

TP10

EN

OPERATING MANUAL
PYROMETER



 **TROTEC**

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Notes regarding the operating manual

Symbols


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


 **Warning of laser radiation**
This symbol indicates dangers to the health of persons due to laser radiation.

 **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 operating manual must be observed.

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




TP10



<https://hub.trotec.com/?id=40356>

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.
This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- 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.
 - Do not immerse the device in water. Do not allow liquids to penetrate into the device.
 - The device may only be used in dry surroundings and must not be used in the rain or at a relative humidity exceeding the operating conditions.
 - Protect the device from permanent direct sunlight.
 - Do not expose the device to strong vibrations.
 - Do not remove any safety signs, stickers or labels from the device. Keep all safety signs, stickers and labels in legible condition.
 - Do not open the device.
 - Avoid looking directly into the laser beam.
 - Never point the laser beam at people or animals.
 - Observe the storage and operating conditions as given in the Technical data chapter.

Intended use

This device is exclusively intended for measuring temperature by means of an infrared sensor in the measuring range specified in the technical data. People who use this device must have read and understood the operating manual, especially the Safety chapter.

To use the device for its intended use, only use accessories and spare parts which have been approved by Trotec.

Foreseeable misuse

The device must not be pointed at people. Do not use the device in potentially explosive atmospheres, for measurements in liquids or at live parts. Trotec accepts no liability for damages resulting from improper use. In such a case, any warranty claims will be voided. Any unauthorised modifications, alterations or structural changes to the device are forbidden.

Personnel qualifications

People who use this device must:

- be aware of the dangers that occur when working with laser measuring devices.
- have read and understood the operating manual, especially the Safety chapter.

Residual risks



Warning of laser radiation

Laser class 2, P max.: < 1 mW, λ: 400-700 nm, EN 60825-1:2014

Do not look directly into the laser beam or the opening from which it emerges.

Never point the laser beam at people, animals or reflective surfaces. Even brief eye contact can lead to eye damage.

Examining the laser output aperture by use of optical instruments (e.g. magnifying glass, magnifiers and the like) entails the risk of eye damage.

When working with a laser of class 2, observe the national regulations on wearing eye protection.



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

Keep a sufficient distance from heat sources.

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.

Information about the device

Device description

The pyrometer TP10 uses an infrared sensor to measure surface temperatures without contact. An integrated multi-laser pointer serves for the determination of the measuring spot.

You can set the emission ratio of the material to be measured so as to achieve a more precise measurement result.

For the temperature measurement the device allows you to set freely definable thresholds. Exceeding or falling below these preselected thresholds is indicated by an acoustic alarm function and visually by a changed display colour.

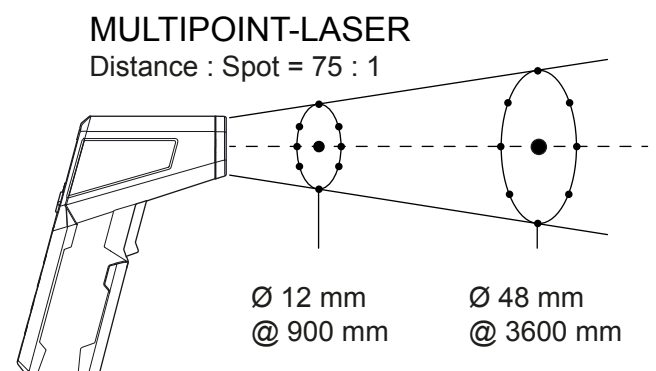
The display can be illuminated as needed. When not in use, an automatic switch-off saves the battery.

Measuring principle

The device measures the temperature by means of an infrared sensor. Important factors playing a role in the temperature measurement are the measuring spot diameter and the degree of emission.

Measuring spot

Observe the ratio of the distance (D) to the measuring spot diameter (S). The larger the distance to the object, the larger the measuring spot diameter and hence, the less precise the measured result. The device calculates an average temperature from all the temperatures in the measuring spot.



