testo 872 - Thermal Imager

Instruction manual

testo.com/download/865-872

Short instructions

Instruction manual

Thermography pocket guide

Videos

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1 Safety and waste disposal

1.1 Zu diesem Dokument

- The instruction manual is an integral part of the instrument.
- Keep this document throughout the entire operating life of the instrument.
- Always use the complete original instruction manual.
- Please read this instruction manual through carefully and familiarise yourself with the product before putting it to use.
- Pass this instruction manual on to any additional or subsequent users of the product.
- Pay particular attention to the safety instructions and warning advice in order to prevent injury and damage to the product.

1.2 Safety

General safety instructions

- Only operate this instrument in the proper manner, for its intended purpose and within the parameters specified in the technical data.
- Do not apply any force to open the instrument.
- Do not operate the instrument if there are signs of damage on the housing, mains unit or connected cables.
- Always comply with the locally valid safety regulations when carrying out measurements. Dangers may also arise from objects to be measured or the measuring environment.
- Do not store the product together with solvents.
- Do not use any desiccants.
- Only perform maintenance and repair work on this instrument that is described in this documentation. Follow the prescribed steps exactly.
- Use only original spare parts from Testo.
- During operation, this instrument must not be pointed at the sun or other intensive sources of radiation (e.g. objects with temperatures exceeding 650 °C). This can cause serious damage to the detector. The manufacturer does not provide any warranty for any such damage to the microbolometer detector.

Batteries

- Improper use of batteries may cause the batteries to be destroyed, or lead to injury due to current surges, fire or escaping chemicals.
- Only use the batteries supplied in accordance with the instructions in the instruction manual.
- Do not short-circuit the batteries.
- Do not take the batteries apart and do not modify them.
- Do not expose the batteries to heavy impacts, water, fire or temperatures in excess of 60 °C.
- Do not store the batteries in the proximity of metal objects.
- In the event of contact with battery acid: rinse affected areas thoroughly with water, and if necessary consult a doctor.
- Do not use any leaky or damaged batteries.
- Only charge the rechargeable battery in the instrument or in the recommended charging station.
- Immediately stop the charging process if this is not completed in the given time.
- Take the rechargeable battery out of the instrument or the charging station immediately if it is not functioning properly or if it shows signs of overheating. Rechargeable battery may be hot!
- When not in use for a long period of time, take the rechargeable battery out of the instrument to prevent exhaustive discharge.

Warnings

Always pay attention to any information denoted by the following warnings. Implement the precautionary measures specified!

Display	Explanation
⚠ WARNING	Indicates possible serious injury.
⚠ CAUTION	Indicates possible minor injury.
ATTENTION	Indicates possible damage to equipment.

1.3 Waste disposal

- Dispose of faulty rechargeable batteries and spent batteries in accordance with the valid legal specifications.
- At the end of its useful life, dispose of the instrument via separate collection for electrical and electronic devices. Please observe local regulations regarding waste disposal, or alternatively return the product to Testo for disposal.

2 Technical data

2.1 Bluetooth module

The use of the wireless module is subject to the regulations and stipulations of the respective country of use, and the module may only be used in each case in countries for which a country certification has been granted.

The user and every owner undertake to adhere to these regulations and prerequisites for use, and acknowledge that the re-sale, export, import, etc. in particular in, to or from countries without wireless permits, is their responsibility.

2.2 General technical data

Infrared image output

Feature	Values
Infrared resolution	320 x 240
Thermal sensitivity (NETD)	60 mK
Field of view (FOV) / min. focusing distance	42° x 30° / <0.5 m
Geometric resolution (IFOV)	2.3 mrad
SuperResolution	640 x 480 pixels / 1.3 mrad
IR image refresh rate	9 Hz
Focus	Fixed focus
Spectral range	7.5 - 14 µm

Visual image output

Feature	Values
Image size / min. focusing distance	Min. 3.1 MP / 0.5 m

Image presentation

Feature	Values
Display	8.9 cm (3.5") TFT, QVGA (320 x 240 pixels)
Digital zoom	2x, 3x, 4x
Display options	• Infrared image • Real image
Interface	• WLAN • Bluetooth • USB 2.0 micro B
Colour palettes	11 options: • Blue/red • Grey • Inverted grey • High temp • Cold-hot • Humidity • Iron • Rainbow • Rainbow HC • Sepia • Testo

Measurement

Feature	Values
Measuring range	-30 to 650 °C
Accuracy	± 2 °C / ± 2%
ε-Assist	Automatic emission value and RTC detection
Emissivity/reflected temperature adjustment	0.01 to 1/manual

Measurement functions	• Single point measurement • Coldspot • Hotspot • Differential temperature • Area measurement • ScaleAssist • IFOV warner • Surface moisture distribution • Humidity measurement with testo 605i humidity probe • Solar mode (manual) • Electrical mode (manual) • Electrical measurement with testo 770 wireless clamp meter

Imager equipment

Feature	Values
Digital camera	Yes
Fullscreen mode	Yes
File format	.jpg
Video streaming	• USB • WLAN via the App
Laser not available in USA, Japan, China	635 nm, class 2

Image storage

Feature	Values
File format	• .jpg • .bmt • Option of exporting in .bmt .jpg .png .csv .xls
Memory capacity	Internal mass storage 2.8 GB, > 2000 images (without SuperResolution)

Power supply

Feature	Values
Battery type	Li-Ion rechargeable battery 2500 mAh / 3.7 V
Operating time	4.0 h @ 20 °C
Charging option	In instrument/in charging station (optional)
Charging time	approx. 5 h via mains unit approx. 8 h via a PC's USB interface

Ambient conditions

Feature	Values
Operating temperature	-15 to 50 °C
Storage temperature	-30 to 60 °C
Humidity	20 - 80 %RH, not condensing

Physical features

Feature	Values
Weight	510 g (including battery)
Dimensions	219 x 96 x 95 mm
Housing	PC/ABS
Protection class (IEC 60529)	IP 54
Vibration (IEC 60068-2-6)	2 G

Standards, tests, warranty

Feature	Values
EMC	2014/30/EU
RED	2014/53/EU
Warranty	2 years, warranty conditions: see www.testo.com/warranty

You can find the EU declaration of conformity on the Testo homepage www.testo.com under the product-specific downloads.

