

USER MANUAL

TEMPERATURE DATA LOGGER

PCE-T 420

ENGLISH



User manuals in various languages (français, italiano, español, português, nederlands, türk, polski) can be found via our product search on:
www.pce-instruments.com

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.
- » 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.
- » 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.

SPECIFICATIONS

Measurement range	Typ B: +600 ... +1800 °C Typ E: -200 ... +850 °C J-Typ: -200 ... +1050 °C K-Typ: -200 ... +1370 °C N-Typ: -200 ... +1300 °C R-Typ: 0 ... +1750 °C S-Typ: 0 ... +1750 °C T-Typ: -200 ... +400 °C
Accuracies at 23 °C ±5 °C	Typ B: ±(0.05 % + 1 °C / 1.8 °F) Typ E: ±0.6 °C / ±1.1 °F J-Typ: ±(0.04 % + 0.3 °C / 0.5 °F) K-Typ: ±(0.04 % + 0.3 °C / 0.5 °F) N-Typ: ±0.6 °C / ±1.1 °F R-Typ: ±(0.05 % + 1 °C / 1.8 °F) S-Typ: ±(0.05 % + 1 °C / 1.8 °F) T-Typ: ±0.6 °C / ±1.1 °F
Resolution	0.1 °C
Data logger	Various start / stop triggers Possible measuring intervals 1 s ... 12 h 100 data records (up to 100,000 readings per data record)
Display	2,8" LCD
Units	°C, °F, K
Menu languages	English, German, French, Spanish, Italian, Dutch, Portuguese, Turkish, Polish, Russian, Chinese, Japanese, Danish
Operating/storage conditions	Temperature: -20 °C ... +65 °C Humidity: 10 % RH ... 95 % RH, non-condensing
Power supply	Internal: rechargeable LiPo battery (3.7 V, 2500 mAh) External: USB 5 VDC, 500 mA
Battery life	approx. 24 ... 36 h (depending on display brightness)
Dimensions	165 x 85 x 32 mm / 6,4 x 3,3 x 1,2"
Weight	255 g / 0.56 lbs

DELIVERY CONTENTS

- 1 x temperature data logger PCE-T 420
- 4 x K type wire probe (TF-500)
- 1 x USB cable
- 1 x USB pen drive with manual and PC software
- 1 x quick start guide

ACCESSORIES

Item number	Description
TF-106	Penetrating/immersion probe
TF-509	Surface probe (self-adhesive)
PCE-SP-202	Surface temperature sensor
TF-513	Magnetic surface probe
TF-109	Probe with alligator clip

More sensors can be found on our website: <https://www.pce-instruments.com>.

SYSTEM DESCRIPTION

The PCE-T 420 temperature data logger is suitable for measuring and monitoring temperatures with thermocouples of the types B, E, J, K, N, R, S and T. The meter has four input sockets, which means that temperatures can be measured, compared and monitored simultaneously with four thermocouples. It is also possible to display the maximum value, the minimum value and the average value on the display in addition to the current measured value. All four channels can be monitored simultaneously or each channel individually.

In addition, each channel can be compared with all other channels. The current measured value of the channel and the difference of the other channels to the reference channel are displayed.

Further functions of the PCE-T 420 include a data logger function for recording measured values over a longer period of time.

With the PC software included in the scope of delivery, the saved data can be imported from the instrument and graphically displayed, analysed and archived accordingly.

The measuring device has an internal LiPo battery that is charged via the USB socket with standard USB mains adaptors and the battery life is approx. 24...36 hours, depending on the brightness set.

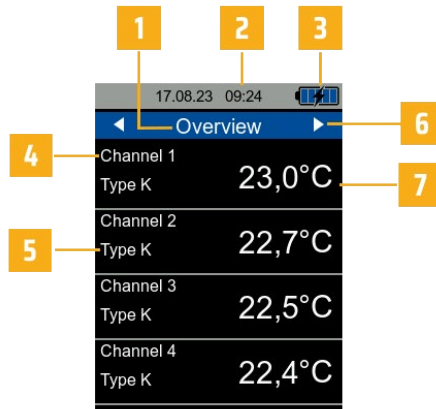
Device

- 1 - Sensor sockets
- 2 - LCD
- 3 - Function keys
- 4 - USB port












Display

- 1 - Display of measurement view
- 2 - Date and time
- 3 - Battery level
- 4 - Measuring channel
- 5 - Type of selected thermocouple
- 6 - Change measurement view
- 7 - Display of measured value



Function keys

Key	Description	Function
	On/Off button	Turn meter on/off
	Left arrow button	Navigate left
	MENU button	Open main menu
	Up arrow button	Navigate up
	Back button	Cancel, back
	Right arrow button	Navigate right
	REC button	Start/stop data logger
	Down arrow button	Navigate down
	OK button	Confirm

GETTING STARTED

Power supply

An internal LiPo battery serves as the power supply. With a fully charged battery, an operating time of approx. 24...36 hours is possible, depending on the brightness of the display. The battery is charged via the USB port at the bottom of the device and suitable USB chargers can be used.

