testo 104-IR BT

Combined infrared and penetration thermometer

Instruction manual en-US

1. General information

Please read this document through carefully and familiarize yourself with the operation of the product before putting it to use. Keep this document on hand so that you can refer to it when necessary.

2. Safety information

Avoid electrical hazards:

- Do not conduct measurements on or near live parts!

Adhere to the product safety/warranty requirements:

- Always operate the instrument properly and according to its intended purpose and within the parameters specified. Do not use force.
- Do not store with solvents (e.g. acetone).
- Only open the instrument if this is expressly described in the documentation for the purpose of maintenance or repair work.

Ensure correct disposal:

- Dispose of defective rechargeable batteries and spent batteries at the collection points provided.
- Send the instrument directly to us at the end of its life cycle. We will ensure that it is disposed of in an environmentally friendly manner.

3. Intended use

The testo 104-IR BT is a robust food thermometer.
The product is designed for the following tasks/areas:

- Food sector: production, food service, spot check measurement, incoming goods.
- Measuring liquids, pastes and semi-solid materials

The following product components are designed for continuous contact with foodstuffs in accordance with Regulation (EC) 1935/2004:
The immersion/penetration probe from the tip up to 2 cm before the probe handle or the plastic housing. If provided, information about penetration depths in the instruction manual or the mark(s) on the immersion/penetration probe should be observed.

The product should not be used in the following areas:

- Potentially explosive areas
- For diagnostic measurements in the medical sector

4. Technical data

4.1 Bluetooth® Module

! The Bluetooth® option may only be operated in countries in which it is type approved.

Feature	Values
Bluetooth®	Range >20 m (free field)
Bluetooth® type	LSD Science & Technology Co., Ltd L Series BLE Module (08 Mai 2013) based on TI CC254X chip
Qualified Design ID	B016552
Bluetooth® radio class	Class 3
Bluetooth® company	10274

Certification

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

Norway, Switzerland, Lichtenstein und Iceland.

Other countries

USA

Information from the FCC (Federal Communications Commission)

This device complies with part 15 of the FCC Rules. Commissioning is subject to the two following conditions: (1) This instrument must not cause any harmful interference and (2) this instrument must be able to cope with interference, even if this has undesirable effects on operation.

Changes

The FCC demands that the user be informed that any changes or modifications to the instrument that are not explicitly approved by Testo AG may void the user's right to use this instrument.

4.2 General Technical data

Feature	Values
Penetration probe	
Sensor type	NTC
Measuring range	-50 to +250 °C / -58 to +482 °F
Resolution	0.1 °C/°F/°R
Accuracy (±1 digit)	±1.0 °C / ±1.8 °F (-50,0 to-30,1°C /-58.0 to -22.1 °F) ±0.5 °C / ±0.9 °F (-30,0 to +99,9°C /-22.0 to +211.9 °F) ±1 % of the measuring range (+100.0 to +250.0 °C / +212.0 to +482.0 °F)
Response time t99	10 s (measured in moving liquid)
Measuring rate	0.5 s
Infrared measurement	
Lens	10:1 + opening diameter of the sensor (12 mm / 0.47")
Spectral range	8 to 14µm
Laser type	2-point laser
Output / wavelength	< 1 mW / 650nm
Class / standard	2 / DIN EN 60825-1:2007
Measuring range	-30 - +250 °C / -22 - +482 °F
Resolution	0.1 °C/°F/°R
Accuracy (at 23°C, ±1 digit)	±2.5 °C / ±4.5 °F (-30.0 to -20.1 °C / -22.0 to -4.2 °F) ±2.0 °C / ±3.6 °F (-20.0 to -0.1 °C / -4.1 to 31.9 °F) ±1.5 °C / ±2.7 °F or ±1.5 % of the measuring value (0.0 to +250.0 °C / +32.0 to +482.0 °F)
Measuring rate	0.5 s
General	
Operating temperature	-20 to +50 °C / -4 to +122 °F
Transportation/ storage temperature	- 30...+70 °C / -22 to +158 °F (without batteries)
Power supply	2 x AAA batteries
Housing	ABS/TPE/PC and die-cast zinc/stainless steel
Protection class	IP65
Dimensions	281 x 48 x 21 mm / 11.06 x 1.89 x 0.83" (immersion/ penetration probe folded out) 178 x 48 x 21 mm / 7.01 x 1.89 x 0.83" (immersion/ penetration probe folded up)
Weight	207 g / 0.433lbs (incl. batteries)
Standards	EN 13485
EC Directive	2014/30/EC
Warranty	2 years, warranty terms: see www.testo.com/warranty