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

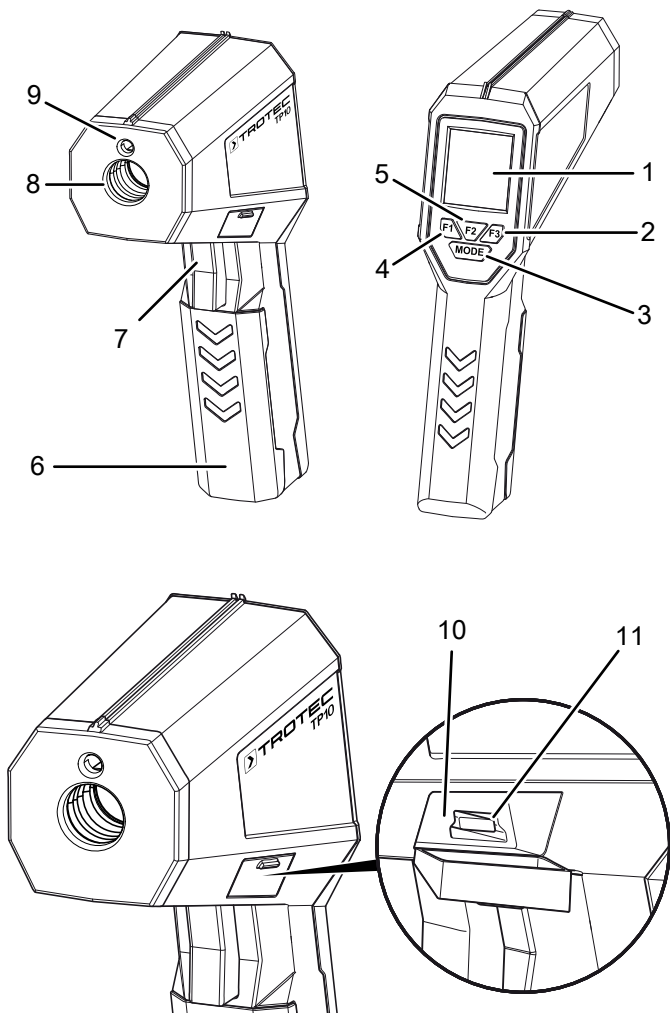
The table below may be used as reference for setting the degree of emission. It supplies reference values for the emissivity of common materials.

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

Material	Degree of emission
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
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

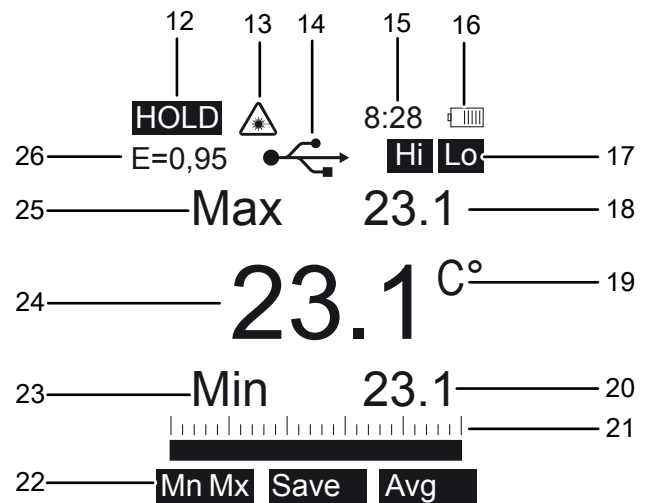
Material	Degree of emission
Cement	0.90 to 0.96
Brick (rough)	0.90 to 0.95
Zinc, oxidized	0.1

Device depiction



No.	Designation
1	Display
2	F3 button
3	Mode button
4	F1 button
5	F2 button
6	Battery compartment with cover
7	Measurement button
8	Infrared sensor
9	Laser pointer
10	Miniature contact pin connection
11	USB port

Display



No.	Designation
12	SCAN/HOLD indication
13	Laser indication
14	USB indication
15	Time
16	Battery status
17	Saving/Hi/Lo indication
18	Measurement value display top
19	Temperature indication
20	Measurement value display bottom
21	Scale
22	Menu
23	Min/Dif indication
24	Measurement value display
25	Max/Avg indication
26	Indication of the emission value