3 Description of the instrument

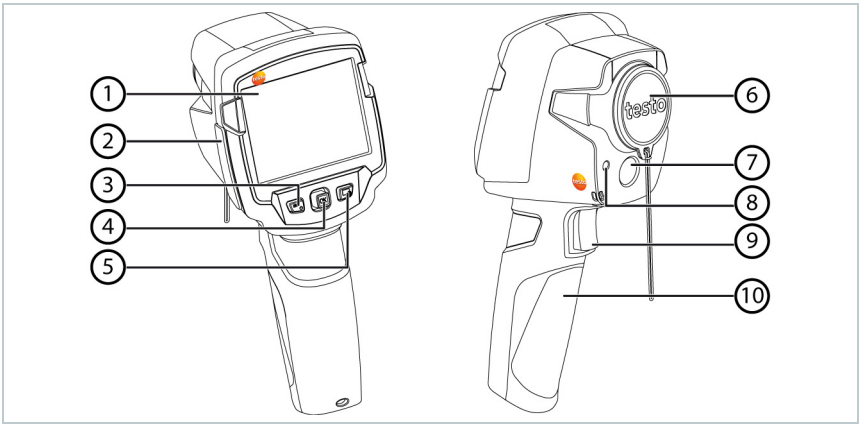
3.1 Use

The testo 872 is a handy, robust thermal imager. You can use it to undertake the non-contact measurement and display of surface temperature distribution.

Areas of application

- Building inspection: Energy efficiency rating of buildings (heating, ventilation, air-conditioning trade, building engineers, engineering firms, experts)
- Production monitoring / quality assurance: monitoring of production processes
- Preventive maintenance / servicing: Electrical and mechanical inspection of systems and machines

3.2 Instrument / operating elements overview



	Element	Function
1	Display	Displays infrared and real images, menus and functions
2	Interface terminal	Contains micro USB interface for power supply and connection to the computer

	Element	Function
3	- ⏻ key - Esc key	- Switch camera on and off - Cancel action
4	- OK key - Joystick	- Open menu, select function, confirm setting - Navigate within the menu, highlight function, select colour palette
5	Quick select button	Opens the function assigned to the quick select button; the icon for the selected function is displayed bottom right
6	Infrared camera lens; protective cap	Takes infrared images; protects the lens
7	Digital camera	Takes real images
8	Laser	Marking of the measuring point
9	Trigger	Saves the displayed image
10	Battery compartment	Contains the rechargeable battery

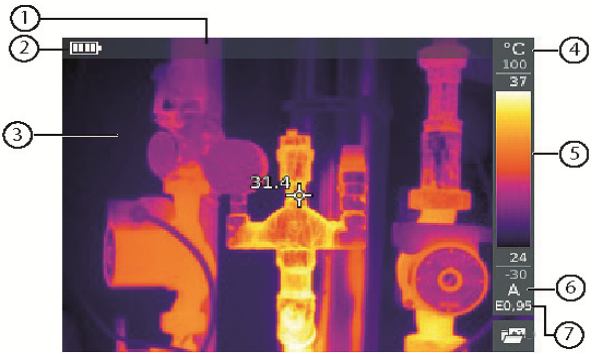
⚠ CAUTION

Laser radiation! Class 2 laser

- Do not look into the laser beam

Laser can be activated with the Remote function, also via smartphone or tablet.

3.3 Displays overview



	Element	Function
1	Status bar	In the status bar, values are displayed depending on the setting.
2		Battery capacity / charge status: : Battery operation, capacity 75-100% : Battery operation, capacity 50-75% : Battery operation, capacity 25-50% : Battery operation, capacity 10-25% : Battery operation, capacity 0-10% : Mains operation, battery is charging
3	Image display	IR image or real image display
4	°C or °F	Unit set for reading and scale displays
5	Scale	- Temperature unit - Grey characters: measuring range - White characters: temperature margin of the image displayed, showing the minimum/maximum reading (with automatic scale adjustment) or the selected minimum/maximum display value (with manual scale adjustment)
6	A, M or S	A - automatic scale adjustment M - manual scale adjustment S - ScaleAssist is enabled
7	E ...	Emissivity set

3.4 Power supply

The power is supplied to the instrument via a replaceable rechargeable battery or the mains unit provided (battery must be inserted).

With an attached mains unit, power is supplied automatically via the mains unit and the rechargeable battery is charged (only at ambient temperatures from 0 to 40°C).

If the instrument is switched off when connected to a PC via the USB interface, the rechargeable battery is charged via the USB interface.

It is also possible to charge the battery using a charging station (accessory).

The instrument is equipped with a buffer battery to maintain the system data during an interruption in the power supply (e.g. when the battery is changed).

4 Operation

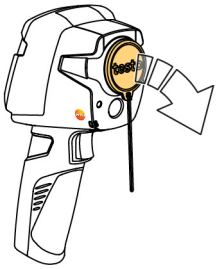
4.1 Initial operation

Please read the testo 872 1st steps commissioning instructions supplied (0970 8652).

4.2 Switching instrument on and off

Switching on the camera

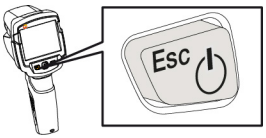
1 - Remove protective cap from the lens.



2 - Press ⏻.

▸ The camera starts.

▸ The start screen appears on the display.

