User Manual

PCE-893 Infrared Thermometer

User manuals in various languages (français, italiano, español, português, nederlands, türk, polski, русский, 中文) can be found by using our

product search on: www.pce-instruments.com

Last change: 25 October 2019
v1.0

Contents

1   Safety notes

Please read this manual carefully and completely before you use the device for the first time. The device may only be used by qualified personnel and repaired by PCE Instruments personnel. Damage or injuries caused by non-observance of the manual are excluded from our liability and not covered by our warranty.

- The device must only be used as described in this instruction manual. If used otherwise, this can cause dangerous situations for the user and damage to the meter.
- The instrument may only be used if the environmental conditions (temperature, relative humidity, …) are within the ranges stated in the technical specifications. Do not expose the device to extreme temperatures, direct sunlight, extreme humidity or moisture.
- Do not expose the device to shocks or strong vibrations.
- The case should only be opened by qualified PCE Instruments personnel.
- Never use the instrument when your hands are wet.
- You must not make any technical changes to the device.
- The appliance should only be cleaned with a damp cloth. Use only pH-neutral cleaner, no abrasives or solvents.
- Be particularly careful when the laser beam is activated.
- Avoid eye contact with the laser beam.
- Also avoid eye contact with the laser beam through reflecting surfaces.
- The device must only be used with accessories from PCE Instruments or equivalent.
- Before each use, inspect the case for visible damage. If any damage is visible, do not use the device.
- Do not use the instrument in explosive atmospheres.
- It is not recommended to measure glossy or polished metallic surfaces (stainless steel, aluminium etc.) with this meter, see information about emissivities.
- The thermometer cannot measure through transparent surfaces such as glass. It would measure the surface temperature of the glass instead.
- Vapor, dust, smoke etc. can impair the optics of the meter and thus have a negative impact on the measuring accuracy.
- The measurement range as stated in the specifications must not be exceeded under any circumstances.
- Non-observance of the safety notes can cause damage to the device and injuries to the user.

We do not assume liability for printing errors or any other mistakes in this manual.

We expressly point to our general guarantee terms which can be found in our general terms of business.

If you have any questions please contact PCE Instruments. The contact details can be found at the end of this manual.

2   Technical specifications

| Infrared measurement	
Infrared measurement	-50 ... 1200 °C / -58 ... 2192 °F
Resolution	0.1 at display <1000
	1 at display >1000
Accuracy	±3 °C / 5.4 °F (-50 ... 20 °C / -58 ... 68 °F)
	±1 % ±1 °C / ±1.8°F (20 ... 500 °C / 68 ... 932°F)
	±1.5 % (500 ... 1000 °C / 932 ... 1832 °F)
	±2 % (1000 ... 1600 °C / 1832 ... 2912 °F)
The accuracies apply at an ambient temperature of 23 ... 25 °C (73 ... 77 °F)	
Repeatability	±1.5 °C / 2.7 °F (-50 ... 20 °C / -58 ... 68 °F)
	±0.5 % or ±0.5 °C / 0.9 °F
	(20 ... 1000 °C / 68 ... 1832 °F)
	±1.0 % (1000 ... 1600 °C / 1832 ... 2912 °F)
Thermoelement	
Measuring range	-50 ... 1370 °C / -58 ... 2498 °F
Resolution	0.1 at display <1000
	1 at display >1000
Accuracy	±2.5 °C / ±3.6°F (-50 ... 0 °C / -58 ... 32°F)
	±0.5 % ±1.5 °C / 3 °F
	(0 ... 1370 °C / 32 ... 2498 °F)
Measurement spot ratio	50:1
Response time	150 ms
Spectral range	8 ... 14 µm
Emissivity	Adjustable 0.10 ... 1.0
Display overrange	The display will show "----"
Display laser diode	LCD with backlight
Output	<1 mW
Wavelength	630 ... 670 nm
Classification	Class 2
Power supply	9 V block battery
Operating conditions	0 ... +50 °C / 32 ... 122 °F
Storage conditions	-10 ... +60 °C / 14 ... 140 °F
Weight	ca. 282 g without battery
Dimensions	200 x 55 x 150 mm / 7.8 x 2.1 x 5.9"

