

EN

INSTRUCTIONS
DIGITAL TRUE RMS MULTIMETER
WITH THERMAL IMAGING
CAMERA



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Information on the use of this instructions

Symbols



Warning of electrical voltage

This symbol indicates dangers to the life and health of persons due to electrical voltage.



Warning

This signal word indicates a hazard with an average risk level which, if not avoided, can result in serious injury or death.



Caution

This signal word indicates a hazard with a low risk level which, if not avoided, can result in minor or moderate injury.

Note

This signal word indicates important information (e.g. material damage), but does not indicate hazards.



Info

Information marked with this symbol helps you to carry out your tasks quickly and safely.



Follow the manual

Information marked with this symbol indicates that the instructions must be observed.

You can download the current version of the instructions and the EU declaration of conformity via the following link:



BE60



<https://hub.trotec.com/?id=46449>

Safety

Read this manual carefully before starting or using the device. Always store the manual in the immediate vicinity of the device or its site of use.



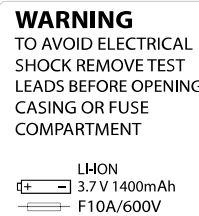
Warning

Read all safety warnings and all instructions.

Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.

Save all warnings and instructions for future reference.

- The device is supplied with a warning sign. Prior to initial start-up, make sure to paste the corresponding warning sign in your local language, if available, over the one present at the rear of the device as described in chapter Operation. Otherwise, choose a label in a language you know.



- Do not use the device in potentially explosive rooms or areas and do not install it there.
- Do not use the device in aggressive atmosphere.
- Protect the device from permanent direct sunlight.
- Do not open the device.
- Do not remove any safety signs, stickers or labels from the device. Keep all safety signs, stickers and labels in legible condition.
- Do not exceed the measuring range of a function specified in the technical data.
- Always disconnect the measuring tips from the circuit before changing the type of measurement.
- Proceed with the utmost care when measuring voltages above 25 VAC rms or 35 VDC. There is a risk of an electric shock at these voltage levels.

- Before carrying out the diode, resistance or continuity test, make sure that the object to be measured has zero potential and that any capacitors are discharged. If you have previously carried out measurements on live parts, disconnect the measuring tips from the object to be measured before the diode, resistance or continuity test.

Intended use

Only use the device for measurements within the measuring ranges and overvoltage categories specified in the technical data.

Intended use comprises:

- measurements of AC and DC voltages
- measurements of direct and alternating currents
- capacitance measurements
- frequency / duty cycle measurements
- resistance measurements
- testing diodes
- continuity tests with acoustic indication
- temperature measurements with the thermal imaging camera

Any use other than the intended use is regarded as misuse.

Reasonably foreseeable misuse

Do not use the device in potentially explosive atmospheres, when wet or very humid.

Unauthorized modifications of the device are forbidden.

Personnel qualifications

People who use this device must:



- master the 5 safety rules of electrical engineering
 - 1. De-energise
 - 2. Secure against restart
 - 3. Verify de-energised state (bipolar)
 - 4. Earth and short-circuit
 - 5. Cover neighbouring live parts
- take measures to protect themselves from direct contact with live parts.
- have read and understood the instructions, especially the Safety chapter.

Safety signs and labels on the device

Note

Do not remove any safety signs, stickers or labels from the device. Keep all safety signs, stickers and labels in legible condition.

The following safety signs and labels are attached to the device:

Safety symbol	Meaning
	This sign warns you of hazards when using electric power. Exercise caution and observe the safety instructions.
	This sign indicates that the operating manual must be observed.

Residual risks



Warning of electrical voltage

Electric shock due to insufficient insulation! Check the device and the measuring cables for damages and proper function before each use.

If you detect damages, do not use the device any longer.

Do not use the device when either the device or your hands are damp or wet!

Do not use the device when the battery compartment or the housing is open.



Warning of electrical voltage

Electric shock due to contact with live parts! When using the measuring tips, make sure not to reach behind the protection against contact.



Warning of electrical voltage

There is a risk of a short-circuit due to liquids penetrating the housing!

Do not immerse the device and the accessories in water. Make sure that no water or other liquids can enter the housing.



Warning of electrical voltage

Work on the electrical components must only be carried out by an authorised specialist company!



Warning of explosive substances

Do not expose the batteries to temperatures above 60 °C! Do not let the batteries come into contact with water or fire! Avoid direct sunlight and moisture. There is a risk of explosion!



Warning

Risk of suffocation!

Do not leave the packaging lying around. Children may use it as a dangerous toy.

**Warning**

The device is not a toy and does not belong in the hands of children.

**Warning**

Dangers can occur at the device when it is used by untrained people in an unprofessional or improper way! Observe the personnel qualifications!

**Caution**

When handling the device there is a risk of injury due to the exposed measuring tips. Always put on the protective cap when not in use.

**Caution**

Lithium-ion batteries might catch fire in case of overheating or damage. Ensure a sufficient distance to heat sources, do not subject lithium-ion batteries to direct sunlight and make sure not to damage the casing. Do not overcharge lithium-ion batteries. If the battery is not permanently installed in the device, only use smart chargers that switch off automatically when the battery is fully charged. Charge lithium-ion batteries in due time before they are discharged completely.

**Caution**

Keep a sufficient distance from heat sources.

Note

To avoid damages to the device, make sure that the correct measuring range is selected before carrying out a measurement.

If you are unsure, select the largest measuring range. Remove the measuring cables from the measuring point before changing the measuring range.

Note

To prevent damages to the device, do not expose it to extreme temperatures, extreme humidity or moisture.

Note

Do not use abrasive cleaners or solvents to clean the device.

Note

Before commissioning, check the function of the device at a known voltage source, e.g. on a known and safe 230 V voltage source or on a known and safe 9 V battery. Select the correct measuring range!

Information about the device

Device description

The multimeter is a battery-powered, mobile hand-held measuring device with an extensive range of measurement possibilities.

The integrated thermal imaging camera helps you to detect electrical problems, validate troubleshooting and document it in reports. Hotspots on high-voltage installations and transformers can be checked from a safe distance and heating, e.g. of fuses, insulators, connectors or wires, can be detected.

The true RMS measuring function allows for the precise measurement of sinusoidal and non-sinusoidal signals generated due to faults, e.g. by frequency inverters or switching power supplies of computers.

The device is equipped with the following functional properties and equipment features:

- Thermal imaging camera
- Automatic/manual selection of the measuring range
- TFT display
- Can also be operated while wearing gloves
- Fold-out stand and holding fixture for measuring tips
- AC and DC voltage measurement
- Measurement of direct and alternating currents
- Resistance measurement
- Capacitance measurement
- Frequency / duty cycle measurement
- Diode testing function
- Acoustic continuity testing
- Hold function
- Indication of maximum, minimum and peak value

The integrated Bluetooth function makes it possible to connect the device to a terminal device via the Trotec MultiMeasure Mobile app.

The measurement results can be displayed and saved on the terminal device either numerically or in form of a chart. Then, the measurement data can be sent in PDF or Excel format.

The app also includes a report generation function, an organiser function, one for customer management and further analysis options. Moreover, it is possible to share measurements and project data with colleagues in another subsidiary.

If MultiMeasure Studio Professional is installed on a PC, you can even use report templates and ready-made text blocks for various fields of application to turn the data into professional reports.

Overvoltage protection and measurement category

The design of a measurement device determines in which environments and for which voltages it can be safely used. What is important in this connection for example is the touchability of live parts, anti-kink protection guards on the measuring lines or the insulation. Depending on the design details, the measurement device can carry out safe measurements up to a specific voltage in one or several measuring categories. The measurement category is specified on the measurement device as well as in the operating manual.

This measurement device is suited for measurement categories CAT III (600 V) and CAT IV (300 V).

This means that the measuring device may be used in low-voltage house installations for voltages up to 600 V and at the house connection point for voltages up to 300 V.

Thermal imaging camera

When the thermal imaging camera is switched on, the device measures surface temperatures without contact by means of an infrared sensor.

For an exact measurement of the surface temperature, the emissivity of the material to be measured needs to be set.

Degree of emission

The degree of emission is used to describe the energy radiation characteristics of a material.

Most organic materials have an emissivity of 0.95. Metals or shiny materials come with a much lower value.

A material's emissivity depends on various factors, e.g. on

- Material composition
- Surface condition
- Temperature

The emissivity can range between 0.1 and 1 (in theory).

The following rule of thumb can be assumed:

- When a material is rather dark and its surface texture matt, it probably has a high emissivity.
- The brighter and smoother the surface of a material, the lower will be its emissivity, presumably.
- The higher the degree of emission of the surface to be measured, the better it is suited for non-contact temperature measurement by use of a pyrometer or thermal imaging camera, since falsifying temperature reflections become negligible.