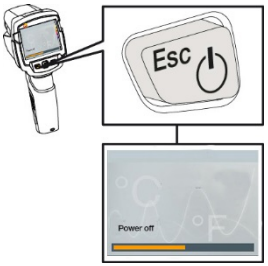


The camera carries out automatic zeroing approx. every 60 seconds in order to guarantee measuring accuracy. A "click" is heard when this happens. The image freezes briefly when this occurs. Zeroing is carried out more frequently during the camera warm-up period (takes approx. 90 seconds).

During the warm-up period no measuring accuracy is guaranteed. The image can already be used for indication purposes and saved.

Switching off the camera

1 - Press and hold down ⏻ until the progress bar is complete.



▶ The display goes off.

▶ The camera is switched off.

4.3 Getting to know the menu

1 - Press OK to open the menu.

2 - Move the joystick down/up to highlight a function (orange border).

3 - Press OK to select the function.

3.1 - Move the joystick to the right to open the submenu (marked with >).

- Return to the main menu:
  - Move the joystick to the left or
  - Move the joystick to the menu bar and press OK.

4.4 Quick select button

The quick select button is another navigation option that you can use to call up certain functions simply at the touch of a button.

Quick select menu items

Menu item	Function
Image gallery	Opens an overview of saved images.
Scale This function is only available if the Image type is set to infrared)	Set scale limits.
Emissivity This function is only available if the Image type is set to infrared)	Set emissivity (E) and reflected temperature (RTC).
Palette	Toggles the palette selection.
Adjustment This function is only available if the Image type is set to infrared)	Carries out manual zeroing.
Image type	Alternately switches the image display between infrared and real image.
Laser	Activates the laser pointer.
Zoom	Enlarges the image section (2x, 3x, 4x)

Changing assignment

1 - Move the joystick to the right.

▸ The Configure key selection menu appears.

▸ The activated function is marked with a dot (●).

2 - Move the joystick up/down until the orange box appears around the required menu item.
- Press OK

▸ The quick select button is assigned to the selected menu item.

▸ The icon for the selected function is displayed bottom right.

Using the quick select button

1 - Press .

▸ The function assigned to the quick select button is carried out.

5 WLAN connection - using the App

5.1 Activating/disabling the connection

To connect via WLAN, you need a tablet or smartphone with the Testo **Thermography App** already installed on it.

You can get the App from the App Store for iOS devices or from the Play Store for Android devices.

Compatibility:

Requires iOS 8.3 or later/Android 4.3 or later

1 - Open Menu.

2 - Move the joystick down and select Configuration.
- Press OK or move the joystick to the right.

3 - Move the joystick down and select Connectivity.
- Press OK or move the joystick to the right.

4 - Select WLAN and press OK to activate (a tick appears when WLAN is activated).

While WLAN is activated, the image gallery cannot be accessed.

Explanation of WLAN icons

Icon	Function
	App is connected
	No connection to the App

5.2 Using the App

5.2.1 Establishing a connection

✓ - WLAN is activated in the thermal imager.

1 - Smartphone/tablet -> Settings -> WLAN settings -> camera is shown with serial number and can be selected.

2 - Press Connect.

▸ The WLAN connection to the thermal imager is established.

5.2.2 Select display

Second display

✓ - The thermal imager is connected via WLAN.

1 - Selection -> 2nd display

▸ The display on the thermal imager is shown on your mobile end device.

Remote

✓ - The thermal imager is connected via WLAN.

1 - Selection -> Remote

▸ The display on the thermal imager is shown on your mobile end device. The thermal imager can be controlled and settings made via the mobile terminal device.

Gallery

✓ - The thermal imager is connected via WLAN.

1 - Selection -> Gallery

▸ The saved images are displayed and can be managed.

6 Bluetooth® connection

A connection between the thermal imager and the testo 605i humidity probe or testo 770-3 clamp meter can be established via Bluetooth®.

Bluetooth® 4.0 required

1 - Open Menu.

2 - Move the joystick down and select Configuration.
- Press OK or move the joystick to the right.

3 - Move the joystick down and select Connectivity.
- Press OK or move the joystick to the right.

4 - Select Bluetooth® and press OK to activate (a tick appears when Bluetooth® is enabled).

Explanation of Bluetooth® icons

Icon	Function
	No connection to the humidity probe
	Searching for humidity probe.
	Humidity probe readings are being transmitted.

When connected to the clamp meter

- Clamp meter readings are displayed in the header.

Readings are only transferred if the current, voltage or power is set on the clamp meter.

When connected to the humidity probe

- The thermal imager switches automatically to humidity measurement.
- Humidity probe readings are displayed in the header.

If a WLAN connection is enabled in addition, the Bluetooth data transfer is continued. However, it is not possible to establish a new connection to a humidity probe.

7 Performing the measurement

CAUTION

High thermal radiation (e.g. due to sun, fire, furnaces)
Detector may be damaged!

- **Do not point the camera at objects with temperatures > 650 °C.**

Ideal framework conditions

- Building thermography, investigating the building shell:
  Considerable temperature difference between inside and outside required (ideal: ≥ 15 °C / ≥ 27 °F).
- Consistent weather conditions, no intensive sunlight, no precipitation, no strong wind.
- To ensure maximum accuracy, the camera requires an adjustment time of 10 minutes after it is switched on.

Important camera settings

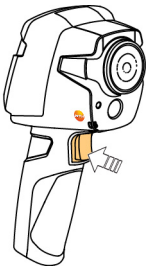
- Emissivity and reflected temperature must be set correctly in order to precisely determine the temperature. Subsequent adjustment is possible via the PC software, if required.
- When auto-scaling is activated, the colour scale is continuously adjusted to the min./max. values of the current measurement image. This means that the colour assigned to a specific temperature is changing constantly! To be able to compare multiple images based on the assigned colour, scaling must be set manually to fixed values, or must be subsequently adjusted to uniform values using the PC software.