Information on standards

This product complies with the EN 13485 standard for penetration measurement.
Suitability: S, T (storage, transportation)
Environment: E (transportable thermometer)
Accuracy class: 0.5
Measuring range: -50...+250 °C
According to EN 13485, the measuring instrument should be checked and calibrated regularly under the terms of EN 13486 (recommended frequency: yearly).
Contact us for more information.

5. Product description

1 Infrared sensor

2 2-point laser

3 Display

4 Control keys:
- [ON]: switches the instrument on
- [OFF]: switches the instrument off (hold button down)
- [▲]: switches to IR measurement, carry out IR measurement (hold button down)
- [▼]: switches to contact measurement
- [⬆/HOLD/MIN/MAX]: Hold reading, show minimum / maximum value, sends readings to the mobile Testo terminal (Bluetooth®)

5 Battery compartment (at the back)

6 Fold-out immersion/penetration probe, folding out the probe switches the instrument on

6. Commissioning

Inserting batteries

1 Use a slotted screwdriver to undo the screw on the battery compartment.

2 Open the battery compartment.

3 Insert batteries (2x type AAA). Observe the polarity!

4 Close the battery compartment.

5 Tighten the screw.

7. Operation

7.1 Switching on/off

Switching on via fold-out probe

▶ Fold out the probe.

- All display segments light up briefly. Contact measurement is enabled (▼lights up).

Switching on/off via control keys

▶ Switch the instrument on: press [ON].

- All display segments light up briefly. IR measurement is enabled (▲lights up).

▶ Switch off the instrument: press and hold down [OFF] until the display goes off.

! The instrument switches off automatically if no key is pressed: for 10 minutes, or for 1 minute when the probe is folded up, and Bluetooth® Mode is disabled.

7.2 Changing the measuring mode

▶ Contact measurement —> IR measurement: press [▲].

▶ IR measurement —> contact measurement: press [▼].

7.3 Measuring

! Observe the information on IR measurement/contact measurement (see chapter below).

! Press [⬆] to transfer the displayed reading in Bluetooth® mode to the mobile Testo terminal.

IR measurement

- Instrument is switched on, IR measurement is enabled, Bluetooth® mode is enabled.

1 Start measurement: press and hold down [▲].

2 Lock in on measurement object using the laser points: laser points mark the edges of the measuring range.

- The current measuring value is displayed.

3 End measurement: release the key.

- Hold lights up. The last measuring value and min./max. value are saved until the next measurement, or until the instrument is switched off.

▶ Switch between min., max. and recorded value: press [⬆].

! The min./max. values can be reset:

· press [▲] or switch the instrument off.

▶ Restart measurement: press and hold down [▲].

▶ Setting the emission level:
  · When IR measurement is enabled, press and hold down[▲] and [▼] at the same time (▼lights up).
  · Emission level is displayed.
  · Use [▲] or [▼] to change the value and wait for 3 s.

Contact measurement

- Instrument is switched on, contact measurement is enabled (▼ lights up), Bluetooth® mode is enabled.

1 Position the contact thermometer in the measurement object and initiate the measurement: press [▼].

2 End measurement: press [⬆].

- Hold lights up. The last measuring value and min./max. values are saved until the next measurement, or until the instrument is switched off.

! AutoHold function: if this function is enabled, the measurement is ended automatically as soon as the measuring value is stable, AutoHold lights up.