Nevertheless, entering a degree of emission as appropriate as possible is indispensable for a precise measurement.

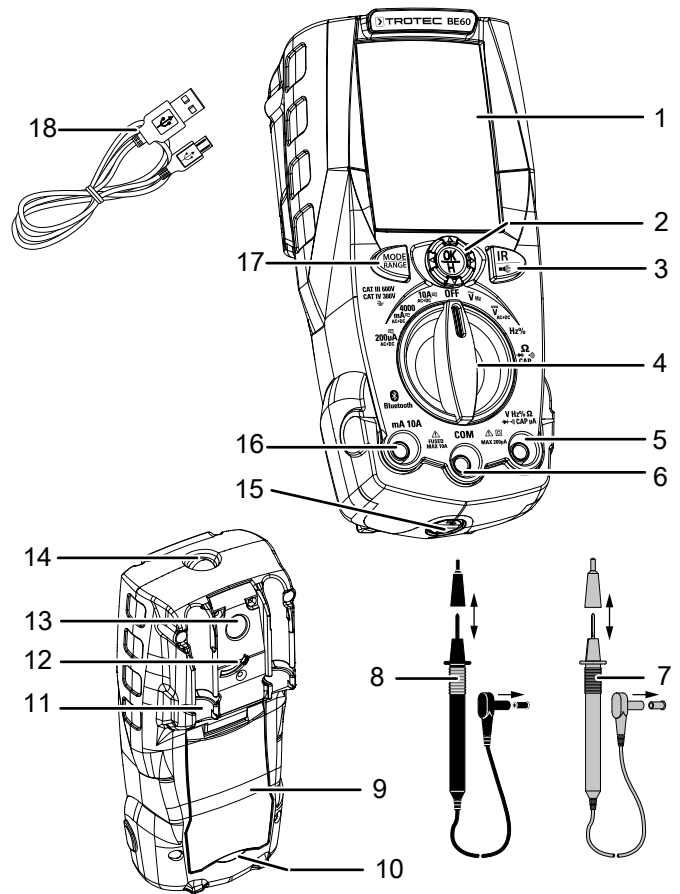
Emissivity table

The table below may be used as reference for setting the degree of emission. It supplies reference values for the emissivity of common materials.

Material	Degree of emission
Aluminium, roughened	0.1 to 0.3
Aluminium, alloy A3003, oxidized	0.3
Aluminium, oxidized	0.2 to 0.4
Asbestos	0.92 to 0.95
Tarmac	0.92 to 0.95
Basalt	0.7
Concrete	0.92 to 0.95
Bitumen	0.98 to 1.00
Lead, oxidized	0.2 to 0.6
Lead, rough	0.4
Roofing felt	0.95
Ice	0.98
Iron (forged), blunt	0.9
Iron, oxidized	0.5 to 0.9
Iron, rusted	0.5 to 0.7
Enamel varnish, black	0.95
Earth	0.92 to 0.96
Paint (not alkaline)	0.90 to 0.95
Paint (non-metal)	0.95
Gypsum	0.60 to 0.95
Glass, pane	0.85 to 0.95
Rubber	0.92 to 0.95
Cast iron, molten	0.2 to 0.3
Cast iron, not oxidized	0.2
Skin	0.98
Haynes alloy	0.3 to 0.8
Radiator enamel	0.95
Timber (natural)	0.90 to 0.95
Inconel, electro-polished	0.15
Inconel, oxidized	0.70 to 0.95
Inconel, sand-blasted	0.3 to 0.6
Limestone	0.95 to 0.98
Carborundum	0.9
Ceramics	0.88 to 0.95
Gravel	0.95
Carbon, graphite	0.70 to 0.85
Carbon, not oxidized	0.8 to 0.9

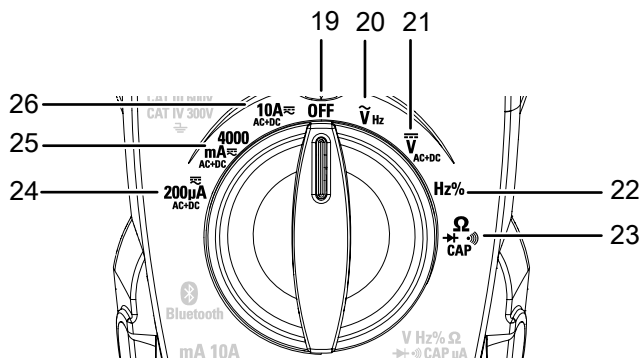
Material	Degree of emission
Plastic, non-transparent	0.95
Copper, oxidized	0.4 to 0.8
Varnish	0.80 to 0.95
Marble	0.90 to 0.95
Brass, highly polished	0.3
Brass, oxidized	0.5
Molybdenum, oxidized	0.2 to 0.6
Nickel, oxidized	0.2 to 0.5
Plastic	0.85 to 0.95
Plaster	0.90 to 0.95
Sand	0.9
Snow	0.9
Steel, heavy plate	0.4 to 0.6
Steel, cold-rolled	0.7 to 0.9
Steel, oxidized	0.7 to 0.9
Steel, polished sheet metal	0.1
Steel, stainless	0.1 to 0.8
Cloth	0.95
Wallpaper (non-metal)	0.95
Textiles (non-metal)	0.95
Titanium, oxidized	0.5 to 0.6
Clay	0.90 to 0.95
Water	0.93
Cement	0.90 to 0.96
Brick (rough)	0.90 to 0.95
Zinc, oxidized	0.1

Device depiction

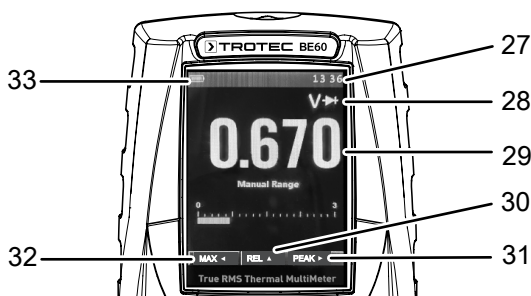


No.	Designation
1	TFT display
2	OK/Hold button
3	IR/ button
4	Rotary switch
5	V/Hz socket
6	COM socket
7	Red measuring tip
8	Black measuring tip
9	Fold-out stand
10	Fuse compartment (below stand)
11	Holding fixture for measuring tips
12	Infrared sensor closure
13	Infrared sensor
14	Work light
15	USB connection
16	mA/10 A socket
17	MODE/RANGE button
18	USB cable

Rotary switch



No.	Position	Description
19	OFF	Device is switched off.
20	\tilde{V}_{Hz}	AC voltage: 200 mV to 600 V
21	\bar{V}_{AC+DC}	DC voltage: 200 mV to 600 V
22	Hz%	Frequency measurement: 1 mHz to 10 MHz Duty cycle: 0.1 % to 99.9 %
23	Ω	Resistance measurement: 200 Ω to 20 M Ω
	$\rightarrow \leftarrow$	Diode test / continuity measurement
	nF	Capacitance measurement
24	200 μ A	Direct and alternating current: up to 200 μ A
25	4000 mA	Direct and alternating current: up to 4000 mA
26	10 A	Direct and alternating current: up to 10 A



No.	Designation
27	Time indication
28	Measuring mode indication
29	Measurement value display
30	REL indication
31	PEAK indication
32	MAX indication
33	Battery status indication

Technical data

General characteristics

Parameter	Value
General information	
Continuity test	An acoustic signal is emitted if the resistance is less than 50 Ω
Diode test	Test current: <1.5 mA max. test voltage: 3.3 VDC
LC display	3 3/4 digits, 4000 count TFT
Menu languages	German, Chinese, English, Italian, Spanish, French, Dutch, Polish, Turkish, Portuguese
Exceedance of the measuring range	OL will be displayed
Polarity	Automatic (no indication for positive); minus (-) sign for negative
Measuring speed	3 x per second, nominal
Bluetooth frequency range	2.4 GHz
Bluetooth max. transmission power	0 dBm
Battery status indication	The battery icon will be displayed when the battery voltage drops below the operating voltage threshold
Battery	1 x 3.7 V lithium-ion battery, 1400 mAh
Battery charging socket	micro USB (5 VDC, 1A)
Fuse	10 A / 600 V
Operating temperature	5 °C to 40 °C (41 °F to 104 °F)
Storage temperature	-20 °C to 60 °C (-4 °F to 140 °F)
Max. relative humidity	< 80 %
Degree of pollution	2
Insulation	double insulation
Operating height above sea level	max. 2000 m (6562 ft)
Type of protection	IP40
Weight	approx. 540 g
Dimensions	175 x 85 x 55 mm
Automatic switch-off	after 15 to 60 minutes of non-use (can be deactivated)
Shock test	up to a drop height of 2.0 m (6.5 ft)
Safety	This measuring device is designed for indoor use and complies with measuring category CAT III up to 600 V and measuring category CAT IV up to 300 V.

