PCE Instruments PCE-CT 80 Material Thickness Gauge User Manual

Contents

PCE Instruments PCE-CT 80 Material Thickness Gauge

Product Information

The product is a multi-functional instrument that offers various measurement capabilities. It comes with a user manual that provides detailed instructions on how to use the product effectively.

Specifications

- **Technical specifications:** The technical specifications of the product are listed in section 2.1 of the user manual.
- **Delivery contents:** The items included in the package when purchasing the product are listed in section 2.2 of the user manual.
- **Optional accessories:** Additional accessories that can enhance the functionality of the product are listed in section 2.3 of the user manual.

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.

Specifications

Technical specifications

Specifications of the meter PCE-CT 80

Specification	**Description**
Measurement range	Depending on sensor (see sensor chart)
Accuracy	Depending on sensor (see sensor chart)
Resolution	0.1 µm (<100 µm) 1 µm (>100 µm)
Measurable materials	Non-magnetic layers on Fe (steel, iron) Non-electrically conductive layers on NFe (aluminum, copper)
Min. radius of curvature conv ex	5 mm
Min. radius of curvature conc ave	25 mm

Min. measuring surface	Ø 17 mm
Min. substrate thickness	0.2 mm (magnetic materials) 0.05 mm (non-magnetic materials)
Probe mode	Automatic mode with material recognition (Fe + NFe) Magnetic mode (Fe) Eddy current (NFe)
Measure mode	Single measurement
Calibration	Multi-point calibration (1 … 4 points per group) Zero-point calibration
Units	µm / mm / mils
Data transfer	Data transfer via USB 2.0
Memory	One group of measurements (DIR mode) that is lost when meter is turned off Four groups of measurements with auto save and max. 2000 readings (GEN mode) **Note**: Each group of measurements has individual statistics, alarm thresholds and calibration
Statistic functions	Number of readings, mean value, minimum, maximum, standard deviation
Alarm	Indication when set upper and lower alarm thresholds are exceeded or fallen below
Operating time	Auto Power Off function
Power supply	3 x 1.5 V AAA batteries
Display	128 x 128 LCD
Displayed information	Battery level Fault detection
Operating conditions	0 °C… +50 °C 20 %… 90 % RH non-condensing
Storage conditions	-10 °C… +60 °C 20 %… 90 % RH non-condensing

Dimensions	143 x 71 x 37 mm (L x W x H)
Weight incl. probe	approx. 271 g

Specifications of the selectable probes

Specification	**Description**		
Type	Ø [mm]	Measurement range [µm]	Accuracy
PCE-CT 80-FN0.5*	17	Fe: 0 … 500 NFe: 0 … 500	±(1 % of rdg. + 1 µm)
PCE-CT 80-FN1.5*	17	Fe: 0 … 1500 NFe: 0 … 1500	±(2 % of rdg. + 1 µm)
PCE-CT 80-FN2*	17	Fe: 0 … 2000 NFe: 0 … 2000	±(2 % of rdg. + 1 µm)
PCE-CT 80-FN2.5*	17	Fe: 0 … 2500 NFe: 0 … 2500	±(2 % of rdg. + 1 µm)
PCE-CT 80-FN3*	17	Fe: 0 … 3000 NFe: 0 … 3000	±(2 % of rdg. + 1 µm)
PCE-CT 80-F5N3*	17	Fe: 0 … 5000 NFe: 0 … 3000	±(2 % of rdg. + 1 µm)

- **Fe and NFe:** for ferromagnetic and non-ferromagnetic substrates

Delivery contents

- 1 x coating thickness gauge PCE-CT 80
- 1 x probe FN1.5
- 3 x AAA batteries
- 1 x carrying case
- 1 x set of standard foils
- 1 x calibration plates (Fe and NFe) 1 x ISO-calibration certificate
- 1 x user manual

Optional accessories

- Probe PCE-CT 80-FN0.5
- Probe PCE-CT 80-FN2
- Probe PCE-CT 80-FN2.5
- Probe PCE-CT 80-FN3
- Probe PCE-CT 80-F5N3
- PC software with data cable