Technical data

Parameter	Value	
Model	TP10	
Weight	300 g	
Dimensions (length x width x height)	168 mm x 56 mm x 225 mm	
Measuring range	-50 °C to 1850 °C (-58 °F to 2912 °F)	
Resolution	≤ 1000 °C > 1000 °C	0.1 °C / °F 1 °C / °F
Target display	Laser class II, 630 to 670 nm < 1 mW	
Accuracy	-50 °C to 20 °C (-58 °F to 68 °F) 21 °C to 500 °C (69 °F to 932 °F) 501 °C to 1000 °C (933 °F to 1832 °F) 1001 °C to 1850 °C (1833 °F to 3362 °F)	± 3.0 °C (± 5.4 °F) ± 1 % ± 1 °C (1.8 °F) ± 1.5 % ± 2.0 %
Repeatability	-50 °C to 20 °C (-58 °F to 68 °F) 21 °C to 1000 °C (69 °F to 1832 °F) 1001 °C to 1850 °C (1833 °F to 3362 °F)	± 1.5 °C (2.7 °F) ± 0.5 %, ± 0.5 °C (0.9 °F) ± 1 %
Degree of emission	Adjustable from 0.10 to 1.0	
Optical resolution	75:1 (D:S)	
Smallest measuring spot	ø 18 mm	
Spectral sensitivity	8~14 µm	
Response time	< 150 ms	
Operating temperature	0 °C to 50 °C (32 °F to 122 °F), 10 % to 90 % RH	
Storage conditions	-10 °C to 60 °C, < 80 % RH	
Power supply	9 V battery	
Switch-off	After approx. 7 seconds of non-use	
Type K contact sensor		
Temperature range	-50 °C to 300 °C (-58 °F to 572 °F)	
Resolution	0.1 °C / °F	
Accuracy	± 1.5 %, ± 3 °C (5 °F)	
Repeatability	± 1.5 %	
Operating conditions	0 °C to 50 °C (32 °F to 122 °F), 10 to 90 % RH	
Storage conditions	-10 °C to 60 °C (-2 °F to 140 °F), < 80 % RH	

Note:

Apart from the contact sensor included in the scope of delivery, other type K temperature probes with miniature contact pin can also be connected to the device. The pyrometer can process and display the measurement data of the external sensor in a measuring range from -50 °C to 1,370 °C.

Scope of delivery

- 1 x Pyrometer TP10
- 1 x 9 V battery
- 1 x Device bag
- 1 x CD with software
- 1 x Type K contact sensor
- 1 x USB cable
- 1 x Mini tripod
- 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.

Storage

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

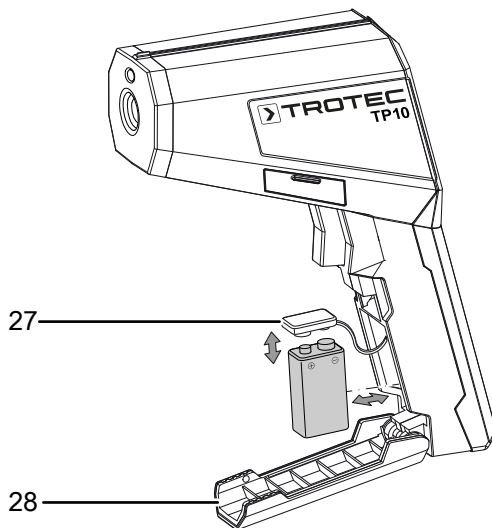
- Dry and protected from frost and heat
- Protected from dust and direct sunlight
- For storing the device, use the transport case included in the scope of delivery in order to protect the device from external influences.
- The storage temperature is the same as the range given in the Technical data chapter.
- Remove the batteries from the device.

Operation

Inserting the battery

Note

Make sure that the surface of the device is dry and the device is switched off.



1. Open the battery compartment by folding open the cover (28) with your fingers.
2. Use the battery clip (27) to connect the new battery (1 x 9 V) with correct polarity.
3. Insert the battery in the battery compartment.
4. Close the cover of the battery compartment (28).

Carrying out a measurement

- Ensure that the surface to be measured is free of dust, dirt or similar substances.
- To be able to gain exact measurement results on surfaces which reflect heavily, stick matt masking tape to the surface or apply matt black paint with a very high and known degree of emission.
- Note the 75:1 ratio of the distance to the measuring spot diameter. For accurate measurements the measuring object should be at least twice as large as the measuring spot.

Please proceed as follows to carry out a measurement:

1. Point the device at the object to be measured.
2. Press the measurement button (7). Hold onto the Measurement button (7) if you want to perform a prolonged measurement.
 - ⇒ The device turns on and carries out a measurement.
 - ⇒ The *SCAN* symbol (12) appears in the display. The currently measured value is indicated.