Parameter	Value
Thermal imaging camera	
Temperature range	-20 °C to +260 °C (-4 °F to +500 °F)
Minimum focusing distance	0.5 m
Field of view (FOV)	15.6 x 15.6 °
Spatial resolution (IFOV)	2.26 mrad
Thermal image resolution	120 x 120 pixels
Focusing mode	Fixed focus
Focal length	7.5 mm
Frame rate	50 Hz
Detector type	Focal Plane Array/uncooled microbolometer
Infrared spectrum	8 µm to 14 µm
Accuracy	±3 °C (± 5.4 °F) or ±3 % (at an ambient temperature of 10 °C to 35 °C, object temperature >0 °C)

Measuring ranges

DC voltage (V DC)				
Measuring range	Resolution	Accuracy	Input impedance	Overvoltage protection
400 mV	0.1 mV	± (0.8 % + 8 digits)	>10 MΩ	600 VDC/ACrms
4 V	0.001 V	± (0.5 % + 5 digits)		
40 V	0.01 V	± (0.8 % + 5 digits)		
400 V	0.1 V	± (0.8 % + 5 digits)		
600 V	1 V	± (0.8 % + 5 digits)		

AC voltage TRMS (V AC)				
Measuring range	Resolution	Accuracy ¹⁾		Overvoltage protection
		50 – 60 Hz	61 Hz – 1 kHz	
4 V	0.001 V	± (1 % + 5 digits)	± (2.5 % + 5 digits)	600 VDC/ACrms
40 V	0.01 V			
400 V	0.1 V			
600 V	1 V			

1) The accuracy refers to a range from 10 % of the measuring range up to 100 %, sine wave.
Input impedance: > 9 MΩ
Accuracy of the PEAK function: ± 10 %, PEAK response time: 1 ms

AC and DC voltage TRMS (V AC+DC)				
Measuring range	Resolution	Accuracy	Input impedance	Overvoltage protection
4 V	0.001 V	± (2.5 % + 20 digits)	>10 MΩ	600 VDC/ACrms
40 V	0.01 V			
400 V	0.1 V			
600 V	1 V			

Direct current (A DC)			
Measuring range	Resolution	Accuracy	Overvoltage protection
400 µA	0.1 µA	± (1.5 % + 5 digits)	Fusing 500 mA/600 V
4000 µA	1 µA		
40 mA	0.01 mA		
400 mA	0.1 mA	± (1.5 % + 8 digits)	
10 A	0.01 A	± (2.0 % + 8 digits)	Fusing 10 A/600 V

Alternating current TRMS (A AC)			
Measuring range	Resolution	Accuracy ¹⁾ 50 Hz – 1 kHz	Overvoltage protection
400 µA	0.1 µA	± (2.0 % + 5 digits)	Fusing 10 A/600 V
4000 µA	1 µA		
40 mA	0.01 mA		
400 mA	0.1 mA		
10 A	0.01 A	± (2.5 % + 5 digits)	

1) The accuracy refers to a range from 10 % of the measuring range up to 100 %, sine wave.
Accuracy of the PEAK function: ± 10 %, amperage AC+DC TRMS: Accuracy (50 Hz – 1 kHz): ± (3.0 % + 20 digits)

Resistance and continuity test				
Measuring range	Resolution	Accuracy	Acoustic signal	Overvoltage protection
400 Ω	0.1 Ω	± (1.0 % + 10 digits)	>50 Ω	600 VDC/ACrms
4 kΩ	0.001 kΩ			
40 kΩ	0.01 kΩ			
400 kΩ	0.1 kΩ			
4 MΩ	0.001 MΩ			
40 MΩ	0.01 MΩ	± (2.5 % + 10 digits)		

Frequency measurement (\tilde{V}_{Hz})			
Measuring range	Resolution	Accuracy	Overvoltage protection
40 Hz – 10 kHz	0.01 Hz - 0.001 kHz	$\pm 0.5 \%$	600 VDC/ACrms
Sensitivity: 2 Vrms			

Frequency measurement (Hz%)			
Measuring range	Resolution	Accuracy	Overvoltage protection
40 Hz	0.01 Hz	$\pm (0.2 \%$ $+ 5 \text{ digits})$	600 VDC/ACrms
400 Hz	0.1 Hz		
4 kHz	0.001 kHz		
40 kHz	0.01 kHz		
400 kHz	0.1 kHz		
4 MHz	0.001 MHz		
10 MHz	0.01 MHz		
Sensitivity:	$>2 \text{ Vrms}$ (20 % – 80 % duty factor and $f < 100 \text{ kHz}$)		
	$>5 \text{ Vrms}$ (20 % – 80 % duty factor and $f < 100 \text{ kHz}$)		

Duty factor		
Measuring range	Resolution	Accuracy
10.0 – 90.0 %	0.1 %	$\pm (1.2 \%$ + 2 digits)
Pulse frequency width: 40 Hz – 10 kHz, pulse amplitude: $\pm 5 \text{ V}$ (100 μs – 100 ms)		

Capacity			
Measuring range	Resolution	Accuracy	Overvoltage protection
40 nF	0.01 nF	$\pm (3.0 \%$ $+ 20 \text{ digits})$	600 VDC/ACrms
400 nF	0.1 nF		
4 μF	0.001 μF		
40 μF	0.01 μF		
400 μF	0.1 μF	$\pm (3.5 \%$ $+ 20 \text{ digits})$	
4000 μF	1 μF		

Note:

The accuracy is based on an ambient temperature of 18 °C to 28 °C (64 °F to 82 °F) and a relative humidity of less than 80 %.

The accuracy specification consists of two values:

- % value referring to the reading: Results from the accuracy of the measuring circuit.
- + digits: Results from the accuracy of the analogue-to-digital converter.

Scope of delivery

- 1 x Device BE60
- 2 x Measuring tip
- 1 x USB cable
- 1 x Transport case
- 1 x Quick guide

Transport and storage

Note

If you store or transport the device improperly, the device may be damaged.

Note the information regarding transport and storage of the device.

Transport

For transporting the device, use the transport case included in the scope of delivery in order to protect the device from external influences.

The supplied Li-ion batteries are subjects to the requirements of dangerous goods legislation.

Observe the following when transporting or shipping Li-ion batteries:

- The user may transport the batteries by road without any additional requirements.
- If transport is carried out by third parties (e.g. air transport or forwarding company), special requirements as to packaging and labelling must be observed. This includes consulting a dangerous goods specialist when preparing the package.
 - Only ship batteries if their housing is undamaged.
 - Please also observe any other national regulations.

Storage

When the device is not being used, observe the following storage conditions:

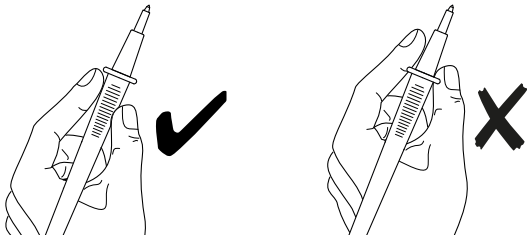
- dry and protected from frost and heat
- protected from dust and direct sunlight
- For storing the device, use the transport case included in the scope of delivery in order to protect the device from external influences.
- the storage temperature complies with the values specified in the Technical data

Operation



Warning of electrical voltage

Electric shock due to contact with live parts! When using the measuring tips, make sure not to reach behind the protection against contact.



Charging the battery

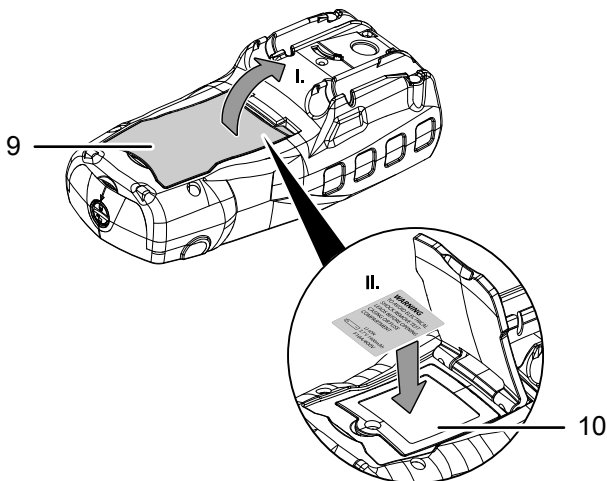
The battery is partially charged upon delivery to avoid damage to the battery caused by a deep discharge.

To fully charge the battery, please proceed as described in the chapter *Maintenance and repair*.