System description

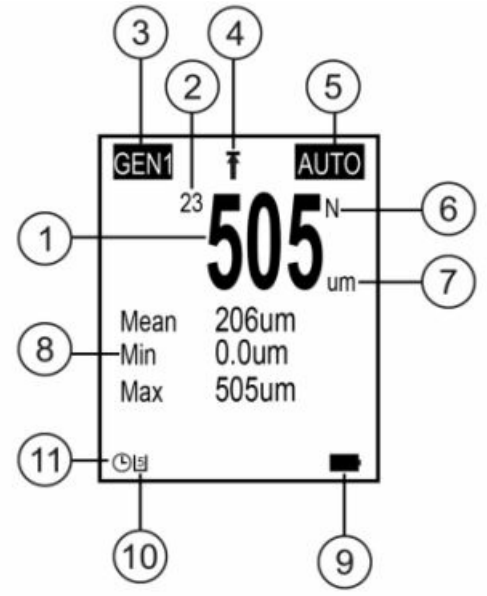
Device

1. LC display
2. LED red
3. LED green
4. Membrane keypad
5. Probe

Interfaces

1. Probe socket
2. Micro USB 2.0 connector

Display



1. Reading
2. No. of readings
3. Memory group
4. Limit value display
5. Probe mode
6. Material setting
7. Unit
8. Statistics (Mean, minimum, maximum value)
9. Battery level
10. USB communication status
11. Auto Power Off

Function keys

Key	Designation	Functions	
		Measure mode	**Menu mode**
	On/off	On/off (2 s)	On/off (2 s)
	Calibration	Start and stop calibration	/
	Zero point calibration	Start and stop zero point calibration	Back to measuring mode directly
		Press and hold during device start-up to reset meter to factory settings	
	Enter	Open menu	Save, select, confirm
	Back	Backlight on/off	Cancel, back, close
	Up	Delete readings	Up, increase value
	Down	Refresh screen	Down, decrease value

Getting started

Power supply

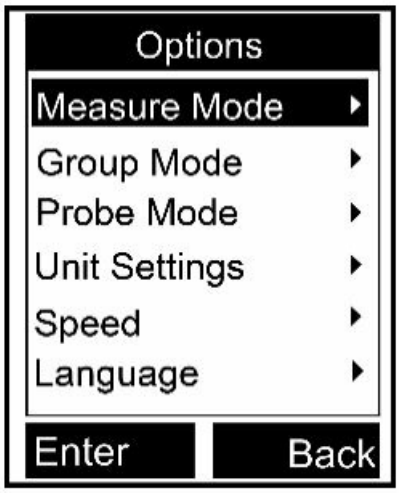
For power supply, three AAA Alkaline batteries are required. Before replacing the batteries, turn off the meter. The battery compartment is located at the rear side of the meter and fixed with two screws. Loosen the screws, remove the cover, insert the batteries as marked and close the battery compartment by tightening the screws.

Preparation

To turn on the meter, press  until the display reacts. After charging, the meter will show the measuring screen. To turn off the meter, press  . Connect the included probe FN1.5 to the probe socket of the meter. Make sure that the plug is in the right position. The arrow must be visible from the front side of the meter.

Options

To change the standard settings, navigate to the submenu “Options“. Follow these steps:



1. Press ENTER to enter the “Root“ menu.
2. Use the DEL REFRESH key to go to “Options“ and confirm with ENTER.
3. Navigate to the desired settings with the DEL REFRESH keys and confirm with ENTER.
4. Select an element with DEL REFRESH and confirm with ENTER.

Setting	**Element**	**Description**
Measure mode	Single	Individual measurements
Group mode	DIR, GEN General 1, General 2, General 3, General 4	DIR (Direct): Data are lost when the meter is turned off. When the memory is full, th e last readings are deleted. GEN (General 1-4): The data are saved to one of the 4 groups and are not lost when turnin g off the meter. When the memory is full, measurements are still possible but not saved and ”fl“ is displayed.
Probe mode	Auto, FE, N- FE	Auto: The substrate material is recognised automatically. FE: You can measure on magnetic materials only. N-FE: You can measure on non-magnetic materials only. When the meter recognises a magnetic material, it displays an “F“. If t he material is non-magnetic, it displays an ”N“.
Unit settings	µm, mils, mm	Selection of measuring unit

Speed	Normal, fast	The higher the speed, the lower the accuracy will be.
Language	German, English, Russian, Chinese	Selection of one out of four languages
Auto Poweroff	Deactivate Activate	After inactivity for a certain period, the device turns off automatically. Before powering off, the meter will beep several times. By pressing any key, you can cancel this process.

Operation

Before making a measurement or calibration, you should be aware of the factors that can influence the measuring accuracy. These influences are listed in the following chart.