The charging process can be shortened by switching the meter off during the charging process.

The current charge level of the batteries is displayed in the status bar at the top right. As soon as the battery level is no longer sufficient for proper operation of the device, it switches off automatically and the screen shown below is displayed.

First use

Before the meter is switched on, a sensor should be connected to it. To do this, insert the plug of the thermocouple into one of the input sockets on the top of the meter.

The instrument has an automatic sensor recognition function. If no sensor is connected, the message **No sensor** appears instead of the measured value and the respective memory functions are deactivated. This display can also be used to diagnose a cable break.

To start the instrument, press the ON/OFF key until the start-up screen appears. The start-up screen is displayed for approx. 2 seconds and the meter then switches to measuring mode. To switch off the device, press ON/OFF until the display turns off.

MENU

The main menu can be opened at any time with the MENU key. The arrow keys are used to navigate between the menu items, which can be activated with the OK key. Submenus can be exited again with the BACK key. The main menu of the PCE-T 420 consists of the submenus Measurement, Alarm, Data logger, Settings, Calibration, Manual and Info. The submenus are explained in more detail in the following chapters.

Measurement

In the Measurement submenu, the options relevant for the measurement can be set for each channel: activate channel, select thermocouple type, set offset.

Alarm

In the Alarm submenu, an upper and a lower threshold value can be set for each channel. If these threshold values are exceeded during a measurement, this is indicated by an orange measured value and an orange arrow in front of the measured value. If the arrow points upwards, the upper threshold value has been exceeded. If the arrow points downwards, the lower threshold value has been fallen below.

Data logger

In this menu, you can change the settings for the data logger.

Start condition

The data logger can be started either manually by pressing a key or automatically from a date that is set in this menu.

Stop condition

Three different options are available for stopping the data logger. It can either be stopped manually by pressing a key, on a date or after an adjustable time interval.

Memory interval

For the memory interval, different time intervals between 1 s and 12 h are available.

Show data

With the help of this function, an overview of the saved measurements can be called up. The saved measurements can only be recalled via the PC software.

Delete data record

To delete individual data records, the data record must first be called up. Then the record can be deleted by holding down the OK key.

Delete all data

This menu item is used to delete all saved measurements. After selecting this item, a window first opens in which the deletion must be confirmed before the deletion process is carried out.

SETTINGS

Units

In the sub-item Units, you can choose between the International System of Units (SI) and the Anglo-American System of Units (US).

Decimal character

Either a point or a comma can be selected as decimal character for measured values.

Date & time

The date and time can be set in this menu. In addition, the date format can be changed.

Display

In this tab, the display brightness can be adjusted between 50 % and 100 %. In addition, automatic dimming can be set. After the set time, the display is dimmed to a low brightness to save power. Pressing any key resets the brightness to the originally set value. Furthermore, the settings for time formatting of the graph can be made.

Language

The menu languages available are English, German, French, Spanish, Italian, Dutch, Portuguese, Turkish, Polish, Russian, Chinese, Japanese and Danish.

Auto power off mode

With the help of this option, an automatic power off of the device can be set. You can choose between 1 minute, 5 minutes and 15 minutes. After this time has elapsed, the meter switches off automatically and pressing any key resets the timer. In addition, automatic power off can be completely deactivated.

Factory settings

With the help of this option, the instrument can be reset to its factory settings. A distinction is made between device settings, calibration and data. These can each be reset separately.

When resetting the device settings, default values for the measurement parameters and the remaining menu options are loaded. A previously performed calibration is retained.

To prevent unintentional resetting of the calibration, this menu is protected with the same code as is used for calibration. The code is 1402.

ATTENTION:

When resetting the calibration, a previously performed and saved calibration is deleted and a default calibration for the instrument is selected. It is recommended to perform a new calibration afterwards. The reset must be explicitly accepted by ticking the dialogue box.