Attaching the warning sign

Prior to initial start-up, check whether the warning sign at the rear underneath the stand is in your local language, if not, paste the proper one over it. Warning signs in several languages are supplied along with the device. Please proceed as follows to attach the warning sign to the rear of the device:

1. Remove the label in your local language from the supplied film.
2. Fold the stand (9) at the rear of the device up.
3. Affix the label in the intended position on the fuse compartment (10).



Undefined displays

If measuring inputs are open or touched by hand, this can lead to undefined displays. This is not a malfunction but a reaction of the sensitive measuring input to existing interference voltages.

Normally, when there is no high interference level at the workplace or in case of a short circuit at the measuring input zero is displayed immediately. Or, if the measuring object is connected, the exact measured value is displayed. Fluctuations in the displayed value by some digits are systemic and within the tolerance.

If the resistance measuring range, the continuity testing range or the diode test was selected and the measuring input is open, the *OL* indication (exceedance of the measuring range) will be displayed.

Settings menu

Press and hold the *OK/Hold* button (2) to enter the settings menu. The following menu items and setting options can be selected:

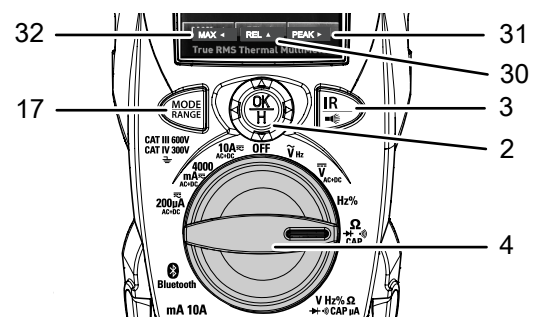
Menu item	Setting/submenu	Option
Palette	Selection of the colour palette	5 colour palettes
Temp Unit	Temperature display unit	°C/K/°F
Measure	Indication of maximum temperature	enable/disable
	Indication of minimum temperature	
Emissivity	Emissivity	adjustable from 0.01 to 0.99
Language	Chinese	selection
	English	
	German	
	Italian	
	Spanish	
	French	
	Dutch	
	Polish	
	Turkish	
	Portuguese	
Setup	Key sounds	switch on/off
	Bluetooth	
	Display brightness	10–100 % in increments of 10 %
	Auto Power OFF	disabled/ 15/30/60 minutes

Menu item	Setting/submenu	Option
Date/Time	Year	last 2 digits of the year
	Month	1–12
	Day	0–12
	Hour	0–23
	Minute	0–59
	Time Format	12 h/24 h
Memory	Recall Photos	view and/or delete individual images from the thermal imaging camera
	Delete Photos	delete all images of the thermal imaging camera
Information	Hardware	version
	Software	version
	Thermal imaging camera	version
Factory Set	Restore factory settings?	yes/no

Use the *OK/Hold* button (2) to make the settings:

- Switch between menu items: press up or down button
- Open submenu: press arrow to the right
- Return to main menu from submenu: press arrow to the left
- Change a preset value: press, then press forward or backward to adjust the value

Operating elements



OK/Hold button (2):

- Navigate in the menu: Press up/down/left/right button
- Open settings menu: Press and hold
- Confirm menu display: Press briefly
- Freeze measured value (hold function): Press briefly
- *PEAK* indication (31) – only with AC voltage:
 - Show current value, maximum and minimum value within a cycle: Press *OK/Hold* button (2) to the right
 - Press to the right again: Exit peak value indication
- *REL* indication (30):
 - Show difference between two measured values: Press *OK/Hold* button (2) up
 - Press up again: Exit differential value indication
- *MAX* indication (32):
 - Show maximum and minimum value in the type of measurement set: Press *OK/Hold* button (2) to the left
 - Press to the left again: Exit MAX/MIN value indication

IR button (3):

- Switch thermal imaging camera on/off: Press briefly
- Switch work light on/off: Press and hold

Rotary switch (4):

- Set type of measurement

MODE/RANGE button (17):

- Change measuring mode within the type of measurement set: Press briefly
- Set range (decimal places): Press and hold

IMPORTANT INFORMATION ON THE MEASURING PROCESS!



Warning of electrical voltage

Improper handling of the measuring device entails a risk of electric shock!

Before carrying out voltage measurements, observe the following:

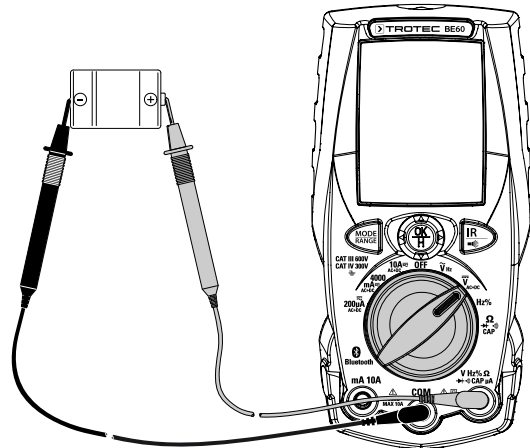
- Never apply a voltage exceeding the rated nominal voltage of the measuring device between the connections or between the connections and earth (see imprint on the housing).
- Check the measuring tips for damaged insulation and for continuity. Replace damaged measuring tips.
- Check the insulation of the measuring device sockets.
- Before commissioning, check the function of the device at a known voltage source, e.g. on a known and safe 230 V voltage source or on a known and safe 9 V battery.
- First connect the measuring tip connected to earth and afterwards the live measuring tip. When disconnecting the measuring tips, proceed in reverse order, i.e. disconnect the live measuring tip first.
- Prior to every voltage measurement make sure that the measuring device is not set to the current measuring range.
- If the device indicates an exceedance of the measuring range (*OL*) immediately after being connected to the measuring object, first switch off the circuit at the measuring object, then immediately remove the measuring tips from the measuring object.
- Do not switch any motors in the measuring circuit on or off during a measurement. Voltage peaks caused by a switch-on or switch-off can damage the measuring device.

Measuring DC voltage

1. Turn the rotary switch (4) to \overline{V}_{AC+DC} (21).
2. Insert the plug of the black measuring tip into the *COM* measuring socket (6) and the plug of the red measuring tip into the *V/Hz* measuring socket (5).
3. Connect both measuring tips to the measuring object with correct polarity (black to minus, red to plus).
 - ⇒ The measured value will be indicated on the display.
 - ⇒ If the input voltage is negative, a minus (-) will appear in front of the measured value on the display.

4. If the *OL* indication (exceedance of the measuring range) appears after the manual range selection, immediately switch over to the respectively next higher range (*MODE/RANGE* button (17)). If the *OL* indication appears and the maximum range has been set already or in case of the automatic range selection, first switch off the circuit at the measuring object and then immediately remove the measuring tips from the measuring object.

Example:



Info

In position \overline{V}_{AC+DC} (21) you can measure both DC voltage and AC voltage. To do so, press the *MODE/RANGE* button (17) once. The display will then show the measured values for AC and DC voltage simultaneously.

Measuring AC voltage



Warning of electrical voltage

Risk of electric shock!

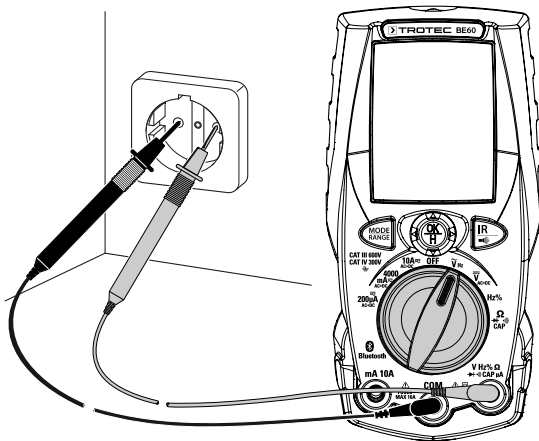
If the measuring tips do not touch the contacts properly because they are not easily accessible, e.g. in sockets, the device may display a value of 0 volts although voltage is present. In case of contact, there is a risk of electric shock.

Make sure that the measuring tips touch the contacts before assuming that there is no voltage.

1. Turn the rotary switch to \tilde{V}_{Hz} (20).
2. Insert the plug of the black measuring tip into the *COM* measuring socket (6) and the plug of the red measuring tip into the *V/Hz* measuring socket (5).
3. Connect both measuring tips to the measuring object.
 - ⇒ The measured value will be indicated on the display.
 - ⇒ If the input voltage is negative, a minus (-) will appear in front of the measured value on the display.

- If the *OL* indication (exceedance of the measuring range) appears after the manual range selection, immediately switch over to the respectively next higher range (*MODE/RANGE* button (17)). If the *OL* indication appears and the maximum range has been set already or in case of the automatic range selection, first switch off the circuit at the measuring object and then immediately remove the measuring tips from the measuring object.