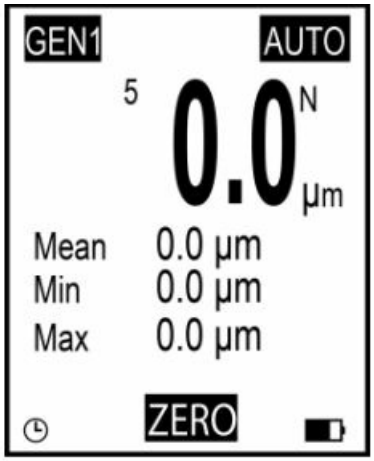
Influencing factor	**Measuring principle**		**Recommendation**
	Magnetic	Eddy current	
Magnetic properties	x		Calibrate meter
Electrical properties		x	Calibrate meter
Material radius	x	x	Chapter 2.1 Calibrate meter
Substrate thickness	x	x	Chapter 2.1 Calibrate meter
Size of measuring surface	x	x	Chapter 2.1 Calibrate meter
Surface roughness	x	x	
Position and shape	x	x	
Sample deformation	x	x	Do not measure objects which are too soft or too thin
Glue	x	x	Clean probe and measuring surface
Strong magnetic fields	x		Avoid strong magnetic fields
Temperature and air humidit y	x	x	Re-calibrate under the same environmental conditions
Measuring processes	x	x	Chapter
Low battery	x	x	Replace battery
Probe wear	x	x	Contact PCE Instruments

Calibration

The meter should be calibrated (zero point / multi-point calibration) each time a new sample is measured. The material properties and the radius of curvature of the uncoated calibration surface should be as similar as possible to those of the sample. Make sure to choose similar calibration/measuring points, particularly when measuring corners and edges of small parts. The radius of curvature, the minimum material thickness and minimum measurement range stated in chapter 2.1 should be observed. The meter offers zero-point and multi-point calibration. Each memory group has its individual zero-point and multi-point calibration. The values previously measured are not affected by a new calibration.

Zero-point calibration

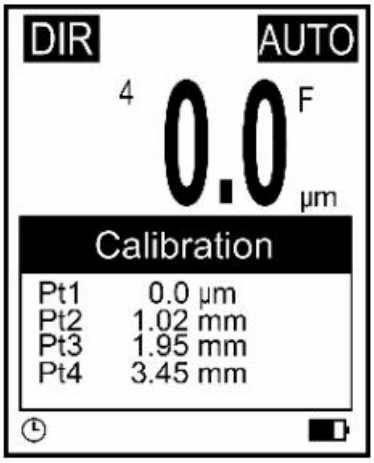
A zero-point calibration must be made on an uncoated calibration surface. If it is not possible to calibrate the meter on the sample, please use the calibration plates that come with the meter. A zero-point calibration is recommended where the measuring accuracy is ±(2 % + 1 µm). To carry out a zero-point calibration, follow these steps:



1. Press and hold →0← until you hear three beep sounds and ”ZERO“ is displayed.
2. Place the probe on the uncoated calibration surface and lift it as soon as you hear a beep sound.
3. Repeat that step several times in order to get a mean value.
4. Press →0← to leave zero-point calibration.

Multi-point calibration

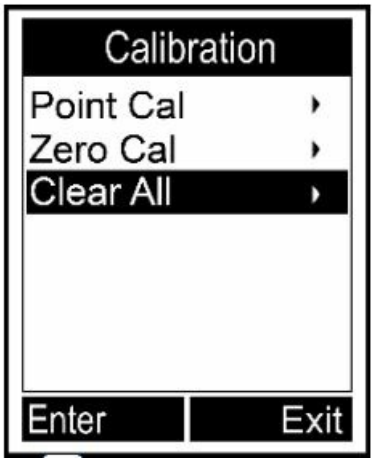
The meter’s multi-point calibration feature allows up to 4 calibration points to be considered. When making a single-point calibration, the calibration value should be as similar as possible to the expected measurement value. When making a multiple-point calibration, the expected measurement values should be somewhere between the calibration values. The permissible maximum measurement error is ±(2 % + 1 µm).



1. If you have already made a calibration, you have to delete the existing calibration values first, as described in chapter 5.1.3. If not, start with the next step.
2. In measure mode, press CAL to open the calibration dialogue which can be enabled or disabled in the calibration settings.
3. If you have previously made a zero-point calibration, the zero point will be used as the first calibration point. If not, follow the steps described in chapter 5.1.1.
4. Place one of the included standard foils on the uncoated calibration surface.
5. Place the sensor on the foil and remove it when you hear a beep sound. The reading will now be displayed.
6. Use the DEL REFRESH keys to adapt the reading to the actual foil thickness (flashing value) and confirm with ENTER. The calibration point will then be displayed in the dialogue box (non-flashing value). You can cancel the procedure with BACK.
7. Repeat these steps if you wish to get all four calibration points. Use a different standard foil for each calibration point.
8. Press CAL to exit the multi-point calibration.

