User Manual

Multifunction Moisture Meter PCE-MMK 1

Last change: 21 July 2020
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.
- 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.
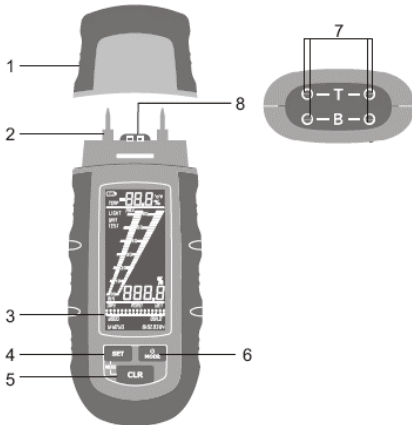
2 Description

2.1 Purpose

The multifunctional moisture meter PCE-MMK 1 has been designed for mobile use. The universal tester shows the moisture in building materials or wood as well as the air humidity and temperature. The display immediately shows a humidity reference value in %, so no conversion is necessary. The scope of delivery of the multifunction moisture meter PCE-MMK 1 includes various insertion probes for wood, building materials and stacks of paper or cardboard. By means of a self-test, the universal moisture meter can be checked for correct operation. In addition, the universal humidity and moisture meter has manual temperature compensation.

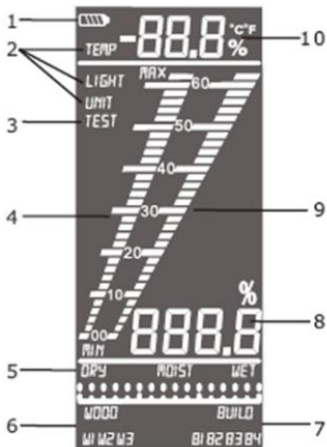### 2.2 Technical specifications of the multifunction moisture meter

Measurement range	Wood	1 … 75 %
	Building materials	0.1 … 2.4 %
	Temperature	-40 °C ... +70 °C / -40 ... +158 °F
	Humidity	0 … 100 % RH
Resolution		0.1 %
Accuracy	Wood	1 … 30 % / ±1 %
		31 ... 60 % / ±2 %
		61 ... 75 % / ±4 %
	Building materials	±0.5 %
	Temperature	-40 ... -10 °C, +40 ... +70 °C / ±2 °C
		-10 ... +40 °C / ±1 °C
	Humidity	0 ... 20 % RH, 80 ... 100 % RH: ±5 % RH
		20 ... 80 % RH: ±3.5 % RH
Electrode length		8 mm (internal), 30 mm and 150 mm (external)
Measuring principle		electrical resistance
Auto Power Off function		after approx. 3 min without use
Automatic backlight cutoff		after approx. 10 seconds
Housing		plastic, shockproof
Battery		3 x CR 2032
Environmental conditions		0 ... +40 °C / 32 ... 104°F, 0 ... 85 % RH
Dimensions		139 x 47 x 25 mm / 5.5 x 1.9 x 1.0 in
Weight		100 g / <1 lb (without electrodes)

2.3   Device overview

1. Protective cap
2. Measuring electrodes
3. Digital and analogue display
4. Setting key [SET]
5. Delete key [CLR]
6. Power / menu key [MODE]
7. Function test points on the protective cap
8. Sensor for ambient temperature and relative humidity

2.4   Display indications

1.	Battery status indicator
2.	Menu indicators:
	"LIGHT" - Set backlight
	"TEMP" - Set temperature compensation
	"UNIT" - Select °C or °F
3.	Self test mode
4.	MIN / MAX graph
5.	Dry / wet: indicator DRY, MOIST, WET
6.	Wood class (W1, W2, W3)
7.	Building materials (B1, B2, B3, B4)
8.	Moisture display (numerical)
9.	Moisture display (graphic)
10.	Temperature display

