English

User Manual

PCE-CT 2X BT Series Coating Thickness Gauge

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

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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.
- 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.

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

2 Technical specifications

Model	PCE-CT 21BT	PCE-CT 22BT	PCE-CT 23BT
Measurable substrates	Fe	Fe, NFe	Fe, NFe
Probe	external	internal	external
Measurement range		0 ... 1500 µm	
Resolution		0.1 µm (within meas. range 0 ... 99.9 µm) 1 µm (within meas. range 100 ... 1500 µm)	
Accuracy		±(1 µm + 2 % of the coating thickness)	
Units		µm, mil	
Min. curvature		convex 5 mm, concave 5 mm	
Min. measuring area		10 x 10 mm	
Min. thickness of substrate		0.4 mm	
Interface		Bluetooth, micro USB	
Memory space		10 groups of 60 measured values each	
Power supply		2 x 1.5 V AA battery, 5 V USB interface	
Environmental conditions		-10 ... 50 °C, 10 ... 85 % RH	
Dimensions		126 x 69 x 35 mm (without sensor)	
Weight		approx. 97 g (without batteries)	

3 Delivery scope

1 x coating thickness gauge PCE-CT 2x BT series
5 x calibration foil reference
1 x Fe zero standard
1 x NFe zero standard (only for PCE-CT 22BT and PCE-CT 23BT)
1 x transport loop
2 x 1.5 V AA batteries
1 x carrying case
1 x user manual

4 Display description

Symbol	Designation	Description
99.7	Measured value	Display of the current measured value
	Battery indicator	Batteries charged or the meter is operated via the USB interface. Batteries are 2/3 charged Batteries are 1/3 charged Batteries are discharged. Please replace the batteries.
Fe NFe	Substrate	Fe: magnetic material NFe: non-magnetic material
µm	Unit	Adjustable units µm and mil
^ / v	Limit value	Is displayed when the set limit value is exceeded or fallen below.
17	Number of measurements	Number of measured values

4.1 Key description

Symbol	Designation	Description
	On and off switch	Press and hold this key for more than one second to switch the meter on and off
OK	Menu key, enter key	Open the menu, apply changes to the settings.
CAL	Calibration key, back	Press this key to enter the calibration menu. Press this key to go back one step and exit the menu.
	Arrow keys	Change parameters and select the desired function in the menu.

5 Power supply

To start using the meter, first insert 2 x 1.5 V AA batteries into the battery compartment on the back. Make sure the polarity is correct when inserting them. To prolong the battery life, make sure to switch off the Bluetooth function when you are not using it.
The meter can also be supplied with power via the micro USB port. Thus, the coating thickness gauge can be operated via the USB port of a computer, for example.

6 On / off

To switch the meter on/off, press and hold the key for more than 1 second. When the meter is not in use, it will automatically turn off within 3 minutes.

7 Measurement

To make a measurement, place the tip of the sensor on the surface to be measured. A measured value will be displayed directly. Make sure that you place the sensor on the sample vertically and quickly. The meter will detect automatically whether the base material is magnetic (Fe) or non-magnetic (nFe). During a measurement, the sensor must not be moved, otherwise incorrect measurements may occur. To carry out further measurements, place the sensor on the next measuring spot.
Important:
In order to obtain the best results, it is important to take measurements on a smooth and non-slip surface.
Do not impact the sensor head too forcefully on the test object, otherwise you could damage the probe.

7.1 Continuous measurement

To perform a continuous measurement, place the sensor on the object to be measured. A measured value will be displayed. Now keep the sensor on the current measuring spot for three seconds. The continuous measurement starts automatically. To stop the continuous measurement, lift the sensor.
Important:
Do not make continuous measurements on sensitive surfaces to create sequences, otherwise you could damage the surface.
Do not carry out continuous measurements on rough surfaces as this could damage the sensor.

8 Menu

To open the menu, press the OK key. The upper part of the display shows you the menu level currently open. The lower part of the display shows the currently selected function at the menu level. You can use the arrow keys to select between the functions and also change parameter values. Press the key OK to open the corresponding function. Press the back key to go back one level.

8.1 Menu structure

Menu	Calibration (Calib)	Zero point calibration (Zero Calib)
		Factory calibration (Factory calib)
		1-point calibration (1 point calib)
		5-point calibration (5-point calib)
	Data groups (Data Group)	History
		Selected group (Select Grp XXX)
		Delete last value (Remove latest)
		Delete group (Erase group)
		Clear memory completely (Erase all)
	Limit value alarm (Limit Alarm)	Activate alarm (alarm on)
		Upper limit value (Up limit)
		Lower limit value (Low limit)
	Bluetooth	On, off (ON, OFF)
	Unit	µm, mil
	Device information (About)	Sensor type (Type)
		Serial number (Serial)
		Hardware version (Hardware)
		Software version (Software)

9 Calibration

To perform a calibration, the meter has various functions.