3 Device description

3.1 Features

- non-contact temperature measurement
- dual laser shows diameter of measuring spot
- adjustable emissivity
- backlit LCD
- transfer of readings to a PC
- infrared optics with distance-to-spot ratio 50:1
- temperature measurement up to 1,200 °C
- K-type thermocouple can be connected

3.2 Possible applications

- food monitoring
- hygiene examinations
- road construction
- control cabinet monitoring
- HVAC
- manufacturing monitoring
- temperature measurement of engines, electronic components, fuse boxes

## 3.3 Measuring distance and distance-to-spot ratio

If you increase the distance to the target, the size of the spot will increase. The two laser points which appear during the measurement mark the diameter of the measuring spot. The complete area within the circular measuring spot will be included in the measurement.
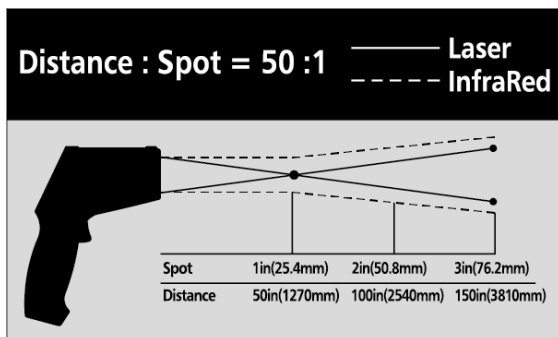
NOTE

Make sure the target is larger than the measuring spot. The smaller the target, the closer the meter must be to make a measurement. If a high accuracy is required, make sure the target is twice as large as the measuring spot.

3.4   Parts of the device
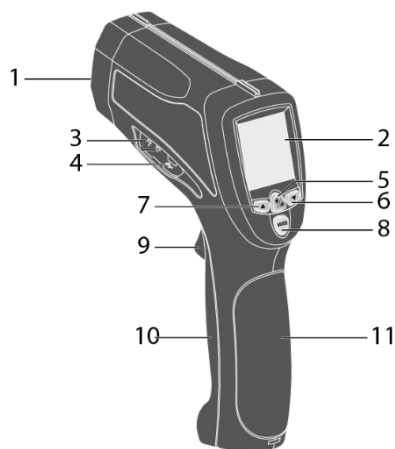
1 Infrared sensor

2 LCD

3 External K-type thermocouple connection

4 USB connection

5 F2 key

6 F3 key

7 F1 key

8 MODE key

9 Trigger button

10 Handle

11 Battery compartment cover

3.5   Display

Icon	Description
SCAN	Ongoing infrared measurement
HOLD	Last reading displayed
■ ||||	Battery level indicator
🔒	Continuous measurement activated
⚠	Laser active during measurement
Hi	High limit value
Lo	Low limit value
E (ε) = 0.95	Emissivity
D	Data recording
📶	Wireless
TK 20.9	Temperature K-type thermocouple
Max 25.3	Max. temperature last measurement
23.5 °C	Temperature last measured

4 Delivery contents

1 x Thermometer PCE-893

1 x K-type thermocouple

1 x Mini Tripod

1 x USB cable

1 x 9 V battery

1 x User manual

Note:
The software can be downloaded here:
https://www.pce-instruments.com/english/download-win_4.htm

5 Measurement

Infrared thermometers measure the surface temperature of an object. The object emits infrared radiation which is collected by the optics of the thermometer and focused onto the sensor where the radiation is converted to a signal that will be transmitted to the electronics. The electronics processes the signal so that the reading can be displayed in degrees Centigrade or Fahrenheit. The laser points mark the diameter of the circular area that will be included in the measurement. The temperature can also be measured by using the included K-type thermocouple. This allows measurements in areas where the infrared sensor could not be used.

1. Hold the meter by its handle and target the surface you wish to measure.
2. Apply and hold the trigger button to make a measurement. The SCAN icon will be displayed. If the display does not light up, replace the battery.
3. Release the trigger button to stop the measurement. The HOLD icon will appear and various functions and settings are available via the keys MODE, F1, F2 and F3.
4. The thermometer powers off automatically (standard 7 s, max. 60 s).