Delete calibration

To start a new calibration, you can delete the calibration points recorded during zero-point calibration and during multi-point calibration individually. Follow these steps:



1. Press ENTER to enter the “Root“ menu.
2. Use the DEL REFRESH keys to navigate to “Calibration“ and confirm with ENTER.
3. Select according to the following subsections (a, b, c) what values you would like to delete.

Delete multi-point calibration values

1. Navigate to “Point Cal“ by using the DEL REFRESH keys and confirm with ENTER.
2. Use the DEL REFRESH keys to navigate to “Clear Magnetic“ or ”Clear Magnetic“ as required and confirm with ENTER.
3. A dialogue box opens. Confirm with ENTER to delete the calibration values or cancel the procedure with BACK.

Delete zero-point calibration values

1. Use the DEL REFRESH keys to navigate to “Zero Cal“ and confirm with ENTER.
2. Use the DEL REFRESH keys to navigate to “Clear Magnetic“ or ”Clear Magnetic“ as required and confirm with ENTER.
3. A dialogue box opens. Confirm with ENTER to delete the calibration values or cancel the procedure with ENTER.

Delete all calibration values

1. Use the keys DEL REFRESH to navigate to “Clear All“ and confirm with ENTER.

2. A dialogue box opens. Confirm with ENTER to delete all calibration values or cancel the procedure with ENTER.

Measurement

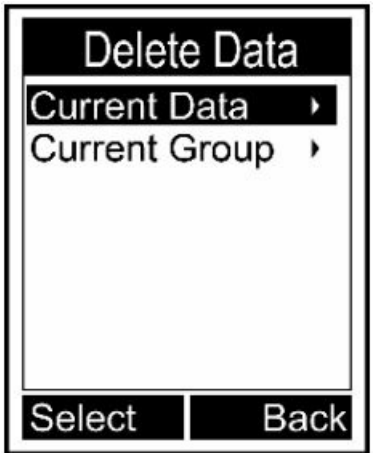
Procedure:

1. First connect the desired probe as described in chapter 4.2.
2. Make the required device settings (measure mode, group mode, probe mode, speed, etc.) as described in chapter 4.3.
3. Make a zero-point calibration and a multi-point calibration before the measurement (chapter 5.1).
4. Place the probe vertically on the surface to be measured. Lift the probe when you hear the beep sound.

Further functions

Delete data

Delete last reading



- In measure mode, press DEL to delete the last recorded reading.

1. Press ENTER to enter the “Root“ menu.
2. Use the DEL REFRESH keys to navigate to “Delete Data“ and confirm with ENTER.
3. Use the DEL REFRESH keys to navigate to “Current Data“ and confirm with ENTER.
4. A dialogue box opens. Confirm with ENTER to delete the last reading or cancel the procedure with BACK.

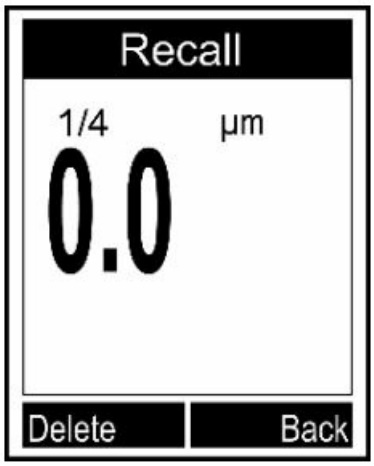
Delete current memory group

- In measure mode, press and hold DEL until you hear another beep sound if you want to delete all values saved in a memory group.

1. Press ENTER to enter the “Root“ menu.
2. Use the DEL REFRESH keys to navigate to “Delete Data“ and confirm with ENTER.
3. Use the DEL REFRESH keys to navigate to “Current Group“ and confirm with ENTER.
4. A dialogue box opens. Confirm with ENTER to delete all readings saved in the memory group or cancel the procedure with BACK.

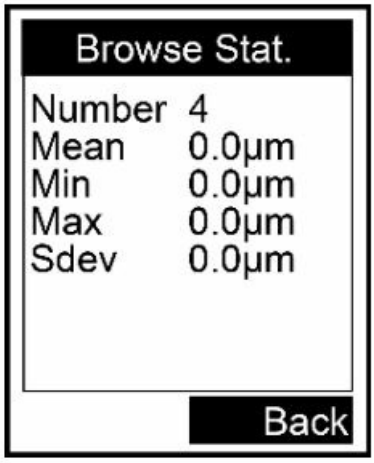
To delete other memory groups and values, change the memory group as described in chapter 4.3 and follow the steps above again.