3. Let go of the Measurement button (7) again.
 - ⇒ The device stops measuring. The *HOLD* symbol (12) appears in the display.
 - ⇒ Depending on the setting of the device, either the Max/Min value or the Avg/Dif value of the last measurement will be displayed.

Settings

The bottom line of the display contains a three-part menu. Within this menu different settings can be selected. You can switch through the different menus using the Mode button (3).

Menu example:

<i>MxMn</i>	<i>Save</i>	<i>Avg</i>
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The menu is controlled as follows:

- The F1 button (4) selects the function on the left, *MxMn* in our example.
- The F2 button (5) selects the function in the centre, *Save* in our example.
- The F3 button (2) selects the function on the right, *Avg* in our example.

Setting the Max/Min function

1. Repeatedly press the Mode button (3) until the *MxMn Save Avg* menu is displayed:
 - ⇒ The *MxMn Save Avg* menu is shown on the display.
2. Press the F1 button (4) to select *MxMn*.
 - ⇒ The maximum value is displayed in the upper measurement value display (18).
 - ⇒ The minimum value is displayed in the lower measurement value display (20).
 - ⇒ The discrepancy between the current measured value and the minimum value is indicated as deflection on the scale (21).

Setting the Avg/Dif function

Please bear in mind, that the average value is continually determined anew during a measurement, which means that there can be deviations of the displayed *Dif* value in the in the hundredth °C range.

1. Repeatedly press the Mode button (3) until the *MxMn Save Avg* menu is displayed.
2. Press the F3 button (2) to select *Avg*.
 - ⇒ The average value is displayed in the upper measurement value display (18).
 - ⇒ The difference between the current measured value to the average value is displayed in the lower measurement value display (20).
 - ⇒ The difference between the current measured value to the average value is indicated on the scale (21).

Using the Save function

1. Repeatedly press the Mode button (3) until the *MxMn Save Avg* menu is displayed.
2. Press the F2 button (5) to select *Save*.
 - ⇒ The *Yes* and *Esc* menus are shown on the display.
3. Press the F1 button (*Yes*) to save the measured value.
 - ⇒ It takes a short moment until the measured value will be saved. The *Saving* indication (17) lights up on the display. After that the display (1) shows the last measured value again.
4. Or you press the F3 button (2) (*Esc*) to cancel the operation.
 - ⇒ The last measurement will be displayed.

Using the Memory function

Using the Memory function you can call up values previously saved with the Save function. The device comes with 30 internal storage locations.

1. Repeatedly press the Mode button (3) until the *Unit Mem E* menu is displayed.
2. Press the F2 button (5).
 - ⇒ The last saved value appears on the display.
 - ⇒ The ▼ *Set* ▲ menu will be displayed.
3. Either press F3 or F1 to view the saved values.
4. Press the F2 button (5) to select *Del*.
 - ⇒ You will now see the *Yes All Esc* menu.
5. If you want to delete a measured value (*Yes*), press the F1 button (4).
 - ⇒ The currently displayed measured value will be deleted.
6. If you want to delete all measured values (*All*), press the F2 button (5).
 - ⇒ All saved measured values will be deleted.
7. If you want to cancel the operation (*Esc*), press the F3 button (2).
 - ⇒ The ▼ *Del* ▲ menu is shown on the display.
8. Press the Mode button (3) to return into measuring mode.

Setting the temperature unit

1. Repeatedly press the Mode button (3) until the *Unit Mem E* menu is displayed.
2. Press the F1 button (4).
 - ⇒ The *Unit °C °F* menu is shown on the display.
3. Press the F2 button (5) for °C or the F3 button (2) for °F.

Setting the degree of emission

1. Repeatedly press the Mode button (3) until the *Unit Mem E* menu is displayed:
2. Press the F3 button.
 - ⇒ The last saved value for the degree of emission appears on the display.
 - ⇒ The ▼ *Tab* ▲ menu will be displayed.
3. Either press F3 or F1 to change the degree of emission.
 - ⇒ The value range is between 0.10 and 1.00.
 - ⇒ The selected setting will be saved automatically.

4. Press the F2 button to select a specific degree of emission.
 - ⇒ The ▼ *Tab* ▲ menu will be displayed.
 - ⇒ A list with different degrees of emission will be displayed:

Default	0.95
0x Aluminium	0.30
0x Brass	0.50
0x Copper	0.60
Paint	0.93

5. Either press F3 or F1 to select a specific degree of emission.
6. Confirm the selection by pressing F2.
 - ⇒ The new degree of emission is set.
7. Press the Mode button (3) to leave the menu.



