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by Schaller Messtechnik

User manual

humimeter PM4
paper moisture meter
## with paper temperature measurement

Measuring procedure

1. Switch on the device by pressing the power button (⏻) for 3 seconds.

2. As the next step, please do the self calibration. The word "Reinitialize?" will show up on your display. Accept by pressing the ✓ button. Hold the humimeter PM4 in one hand up in the air and make sure that nothing stands behind the steel clamps (distance min. 200 mm). Now press the second button (✓) with one finger. The calibration procedure will take a few seconds. During that time, the instrument has to be held up in the air and the measuring field (steel clamps) must NOT be touched. Hold PM4 same in your hand like at measuring process. The device is ready when measuring menu appears at display.

3. Select the right calibration curve using the buttons ▲ or ▼. The name of the calibration curve is shown at the top of the display. Please see the instructions for selection of calibration curve below.

4. Hold the device in one hand and press it onto the paper roll (at the breadth) resp. onto the paper pile with gentle compacting pressure (1,0 kg). The contact-free temperature sensor on the back side must not be covered.

5. Now the display shows the water content. The temperature of the paper is shown on the left.

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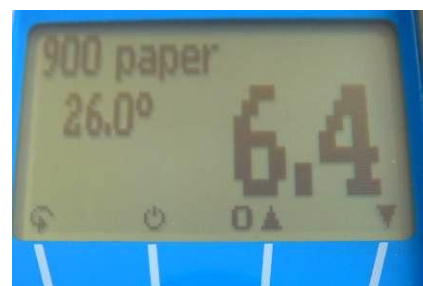
6. To save the results in the save menu press the ⊡ (⏶ button). The storage was successful when the number in front of the symbol ⊡ increased. To reach the store menu please press the left (⊕) button.

7. The menu level „Options -> Log time" offers the possibility to activate the menu item „3 sec.". If you press the ⊡ (⏶ button) in the measuring window after activation, the device will save a measuring value every 3 seconds.
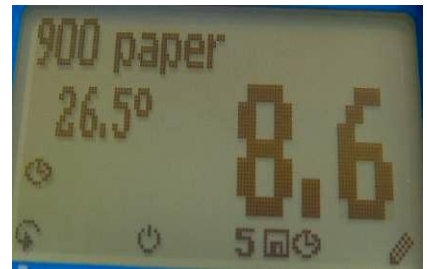
8. Pressing the button ✎ (⏷ button) completes the saving series. Now you can name the saved values using the arrow keys (supplier 1).

Checking the calibration

We recommend to check the calibration of your humimeter PM4 every 4 weeks, using the proof plate delivered with the device. For this check the device has to show a temperature between 18,0 and 24,0°C.

Switch on the instrument and select the calibration curve „reference" using the arrow keys. Hold the humimeter PM4 in one hand and press it onto the grey proof plate (compacting pressure of 1,0kg). Make sure that you hold the device horizontally and the steel clamps are positioned at least 1 cm from the edge of the proof plate.

The shown value should range between 18,5 and 20,5.

If the shown value is out of this range, please contact Schaller GmbH.

Selection of calibration curve

Due to the countless number of paper types there is no standardised allocation of calibration curves. The different calibration curves refer to the different densities of paper or paper rolls. The list of calibration curves below shows suggestions for paper types.

To ensure the best accuracy of your measurement you have to carry out a comparison measurement using your online moisture measuring system or by kiln-drying (according to DIN 287) once.

1.) Measure the water content of your paper using all calibration curves that offer realistic results and write down the measuring results of the different calibration curves.

2.) Now please note the effective water content determined by your online measurement system or carry out a reference measurement according to EN ISO 287.

3.) Compare the determined reference water content with the measuring results of the different calibration curves. Use the calibration curve with the measuring result nearest to the reference water content. *Info: The name of the calibration curve can be modified to your specific paper name!*

Determination of the reference water content

The humimeter PM4 determines the water content, which means that it calculates the moisture referred to the total mass (EN ISO 287):

$$\%WG = \frac{Mn - Mt}{Mn} \times 100$$

Mn: Mass of the sample before drying
Mt: Mass of the dried sample
%WG: Calculated water content

Contact-free temperature sensor

The back side of the humimeter PM4 contains an embedded temperature sensor for the contact-free temperature measurement below the sensor. This ensures the determination of the temperature of the product within seconds and consequently the temperature compensation of the displayed water content.
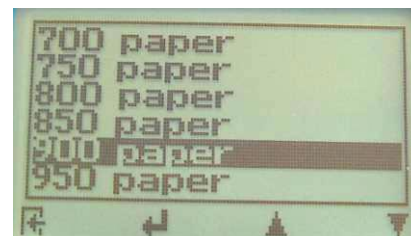
The sensor must not be covered by a hand or any other object!