7.1 Saving an image

1 - Press Trigger.

▸ The image is automatically saved.

▸ Regardless of the image type set, an infrared image is saved with an attached real image.



If a higher resolution is required: in the menu under Configuration -> select SuperResolution for four times as many readings.

7.2 Setting measuring functions

1 - Open the Measurement submenu.

▸ The submenu with the measurement functions opens:

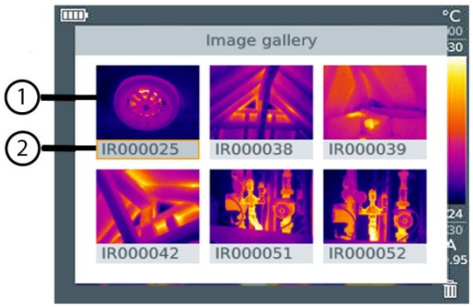
- Pixel mark:
  - Single point measurement: the temperature measuring point in the centre of the image is marked with white crosshairs and the value is displayed.
  - Coldspot, Hotspot: the lowest or highest temperature measuring point is marked with blue or red crosshairs and the value is displayed.
- Min/Max on Area:
  - Min/max on area: the minimum, maximum and mean values for a selected area are displayed.
  - Coldspot, Hotspot: the lowest or highest temperature measuring point within the range selection is marked with blue or red crosshairs and the value is displayed.
- Measuring range: choose between two temperature ranges.
- Differential temperature: identifies the difference between two temperatures.
- External measurement values: select Humidity, Current, Voltage, Solar, Power, None.
- IFOV: the IFOV warner shows what can be measured accurately from a specific distance.
- Zoom: enlarges the image section (2x, 3x, 4x)

2 - Move the joystick up/down to select the required function and then press OK.

7.3 Image gallery

Saved images can be displayed, analysed or deleted.

File names



	Designation	Explanation
1	-	Infrared image preview
2	IR	Infrared image with attached real image
	000000	Consecutive number
	SR	Images captured with SuperResolution

File names can be changed via the PC, e.g. in Windows Explorer.

Displaying a saved image

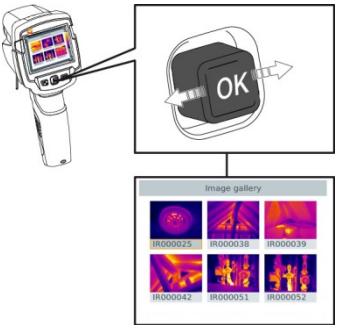
Saved images can be viewed and analyzed in the image gallery.

When SuperResolution is enabled, 2 images are saved in the image gallery (an IR image, and an SR image). The high-resolution SuperResolution image is saved in the background. In the status bar, the number of SuperResolution images to be saved is displayed (for example: SR(1)). A maximum 5 SuperResolution images can be processed simultaneously.

1 - Select the Image gallery function.

▶ All saved images are displayed in the form of an infrared preview.

2 - Move joystick to select an image.



3 - Press OK to open the selected image.

▶ The image is displayed.

Analyzing an image

If an image is saved with SuperResolution, the image gallery contains an (IR) image and a high-resolution image (SR). The images show the same image section. They can be displayed and analyzed in the image gallery.

The measurement functions Single point measurement, Hotspot, Coldspot, Min/Max on Area and Differential temperature can be used to analyze saved images. In saved images the crosshairs, which mark the measuring point, can be moved using the joystick.

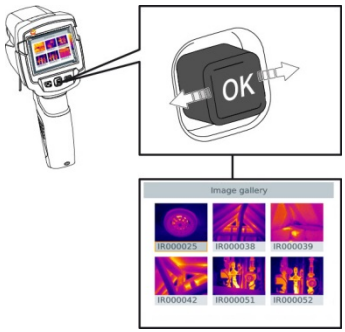
For a description of the individual functions, please read the information in the relevant sections.

Deleting an image

1 - Select the Image gallery function.

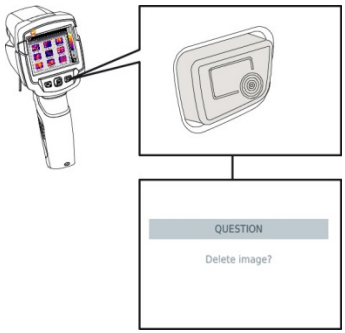
▸ All saved images are displayed in the form of an infrared preview.

2 - Move joystick to select an image.



3 - Press .

▸ Delete image? is displayed.



4 - Press OK to delete the image.

4.1 - Press Esc to cancel the process.

7.4 Image type

The display can be switched between infrared image and real image (digital camera).

1 - Select the Image type function.

2 - Move the joystick up or down and choose between infrared image or real image view.

3 - Press OK to confirm the selection.

7.5 Setting the scale

Manual scaling can be activated instead of automatic scaling (continuous automatic adjustment to the current min./max. values). The scale limits can be set within the measurement range.
The activated mode is displayed bottom right: A automatic scaling, M manual scaling and S OptiScale (ScaleAssist).

Auto-scaling continuously adjusts the scale to the readings presented, and the colour assigned to a temperature value changes.
In manual scaling fixed limit values are defined, and the colour assigned to a temperature value is fixed (important for visual image comparisons).
Scaling influences the way the infrared image is shown on the display but does not affect the recorded measuring values.
With ScaleAssist, a standardized scale is set depending on the inside and outside temperature.

Setting automatic scaling

1 - Select the Scale function.

2 - Move the joystick up or down until Auto is selected and then press OK.

▸ Automatic scaling is activated. A is displayed bottom right.

Setting manual scaling

The lower limit value, the temperature range (upper and lower limit value simultaneously) and the upper limit value can be set.

1 - Select the Scale function.