Info

A set specific degree of emission will not be stored in the device, after it has been switched off. When being switched on again, the device will always return to the degree of emission previously set by hand.

De-/activating continuous measurements

Once the function is activated, the measurement will continue until the function is terminated again. Within this time frame settings can only be made in the following menu:

🔒	<i>Lit</i>	<i>Laser</i>
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1. Repeatedly press the Mode button (3) until the 🔒 *Lit Laser* menu is displayed.
2. Press the F1 button (4).
 - ⇒ Continuous measurement is activated.
 - ⇒ The 🔒 *On* ▲ menu will be displayed.
3. Press the F1 button (4).
 - ⇒ Continuous measurement is deactivated.
 - ⇒ The 🔒 *Lit Laser* menu is displayed.

Adjusting the display illumination

Ex works the display illumination is switched off. There are two ways to adjust the display illumination.

Option 1: Via the menu. To do so, please proceed as follows:

1. Repeatedly press the Mode button (3) until the 🔒 *Lit Laser* menu is displayed.
2. Repeatedly press the F2 button (5) until the display is illuminated as desired.

Option 2: Via the additional settings. To do so, please proceed as follows:

1. Repeatedly press the Mode button (3) until the *Hi Set Lo* menu is displayed.
2. Press the F2 button (5).
 - ⇒ The ▼ *Set* ▲ menu will be displayed.
3. Either press F3 or F1 to select the *Backlight* option.
4. Confirm the selection by pressing the F2 button (5).

5. Press the Mode button (3) to return to the measurement value display.



Info

The device memorizes the selected setting when switching off.

Switching the laser pointer on or off

Ex works the laser pointer is switched off.



Info

Please observe that with a switched-on laser the laser pointer will go on as soon as you press the Measurement button (7) or activate continuous measurement.




Warning of laser radiation

Class 2 laser radiation.

Lasers of class 2 only radiate in the visible range and during continuous wave operation (lasting beam) no more than 1 milliwatt (mW) of output will be emitted. Looking directly into the laser beam for a longer period of time (more than 0.25 seconds) can cause damage to the retina.

Avoid looking directly into the laser beam. Never look into the laser beam using optical aides. Do not suppress the winking reflex when looking into the laser beam unintentionally. Never point the laser beam at people or animals.

1. Repeatedly press the Mode button (3) until the  *Lit Laser* menu is displayed.
2. Press the F3 button (2).
 - ⇒ The Laser indication (13) appears on the display.
 - ⇒ The laser pointer is active and will switch on when starting with the next measurement.
3. Press the F3 button (2) again.
 - ⇒ The Laser indication (13) disappears.
 - ⇒ The laser pointer is switched off.



Info



The device memorizes the selected setting when switching off.

Setting the alarm



The device is equipped with an alarm function for which an upper and a lower alarm threshold can be specified. When exceeding or falling below these values, an acoustic signal will be emitted. Additionally, the display lights up in one of the following colours:

Display colour	Meaning
Flashes red	Surface temperature exceeds activated upper threshold. The display flashes red and a constant alarm tone is emitted. Also works when the display illumination is deactivated.
Flashes blue	Surface temperature below activated lower threshold. The display flashes blue and a constant alarm tone is emitted. Also works when the display illumination is deactivated.
Continuously illuminated in green	Surface temperature is in normal range. The display will only be illuminated in green if the display illumination is activated.

Setting the lower alarm threshold:

1. Repeatedly press the Mode button (3) until the *Hi Set Lo* menu is displayed:
2. Press the F3 button (2) to set the lower alarm threshold.
 - ⇒ The  *On*  menu will be displayed.
 - ⇒ The current value for the lower alarm threshold appears on the display.
3. Press the F2 button (5) to enable (*On*) or disable (*Off*) the lower alarm threshold.
 - ⇒ With enabled lower alarm threshold the indication *Lo* (17) will be displayed.
4. Either press F3 or F1 to set the value.
 - ⇒ For larger temperature changes hold onto these buttons, as needed.
5. Press the Mode button (3) to return to the measurement value display.
 - ⇒ The setting for the lower alarm threshold is saved.