- Factory calibration
- Zero point calibration
- One-point calibration
- Five-point calibration

In order to obtain the most accurate measurement result over the entire measuring range, a five-point calibration is recommended. A calibration of magnetic (Fe) and non-magnetic substrates (nFe) is independent on each other. After each calibration, check the measured values again with the references. If the measured values are still not within the accuracies, repeat the calibration if necessary.

9.1 Zero point calibration

To perform a zero point calibration, press the CAL key. Now place the sensor on the corresponding zero reference. When "Lift probe up" appears on the display, remove the sensor from the reference. You will then be asked if you want to accept the calibration. Press the OK key to save the change. To discard the setting, press the CAL key.

9.2 One-point calibration

To perform a 1-point calibration, first go to the calibration menu and select "1-point calib". Now place the sensor on the corresponding zero reference. When "Lift probe up" appears on the display, remove the sensor from the zero reference. Now place a foil reference on the zero reference. Now carry out a measurement of the reference by positioning the probe on the foil. When "Lift probe up" appears on the display, remove the sensor from the reference. The display will now show the measured value. With the arrow keys, you can now set this value to the calibration reference. Confirm the set value with the OK key. You are then asked whether you want to accept the calibration. Press the OK key to save the change. To discard the setting, press the CAL key.

9.3 Five-point calibration

To perform a five-point calibration, first go to the calibration menu and select "5-point calib". Now place the sensor on the corresponding zero reference. When "Lift probe up" appears on the display, remove the sensor from the zero reference. Now place a foil reference on the zero reference. Now carry out a measurement of the reference by positioning the probe on the film. When "Lift probe up" appears on the display, remove the sensor from the reference. The display will now show the measured value. With the arrow keys, you can now set this value to the value of the calibration reference. Confirm the set value with the OK key. The second calibration point will follow now. Now use another calibration reference and repeat the calibration procedure until you reach the last calibration point. Then you are asked whether you want to accept the calibration. Press the OK key to save the change. To discard the setting, press the CAL key.
Important: When instructed to lift the probe, lift the probe quickly and place it 30 cm away from the reference before changing the reference film.

10 Data group

With this coating thickness gauge, the measured values are saved automatically. Various data groups are available for this purpose. To make settings to the data memory, go to the menu under the item "Data Group". Here, you can make the following settings:

Course (History)	Here you can view the last measured values belonging to the set measuring group.
Selected group (Select Grp XXX)	Here you set the current measuring group. If you make settings in the menu item "Data group", these always refer to the data group selected here. The measured values are also saved in the data group selected here.
Delete last value (Remove latest)	With this function, you can delete the last measured value.
Delete group (Erase group)	The entire measuring group is deleted here.
Erase memory completely (Erase all)	Here, you can clear the entire memory.

11 Limit value alarm

To set limit values, first go to the "limit alarm" menu. Under the item "Alarm on", you can activate the limit alarm function. You can set the limits as follows:

Upper limit value (Up limit)	Here, you can set the upper limit value.
Lower limit value (Low limit)	Here, you can set the lower limit value.

If the measured value is within the limit range, the LED indicator briefly flashes in green. If the measured value is outside the limit values, the LED indicator briefly flashes in red. The display shows whether the current measured value is too high or too low.

12 Convert unit

To change the unit, go to the menu. Under the item "Unit", you can choose between the units µm and millimetre.

13 Backlight

The backlight switches on and off automatically. It is not possible to adjust this.

14 Software

The data from the coating thickness gauge can also be exported. For this purpose, there is the possibility of Bluetooth transfer to an Android or iOS device. It is also possible to transfer the data to a PC via the micro USB interface.

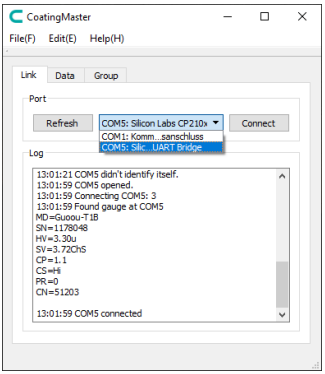
14.1 PC transfer

First connect the meter to the PC using a micro USB cable.

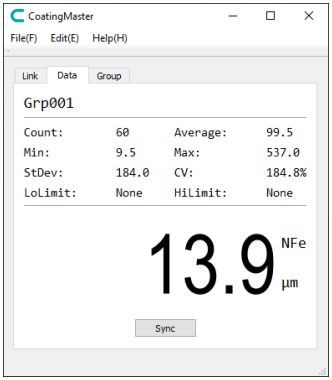
Important: To establish a PC connection, the Bluetooth function in the meter must be switched off.
Note: You can also find the software on the download page on https://www.pce-instruments.com.