User manual

A QR code is displayed in this menu. The QR code can be scanned with an appropriate reader such as a mobile phone and leads directly to this instruction manual.

Info

The Info menu displays the model name, serial number and firmware version.

Software

With the help of the PC software PCE-T 420, the saved data of the data logger can be transferred from the device to the PC, displayed and archived.

MEASUREMENT

For different views of the measurements, the arrow keys can be used to switch between several screens. Which arrow keys can be used on the current screen is indicated by white arrows in the upper corners or at the bottom of the screen.

Measurement overview

After switching on the meter, the measurement overview is automatically displayed. Here, you can see for each channel which thermocouple type is set and which temperatures are currently being measured. If no sensor is connected or recognised by the device, **No sensor** is displayed instead of the measured value. This allows you to always see the measured temperatures of all activated channels at a glance.

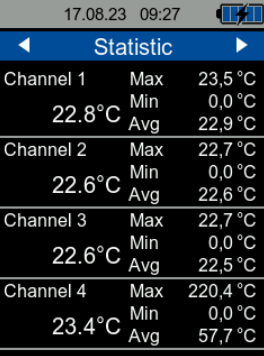
Channel	Type	Temperature
Channel 1	Type K	23,0°C
Channel 2	Type K	22,7°C
Channel 3	Type K	22,5°C
Channel 4	Type K	22,4°C

Channel	Type	Temperature
Channel 1	Type K	23,0°C
Channel 2	Type K	No sensor
Channel 3	Type K	22,6°C
Channel 4	Type K	No sensor

If changes are made in the menu, the new settings are applied when returning to measuring mode and are displayed accordingly. These are also retained when the instrument is switched off and on again.

Statistic overview

This screen shows the statistics from each channel in addition to the current readings at a glance. These include the maximum value, the minimum value and the average value of the measured temperatures. By holding down the OK key, all statistics of the active channels can be reset.



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Statistic		
Channel 1	Max	23,5 °C
	Min	0,0 °C
	Avg	22,9 °C
22,8 °C		
Channel 2	Max	22,7 °C
	Min	0,0 °C
	Avg	22,6 °C
22,6 °C		
Channel 3	Max	22,7 °C
	Min	0,0 °C
	Avg	22,5 °C
22,6 °C		
Channel 4	Max	220,4 °C
	Min	0,0 °C
	Avg	57,7 °C
23,4 °C		

Measurement overview of individual channel

On the following screens, each activated channel can be observed individually. The current measured value, the set thermocouple type, the maximum value, the minimum value and the average value of the measured temperatures are displayed there. By holding down the OK key, the statistics of the channel can be reset.

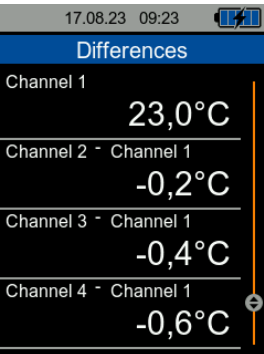


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Channel 1	
Type K	
	22,9 °C
Max	23,5 °C
Min	0,0 °C
Avg	22,9 °C

Differences

If you are on one of the screens for monitoring a single channel, it is possible to compare the measured values of the other channels with the measured value of the current channel. To do this, use the DOWN arrow key to switch to the Differences screen. The measured value of the current channel is displayed there and below the measured value, the differences of the measured values of each further activated channel to the measured value of the current channel are displayed. To leave the Differences screen, use the UP arrow key to return to the statistics screen of the channel.

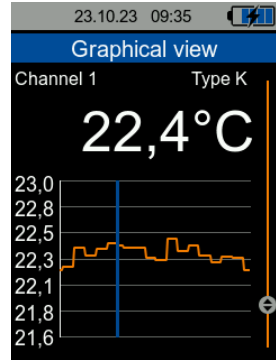


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Differences	
Channel 1	23,0 °C
Channel 2 - Channel 1	-0,2 °C
Channel 3 - Channel 1	-0,4 °C
Channel 4 - Channel 1	-0,6 °C

Graphical view

From the Differences screen, the arrow key can be used to switch to the Graphical View screen. Here, the measured value of the current channel is displayed and the last measured 15, 30 or 60 seconds are shown graphically. By holding down the OK key, the graphical view can be reset.



Preparing the meter for a measurement

To make a correct measurement, the desired measurement parameters must first be set in the menu. These include the channels used, the thermocouple types, the unit and, if required, the threshold values that should not be exceeded.