Setting the upper alarm threshold:

1. Repeatedly press the Mode button (3) until the *Hi Set Lo* menu is displayed.
2. Press the F1 button (4) to set the upper alarm threshold.
 - ⇒ The  *On*  menu will be displayed.
 - ⇒ The current value for the upper alarm threshold appears on the display.

3. Press the F2 button (5) to enable (*On*) or disable (*Off*) the upper alarm threshold.
 - ⇒ With enabled upper alarm threshold the indication *Hi* (17) will be displayed.
4. Either press F3 or F1 to set the value.
 - ⇒ For larger temperature changes hold onto these buttons, as needed.
5. Press the Mode button (3) to return to the measurement value display.
 - ⇒ The setting for the upper alarm threshold is saved.



Info

The device memorizes the selected setting when switching off.

Further setting options

In the submenu *Set* you can make further settings for the device.

1. Repeatedly press the Mode button (3) until the *Hi Set Lo* menu is displayed.
2. Press the F2 button (5).
 - ⇒ The ▼ *Set* ▲ menu will be displayed.
 - ⇒ The following list of setting options will be displayed:

Option	Setting options
Time	Setting the time
Date	Setting the date
Backlight	Adjusting the display illumination
Buzzer	Setting the touch tone and alarm sound
Contrast	Setting the display contrast
APO Time	Setting the automatic switch-off
Send Data	De-/activating the USB function

3. Select the desired setting option by use of F3 or F1.
4. Confirm the selection by pressing F2.
5. Select the desired setting by use of F3 or F1.
6. Press the Mode button (3) to confirm your selection.
 - ⇒ The desired settings are saved.

USB port

Via the USB port (11) you can connect the device to a PC. While connected, the device will be supplied with power via the PC. Consequently, the device can be operated without battery for the duration of the connection.

1. Open the lateral sealing cap of the device.
2. Attach the USB cable to the USB port (11) of the device.
3. Connect the USB cable to a PC.
 - ⇒ Wait for a few seconds until the connection is established.

De-/activating the USB function



Info

Activating the USB function is not required, if you only want to use the USB port for the sake of ensuring the power supply for the measuring device. The USB function is only required for the software-supported recording of measurement series in real time.

1. Repeatedly press the Mode button (3) until the *Hi Set Lo* menu is displayed.
2. Press the F2 button (5).
 - ⇒ The ▼ *Set* ▲ menu will be displayed.
3. Select *Send Data* and press the F2 button.
 - ⇒ You can now choose between *Real Time* and *Memory*.
4. Select *Real Time*, if you want to activate the USB function.
5. Press the F2 button (5) to switch between *On* (enable) and *Off* (disable).
6. Press the Mode button (3) to confirm your selection.
 - ⇒ Depending on your selection the USB function is now de-/activated.
7. If you want to transfer the measured values saved in the device to the PC, select *Memory* and confirm with *OK*.
 - ⇒ USB mode will then be activated for the transmission period and afterwards return to inactive state.

Using the software for recording measurement series

- Make sure the device is connected to a PC via USB cable.
- Make sure that the software for recording measurement series required for USB operation is installed on the PC.
- Make sure that the USB function is activated.

During the entire measuring procedure, both the temperature values of the infrared sensor and those of the external type K sensor (if connected) will be transmitted to the software and recorded.



Info

The supplied software is a complimentary bonus that does not belong to the standard scope of delivery and is offered for use without support or warranty. The program interface (only available in the English language) is generally easily comprehensible and can be used intuitively. Further information regarding the use is provided in the application.

Using external sensors (contact sensor type K)

In addition to the non-contact temperature measurement, the measuring device can be used for contact measurements using an external type K contact sensor.

1. Open the lateral sealing cap of the device.
2. Connect the contact sensor to the miniature contact pin connection (10) of the device.
 - ⇒ It takes a few seconds until the sensor is detected.
 - ⇒ During the measurement the contact sensor's measured value is indicated in the lower measurement value display (20).

Maintenance and repair

Battery change

The battery is to be changed when the battery indication (16) flashes in the display or the device can no longer be switched on. See chapter Operation.

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.

For repairs or device testing, contact the manufacturer.

Disposal



The icon with the crossed-out waste bin on waste electrical or electronic equipment stipulates that this equipment 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. For further return options provided by us please refer to our website <https://de.trotec.com/shop/>.

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.

You are responsible for deleting any personal data stored on the waste equipment to be disposed of.



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.

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