Example:



Current measurements

Note

Never connect a voltage source to the multimeter's measuring sockets when a current measuring range is selected. Otherwise the device could be damaged.

- ✓ When switched on, the voltage in the measuring circuit is not higher than 600 V (CAT III) or 300 V (CAT IV) to earth.
 - ✓ The power of the electric circuit is switched off. All capacitors are discharged.
- If necessary, disconnect the circuit at the measuring object so that you can later connect the measuring device in series with the consumer.
 - Depending on the expected measuring current, turn the rotary switch (4) to **200 μ A** (24), **4000 mA** (25) or **10 A** (26).
 - Use the *MODE/RANGE* button (17) to select the desired measuring mode (for direct current: *DC* indication) for alternating current: *AC* indication).
 - Insert the plug of the black measuring tip into the *COM* measuring socket (6) and the plug of the red measuring tip into the μ A measuring socket (5) or *mA/10 A* measuring socket (16) – depending on the selected range.
 - Connect the measuring tips of the measuring device in series with the measuring object. For direct current, make sure that the polarity of the connection to the measuring object is correct (in series; red to plus, black to minus).
 - Switch the measuring circuit back on and read the measured value from the display.

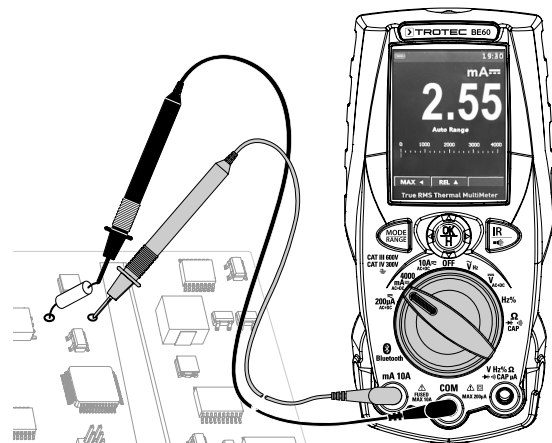
- If the *OL* indication (exceedance of the measuring range) appears after the manual range selection, immediately switch over to the respectively next higher range. If the *OL* indication appears and the maximum range has been set already or in case of the automatic range selection, immediately switch off the voltage supply at the measuring object and disconnect the measuring device from the measuring object.



Info

If you have selected the mA/10 A range for safety's sake, but the measuring current is less than 0.2 mA, switch the measuring circuit back off. Plug the red measuring tip into the μ A socket (5) and select a measuring range in the μ A range. Switch the measuring circuit back on.

Example:



Info

If there is no indication and all connections have been established correctly, the cause of the fault may be a defective internal fuse protecting the current measuring ranges (see chapter Fuse replacement).

Measuring frequency/duty cycle

1. Turn the rotary switch (4) to Hz% (22).
2. Insert the plug of the red measuring tip into the V/Hz measuring socket (5) and the plug of the black measuring tip into the COM measuring socket (6).
3. Connect the measuring tips to the measuring object.
 - ⇒ The frequency will be displayed.
4. If you want to measure a duty cycle, press the MODE/RANGE button (17).

Measuring resistance



Warning of electrical voltage

Before carrying out resistance, continuity or diode measurements, switch off the current of the electric circuit and discharge all capacitors.

1. Turn the rotary switch (4) to Ω / \rightarrow / \rightarrow / CAP (23).
 - ⇒ You are in the resistance measurement mode (M Ω indication (28)).
2. Insert the plug of the red measuring tip into the V/Hz measuring socket (5) and the plug of the black measuring tip into the COM measuring socket (6).
3. Connect the measuring tips to the measuring object.
 - ⇒ The measuring device may take some time to display a stable value. This is due to the measuring principle and not a malfunction.
 - ⇒ The measured value will be indicated on the display.

Continuity test



Info

The continuity test can be used to test fuses, switches, soldering joints, conductors and other components. A functioning fuse, for example, should have continuity.



Warning of electrical voltage

Before carrying out resistance, continuity or diode measurements, switch off the current of the electric circuit and discharge all capacitors.

1. Turn the rotary switch (4) to Ω / \rightarrow / \rightarrow / CAP (23), then use the MODE/RANGE button (17) to select the continuity test (Ω icon indication (28)).
2. Insert the plug of the red measuring tip into the V/Hz measuring socket (5) and the plug of the black measuring tip into the COM measuring socket (6).
3. Connect the measuring tips to the measuring object.
 - ⇒ If there is good continuity with a resistance below 50 Ω , a beep sounds.
 - ⇒ When the circuit is open, OL is displayed.

Diode testing

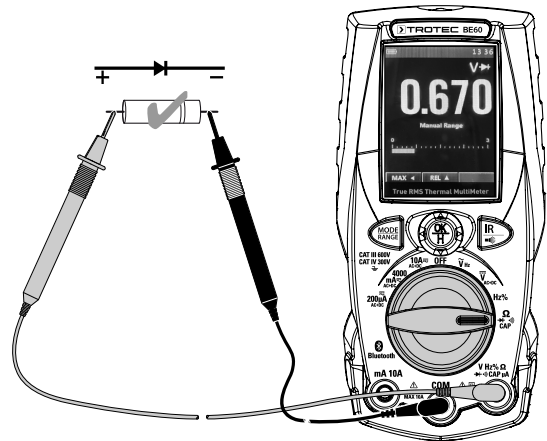


Warning of electrical voltage

Before carrying out resistance, continuity or diode measurements, switch off the current of the electric circuit and discharge all capacitors.

1. Turn the rotary switch (4) to Ω / \rightarrow / \rightarrow / CAP (23), then use the MODE/RANGE button (17) to select the diode test (V \rightarrow indication (28)).
2. Insert the plug of the red measuring tip into the V/Hz measuring socket (5) and the plug of the black measuring tip into the COM measuring socket (6).
3. Connect the measuring tips to the diode. If the OL indication (exceedance of the measuring range) is displayed, swap the measuring tip connections at the diode.
 - ⇒ The component's forward voltage will be displayed (approx. 0.2 V to 0.3 V for Ge diodes and approx. 0.5 V to 0.8 V for Si diodes).
 - ⇒ You can tell that the diode is defective by the fact that it either has continuity in both directions (approx. 0.4 V can be measured in both directions) or has no continuity in both directions (OL is displayed in both directions).

Example:



Measuring capacitance

Before carrying out capacitance measurements, observe the following:

- Discharge each capacitor before carrying out a measurement! Residual voltage in the capacitor can lead to a destroyed measuring device! Do not discharge the capacitor by means of a short circuit. Instead connect a consumer.
- For reasons of safety, measure whether there is a residual charge in the capacitor (using the VDC range) before you perform a capacitance measurement.
- Completely remove the capacitor from the circuit. To do so, remove all contacts to the circuit and make the poles of the capacitor freely accessible.

Please proceed as follows to measure the capacitance:

1. Turn the rotary switch (4) to Ω / \rightarrow \rightarrow / CAP (23), then use the *MODE/RANGE* button (17) to select the capacitance measurement (*nF* indication (28)).
2. Insert the plug of the red measuring tip into the *V/Hz* measuring socket (5) and the plug of the black measuring tip into the *COM* measuring socket (6).
3. Connect the capacitor to be measured to the measuring tips. Electrolytic capacitors must be connected with correct polarity (red to plus, black to minus).

Since the charging processes within the capacitor require a certain amount of time, the indication will be delayed by up to 30 seconds. This delay is systemic, not a malfunction. Wait until the displayed value has stabilized before reading the measured value.

- ⇒ The measured value will be indicated on the display.
- ⇒ In case of a defective capacitor zero will be displayed.



Info

Bear in mind that electrolytic capacitors can come with a substantial scattering within their tolerance range.

Displaying the minimum / maximum value

The device comes with a maximum and minimum value indication.

1. Press the *OK/Hold* button (2) to the left to show the maximum and minimum value.
 - ⇒ The maximum and minimum value are shown on the display.
 - ⇒ The *MAX* indication (32) on the display shows that the maximum and minimum value function is active.
2. Press the *OK/Hold* button (2) to the left once again to exit the maximum and minimum value function and return to the measuring function.

Displaying the peak value

The device has a peak value indication showing the current, maximum and minimum peak value for AC voltage.

1. Press the *OK/Hold* button (2) to the right to show the peak value.
 - ⇒ The peak value is shown on the display.
 - ⇒ The *PEAK* indication (31) on the display shows that the peak value function is active.
2. Press the *OK/Hold* button (2) to the right once again to exit the peak value function and return to the measuring function.