NOTES
- Not recommended for glossy or polished materials (stainless steel, aluminium).
- The material-specific emissivity can be set in the meter, see chapters 6.1.6 and 7.
- The meter cannot measure through transparent surfaces such as glass or plastic. It would measure the surface temperature of the transparent surface instead.
- Vapor, dust, smoke etc. can impair the optics of the meter.
- To find a spot of critical temperature (hot spot), slowly change the targeted area during the measurement and watch the display.
- Allow some time for the meter to adapt to the ambient temperature, especially when there is a considerable difference between the measuring and ambient temperatures.

6 Menu overview

Lots of settings can be made via the menu of the infrared thermometer. With the MODE key, you can go to the next level in the menu.

6.1 Main menu

Level	F1 key	F2 key	F3 key
1	**MnMx** Min/Max temperature display	**Save** Saving the reading	**Avg** Average temperature and temperature difference display
2	**Unit** Selection °C/°F	**Mem** Viewing/deleting readings	**ε** Setting the emissivity
3	Continuous measurement	**Lit** Setting the display brightness	**Laser** Laser on/off
4	**HI** Activation of high limit alarm	**SET** Confirming a selection	**Lo** Activation of low limit alarm

The listed functions are accessible directly after the measurement.

6.1.1 MNMX (Minimum/Maximum)

The thermometer can determine the maximum and minimum values during every measurement.
1. Press the MODE key until "MnMx" is displayed above the F1 key.
2. Press the F1 key.

The maximum and minimum values will now be displayed.

6.1.2 SAVE (Saving)

The meter can save 30 readings:
1. Press the MODE key until "SAVE" is displayed above the F2 key.
2. Press the F2 key.
3. Press   F1 "YES" to save the reading
         or   F3 "ESC" to cancel

The measurement will be assigned a memory space where the temperature, emissivity, date and time of the measurement will be saved.

6.1.3 Avg (Average)

During each measurement, the thermometer calculates the average value and the difference between the minimum and the maximum values of the current measurement.
1. Press the MODE key until "AVG" is displayed above the F3 key.
2. Press the F3 key.

When "Avg" is displayed, the average temperature will be visible and when "Diff" is displayed, the temperature difference will be visible.

6.1.4 Unit (Temperature unit)

You can select either degrees Centigrade of degrees as the unit for your temperature measurement.
1. Press the MODE key until "UNIT" is displayed above the F1 key.
2. Press the F1 key.
3. Select "°C" for degrees Centigrade with the F2 key or "°F" for degrees Fahrenheit with the F3 key.

6.1.5 MEM (Memory) – viewing the saved readings

The thermometer saves the measured data including the time, date, emissivity and record no.
To view the readings:
1. Press the MODE key until "MEM" is displayed above the F2 key.
2. Press the F2 key.
3. Use the F1 or F3 key to select a value from all the saved readings.

6.1.6 Emissivity

The pre-set standard value is 0.95. The standard value can be changed as follows:
1. Press the MODE key until "ε" is displayed above the F3 key.
2. Press the F3 key
3. To select a material from ths list, press F2 "Tab", make a selection from the list with F1 and confirm with F2 "OK".
4. To change the emissivity for other materials, increase the value with F1 or decrease it with F3 (the values for some materials can be found in chapter 7).

6.1.7 Continuous measurement

To make a continuous measurement:
1. Press the MODE key until "▇" is displayed above the F1 key.
2. Press the F1 key. The ▇ icon will be displayed.
3. To stop the continuous measurement, press the F1 key again.

6.1.8 Backlight

The backlight of the display has 8 brightness levels.
Press the MODE key until "Lit" is displayed above the F2 key. Then repeatedly press the F2 key until the desired brightness is selected.

6.1.9 Laser

The thermometer is equipped with two lasers that mark the target point. The lasers are only active during the measurement but can be disabled completely.
1. Press the MODE key until "Laser" is displayed above the F3 key.
2. Press the F3 key to enable or disable the laser. The laser icon will then appear or disappear from the display.

6.1.10 Hi (Alarm for upper temperature limit)

When the upper temperature limit is exceeded, a continuous beeping sound can be heard.
1. Press the MODE key until "Hi" is displayed above the F1 key.
2. Press the F1 key.
3. Press F1 to decrease the alarm limit, F2 to enable or disable or press F3 to increase the alarm level.