ATTENTION:

It should be ensured in any case that the thermocouple type that is really connected is set on each activated channel, otherwise incorrect measured values will be displayed!

Making a measurement

To carry out a measurement, the thermocouples must be plugged into the sockets of the activated channels at the top of the meter. The channels are numbered from 1 to 4 from left to right (view of the front side with screen).

The thermocouple plug must always be inserted the right way round in order to obtain correct measurement results and not to damage the sockets. For this purpose, there is a + at the socket into which the part of the plug marked with a + must be inserted.

ATTENTION:

If a thermocouple plug is inserted into a socket the wrong way round, this will damage the socket and also display incorrect readings. In measurement mode, the measurement is carried out continuously and the current measured values are displayed on the screen.

If a threshold value is activated, exceeding the threshold value is indicated by a colour change of the current measured value and an arrow in the same colour. If the arrow points upwards, the upper threshold value has been exceeded. If the arrow points downwards, the value has fallen below the lower threshold value.

DATA LOGGER

With the help of the data logger function, measured values can be logged over a defined period of time. A total of 100 slots are available in the memory for the saved data records. The PC software must be used to display the data records.

Settings

The same settings are used for logging as for regular measurement mode. These can be set in the Measurement menu. The settings specific to data logger mode are in the Data Logger menu. The memory interval can be set between 1 s and 12 h. This means that the measured values are only saved at the set interval. The measured value displays update during logging at the same rate as in regular measuring mode. The data logger can be started in two different ways. This can be done manually via the REC key or a start time can be set via the Start condition menu.

There are three different options for stopping the data logger, which can be selected via the Stop condition menu. Either the stop can be initiated manually via the REC key, at a specific time or after an adjustable time interval.

The start and stop conditions can be combined in any way. When selecting date/time for the start or stop condition, the start of the data logger is prevented if the set start/stop time is before the current time or the stop time is before the start time. In this case, the corresponding settings must be checked and corrected. After the desired data logger settings have been selected, the data logger can be started.

Operation

Pressing the REC key opens the data logger info window. The current status of the data logger, all set parameters and the information that the data logger is started by holding down the REC key are displayed there.

Depending on the start condition, the data logger starts automatically when set start time has been reached. A measurement in progress is indicated by the message REC in the upper left corner of the display and a flashing red circle.

The measured values can be observed in the same way as in regular measuring mode. To do this, the data logger info window can be exited with the BACK key.

Depending on the stop condition set, the data logger stops either automatically after reaching the stop time or after the desired duration or after holding down the REC key again. Even if a time or duration has been set as the stop condition, a running measurement can always be stopped by pressing the REC key. Depending on the duration of the recording, ensure that the battery is sufficiently charged. The device can also be operated with the help of the USB charger so that measurements can be made over a long period of time. The data records can then be read out from the meter and displayed using the PC software.

DISPOSAL

For the disposal of batteries in the EU, the (EU) 2023/1542 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.

CONTACT INFORMATION

Germany

PCE Deutschland GmbH
Im Langel 26
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

United Kingdom

PCE Instruments UK Ltd
Trafford House
Chester Rd, Old Trafford
Manchester M32 0RS
United Kingdom
Tel: +44 (0) 161 464902 0
Fax: +44 (0) 161 464902 9
info@pce-instruments.co.uk
www.pce-instruments.com/english

The Netherlands

PCE Brookhuis B.V.
Twentepoort West 17
7609 RD Almelo
Nederland
Telephone: +31 (0)53 737 01 92
info@pcebenelux.nl
www.pce-instruments.com/dutch

France

PCE Instruments France EURL
2, rue Georges Kuhnmmunch
67250 Soultz-sous-Forêts
France
Tel.: +33 (0) 972 35 37 17
Fax: +33 (0) 972 35 37 18
info@pce-france.fr
www.pce-instruments.com/french

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

United States of America

PCE Americas Inc.
1201 Jupiter Park Drive, 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

Spain

PCE Ibérica S.L.
Calle Mula, 8
02500 Tobarra (Albacete)
España
Tel.: +34 967 543 548
info@pce-iberica.es
www.pce-instruments.com/espanol

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

Denmark

PCE Instruments Denmark ApS
Birk Centerpark 40
7400 Herning
Denmark
Tel: +45 70 30 53 08
kontakt@pce-instruments.com
www.pce-instruments.com/dansk