

USER MANUAL

ABSOLUTE MOISTURE METER

PCE-MA 200TS SERIES

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 INFORMATION



Please read this user manual carefully and completely before using the appliance for the first time. The appliance may only be used by carefully trained personnel. We accept no liability for damage caused by failure to observe the instructions in the operating manual.

- » This measuring device may only be used in the manner described in these operating instructions. Using the meter in any other way can lead to dangerous situations.
- » Only use the measuring device if the ambient conditions (temperature, humidity, ...) are within the limits specified in the 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 device housing may only be opened by qualified personnel from PCE Deutschland GmbH become.
- » Never use the measuring device with wet hands.
- » No technical modifications may be made to the device.
- » The appliance should only be cleaned with a cloth. Do not use abrasive cleaners or cleaning agents containing solvents.
- » The device may only be used with the accessories offered by PCE Deutschland GmbH or equivalent replacements.
- » Check the housing of the measuring device for visible damage before each use. If there is any visible damage, the device must not be used.
- » The measuring device must not be used in an explosive atmosphere.
- » The measuring range stated in the specifications must not be exceeded under any circumstances.
- » Failure to observe the safety instructions may result in damage to the appliance and injury to the operator.
- » The measuring device should be transported as horizontally as possible, on the floor and well padded. Make sure that the loose attachments are removed from the measuring chamber to avoid damage. It is recommended to keep the original packaging for transportation.
- » Only use appliance plugs with a PE contact.
- » Do not touch the halogen lamps or the cover during or after the measuring process, as this can cause serious burns.
- » After measuring, allow the sample to cool down before touching it.
- » Never operate the appliance with the lid open.

We accept no liability for printing errors or errors in the content of this manual. We expressly refer to our general warranty conditions, which can be found in our General Terms and Conditions.

Safety symbols

Safety instructions which, if ignored, may result in damage to the appliance or injury are also marked with a safety symbol.

Symbol	Designation / Description
	General warning sign Failure to observe this may result in injury and/or damage to the appliance.
	Warning of hot surface Non-observance can lead to burns.

SPECIFICATIONS

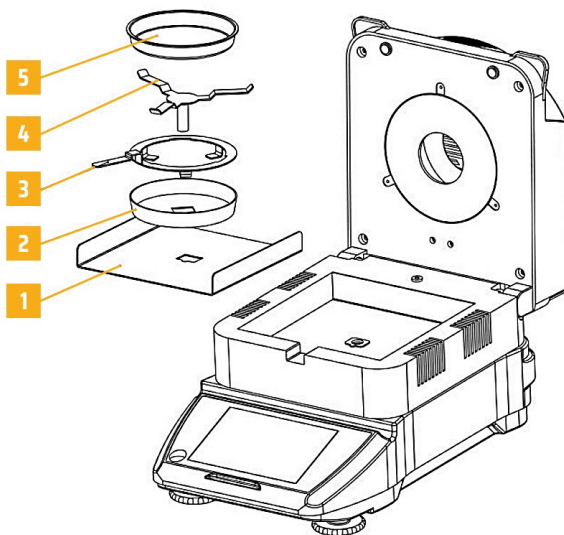
	PCE-MA 110TS	PCE-MA 200TS
Measuring range	0 ... 110 g	0 ... 200 g
Resolution	0.001 g	0.01 g
Accuracy	±0.003 g	±0.04 g
Heating element	Round halogen lamp, Ø 90 mm	
Temperature range	40 ... 165 °C	
Humidity display	0 ... 100 %	
Moisture dissolution	0.01 %	
Memory	32 dryings	
Interface	RS 232	
Display	5" Touchscreen	
Power supply	220 ... 240 V AC, 50 / 60 Hz	
Power consumption	300 W	
Dimensions	375 x 225 x 205 mm	
Weight	4.3 kg	

Conversion formulas

Display	Conversion formula	Description
%M	$=100 * (\text{starting weight} - \text{dry weight}) / \text{starting weight}$	Moisture in % in relation to the starting weight
%D	$=100 * \text{dry weight} / \text{starting weight}$	Dry matter in % of starting weight
%W	$=100 * \text{starting weight} / \text{dry weight}$	Starting weight in % of the dry weight
%R	$=100 * (\text{starting weight} - \text{dry weight}) / \text{starting weight}$	Moisture in % based on dry weight

Device description

- 1 - Heat protection
- 2 - Windbreak
- 3 - Insertion aid
- 4 - Sample pan stand
- 5 - Sample tray



COMMISSIONING

Assemble the scales in the following sequence:

First insert the heat protection, then the windscreen and finally the test pan stand. Then connect the power cable to the measuring device and the socket.