6.1.11 Lo (Alarm for lower temperature limit)

When the lower temperature limit is fallen below, a continuous beeping sound can be heard.

1. Press the MODE key until "Lo" is displayed above the F3 key.
2. Press the F3 key.
3. Press F1 to decrease the alarm limit, F2 to enable or disable or press F3 to increase the alarm level.

6.2 SET menu

SET	Time	Time setting	
	Date	Date setting	
	Backlight	Display brightness setting	
	Buzzer	Button	Key tones ON/OFF
		Alarm	Alarm tones ON/OFF
	Contrast	Display contrast setting	
	APO time	Auto power off time setting	
	Send data	Memory	Sending readings to USB
		Real time	Sending real-time values to USB

To access the listed functions, make a measurement first and go to the SET menu.

1. Target the object and apply the trigger button to make a measurement.
2. Release the trigger button to stop the measurement.
3. Press the MODE key until "SET" is displayed above the F2 key.
4. Confirm with the F2 key.

6.2.1 Time

To set the time:

- Select "Time" from the list by pressing F1 or F3.
- Confirm with F2 – "SET".
- Change the hours with F1 or F3.
- Press F2 – "Next" to get to the minutes.
- Change the minutes with F1 or F3.
- Confirm with "OK".

6.2.2 Date

To set the date:

- Select "Date" from the list by pressing F1 or F3.
- Confirm with F2 – "SET".
- Change the year with F1 or F3.
- Press F2 – "Next" to get to the month.
- Change the month with F1 or F3.
- Press F2 – "Next" to get to the day.
- Change the day with F1 or F3.
- Confirm with "OK".

6.2.3 Backlight

In normal operation mode, the backlight will be on. It can be disabled via the menu to save battery power.

- Select "Backlight" from the list by pressing F1 or F3.
- Confirm with F2.
- Change the brightness with F1 or F3.
- Confirm with F2 – "OK".

6.2.4 Buzzer

The pre-activated key tones and beeping sounds for the limit alarms can be disabled.

- Select "buzzer" from the list by pressing F1 or F3.
- Press the F2 key to confirm.
- Select "button" or "alarm" with F1 or F3.
- Use F2 to change between "ON" and "OFF".

6.2.5 Contrast

The contrast can be adapted to different environments of application.

- Select "contrast" from the list by pressing F1 or F3.
- Press the F2 key to confirm.
- Change the brightness with F1 or F3.
- Confirm with F2 – "OK".

6.2.6 APO time (Automatic power off)

The time after which the meter powers off automatically can be set to a value between 7 and 60 seconds.

- Select "APO time" from the list by pressing F1 or F3.
- Press the F2 key to confirm.
- Change the time with F1 or F3.
- Confirm with F2 – "OK".

6.2.7 Send data

The thermometer can directly transfer real-time data and saved data to a PC by using the free software and the USB cable.

Real-time data (real time)
- Select "send data" from the list by pressing F1 or F3.
- Press the F2 key to confirm.
- Select "real time" with F1 or F3.
- W Use F2 to change between "ON" and "OFF".

Saved data (memory)
- Select "send data" from the list by pressing F1 or F3.
- Press the F2 key to confirm.
- Select "memory" with F1 or F3.
- Confirm with F2 – "OK".

7 Emissivity values

The emissivity describes the energy emission behaviour of materials. Most (90 % of the typical applications) organic materials and painted or oxidised surfaces have an emissivity of 0.95 which is the standard setting in the meter.

When you measure glossy or polished surfaces, the accuracy will deteriorate. If possible, cover the surface to be measured with temperature-resistant black adhesive tape or a thin layer of black paint. Allow some time for the tape or paint layer to take on the same temperature as the material below it. Now measure the temperature.

Material	Heat emissivity	Material	Heat emissivity
Asphalt	0.90 … 0.98	Cloth (black)	0.98
Concrete	0.94	Human skin	0.98
Cement	0.96	Leather	0.75 … 0.80
Sand	0.90	Charcoal (powder)	0.96
Earth	0.92 … 0.96	Lacquer	0.80 … 0.95
Water	0.92 … 0.96	Lacquer (matte)	0.97
Ice	0.96 … 0.98	Rubber (black)	0.94
Snow	0.83	Plastics	0.85 … 0.95
Glass	0.90 … 0.95	Wood	0.90
Ceramics	0.90 … 0.94	Paper	0.70 … 0.94
Marble	0.94	Chromium oxide	0.81
Plaster	0.80 … 0.90	Copper oxide	0.78
Mortar	0.89 … 0.91	Iron oxide	0.78 … 0.82
Brick	0.93 … 0.96	Textiles	0.90

Note:
This chart is only for guidance.