Setting the range

The device is provided with an auto-range function, this means that it adapts the indication of the decimal places and the unit to the measurement result. To manually adjust the indication of decimal places, please proceed as follows:

1. Press and hold the *MODE/RANGE* button (17).
 - ⇒ The device exits the auto-range function and enables manual setting of the decimal places.
2. Repeatedly press the *MODE/RANGE* button (17) briefly until the desired setting of the decimal places is displayed.
3. Carry out the measurements.
4. Return to the auto-range function by pressing and holding the *MODE/RANGE* button (17).

Hold function

1. Briefly press the *OK/Hold* button (2) to freeze the current measured value on the display.
 - ⇒ The measurement result will be frozen on the display.
 - ⇒ The *HOLD* indication on the display shows that the hold function is active.
2. Briefly press the *OK/Hold* button (2) again to exit the hold function and return to the measuring function.
 - ⇒ The *HOLD* indication disappears.
 - ⇒ The display indicates the current measurement result again.

Using the thermal imaging camera



Caution

Burn hazard! When temperatures are measured on reflective objects, the displayed temperatures are lower than the actual temperatures. Set the emissivity correctly to ensure that the temperature measurement is as accurate as possible.

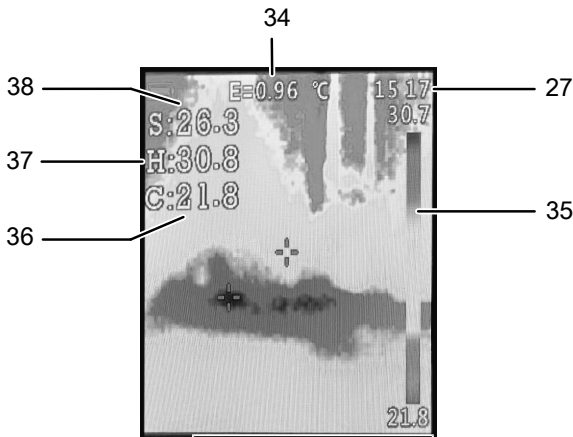


Info

You can use the thermal imaging camera from any measuring mode and perform measurements while using the thermal imaging camera.

Please proceed as follows to use the thermal imaging camera:

1. Press the **IR** button (3) to activate the thermal imaging camera.
 - ⇒ The thermal image appears on the display with the following indications:



Item	Designation/function
34	Set emissivity: Can be adjusted in the settings menu
27	Time
35	Temperature scale with highest value (top) and lowest value (bottom)
36	C: Lowest temperature measured (can be deactivated)
37	H: Highest temperature measured (can be deactivated)
38	S: Temperature in the crosshair centre

2. Press the **OK/Hold** button (2) to freeze the image.
 - ⇒ The **HOLD** indication appears on the left below the thermal image and the **SHARE** ◀ and **SAVE** ▲ indications appear at the bottom of the image.
 - ⇒ You can save the frozen thermal image by pressing the **OK/Hold** button (2) forward.
 - ⇒ If connected to the active MultiMeasure app, you can share the frozen thermal image directly with the app by pressing the **OK/Hold** button (2) to the left. A prompt will then appear in the app asking whether you want to save the thermal image.
3. Press the **OK/Hold** button (2) to exit the hold mode and return to the current thermal image.

You can change the emissivity, colour palette and temperature display unit for the thermal imaging camera. To do so, please proceed as follows:

1. Press and hold the **OK/Hold** button (2) to open the settings menu.
2. Use the **OK/Hold** button (2) to navigate to the desired menu item.
 - Emissivity: menu item *Emissivity*
 - Colour palette: menu item *Palette*
 - Temperature display unit: menu item *Temp Unit*
 ⇒ The emissivity/temperature display unit are now shown in grey instead of white.
3. Press the **OK/Hold** button (2) to the right to change the setting in the selected menu item.
 - Emissivity:
Set the value by pressing the **OK/Hold** button (2) forward or backward. Press the **OK/Hold** button (2) to the left to save the set value.
 - Colour palette:
Each time the **OK/Hold** button (2) is pressed to the right, the next colour palette is displayed and saved. You can choose from five colour palettes.
 - Temperature display unit:
Set the unit by pressing the **OK/Hold** button (2) forward or backward. You can choose between °C, °F and K (Kelvin). Press the **OK/Hold** button (2) to the left to save the set unit.
4. Exit the settings menu by pressing the **OK/Hold** button (2) to the left.

In addition, you can activate/deactivate the indication of the lowest and highest temperature. To do so, please proceed as follows:

1. Press and hold the **OK/Hold** button (2) to open the settings menu.
2. Use the **OK/Hold** button (2) to navigate to the menu item *Measure*.
3. Press the **OK/Hold** button (2) to the right to open the submenu.
4. Activate/deactivate the indication of the highest temperature (Temp. Max) by pressing the **OK/Hold** button (2) to the right.
5. Use the **OK/Hold** button (2) to navigate to the menu item *Temp. Min*.
6. Activate/deactivate the indication of the lowest temperature by pressing the **OK/Hold** button (2) to the right.
7. Press the **OK/Hold** button (2) to the left to exit the submenu and return to the main menu.
8. Exit the settings menu by pressing the **OK/Hold** button (2) to the left.

Viewing/deleting stored thermal images

You can view the images stored on the thermal imaging camera and/or delete all or individual images. To do so, please proceed as follows:

1. Press and hold the *OK/Hold* button (2) to open the settings menu.
2. Use the *OK/Hold* button (2) to navigate to the menu item *Memory*.
3. Press the *OK/Hold* button (2) to the right to open the submenu.
4. View the images stored on the thermal imaging camera by pressing the *OK/Hold* button (2) to the right in the *Recall Photos* submenu.
 - ⇒ The display shows one of the stored thermal images.
 - ⇒ At the bottom left of the display, the file name containing the date and time of the image is shown.
 - ⇒ To the right, the number of the image and the total number of stored thermal images are displayed.
5. Go to the next or previous thermal image by pressing the *OK/Hold* button (2) forward or backward.
6. Delete a thermal image by pressing the *OK/Hold* button (2) down.
 - ⇒ *Delete* appears at the bottom of the image.
 - ⇒ Press the *MODE/RANGE* button (17) to delete the image.
 - ⇒ Press the *OK/Hold* button (2) to return to the thermal image view.
7. Press the *MODE/RANGE* button (17) to exit the indication of thermal images.

In addition, you can delete all images stored on the thermal imaging camera at the same time. As soon as you are in the settings menu of the *Memory* menu item, please proceed as follows:

1. Press the *OK/Hold* button (2) to the right to open the submenu.
2. Use the *OK/Hold* button (2) to navigate to the submenu *Delete Photos*.
3. Press the *OK/Hold* button (2) to the right to open the submenu.
 - ⇒ The display shows a dialogue menu in which you can confirm the deletion of all images.
4. Use the *OK/Hold* button (2) to navigate to the dialogue box *Yes or No* and confirm your selection.
 - ⇒ If you have selected *Yes*, all images stored on the thermal imaging camera will be deleted.
5. Press the *MODE/RANGE* button (17) to exit the indication of thermal images.

Switching the display illumination on/off

Press and hold the *IR/*  button (3) to switch on the display illumination.

Press and hold the *IR/*  button (3) again to switch the display illumination back off.

Switching the Bluetooth interface on/off

The device is provided with a Bluetooth interface that allows you to connect the device with a terminal device (mobile phone, tablet, etc.) on which the MultiMeasure Mobile App is installed (see chapter *MultiMeasure Mobile app*).

1. Press and hold the *OK/Hold* button (2) to open the settings menu.
2. Use the *OK/Hold* button (2) to navigate to the menu item *Setup*.
3. Press the *OK/Hold* button (2) to the right to open the submenu.
4. Use the *OK/Hold* button (2) to navigate to the menu item *Bluetooth*.
5. Switch Bluetooth on/off by pressing the *OK/Hold* button (2) to the right.
 - Bluetooth switched on: *ON* indication
 - Bluetooth switched off: *OFF* indication
6. Press the *OK/Hold* button (2) to the left to exit the submenu and return to the main menu.
7. Exit the settings menu by pressing the *OK/Hold* button (2) to the left in the main menu.

Switching the device off

1. Turn the rotary switch (4) to **OFF** (19) to switch off the device manually.



Info

The device is switched off automatically after 15 minutes of non-use. Automatic switch-off can be adjusted (15 to 60 minutes) or disabled in the settings menu.

To switch the device back on after automatic switch-off, first turn the rotary switch (4) to **OFF** (19) and then to the position for the desired type of measurement.

MultiMeasure Mobile app

MultiMeasure Mobile app



Install the Trotec MultiMeasure Mobile app on the terminal device you want to use in combination with the device.

Info

Some of the app's functions require access to your location and an active Internet connection.