- » Allow the device to acclimatize to the new environment for at least 30 minutes after unpacking.
- » Adjust the height of the feet at the front of the appliance so that the scales are level.
- » Connect the scale to the mains by the power cable to the power connection of the scale on one side and to a socket on the other side.
- » The weighing cells of analytical scales are subject to temperature fluctuations.
- » Make sure that the scales are always in relatively constant ambient conditions (temperature and humidity).

REHEARSAL PREPARATION

Only ever prepare one sample for the measurement. This prevents the sample from exchanging moisture with the environment. If several samples have to be taken at the same time, they should be packed in airtight containers so that their properties do not change during storage. Spread the sample evenly and thinly on the sample tray, to obtain reproducible results. Uneven application leads inhomogeneous heat distribution in the sample to be dried, which results in incomplete drying or an extension of the drying time. Accumulation of the sample results in increased heating of the upper layers, which consequently to burning or incrustation. If the layer thickness is too great or if incrustation occurs, this prevents the moisture from escaping from the sample. This residual moisture means that measurement results obtained in this way are not comprehensible and reproducible.

Tools for sample preparation

The tools and instruments used for sample preparation are crucial for the accuracy and reliability of the measurement. Tools with heat-conducting properties should be avoided, i.e. they can transfer heat to the sample. Improper handling and preparation of the sample will falsify the final result of the measurement.

Disposable aluminum sample tray

In order to be able to measure the moisture content of the sample, the sample should be evenly on the sample pan and then placed in the drying chamber of the moisture analyzer. Reusing a sample tray can falsify the final result of the measurement due to the adhering residues.

Distribution of the sample

The samples should not exceed 8 mm in thickness and 90 mm in diameter. Exceeding the prescribed maximum height of the sample can lead to burning or encrustation of the sample. The sample should be applied as evenly as possible to the sample pan, preferably in 2 ... 5 mm thick layers. Make sure that the temperature sensor, which is in the lid of the moisture analyzer, does not touch the sample, as this will falsify the result.

Solids:

- » Distribute powdery and granular samples evenly on the sample tray.
- » Crush coarse-grained samples with a mortar or similar. Avoid applying any heat when crushing the sample, as this to moisture loss.

**Liquids:**

It is recommended to use the glass fiber filter for liquids, pastes or melting samples.

**Fiber optic round filter**

Glass fiber round filters ensure an even distribution of liquids on the sample pan and prevent solids from burning.

The round glass fiber filter has the following advantages:

- » even distribution due to capillary action
- » no droplet formation
- » fast evaporation due to larger surface area

Practical tips

Before you start the measurement, you should place the sample pan and, if necessary, the glass fiber round filter on the place and tare the pan stand so that only the weight of your sample is evaluated. If you take several measurements in succession, bear in mind that the temperature of the previous measurement still exists and that evaporation already occurs when the lid is closed, which can lead to measurement deviations. So either let the drying chamber cool down or the measurement deviations and start the next measurement as soon as possible.

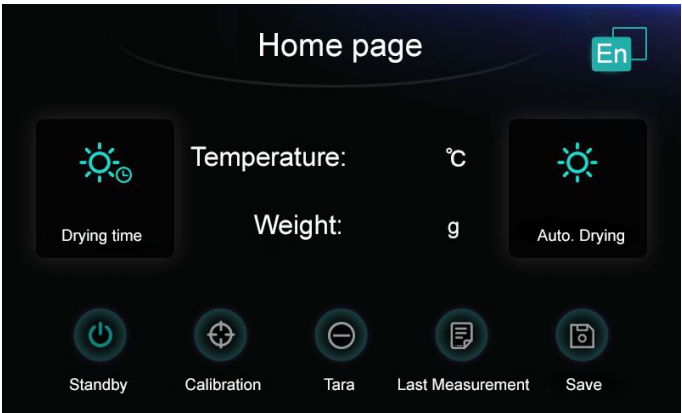
SWITCH ON AND OFF

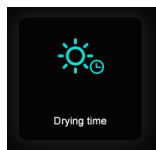
To switch the moisture analyzer on and off again, there is an on/off switch on the back switch. If the meter is switched off using this switch, it is de-energized.