Calibration curves

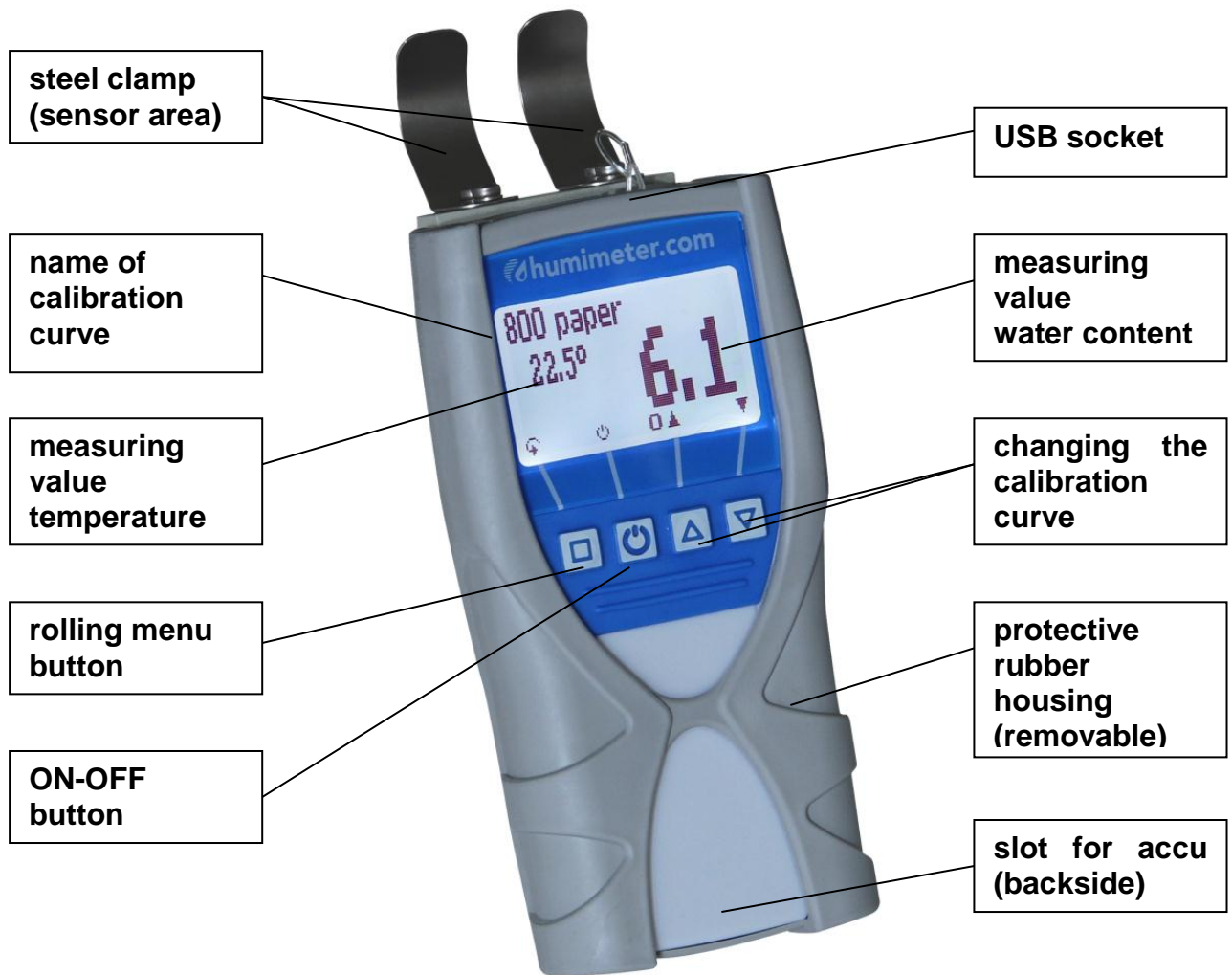| name	paper type	density
600 paper	Very low density paper	600 kg/m³
650 paper	Low density paper	650 kg/m³
700 paper	Low density paper	700 kg/m³
750 paper	Fluting, Schrenz	750 kg/m³
800 paper	Newsprint paper	800 kg/m³
850 paper	Kraftliner brown	850 kg/m³
900 paper	Kraftliner White Top, Testliner brown	900 kg/m³
950 paper	Testliner white, copy paper	950 kg/m³
1000 paper	Copy paper, LWC raw	1000 kg/m³
1050 paper	Copy paper calendered	1050 kg/m³
1100 paper	Copy paper calendered	1100 kg/m³
1200 paper	LWC calendered	1200 kg/m³
1300 paper	Flysheet paper	1300 kg/m³
1400 paper	Flysheet paper	1400 kg/m³
1500 paper	Flysheet paper high density	1500 kg/m³
1600 paper	Flysheet paper very high density	1600 kg/m³
Empty 1700	*For creation of customer calibration curve*	
Empty 975	*For creation of customer calibration curve*	
Empty 550	*For creation of customer calibration curve*	
reference	*! Only for checking the instrument !*	