2 - Press OK.

3 - In the mode menu, move the joystick up/down until Manual is selected.

4 - Move the joystick to the right, select Min.Temp. (lower limit value).
- Move the joystick up/down to set the value.

4.1 - Move the joystick to the right, select Min.Temp. (lower limit value) and Max.Temp. (upper limit value).
- Move the joystick up/down to set the values.

4.2 - Move the joystick to the right, select Max.Temp. (upper limit value).
- Move the joystick up/down to set the value.

4.3 - If necessary, move the joystick to the left, back to the mode menu.

5 - Press OK.

▸ Manual scaling is activated. M is displayed bottom right.

Setting ScaleAssist

The ScaleAssist function calculates a display-neutral scale depending on the inside and outside temperature. This scale graduation can be used to detect building defects.

1 - Select the Scale function.

2 - Press OK.

3 - In the mode menu, move the joystick up/down until ScaleAssist is selected.

4 - Move the joystick to the right, select Indoor temperature.
- Move the joystick up/down to set the value.

5 - Move the joystick to the right, select Outdoor temperature.
- Move the joystick up/down to set the value.

6 - If necessary, move the joystick to the left, back to the mode menu.

7 - Activate ScaleAssist: press Ok.

▸ Manual scaling is activated. S is displayed bottom right.

7.6 Setting emissivity and reflected temperature

This function is only available if the Image type is set to infrared image.

You can choose between user-defined emissivity and 8 materials with permanently set emissivity. The reflected temperature (RTC) can be set individually.

Other materials can be imported into the instrument from an existing list using the PC software.

Emissivity information:

The emissivity describes the capability of a body to emit electromagnetic radiation. This is material-specific and must be adapted for correct measurement results.

Non-metals (paper, ceramic, gypsum, wood, paints and coatings), plastics and food have high emissivity, which means that the surface temperature can be easily measured using infrared.

Because of their low or non-uniform emissivity, bright metals and metal oxides only have limited suitability for infrared measurement. Highly inaccurate measurements should be expected. A remedy for this is coatings that increase emissivity, e.g. paint or emission adhesive (accessory: 0554 0051), which must be applied to the object to be measured.

The following table gives typical emissivities of important materials. These values can be used as a guide for user-defined settings.

Material (material temperature)	Emissivity
Aluminium, bright rolled (170 °C)	0.04
Cotton (20 °C)	0.77
Concrete (25 °C)	0.93
Ice, smooth (0 °C)	0.97
Iron, emery-ground (20 °C)	0.24
Iron with casting skin (100 °C)	0.80
Iron with rolling skin (20 °C)	0.77
Gypsum (20 °C)	0.90
Glass (90 °C)	0.94
Rubber, hard (23 °C)	0.94
Rubber, soft grey (23 °C)	0.89
Wood (70 °C)	0.94
Cork (20 °C)	0.70
Radiator, black anodised (50 °C)	0.98
Copper, slightly tarnished (20 °C)	0.04
Copper, oxidised (130 °C)	0.76
Plastics: PE, PP, PVC (20 °C)	0.94
Brass, oxidised (200 °C)	0.61
Paper (20 °C)	0.97
Porcelain (20 °C)	0.92
Black paint, matt (80 °C)	0.97
Steel, heat-treated surface (200 °C)	0.52
Steel, oxidised (200 °C)	0.79
Clay, burnt (70 °C)	0.91
Transformer paint (70 °C)	0.94
Brick, mortar, plaster (20 °C)	0.93

Reflected temperature information:

Using this offset factor, the reflection is calculated out based on the low emissivity, and the accuracy of the temperature measurement with infrared measuring instruments is improved. In most cases, the reflected temperature is identical to the ambient air temperature. Only when objects with strong emissions at much lower temperatures (such as cloudless skies during outdoor readings) or much higher temperatures (such as ovens or machines) are in proximity to the object being measured should the radiation temperature of these sources be determined and used. The reflected temperature has little effect on objects with high emissivity.

@ Further information can be found in the Pocket Guide.

7.6.1 Selecting the emissivity

1 - Select the Emissivity function.

2 - Move the joystick up/down to select the required material (with permanently set emissivity) and then press OK.

7.6.2 Customizing the emissivity

1 - Select the Emissivity function.

2 - Move the joystick up/down until User defined is selected.
- Move the joystick to the right until E is selected.
- Manually set value.

3 - Press OK.

7.6.3 Setting the RTC

1 - Select the Emissivity function.

2 - Move the joystick to the right until RTC is selected.
- Manually set value.

3 - Press OK.

7.6.4 Setting ε-Assist

1 - Select the Emissivity function.

2 - Move the joystick to the right until ε-Assist is selected.

3 - Press OK.

4 - Affix ε-marker to the object and measure with the camera.

▶ RTC and emissivity are set automatically.

5 - Press OK.

If it is not physically possible to determine the emissivity due to the same object temperature and reflected temperature, the input field opens again. The emission value must be input manually.

7.7 Selecting the colour palette

This function is only available if the Image type is set to infrared image.

1 - Select the Palette function.

2 - Move the joystick up/down to select the required colour palette and then press OK.

7.8 Activating/disabling the zoom

1 - Move the joystick to the right and open the softkey menu (quick select button).

2 - Move the joystick down and select Zoom. Then press OK.

3 - Press to set the Zoom.

7.9 Activating/disabling the laser

1 - Move the joystick to the right and open the softkey menu (quick select button).

2 - Move the joystick up or down and select Laser. Then press OK.

3 - Press to activate the Laser.

7.10 Activating humidity, solar or electrical mode

1 - Open Menu.

2 - Move the joystick down and select Measurement. Then press OK or move the joystick to the right.

3 - Move the joystick down and select External measurement values. Then press OK.