As soon as the meter switched on, the following screen is displayed:



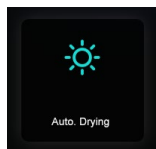
After the moisture analyzer has been activated, the start page is displayed. The current temperature of the drying chamber and the weight applied are shown there.





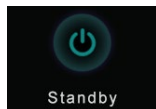
„Drying time“ measuring mode

Here, the sample is dried over an adjustable period of time.

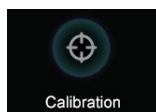


„Automatic drying“ measuring mode

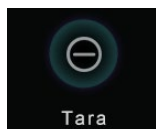
Here, the sample is dried until the weight has not changed for 8 seconds during drying.



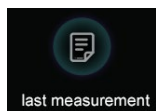
Switches the measuring device to standby. The display switches off completely after a few seconds. Pressing the touchscreen again reactivates the moisture analyzer scale.



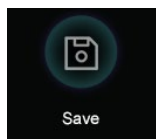
Calibrating the moisture analyzer scale and setting the date and time



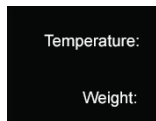
Tare the displayed weight



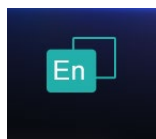
Display of the last measurement



Displaying the stored measured values



Display of the current temperature of the drying chamber and the weight



Setting the language

Automatic and time-based drying

There are two different types of drying. In automatic drying, the moisture analyser dries the sample until no weight difference is detected for a period of 8 seconds. In time-based mode, drying is carried out until the set drying time has elapsed.

Automatic drying

For automatic drying, you only need to set the drying temperature and drying mode. The temperature of the drying chamber and the weight on the sample tray are also displayed. If necessary, the weight can be tared using the 'Tare' button. Taring must always be carried out if only the sample weight is to be determined. The weight of the sample dish and accessories must be tared. Press 'Start drying' to start drying. There are two different types of drying. In automatic drying, the moisture analyser dries the sample until no weight difference is detected for a period of 8 seconds. In time-based mode, drying continues until the set drying time has elapsed.

Auto

Temperature °C current Temperature °C

Mode g

← back ▶ Start drying ⊖ tara

Time-based drying

For time-based drying, the drying temperature, drying time in minutes and drying mode are set. The longest drying time is 99 minutes.

The temperature of the drying chamber and the weight on the sample tray are also displayed. If necessary, the weight can be tared using the 'Tare' button. Taring must always be carried out if only the sample weight is to be determined. The weight of the sample tray and accessories must be balanced. Press 'Start drying' to start the drying process.

Drying Settings

Temperature °C current Temperature °C

Time Min g

Mode

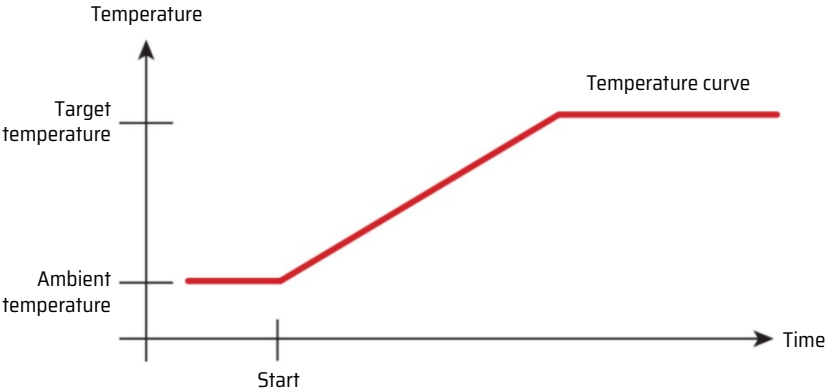
← back ▶ Start drying ⊖ tara

Drying mode

There are three different setting options for heating:

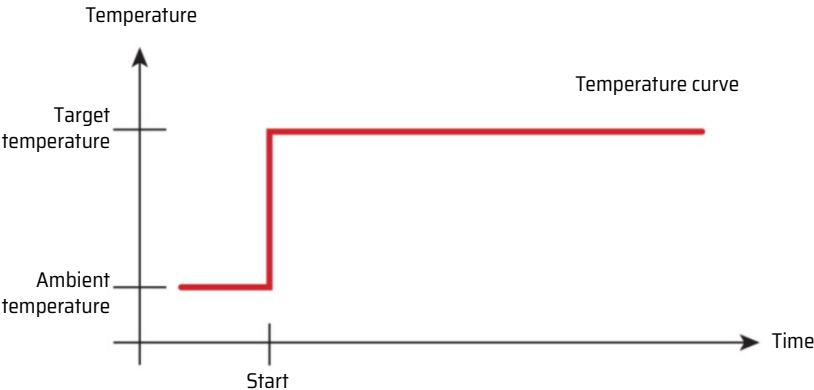
Slow heating up

With slow heating, it takes longer to reach the set temperature. On the other hand, drying is gentler on the sample. This can be helpful for samples with a high sugar content, for example, to allow the moisture to evaporate before a caramelized layer forms that bound water.



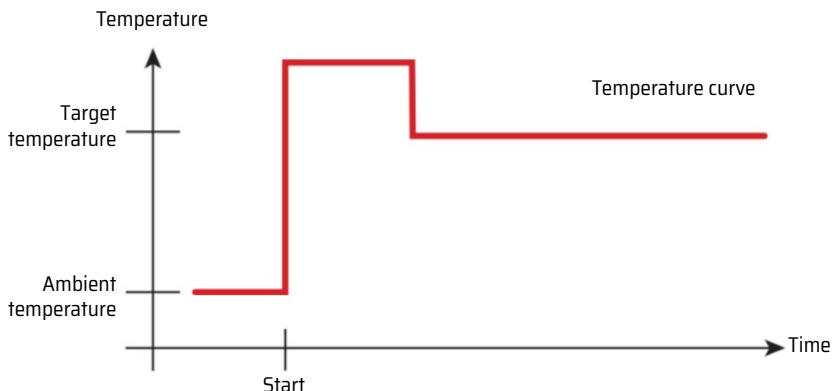
Normal heating

Normal heating is the standard drying profile. It is the most common and sufficient for most samples. In this drying profile, the target temperature is reached and maintained until the end of the measurement.



Fast heating up

Rapid heating can be used if the sample has a high moisture content. The temperature is exceeded by approx. 40 % in the first 3 minutes.



During the drying process

During drying, the target and actual temperature is displayed, as well as the current weight of the sample during drying with the moisture content. The graphical progression can be enlarged by touching it. If you press the graphic again, the view is reduced again.

End of drying

Drying is terminated as soon as the set drying time has elapsed or a weight difference is no longer detected in automatic mode or the measuring chamber has been opened or the measurement has been aborted by pressing the corresponding button.

- » After the measurement, an overview of the measurement is displayed. The measurement can be started via the „Save“ button to save the measurement. The measurement can be printed out via the connected printer using the „Print“ button. The „Calculations“ button allows you to view the various moisture calculations. If required, the measurement can be given an additional sample name.
- » For further weight information, the „Initial/final weight“ button can be used to display the initial and final weights. Final weight values can be called up.
- » The „Back“ button takes you back to the start page.

Note: Please note that both the sample and the measuring device are heated after a measurement. There is a risk of burns.