2.5   Delivery contents

1 x multifunctional moisture meter PCE-MMK 1
1 x measuring cap for self-test
1 x measuring cap for external electrodes
1 x ram electrode, 1 x penetration electrode, 1 x paper electrode
2 x 30 mm measuring tips, 8 x 30 mm needles, 2 x 80 mm needles, 2 x 150 mm measuring tips
2 x 300 mm extension
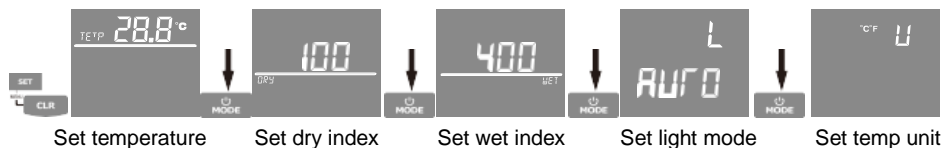2 x 10 mm needles (replacement for internal electrodes)
1 x user manual

3   Switching on/off

To switch on the device, press the [MODE] key for 2 seconds. The display will show the ambient temperature, a diagonal scale from 0 to 60 % and the moisture value 0.0 %. Below this, there is a horizontal scale with the marking DRY / MOIST / WET. At the very bottom of the display, you will see the indication WOOD W1 for woods of group 1 which is selected as standard material. Press the [MODE] key again for 2 seconds to switch off the unit. If you do not press any button within 3 minutes, the unit will switch off automatically to conserve battery power.
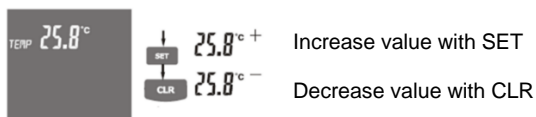
4   Device settings

Briefly press the "SET" and "CLR" keys simultaneously to open the settings menu. Use the "MODE" key to select one of the menu items. Then change the values with the "SET" or "CLR" key.

Set temperature   Set dry index   Set wet index   Set light mode   Set temp unit

4.1 Set material temperature compensation

The relative material moisture depends on the temperature of the material. The instrument automatically compensates this temperature by measuring the ambient temperature.

In addition, you can enter the temperature manually and thus increase the accuracy of the measured value. You can set the value with the "SET" key and the "CLR" key. This value is not saved and must be re-entered each time the instrument is switched on.

Increase value with SET

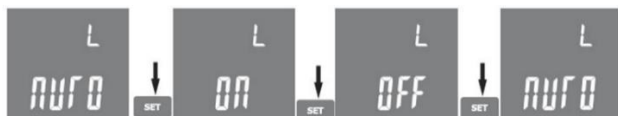Decrease value with CLR

4.2 Setting the moist / dry indicator

With the values for the dry and wet indicator, you can adapt the display of the DRY/MOIST/WET scale to a specific material. Once you have entered the appropriate values, you can see at a glance whether the sample is dry or too moist for your application. Use the [SET] key and the [CLR] key to increase or decrease the value and the [MODE] key to change from "Dry" to "Wet".

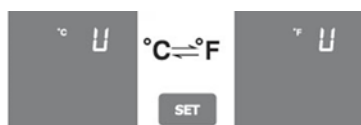### 4.3 Setting the display backlight

AUTO: The backlight is switched off automatically after a period of inactivity and is switched back on as soon as a measurement is started.
ON: The display backlight is permanently switched on.
OFF: The backlight is deactivated.
Press the SET key to switch between the backlight options. This setting is not saved. When the unit is switched on again, the function is set back to "AUTO".

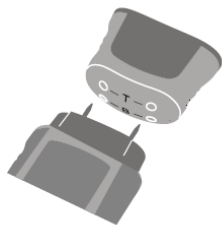### 4.4 Setting the temperature unit

You can switch the temperature unit from °C to °F. This setting will be saved to the device and is still available even after the meter is switched on again.
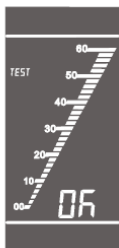
5   Self test

Go to TEST mode by pressing and releasing the MODE key. Place the electrodes at the contacts on the protective cap, marked with "T" and "B". Compare the display with the following pictures.
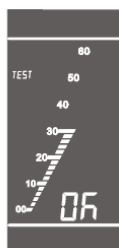
Contacts marked with B   Contacts marked with T

correct   incorrect   correct   incorrect

6   Measurement of the ambient temperature and air humidity

The universal moisture meter continuously measures the ambient temperature and relative humidity. The ambient temperature is used for temperature compensation during material moisture measurement, thus increasing the accuracy. Press and hold the [SET] key for 2 seconds to toggle the display between ambient temperature and relative humidity.