Delete values



Press ENTER to enter the “Root“ menu. Navigate to “Recall“ with the DEL REFRESH keys and confirm with ENTER. In the upper left part of the display, you will now see what value of a memory group has been selected (1/4). Select the desired reading with DEL REFRESH. You can delete that reading by pressing ENTER.

Statistics



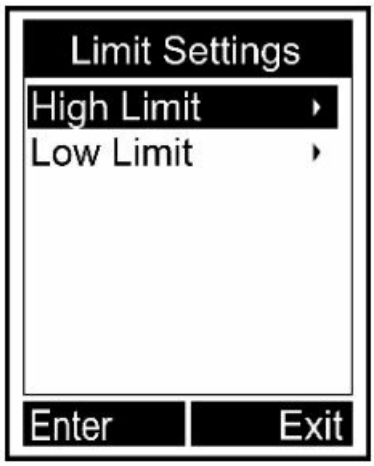
When making a measurement in measure mode, the current mean value, the maximum and the minimum values will be displayed below the current reading. To view the complete statistics, press ENTER first. In the menu that is now displayed, go to “Browse Stat.“ by using the DEL REFRESH keys and confirm with ENTER. You can now see the statistical values of the currently selected memory group. To view the statistics of the other memory groups, change the memory group as described in chapter 4.3 and go back to the statistics function.

The meter creates individual statistics based on the saved readings of each memory group. In the statistics, the number of readings, the mean value, the minimum and maximum values as well as the standard deviation will be displayed. When the memory is full in direct mode, the first reading will be deleted and the new reading will be saved. The statistics will be updated accordingly. When the memory is full in general mode, no new readings will be saved and the statistics will not be updated. If you delete the current reading or all readings of the group, the statistics will update.

Limit settings

Each memory group has its own upper and lower limit value. When changing the memory group, the limit values will be switched automatically. When a limit value is exceeded/fallen below, the red LED on the left will flash. Moreover, a ⬆ will be displayed when the upper limit has been exceeded or ⬇ a if the lower limit has been fallen below.

To enter the upper and lower limit value, follow these steps:



1. Press ENTER to enter the “Root“ menu.

2. Navigate to “Limit“ with the 

keys and confirm with 

.
3. Navigate to “Settings“ with the 

keys and confirm with 

.
4. Use the 

keys to navigate to “High Limit“ or “Low Limit“ and confirm with 

.
5. Set the limit value with 

and confirm with 

or cancel the procedure with 

.

To enter the upper and lower limit value, follow these steps:

1. Press 

to enter the “Root“ menu.
2. Navigate to “Limit“ with the 

keys and confirm with 

.
3. Navigate to “Clear“ with the 

keys and confirm with 

.
4. A dialogue box opens. Confirm with 

to delete the readings of the memory group or cancel the procedure by pressing 

.

To enter or delete the limit values of other memory groups, change the group as described in chapter 4.3 and follow the steps described above again.

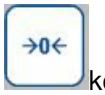
USB communication (only possible with optional software)

The meter can be connected to a PC for communication via the micro USB 2.0 connector. To do so, first install the software and the USB driver for the meter. Then connect the meter to your computer by using the USB cable. If the connection has been successful, you will see the **5** icon at the bottom of the display. You can now organise, format, print or copy the measured data on your PC.

System reset

To reset the meter to its factory default settings, follow these steps:

1. Press 
to turn off the meter.
2. Press and hold 

while turning on the meter with 
.
3. Release the 

key when the dialogue box for the system reset is displayed.
4. To reset the meter, confirm with 

or cancel the procedure with 

. The meter will restart

automatically.

Warranty

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

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.

www.pce-instruments.com

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Documents / Resources

	PCE Instruments PCE-CT 80 Material Thickness Gauge [pdf] User Manual PCE-CT 80 Material Thickness Gauge, PCE-CT 80, Material Thickness Gauge, Thickness Gauge, Gauge

References

- France.fr : Actualités, destinations et infos du tourisme en France
- iberica.es
- Computer Instruments | Home
- Discover Italy: Official Tourism Website - Italia.it
- N.E.E.D.S., (Nutritional Ecological Environmental Delivery System) specializes in providing products, information, and education
- PCEï¼ˆåŒ—äº¬ï¼‰ç§‘æŠ€æœ‰é™å…¬å¸
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