Retrieve measured values

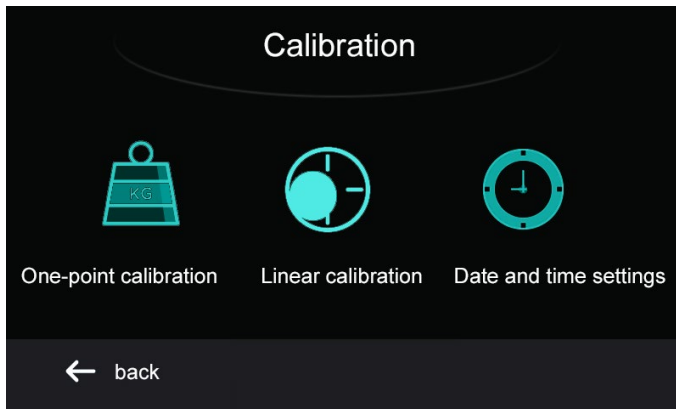
There are two ways to retrieve measured value:

- » To retrieve the measured values of the last measurement, go to „Last measurement“ on the start page. The last measurement can be saved and printed from there.
- » To retrieve the saved measured values, go to „Save“ on the start page. The saved measurement files can be retrieved from there.

Once the measurement data has been retrieved, it can be printed, deleted and renamed.

CALIBRATION

To calibrate the scale, go to the calibration menu via the „Calibration“ button on the start page. A single-point calibration or a linear calibration can be performed from here.



Single-point calibration

For a one-point calibration, select „One-point calibration“. Now follow the instructions on the display:

- » Remove everything from the weighing surface to set a zero point and then press „Start“.
- » Then place a 100 g weight on the weighing surface. Calibration starts automatically.

Once calibration is complete, press the „Back“ button to leave the calibration mode.

Linear calibration

For a linear calibration, select „Linear calibration“. Now follow the instructions on the display:

- » Remove everything from the weighing surface to set a zero point and then press „Start“.
- » Place 20 g on the weighing surface. The measured value for 20 g is calibrated automatically.
- » After calibration, remove the 20 g weight and place a 50 g weight on the scale. The measured value for 50 g is calibrated automatically.
- » After calibration, remove the 50 g weight and place a 100 g weight on the scale. The measured value for 100 g is calibrated automatically.
- » After calibration, remove the 100 g weight. Then press the button „Back“ to complete the calibration. You will return to the start page.

Setting the date and time

To set the date and time, go to the „Calibration“ button. There you will find the „Date and time setting“ button. You can now set the date and time from there. To do this, select the digit to be set.

The display is structured as follows: YYYY - MM - DD HH : MM : SS

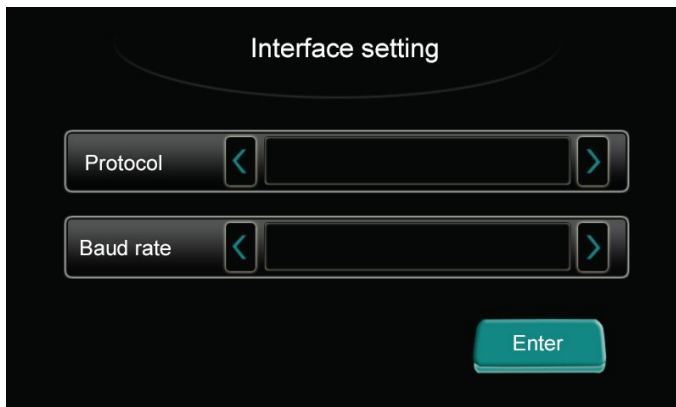
The „Back“ button does not apply the settings. With the „Date“ button and „time setting“, the settings are adopted.

SET DATA TRANSMISSION

It is possible to set the data transfer between a PC and a printer. This is done via the settings. The button for this is located to the right of the heading „Home page“. Press the area there three times.



The protocol and baud rate can be set from here.



ERROR MESSAGES

Error message	Reason for error	Possible solution
-Err 1-	Sample weight less than 1 g	Increase the sample weight
-Err 2-	Temperature setting lower than 40 °C	» Restart the scales » Increase the temperature setting
-Err 3-	Measuring time shorter than 30 s	» Restart the scales » Set the measuring time higher
-Err 4-	Halogen lamp defective	Contact PCE Deutschland GmbH
-Err 5-	Time setting in „Slow“ Mode shorter than 3 min	» Increase the time setting » Restart the scales
-Err 6-	Temperature sensor defective	Contact PCE Deutschland GmbH

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.

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