7   Moisture measurement

Before starting the measurement, you must first select the material group by briefly pressing the [MODE] key.

WOOD   for measurements in wood, wood-based materials and cardboard / paper, divided into 3 groups

BUILD   for building materials such as plaster, aerated concrete, screed and concrete, divided into 4 groups

TEST   to check the meter with the supplied protective cap

Then select the wood or building material group as described in the following sections 7.1 and 7.2. To measure the moisture content, slowly and carefully prick the measuring electrodes into the material (without applying much force). The puncture in wood should be vertical to the wood fibres. At a moisture content of less than 20 %, the penetration geometry is of no great importance for the measurement result. Always measure at several points for comparison or to be able to calculate an average value.

For hard woods and building materials, the use of ram electrodes is recommended. These are connected to the plug on the protective cap via the connection cable. The paper electrode is connected in the same way. For very hard material, where there is a risk of destroying the meter (breakage of the needles), it is also possible to drive in two nails and apply the electrodes to these.

7.1 Selection of wood group (W1, W2, W3)

The device has three groups (W1, W2, W3) for wood and wood-like materials. You can change the group by briefly pressing the [SET] key. The following chart shows what kind of wood belongs to which wood group.

Wood groups			
W1	**W2**		**W3**
Abachi	Agba	Mahogany	Afrormosia / assamela
Pear tree	Maple	Pine tree	Rubber tree
Black afara	Alder	Chestnut	Coco-produa
Beech	Aspen	Khaya	
Dabema	Balsa	Cherry	Cork
Ebony	Tree heath	Pine	Melamine chipboard
Red oak	Beech, European	Poplar (general)	Phenolic resin chipboard
Oak	Birch, yellow birch	Plum	
Ash	Logwood	Sandalwood	
Ash, American	Oak	Swiss pine	
Ash, Japanese	Aspen	Walnut	
Lime tree	Alder	White maple	
Rosewood	Alder, red	White birch	
Rosewood	Alder, black	White beech	
Copper beech	English oak	White Poplar	
Silver poplar	Ash	Juniper	
Teak	Yellow birch	Trembling poplar	
Winter linden	Yellow pine	Cypress	
Winter linden, American	Douglas fir	Elm	
Willow	Red cypress		
White oak	Horse chestnut	Wood fibre insulation board	
Cedar	Tree of life	Fibreboard	
Cypress	Larch	Kauramin chipboard	
Cardboard	Chestnut	Paper	

7.2 Selection of building material group (B1, B2, B3, B4)

The device has characteristic curves for four groups of building materials. You can switch between these by briefly pressing the [SET] key.

B1   Plaster

B2   Aerated concrete

B3E   Screed

B4   Concrete

7.3 Wet / dry indicator

Below the measured moisture value, the test instrument shows a moisture evaluation in the form of a scale on the display. During the measurement, a small marking point above the scale moves from left to right. The scale has 3 main ranges: DRY / MOIST and WET. These have 5 divisions each. This indicator is only meaningful if suitable minimum and maximum values are set for the material to be measured, see chapter 4.2. A minimum value of 70 and a maximum value 850 can be recommended as a starting value and then the values must be adjusted upwards or downwards, depending on the desired indication.

8 Battery replacement

If the battery voltage is too low, this is indicated by an icon in the display. You must replace the batteries when the icon is visible. To do this, remove the screw on the back of the device and replace the batteries, making sure the polarity is correct when inserting the new batteries.

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.

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