Then open the "Coatingmaster" software. Under "Port" select "Silicon Laps CP210x USB to UART Bridge". If this is not available, the driver may be missing. You can find the driver in the program folder under the "driver" folder. If you have a 64-bit system, use the installation file "CP210xVCPInstaller_x64". If you have a 32-bit system, use the installation file "CP210xVCPInstaller_x86" to install the driver.

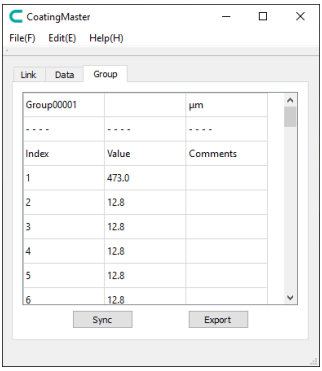
Now click on "Connect". The software now establishes a connection to the meter.



Under the tab "Data", the displays on the meter are now shown mirrored in the programme. This means that the data are live-transferred to the PC. The software is synchronised with the meter via the "Sync" button.



The "Group" tab displays all data saved on the meter. To export these data now, click on "Export". The data can now be saved to the PC as a CSV file. Click the "Sync" button to synchronise the software with the test instrument.



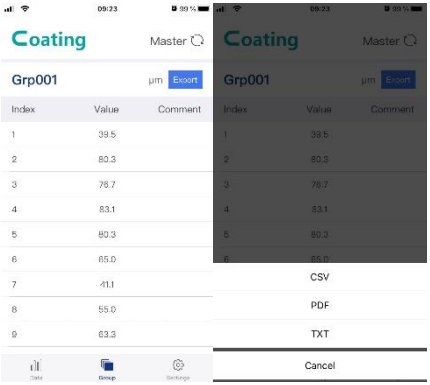
15 App transfer

To establish a connection with a mobile device, first download the "Coatingmaster" app. Then switch on the Bluetooth function in the measuring device. Now connect the coating thickness gauge via the app. To do this, select "Coating_XXXX" in the app.

Note: The app for Android smartphones can also be found on the download page on https://www.pce-instruments.com.

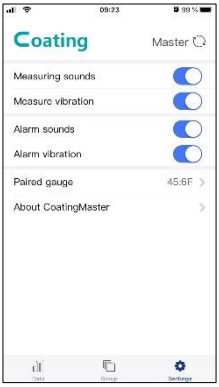
You will then be taken directly to the measurement window where the current measured value is displayed. Via the "Master" function, the meater is synchronised with the mobile device.

Under the "Group" tab, the measurement data stored in the meter is displayed. Via the "Export" function, you can save the data on the mobile device as CSV, PDF and also as a TXT file.



Under the tab "Settings", you can make some settings to the app.

Setting	Meaning
Measuring sounds	During a measurement, a sound can be heard.
Measuring vibration	When a measurement is made, the vibration alarm is activated.
Alarm sounds	When the limit is reached, a sound can be heard.
Alarm vibration	When the limit value is reached, the vibration alarm is activated.
Paired gauge	Click here for more information about this meter.
About CoatingMaster	Here you can find more information about the app.



16 Troubleshooting

Fault	Cause	Solution
Unit does not power on	Batteries discharged	Insert new batteries.
	Batteries are not inserted correctly	Check that the batteries are inserted correctly.
	Batteries inserted with reverse polarity	Check the polarity of the inserted batteries.
Measured value inaccurate or not stable	Base material has varied electromagnetic properties	The test instrument cannot perform measurements on base materials the electromagnetic properties of which are varied.
	Magnetic fields in the environment	Do not carry out measurements in the vicinity of magnetic fields, for example near magnets, microwaves or audio equipment.
	Edge effect	Measurements should be made in the middle of the sample. Do not perform any measurements at the edge.
	Incorrect placement of the probe	Always align the probe vertically and quickly with the surface. Do not perform a measurement by force. The probe must touch the test object and must not swing.
	The base material is too narrow or the measuring surface is too small or too round	Only carry out measurements on test objects with the properties indicated in the specifications. Otherwise, inaccuracies may occur.
	Surface is too rough	Carry out measurements on a surface that is as smooth as possible.
Measurements not possible	Different environmental conditions change measurement	Perform a zero calibration.
Inaccurate measured values		
Display is difficult to read	The meter is used under the wrong environmental conditions	The coating thickness gauge may only be located in areas with the specified environmental conditions. Otherwise damage can occur.
Other technical problems	-	Please contact PCE Instruments' technical support.

17 Warranty

You can read our warranty terms in our General Business Terms which you can find here: https://www.pce-instruments.com/english/terms.

18 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.

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