8 Battery replacement

If the display does not light up when the trigger button is applied or if the icon on the display shows that the battery voltage is low, replace the battery. Press the small yellow key above the trigger button to unlock the battery compartment cover. Then remove the cover. Replace the battery and close the battery compartment cover.

9   Contact

If you have any questions, suggestions or technical problems, please do not hesitate to contact us. You will find the relevant contact information at the end of this user manual.

10   Disposal

For the disposal of batteries in the EU, the 2006/66/EC directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose.

In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law.

For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations.

If you have any questions, please contact PCE Instruments.

PCE Instruments contact information

Germany

PCE Deutschland GmbH
Im Langel 4
D-59872 Meschede
Deutschland
Tel.: +49 (0) 2903 976 99 0
Fax: +49 (0) 2903 976 99 29
info@pce-instruments.com
www.pce-instruments.com/deutsch

Germany

PCE Produktions- und
Entwicklungsgesellschaft mbH
Im Langel 26
D-59872 Meschede
Deutschland
Tel.: +49 (0) 2903 976 99 471
Fax: +49 (0) 2903 976 99 9971
info@pce-instruments.com
www.pce-instruments.com/deutsch

The Netherlands

PCE Brookhuis B.V.
Institutenweg 15
7521 PH Enschede
Nederland
Telefoon: +31 (0)53 737 01 92
info@pcebenelux.nl
www.pce-instruments.com/dutch

United States of America

PCE Americas Inc.
711 Commerce Way suite 8
Jupiter / Palm Beach
33458 FL
USA
Tel: +1 (561) 320-9162
Fax: +1 (561) 320-9176
info@pce-americas.com
www.pce-instruments.com/us

France

PCE Instruments France EURL
23, rue de Strasbourg
67250 Soultz-Sous-Forets
France
Téléphone: +33 (0) 972 3537 17
Numéro de fax: +33 (0) 972 3537 18
info@pce-france.fr
www.pce-instruments.com/french

United Kingdom

PCE Instruments UK Ltd
Unit 11 Southpoint Business Park
Ensign Way, Southampton
Hampshire
United Kingdom, SO31 4RF
Tel: +44 (0) 2380 98703 0
Fax: +44 (0) 2380 98703 9
info@pce-instruments.co.uk
www.pce-instruments.com/english

China

PCE (Beijing) Technology Co., Limited
1519 Room, 6 Building
Zhong Ang Times Plaza
No. 9 Mentougou Road, Tou Gou District
102300 Beijing, China
Tel: +86 (10) 8893 9660
info@pce-instruments.cn
www.pce-instruments.cn

Turkey

PCE Teknik Cihazları Ltd.Şti.
Halkalı Merkez Mah.
Pehlivan Sok. No.6/C
34303 Küçükçekmece - İstanbul
Türkiye
Tel: 0212 471 11 47
Faks: 0212 705 53 93
info@pce-cihazlari.com.tr
www.pce-instruments.com/turkish

Spain

PCE Ibérica S.L.
Calle Mayor, 53
02500 Tobarra (Albacete)
España
Tel. : +34 967 543 548
Fax: +34 967 543 542
info@pce-iberica.es
www.pce-instruments.com/espanol

Italy

PCE Italia s.r.l.
Via Pesciatina 878 / B-Interno 6
55010 Loc. Gragnano
Capannori (Lucca)
Italia
Telefono: +39 0583 975 114
Fax: +39 0583 974 824
info@pce-italia.it
www.pce-instruments.com/italiano

Hong Kong

PCE Instruments HK Ltd.
Unit J, 21/F., COS Centre
56 Tsun Yip Street
Kwun Tong
Kowloon, Hong Kong
Tel: +852-301-84912
jyi@pce-instruments.com
www.pce-instruments.cn