The app is available for download in the Google Play Store as well as in Apple's app store and via the following link:



<https://hub.trotec.com/?id=43083>

Connecting a measuring device



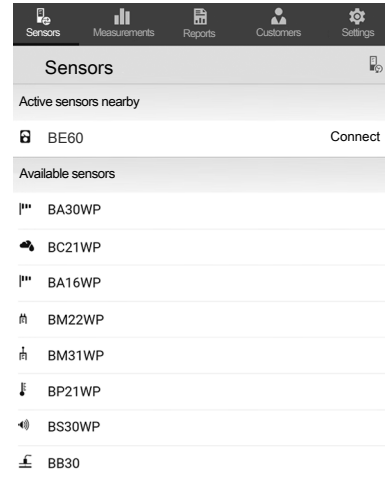
Info

The app can simultaneously be connected to several different measuring devices or measuring devices of the same type and also record several measurements at the same time. The number of sensors that can be connected depends on the terminal device.

Proceed as follows to connect a measuring device to the terminal device:

- ✓ The Trotec MultiMeasure Mobile app is installed.
 - ✓ The Bluetooth function on your terminal device is activated.
1. Switch on the measuring device (see chapter Operation).
 2. Make sure that the Bluetooth function is activated on the measuring device.
 3. Start the Trotec MultiMeasure Mobile app on the terminal device.
 - ⇒ A list of active and available sensors will be displayed.

4. Press the button to refresh the display if the desired measuring device is not displayed as an active measuring device.
 - ⇒ The terminal device now searches all active sensors again and shows them on the display.

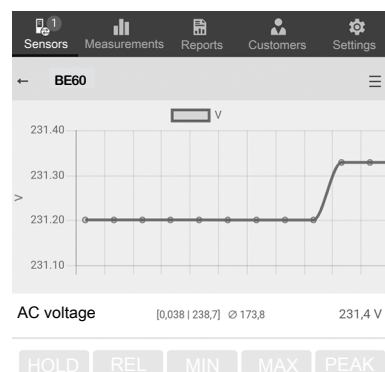


5. Select the desired sensor from the list of active sensors.
 - ⇒ The measuring device and the terminal device establish a connection with each other.
 - ⇒ The measured value indication appears on the display.

Measured value indication

When the sensor and the terminal device have established a successful connection, the submenu for the measurement will open and the display indicates the measured variable set at the multimeter in a continuous measurement.

As an example, the screen for the measured variable AC voltage is shown here:



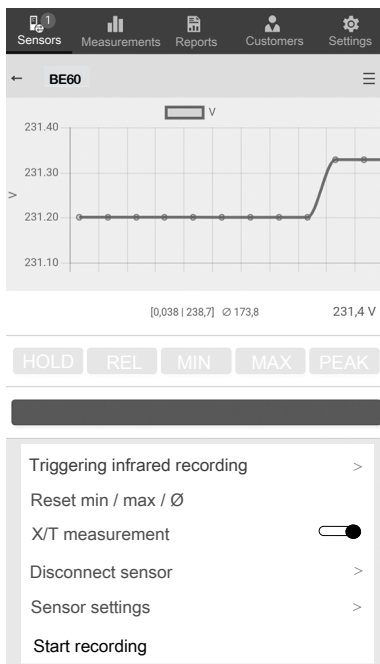
The last 12 values measured over time are displayed in the measured value field.

After several measurements have been carried out, the lowest value, highest value, average value and current value are displayed below the measured value field.

Measuring menu

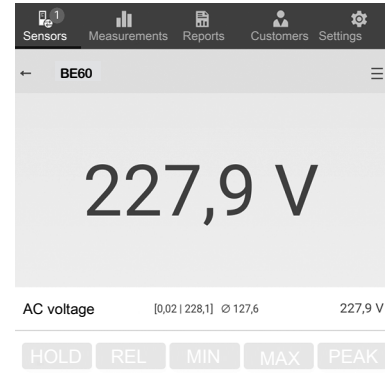
Press the button or the free area below the measurement value display to open the measuring menu at the bottom of the display. You can select from the following options in the measuring menu:

- trigger an infrared recording
- reset the min/max average value
- switch over between X/T measurement (coordinate system) and the display of individual values
- terminate the connection to the sensor
- view and modify sensor settings
- start recording of measured values



Display of individual values

After deactivation of the *X/T measurement* button, the display changes from continuous measurement to individual measurement.



The current measured value is displayed in the measured value field.

After several measurements have been carried out, the lowest value, highest value, average value and current value are displayed below the measured value field.

Recording measurements



Info

The minimum recording time is 30 seconds. If a measurement is interrupted or cancelled before this minimum measurement time has elapsed, it cannot be saved and may have to be performed again.

By actuating the *Start Recording* button, the app starts recording the measured values.

Instead of the button, the symbol of the active sensor flashes to indicate that recording is in progress. You can press this flashing symbol or the free area below the measurement value display to open the context menu to stop recording.

You can choose from saving or discarding the record after stopping recording.

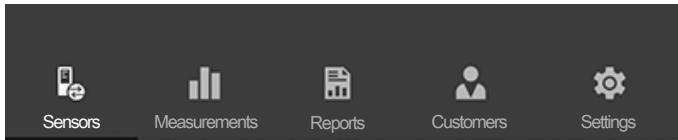
Menu bar

The functions of the MultiMeasure Mobile App are controlled via the menu bar from which the submenus can be accessed.



Info

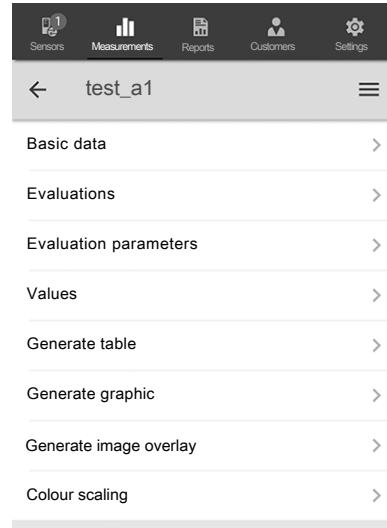
Depending on the operating system of the terminal device, the menu bar is located at the top (Android) or bottom (IOS) of the display. In the further description the displays of the Android system are shown as an example.



Designation	Function
Sensors	Opens the sensors overview. After connecting to the selected sensor, the submenu for the measurement opens.
Measurements	Opens the overview of saved measurements. The measurement series can be opened and edited.
Reports	Opens the overview of saved reports. You can generate on-site reports for the measurements and link them to customer data.
Customers	Opens the customers overview. You can select existing customers or create new customers.
Settings	Opens the settings menu. You can select the language and – depending on the measuring device – adjust different settings.

Submenu measurements

In the submenu *MEASUREMENTS*, the saved recordings of the measured values are displayed along with date, name and number of measuring points. Having selected the desired recording, the context menu of the measurement opens. Depending on the sensor type and the measuring mode, different functionalities can be opened. The following menu items are available:



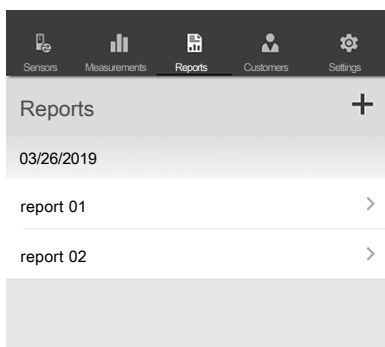
- **Basic data:**
Opens an overview of the data saved for the measurement.
- **Evaluations:**
Opens an overview of the evaluations generated for the measurement (photos, graphics and tables).
- **Evaluation parameters:**
Opens a menu to select and deselect individual evaluation parameters.
- **Values:**
Opens a tabular overview of all logged values for the measurement.
- **Generate table:**
Creates a table containing the logged values of the measurement and saves it as a *.CSV file.
- **Generate graphic:**
Creates a graphic representation of the logged values and saves it as a *.PNG file.
- **Generate image overlay:**
Combines a background image with the representation of the measured values.
- **Colour scaling:**
Allows you to adjust the colour display of the measured values.

Submenu reports

The reports generated in the MultiMeasure Mobile app are short reports providing a fast and simple documentation.

You can select from the following options in the *REPORTS* submenu:

- **Indicate existing reports:**
Having selected a report, a submenu opens where you can view and modify information.



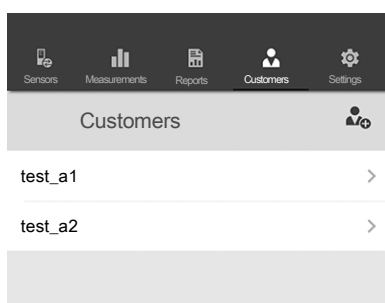
- **Generate a new report:**
Press the + button to open the input mask for a new report.


Submenu customers

Using the integrated customer management function all of the measured data can be assigned to specific clients via the app.

You can select from the following options in the *CUSTOMERS* submenu:

- **Call up an already created customer:**
Having selected a report, a submenu opens where you can view and modify information or directly start a measurement.