4 - Move the joystick up/down and activate Humidity, Current, Voltage, Solar or Power.
- If no radio probe is connected, enter the values manually.
- If a radio probe is connected, values are transferred automatically.

5 - Press OK to activate the selected Mode.

Values for current, voltage and power can be transferred from the testo 770-3 clamp meter.

7.11 Activating the differential temperature

Differential temperature enables the temperatures between two measuring points to be calculated.

1 - Open Menu.

2 - Move the joystick down and select Measurement. Then press OK or move the joystick to the right.

3 - Move the joystick down and select Differential temperature. Then press OK.

4 - Move the joystick down/up and select which differential temperature is to be calculated (Point-Point, Point-Probe, Point-Value, Point-RTC). Then press OK.

4.1 - Point-Point selection:

- Move the joystick to the right -> select measuring point 1 -> press OK -> move the measuring point to the live image using the joystick -> press OK.
- Move the joystick to the right -> select measuring point 2 -> press OK -> move the measuring point to the live image using the joystick -> press OK.
- End measurement: move the joystick to the right, press End.

4.2 - Point-Probe selection:

- Move the joystick to the right -> select measuring point 1 -> press OK -> move the measuring point to the live image using the joystick -> press OK.
- End measurement: move the joystick to the right, press End.

4.3 - Point-Value selection:

- Move the joystick to the right -> select measuring point 1 -> press OK -> move the measuring point to the live image using the joystick -> press OK.
- Move the joystick to the right, set the value manually.
- End measurement: move the joystick to the right, press End.

4.4 - Point-RTC selection:

- Move the joystick to the right -> select measuring point 1 -> press OK -> move the measuring point to the live image using the joystick -> press OK.
- Move the joystick to the right, set the value manually.
- End measurement: move the joystick to the right, press End.

7.12 Activating/disabling the Min/Max on Area function

1 - Open Menu.

2 - Move the joystick down and select Measurement. Then press OK or move the joystick to the right.

3 - Move the joystick down and select Min/Max on Area. Then press OK or move the joystick to the right.

4 - Select Min/Max on Area and press OK to activate (✔) or disable the function.
- Select Hotspot / Coldspot and press OK to activate (✔) or disable the function.
- Select Hide all and press OK to disable all functions for the measuring range.

7.13 Configuration

7.13.1 Settings

Country settings

The user interface language can be set.

1 - Select the Country settings function.

2 - Move the joystick up/down to select the required language and then press OK.

Set time/date

Time and date can be set. The time and date format are set automatically based on the selected user interface language.

1 - Select the Set time/date function.

2 - Move the joystick to the right/left to select the required setting option.

3 - Move the joystick up/down to set the value.

4 - After setting all values, press OK.

Temperature unit

The temperature unit can be set.

1 - Open the Temperature unit submenu. For how to proceed: see Getting to know the menu.

2 - Move the joystick up/down to select the required unit and then press OK.

Power-save options

The illumination intensity of the display can be set. A lower intensity increases the battery life.
The time until automatic switch-off can be set.

1 - Select the Power-save options function.

2 - Move the joystick up/down to select the required intensity level and then press OK.

7.13.2 SuperResolution

SuperResolution is a technology to improve image quality. Each time an image is recorded, a sequence of images is saved on the thermal imager and used to calculate an image with four times more readings, with the aid of the camera , the App or PC software (no interpolation). The geometric resolution (IFOV) is improved by a factor of 1.6.
To use the function, the following conditions must be fulfilled:

- The camera is hand-held.
- The objects to be imaged do not move.

1 - Open the SuperResolution function.

2 - Press OK to activate or disable the function.

7.13.3 Save JPEG function

Infrared images are saved in BMT (image with all temperature data) format. The image can also be saved in JPEG format (without temperature data) at the same time. The image content corresponds to the infrared image shown on the display, including scale display and image marks for the selected measuring functions. The JPEG file is saved under the same file name as the associated BMT file and can be opened on the PC, even without using the IRSoft PC software.

1 - Open the Save JPEG function.

2 - Press OK.

3 - Move the joystick up/down until On/Off is selected.

4 - Press OK.

5 - Add a date/time stamp to a JPEG file if required. Turn function on or off for this.

7.13.4 Connectivity

Enable/disable WLAN or Bluetooth®

1 - Menu -> Configuration -> Connectivity

2 - Move the joystick to the right (>).
- Select WLAN and press OK to enable (✔) or disable the function.
- Select Bluetooth and press OK to enable (✔) or disable the function.

3 - Press Esc to cancel the process.

If there is an active Bluetooth connection and a WLAN connection is activated in addition, the Bluetooth data transfer is continued. However, it is not possible to establish a new connection to a humidity probe.

7.13.5 Ambient conditions

Measurement deviations arising due to high humidity or large distances to the object to be measured can be corrected. Correction parameters must be entered for this.
If the camera is connected to an optional radio humidity probe, the ambient temperature and humidity are transferred automatically.

Values for ambient temperature (Temperature) and ambient humidity (Humidity) can be set manually.

1 - Menu -> Configuration -> Ambient conditions

2 - Move the joystick up/down to set the temperature value.

3 - Move the joystick to the right.

4 - Move the joystick up/down to set the humidity value.

5 - Press OK.

7.13.6 Info

The following instrument information is displayed:

- Device data (e.g. serial number, device name, firmware version)
- Options
- Measurement functions
- WLAN
- Radio certifications
- Legal information

7.13.7 Fullscreen mode

The scale and the quick select button function indicator can be hidden.

1 - Select the Fullscreen mode function.

▸ When Fullscreen Mode is activated, the scale and icon for the quick select button are hidden. When a key is pressed, these elements are displayed briefly.

7.13.8 Reset options

Reset counter

After a reset, the consecutive numbering of images starts again from the beginning. When saving images, already saved images with the same number are overwritten!

Back up all saved images before resetting the counter to prevent possible overwriting.