▶ Switch between min., max. and recorded value: press [⬆].

! The min./max. values can be reset:
  · switch the instrument off, switch to IR measurement or, while the held measuring value is displayed (Hold lights up), press and hold down [⬆] until Clr lights up.

▶ Restart measurement: press [▼].

8. Settings

- The instrument must be switched off to initiate settings mode.

! If no button is pressed for 3 s in settings mode, the instrument switches to the next view.

1 With the instrument switched off, press and hold down [▲] and [▼] until AutoHold or Hold flashes.

2 Switch the AutoHold function on (AutoHold) or off (Hold): press [▲] or [▼].

- °C, °F or °R flashes.

3 Set measurement unit to degrees Celsius (°C), degrees Fahrenheit (°F) or degrees Réaumur (°R): press [▲] or [▼].

- (on) or (oFF) flashes.

4 Switch the laser on (on) or off (oFF): press [▲] or [▼].

5 Switch Bluetooth® on (on) or off (oFF): press [▲] or [▼].

- The instrument switches to IR measurement.
- Bluetooth® is enabled and can be detected by mobile Testo terminals with a Bluetooth® interface. When the connection is established, a beep is emitted and the Bluetooth® icon is shown in the display.

9. Service and maintenance

9.1 Changing the batteries

1 Use a slotted screwdriver to undo the screw on the battery compartment.
2 Open the battery compartment.
3 Insert batteries (2x type AAA). Observe the polarity!
4 Close the battery compartment.
5 Tighten the screw.

9.2 Cleaning the instrument

Only use weak, commercially available neutral/household cleaning agents (e.g. washing-up liquid) to clean the instrument. Do not use aggressive cleaning agents or solvent!

The housing and probe can be disinfected using an alcohol-based spray. In doing so, always follow the manufacturer's instructions.

▶— Clean the housing and probe under running water and rub dry with a towel.
▶ Clean the lens carefully with a cotton swab dipped in water or medical alcohol.

10. Questions and answers

Question	Possible causes	Possible solution
lights up	Low battery	▶ Change batteries.
IR measurement: - - - lights up.	Measurement values outside measuring range	▶ Keep to permissible measuring range.
Contact measurement: - - - lights.	Measurement values outside permissible range	▶ Keep to measuring range.
Instrument cannot be switched on	Batteries dead.	▶ Change batteries.
Instrument switches itself off.	Instrument switches off automatically after 10 min in contact measurement mode and after 1 min after switching on in IR measurement mode.	▶ Switch the instrument on again

If we have not been able to answer your question, please contact your local dealer or Testo Customer Service. For contact details, please visit www.testo.com/service-contact.

11. Information on infrared (IR) measurement

11.1 Measuring method

IR measurement is a visual measurement

- Keep lens clean.
- Do not carry out measurement with a foggy lens.
- Keep the measuring range (the range between the instrument and the measurement object) free of obstacles. There must be no particles of dust or dirt, no humidity (rain, steam) and no gases.

IR measurement is a surface measurement

If there is dirt, dust, frost, etc. on the surface, only the outermost layer is measured, i.e. the dirt.

- For vacuum-packed food, do not measure at air pockets. Where the values are critical, always measure separately with a contact thermometer. Particularly in the food sector: measure core temperature with a penetration/immersion thermometer.

Adjustment time

- If the ambient temperature changes (change of location, e.g. measurement indoors/outdoors), the instrument must be allowed to equalize for 15 minutes for infrared measurement.

11.2 Emissivity

Materials have different emission levels. This means they emit various amounts of electromagnetic radiation. The emission level of the instrument has a default setting of 0.95. This is ideal for the measurement of food, non-metals (paper, ceramic, gypsum, wood, paints and varnishes) and plastics.