- **Creating a new customer:**
Press the  button to open the input mask for a new customer. You can create a new customer set or import an existing contact from the phone book of the terminal device.

Submenu settings

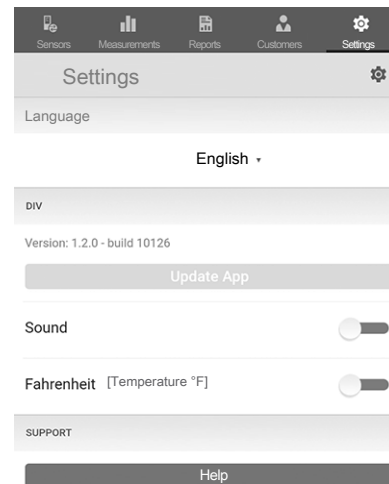
In the submenu *SETTINGS* you can adjust different settings, e.g. changing the menu language.



Note

The various sensors have slightly different setting options.

Example: Submenu *SETTINGS*:



Maintenance and repair

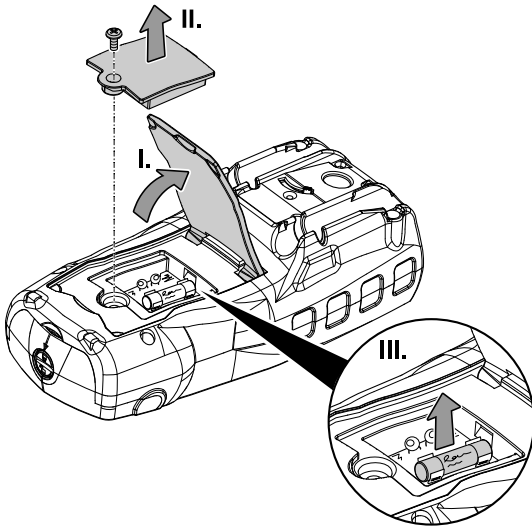
Fuse replacement



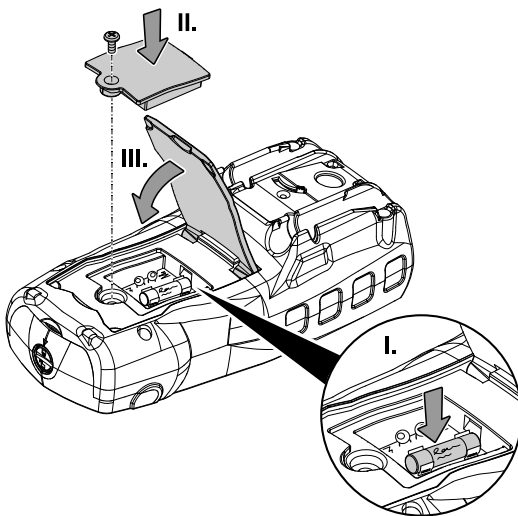
Caution

Switch the device off and remove the measuring tips from the measuring sockets before opening the device! Internal fuses may only ever be replaced with fuses of the same type, never with one of a higher amperage or with a provisional solution! Otherwise the consequences include the risk of accidents, the destruction of the device and the loss of warranty.

1. Fold out the stand (9) at the rear of the device.
2. Loosen the screw of the fuse compartment (10) and remove the fuse compartment cover.
3. Remove the defective fuse.



4. Insert a new fuse (10 A / 600 V).
5. Attach the cover and secure it by tightening the screw.
6. Fold back the stand (9).



Charging the battery

The battery is partially charged upon delivery to avoid damage to the battery caused by a deep discharge.



Warning of electrical voltage

Before each use of the charger or power cable, check for damages. If you notice damages, stop using the charger or power cable!

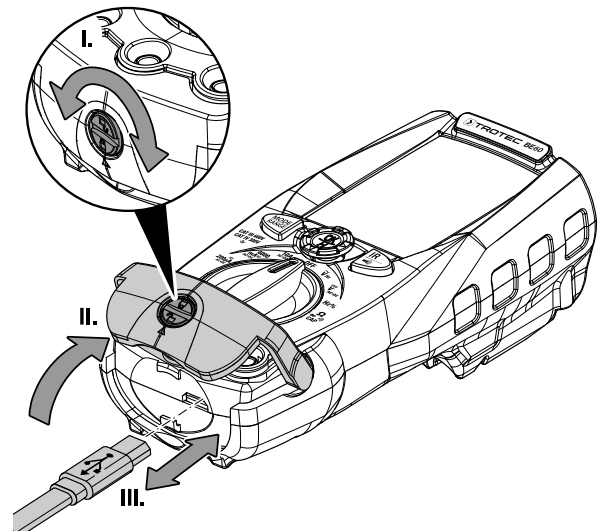
Note

The battery can be damaged in case of improper charging.

Never charge the battery at ambient temperatures below 10 °C or above 40 °C.

The battery must be recharged when the *Battery status* indication (33) on the display indicates a low battery power. To do so, please proceed as follows:

- ✓ The USB cable included in the scope of delivery is connected to a suitable power source (e.g. to the power adapter of a mobile phone or to a computer).
 - ✓ The measuring cables have been removed from the device.
1. Turn the lock over the USB port so that the arrow points to the open lock symbol.
 2. Lift the cover of the USB port.
 3. Connect the USB cable to the USB port.



⇒ The charging screen is shown on the display. When the battery is fully charged, the *Battery status* indication (33) is completely green.

Cleaning

Clean the device with a soft, damp and lint-free cloth. Make sure that no moisture enters the housing. Do not use any sprays, solvents, alcohol-based cleaning agents or abrasive cleaners, but only clean water to moisten the cloth.

Repair

Do not modify the device or install any spare parts. For repairs or device testing, contact the manufacturer.

Errors and faults

The device has been checked for proper functioning several times during production. If malfunctions occur nonetheless, check the device according to the following list.

Display segments are only faintly visible or flicker:

- Do not perform another measurement or stop ongoing measurements immediately!
- The battery voltage is too low. Recharge the battery without delay.

The device displays implausible measured values:

- Do not perform another measurement or stop ongoing measurements immediately!
- The battery voltage is too low. Recharge the battery without delay.

The device can no longer be switched on:

- The battery voltage is too low. Recharge the battery without delay.
- The fuse may be defective. Replace the fuse as described in the Fuse replacement chapter.
- The device may be defective. Please contact the Trotec customer service.

Disposal

Always dispose of packing materials in an environmentally friendly manner and in accordance with the applicable local disposal regulations.



The icon with the crossed-out waste bin on waste electrical or electronic equipment is taken from Directive 2012/19/EU. It states that this device must not be disposed of with the household waste at the end of its life. You will find collection points for free return of waste electrical and electronic equipment in your vicinity. The addresses can be obtained from your municipality or local administration. You can also find out about other return options that apply for many EU countries on the website <https://hub.trotec.com/?id=45090>. Otherwise, please contact an official recycling centre for electronic and electrical equipment authorised for your country.

The separate collection of waste electrical and electronic equipment aims to enable the re-use, recycling and other forms of recovery of waste equipment as well as to prevent negative effects for the environment and human health caused by the disposal of hazardous substances potentially contained in the equipment.



Li-Ion In the European Union, batteries and accumulators must not be treated as domestic waste, but must be disposed of professionally in accordance with Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators. Please dispose of batteries and accumulators according to the relevant legal requirements.

Only for United Kingdom

According to Waste Electrical and Electronic Equipment Regulations 2013 (SI 2013/3113) (as amended) devices that are no longer usable must be collected separately and disposed of in an environmentally friendly manner.

Declaration of conformity

We – Trotec GmbH – declare in sole responsibility that the product designated below was developed, constructed and produced in compliance with the requirements of the EU Radio Equipment Directive in the version 2014/53/EU.

Product model / Product: BE60
Product type: digital true RMS multimeter
with thermal imaging camera
Year of manufacture as of: 2023

Relevant EU directives:

- 2011/65/EU
- 2014/30/EU
- 2014/35/EU
- 2015/863/EU

Applied harmonised standards:

- EN 300 328 V2.2.2

Applied national standards and technical specifications:

- Regulation (EC) 1907/2006
- EN 61010-2-033:2012
- EN 61010-031:2015
- EN 61010-1:2010
- EN 61326-1:2013
- EN 61326-2-2:2013
- EN IEC 61000-4-2:2008
- EN IEC 61000-4-3:2010
- EN IEC 61000-4-8:2009
- IEC 61000-4-4:2012
- IEC 62321-3-1:2013
- IEC 62321-4:2013
- IEC 62321-5:2013
- IEC 62321-6:2015
- IEC 62321-7-1:2015
- IEC 62321-7-2:2017
- IEC 62321-8:2017

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Heinsberg, 17.02.2023



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