1 - Menu -> Configuration -> Reset counter

2 - Select the Reset counter function.

▸ Reset image counter? is displayed.

3 - Press OK to reset the counter.

3.1 - Press Esc to cancel the process.

Factory settings

The instrument settings can be reset to the factory settings.

Time/date, country settings and counter are not reset.

1 - Menu -> Configuration -> Reset options.

2 - Select the Factory settings function.

▸ Apply factory settings? is displayed.

3 - Press OK to apply factory settings.

3.1 - Press Esc to cancel the process.

Formatting

The image memory can be formatted.

When formatting, all data saved in the memory is lost.
Back up all saved images before formatting to prevent loss of data.
Formatting does not reset the counter.

1 - Menu -> Configuration -> Reset options.

2 - Select the Format function.

▸ Format memory? is displayed.

3 - Press OK to format the memory.

3.1 - Press Esc to cancel the process.

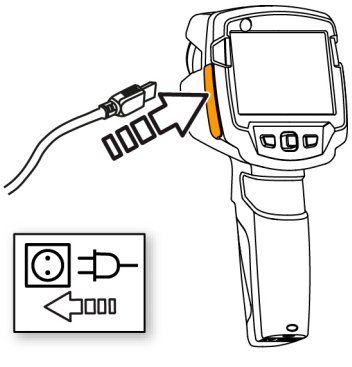
8 Maintenance

8.1 Charging the rechargeable battery

1 - Open the cover of the interface terminal.

2 - Connect the recharger cable to the Micro-USB interface.

3 - Connect the mains unit to a mains socket.



▸ The charging process will start.

If the battery has been completely drained, the charging time is approx. 5 hours.

▸ The charge status is not displayed while the instrument is switched off.

4 - Switch on the instrument to call up the charge status.

@ For other battery charging options, .

8.2 Changing the rechargeable battery

⚠ WARNING

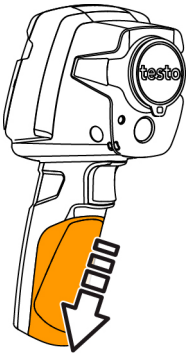
Serious risk of injury to the user and/or destruction of the instrument

> There is a risk of explosion if the battery is replaced with one that is the wrong type.

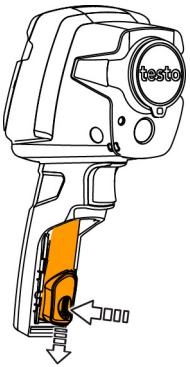
> Dispose of spent/faulty batteries in accordance with the relevant legal specifications.

1 - Switch the instrument off.

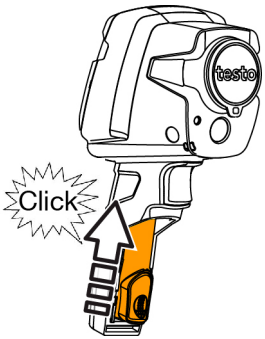
2 - Open the battery compartment.



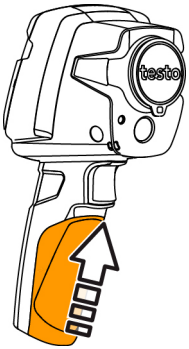
3 - Release the battery and remove.



4 - Insert new battery and slide upwards until it clicks into place.



5 - Close the battery compartment.



8.3 Cleaning the instrument

Cleaning the instrument housing

✓ - The interface terminal is closed.
- The battery compartment is closed.

1 - Rub down the surface of the instrument with a damp cloth. Use mild household cleaning agents or soapy water for this.

Cleaning the lens and display

1 - If the lens is dirty, clean it with a cotton bud.

2 - If the display is dirty, clean it with a cleaning cloth (e.g. microfibre cloth).

8.4 Firmware Update

The current Firmware version can be found on www.testo.com.

There are two update options:

- Update with IRSoft or
- Update directly with the thermal imager

Downloading the Firmware

1 - Download the following Firmware: Firmware-testo-865-872.exe

2 - Unpack file: doubleclick the exe-file

▸ FW_T87x_Vx.xx.bin is stored in a selected file.

8.4.1 Update with IRSoft

8.4.1.1 Prepare the Camera

✓ Battery is fully charged or charger is connected to the camera.

1 - Connect computer to camera with USB cable.

2 - Switch on camera.

▸ Firmware is downloaded completely.

8.4.1.2 Execute Update

✓ - IRSoft is activated.

1 - Select Camera -> Configuration.

2 - Click Configure camera.

▸ Window Camera Settings is opened.

3 - Camera Settings -> select Firmware Update -> OK.

▸ FW_T87x_Vx.xx.bin is displayed.

4 - Select Open.

- Firmware Update is executed.
- Automatic restart of the thermal imager. Update executed successfully.

Camera coul possible display: Firmware Update finished. Please restart the device. Restart will not be done.
Action:
- Switch off the camera after 10 s and switch on after 3 s.
- The current Firmeware version is displayed.

8.4.2 Update with the camera

8.4.2.1 Prepare camera

✓ - Battery is fully charged or charger is connected to the camera.

1 - Switch on camera.

2 - Open the interface cover.

3 - Connect computer with the camera through USB cable.

- Camera is displayed as storage media device in Windows-Explorer.

8.4.2.2 Execute Update

1 - FW_T87x_Vx.xx.bin- with Drag & Drop into the storage media device.

2 - Eject storage media device.

3 - Disconnect USB connection.

4 - Switch off camera.

5 - Switch on camera: Update is executed.

6 - See Progress display.

▸ Update successfully done. Current Firmeware version is displayed.