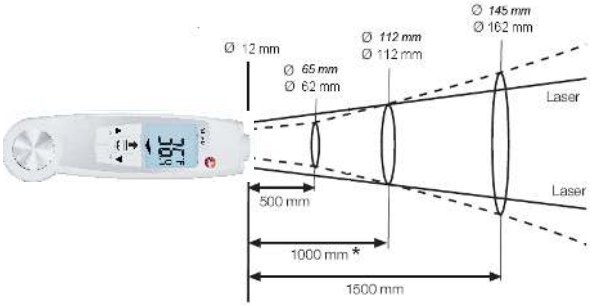
11.3 Measuring range, distance

Depending on the distance of the measuring instrument from the measurement object, a specific measuring range is recorded.

Measuring lens (ratio of distance : measuring range)

In italics = laser

Not in italics = measuring range



* Optimized measuring distance

12. Information on contact measurement

- Observe the minimum penetration depth for immersion/ penetration probes:
  10x probe diameter
- Avoid using in aggressive acids or alkalis.

13. Bluetooth® pairing

This chapter gives an overview of the public Bluetooth® Low Energy (BLE) interface of the testo 104-IR BT and shows how to test functionalities and read out values with a generic BLE scanner app. In addition, a list of available services and characteristics with information about the transferred data is included.

For testing the Bluetooth® GATT profile a Bluetooth® scanner app from the Google Play Store can be used, for example the BLE Scanner app from Bluepixel Technologies LLP Tools (https://play.google.com/store/apps/details?id=com.macdom.ble.blescanner). This app scans the services and characteristics from the BLE device.

13.1 Scan Devices and Connect

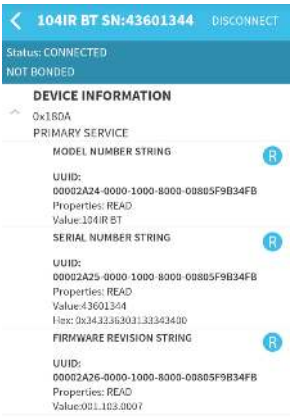
After starting the BLE scanner, all devices in range are detected. The testo 104-IR BT is labeled with the device name and the respective serial number. For connecting the device, the “connect” button must be pressed.

13.2 Services

After connecting, all services available are displayed. To get an overview of the characteristics and their properties and values, click on the service to expand the list.

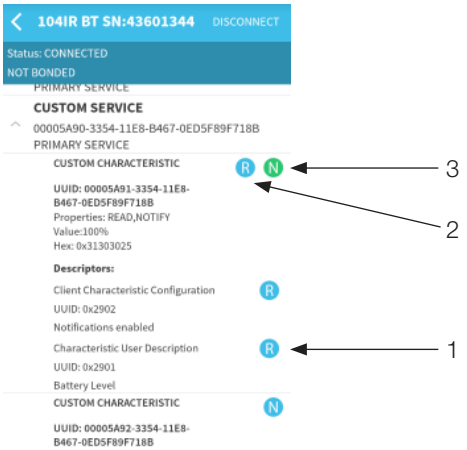
13.3 Read / Notify Characteristics

13.3.1 Device Information



To read the characteristic’s value, press the blue “R” button, to load the value.

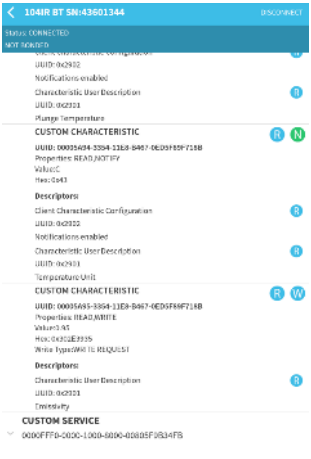
13.3.2 Custom Service

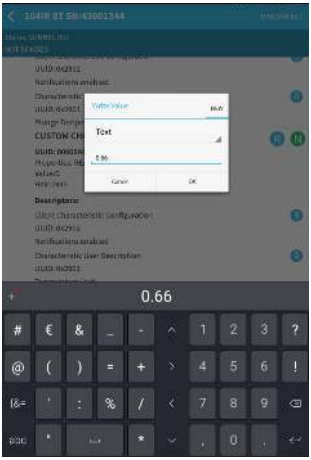


Each characteristic Descriptor (1) (UUID: 0x2901) provides a string to describe what kind of data will be transferred on this characteristic. With the read button (2) the characteristic value will be read out and shown. To activate the notification, click on the “N” button (3). If notifications are enabled the button shows up in green.

