2-wire technology
  - Series 430 – 4-wire technology
- Operating temperature
  - Series 410/420 – – 25°C … +50°C (-13°F … +122°F)
  - Series 430 – – 20°C … +50°C (-4°F … +122°F)
- Storage temperature
  - -30 °C…+70 °C (-22 °F…+158 °F)
- Resolution
  - 0,1°C / 0,2°F
- Resolution TFX430
  - 0.01 °C/0.02 °F at -100.00 °C…+199.99°C (°F), 0,1 °C / 0,1 °F for the rest
- Measuring precision Series 410/420
  - ±0,3°C / ±0,5°F; device w/o probe
  - ±0,3°C / ±0,5°F; device with probe and factory calibration
- Series 430
  - ±0,05°C (±0,08°F) at
  - -50,00 °C…+199,99°C
  - ±0,2°C / ±0,4°F for the rest; de-vice w/o probe
  - ±0,4% of the measurement for the rest; device with probe and factory calibration
- Measuring interval
  - 1 – 15 seconds
- Thermal time constant
  - T90 moved water
- Glass probe
  - approx. 70 s
- Other probes
  - approx. 8 s
- Battery type
  - Lithium coin cell 3 V / 1 Ah, CR 2477
- Life time of battery

- approx. 5 years
- Power off
  - automatically after 2 hours, can be deactivated
- Dimensions
  - 109 x 54 x 22 mm (LxWxH)
- Housing material
  - ABS
- Safety class
  - IP67
- Weight
  - approx. 90 g
- Maximum altitude
  - ∞

Approvals

According to the certificate of conformity, this product complies with the EMC directive.
Information, operating instructions and declarations of conformity can be found at **www.ebro.com**

Operation

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications of the device could void the user's authority to operate the equipment.

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Documents / Resources

	ebro TFX Series TFX 410 Precision Core Thermometer [pdf] User Manual TFX Series, TFX 410, Precision Core Thermometer

References

- Hersteller von professionellen Messgeräten: ebro.com
- Hersteller von professionellen Messgeräten: ebro.com
- Professional measuring equipment manufacturer.: ebro.com
- Fabricant professionnel d'équipements de mesure.: ebro.com