9 Tips and assistance

9.1 Questions and answers

Question	Possible cause / solution
Error! Memory full! is displayed.	Insufficient memory available: Transfer images to the PC or delete.
Error! Permissible instrument temperature exceeded! is displayed.	Switch off the camera, allow the instrument to cool down and observe the permissible ambient temperature.
~ is displayed before a value.	Value is outside the measuring range: extended display range with no guarantee of accuracy.
--- or +++ is displayed instead of a value.	Value is outside the measuring range and the extended display range.
xxx is displayed instead of a value.	Value cannot be calculated: check parameter settings for plausibility.
Automatic zeroing (audible "click" and brief image freeze) is carried out very frequently.	Camera is still in its warm-up period (takes approx. 90 seconds): Wait until the warm-up period has passed.

If we have not been able to answer your question, please contact your dealer or Testo Customer Service. You will find contact details on the back of this document or on the website **www.testo.com/service-contact**.

9.2 Accessories and spare parts

Description	Article no.
Battery charging station	0554 1103
Spare rechargeable battery	0515 5107
Holster case	0554 7808

Additional markers for E-Assist function (10 off)	0554 0872
Emission tape	0554 0051
ISO calibration certificate: Calibration points at 0 °C, 25 °C, 50 °C	0520 0489
ISO calibration certificate: Calibration points at 0 °C, 100 °C, 200 °C	0520 0490
ISO calibration certificate: Freely selectable calibration points in the range -18 °C to 250 °C	0520 0495

For further accessories and spare parts, please refer to the product catalogues and brochures or look up at **www.testo.com**.

10 Authorizations and certification

Product	testo 872
Mat.-No.	0560 8721, 0560 8722, 0560 8723

The use of the wireless module is subject to the regulations and stipulations of the respective country of use, and the module may only be used in countries for which a country certification has been granted. The user and every owner has the obligation to adhere to these regulations and prerequisites for use, and acknowledges that the re-sale, export, import etc. in particular in countries without wireless permits, is his responsibility.

Country	Comments	
Australia		E 1561
Canada	Contains IC: 5969A-TIWI101 Product IC: 6127B-2016TIFAM IC Warnings	

Europa + EFTA	CE The EU Declaration of Conformity can be found on the testo homepage www.testo.com under the product specific downloads. **EU countries:** Belgium (BE), Bulgaria (BG), Denmark (DK), Germany (DE), Estonia (EE), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Sweden (SE), Slovakia (SK), Slovenia (SI), Spain (ES), Czech Republic (CZ), Hungary (HU), United Kingdom (GB), Republic of Cyprus (CY). **EFTA countries:** Iceland, Liechtenstein, Norway, Switzerland
India	Authorized
Japan	R 209-J00157 Japan Information
Russia	Authorized
South Korea	testo 868: MSIP-REM-te2-Testo868 testo 871: MSIP-REM-te2-Testo871 testo 872: MSIP-REM-te2-Testo872 KCC Warning
Turkey	Authorized
USA	contains FCC ID: TFB-TIWI1-01 Product FCC ID: WAF-2016TIFAM FCC Warnings

<table>
<tr><td>WLAN /
Bluetooth®
Information</td><td>
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<tr><th>Feature</th><th>Values</th></tr>
<tr><td>WLAN range
Bluetooth® range</td><td>typical 15 m
typical 5 m</td></tr>
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<tr><td>radio class</td><td>WLAN 2.4 GHz IEEE 802.11 b/g
Bluetooth® 2.1 + EDR and Low Energy (BLE) 4.0</td></tr>
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W66 N220 Commerce Court
Cedarburg,
WI 53012-2636 USA</td></tr>
<tr><td>RF Band</td><td>BT LE: 2402 – 2480MHz
WLAN: 2412 – 2480MHz</td></tr>
<tr><td>power output [E.I.R.P]</td><td>BT LE: 10dBm
WLAN: 20dBm</td></tr>
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<tr><td>Bluetooth® SIG Listing</td><td>
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<tr><th>Feature</th><th>Values</th></tr>
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<tr><td>Declaration ID</td><td>D030647</td></tr>
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</td></tr>
<tr><td>Laser *</td><td>Conform to IEC / EN 60825-1:2014
Laser class 2
 Do not stare into the beam!</td></tr>
</table>

* Use only in products of testo 868, testo 871 and testo 872 for Europe + EFTA countries, Turkey and Australia

IC Warnings

RSS-Gen & RSS-247 statement:

This device complies with Industry Canada licence-exempt RSS standard(s).
Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Caution: Radio Frequency Radiation Exposure
This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets the IC radio frequency (RF) Exposure Guidelines. This equipment should be installed and operated keeping the radiator at least 12 cm or more away from person´s body in normal use position.
Co-Location:
This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

Attention : exposition au rayonnement de radiofréquences
Cet équipement est conforme aux limites d'exposition aux radiofréquences IC fixées pour un environnement non contrôlé et aux Lignes directrices relatives à l'exposition aux radiofréquences (RF). Cet équipement devrait être installé et utilisé à une distance d'au moins 12 cm d'un radiateur ou à une distance plus grande du corps humain en position normale d'utilisation.
Co-location
Ce transmetteur ne peut pas être installé en colocation ou être utilisé avec une autre antenne ou transmetteur, quel qu'en soit le type.

FCC Warnings

Information from the FCC (Federal Communications Commission)
For your own safety
Shielded cables should be used for a composite interface. This is to ensure continued protection against radio frequency interference.

FCC warning statement
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Shielded interface cable must be used in order to comply with the emission limits.

Warning
This device complies with Part 15 of the FCC Rules. 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.
Caution: Radio Frequency Radiation Exposure
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment should be installed and operated keeping the radiator at least 12 cm or more away from person´s body in normal use position.
Co-Location:
This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

Japan Information

当該機器には電波法に基づく、技術基準適合証明等を受けた特定無線設備を装着している。

KCC Warning

해당 무선 설비는 운용 중 전파혼신 가능성이 있음。

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