13.3.3 Write Emissivity

To write a new emissivity value, press the “W” button on the characteristic, after that a new window pops up. Clicking “OK” sends the value to the device. Emissivity is valid in a range of 0.1 – 1.0 with either one or two after point decimals.





13.4 BLE Interface Description

Service	Characteristic	Properties	Description	Range
Device Information (0x180A)				
	Model Number String (00002a24-0000-1000-8000-00805f9b34fb)	read	String (104IR BT)	
	Serial Number String (00002a25-0000-1000-8000-00805f9b34fb)	rear	String (xxxxxxxx)	
	Firmware Revision String (00002a26-0000-1000-8000-00805f9b34fb)	read	String (xxx.xxx.xxxx)	
Generic Access (0x1800)				
	Device Name (00002a00-0000-1000-8000-00805f9b34fb)	read	String (104IR BT SN:xxxxxxxx)	
Custom Service (00005a90-3354-11e8-b467-0ed5f89f718b)				
	Battery Level (00005a91-3354-11e8-b467-0ed5f89f718b)	read/ notify	String (Battery Level + Unit)	0% ~ 100%
	Surface Temperature (00005a92-3354-11e8-b467-0ed5f89f718b)	notify	String (Temperature + Unit)	-22° to 482 °F / -30 to +250 °C "Overrange", "Underrange", "Invalid"
	Plunge Temperature (00005a93-3354-11e8-b467-0ed5f89f718b)	notify	String (Temperature + Unit)	-58° to 482 °F / -50 to +250 °C "Overrange", "Underrange", "Invalid"
	Temperature Unit (00005a94-3354-11e8-b467-0ed5f89f718b)	read/ notify	Char (Temperature Unit)	°F", "C", "R"
	Emissivity (00005a95-3354-11e8-b467-0ed5f89f718b)	read/ write	String (Emissivity)	0.1 ~ 1.0

For each characteristic in the custom service (00005a90-3354-11e8-b467-0ed5f89f718b), there is a descriptor (UUID: 0x2901) which provides a string with information about the data in this characteristic.

14. Declaration of Conformity

CE Declaration No. 0005 / 2015

Wir messen es. testo

EG-Konformitätserklärung
EC declaration of conformity

Für die nachfolgend bezeichneten Produkte:
We confirm that the following products:

testo 104-IR BT Best. Nr.: / Order No.: 0560 1045

wird bestätigt, daß sie den wesentlichen Schutzanforderungen entsprechen und bei bestimmungsmäßiger Verwendung den grundlegenden Anforderungen folgender Richtlinie entsprechen:

corresponds with the main protection requirements and, if used according to their intended purpose, comply with the essential requirements of the directive:

Richtlinien / directives

☒ **R&TTE 199/5/EG** (bis/until 13.06.2016)

☒ **RED 2014/53/EU** (ab/from 14.06.2016)

Zur Beurteilung der Erzeugnisse wurden folgende Normen herangezogen:
For assessment of the product following standards have been called upon:

Normen / standards

☒ **EN 61326-1:2013**

☒ **EN 301 489-1 V1.9.2: 2011**

☒ **EN 301 489-17 V2.2.1: 2012**

☒ **EN 300 328 V1.8.1: 2012**

☒ **EN 62479:2010**

☒ **EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013**

Diese Erklärung wird für: / *This declaration is given in responsibility for:*

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abgegeben durch / *by:*

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(Name / name)

Head of Research & Development
(Stellung im Betrieb des Herstellers)
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Lenzkirch, 30.10.2015
(Ort, Datum / place, date)

ppa.
(Rechtsgültige Unterschrift)
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