List of calibration curves

By pressing one of the arrow keys in the measuring window for approx. 3 seconds a list of all available calibration curves opens. Now you can select your desired curve using the arrow keys and confirm by pressing ⏎.

Design of the device

steel clamp
(sensor area)

USB socket

name of
calibration
curve

measuring
value
water content

measuring
value
temperature

changing the
calibration
curve

rolling menu
button

protective
rubber
housing
(removable)

ON-OFF
button

slot for accu
(backside)

800 paper
22.5°
6.1

Device maintenance instructions

To provide a long life of your device please do not expose it to strong mechanical loads or heat e.g. dropping it or direct sunlight exposure.

The instrument is not rainproof. Keep it in dry areas. Clean the device only with a dry cloth (excluded temperature sensor). For cleaning the steel clamps you can also use alcohol. Please do not deform the steel clamps.

Do not touch the contact-free temperature sensor. Clean it by blowing, but do not use compressed air.

If the device is not used for a longer period (2 months) or when the batteries are empty, they should be removed to prevent a leakage of the battery acid.

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Menu level overview

type selection menu

Next calibration curve
Previous calibration curve
Power off (3 sec.)
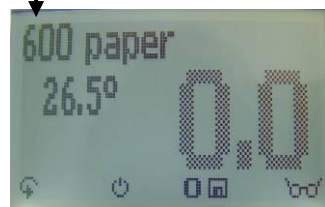
store menu

Watch last saved data
Save new value
Power off (3 sec.)
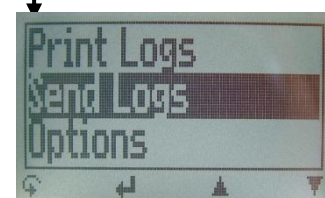
main menu

Switch upper
Switch lower
Open this menu/Enter

Keypad symbols

measuring window:

⟳	Rolling menu
⏻	Power ON / OFF
▲	Switch upper
▼	Switch lower
🖫	Save
🄷	Hold
ᴏ⌐ᴏ	Watch saved data
✎	Add supplier´s data

menu:

↵	Enter
▲	Switch upper
▼	Switch lower
⭲	Back
0..9	Enter numbers
A..Z	Enter letters
＞	Next or right
＜	Left
✓	Yes
✗	No
⇧	Shift
OK	OK

Overview main menu

Data storage	*Options*
Manual logs	Date / Time
Auto logs	Emission ratio
Clear logs	Log Time
	Language
Print logs	Unlock
Last logs	°C / °F
All logs	Calibrate
Clear logs	o Userlevel
	BL On time
Send logs	Auto Off time
Manual logs	Materialcalib.
Auto logs	Password
Clear logs	Reset
Options	SN.
	Logo
	TM

Charging the batteries

Connect the provided USB cable to the device and the other end of the cable to a PC or another USB charging adapter. It takes about 6 hours to charge the completely discharged batteries. Please make sure that the **temperature during the charging process is between 0°C and 45°C**, as otherwise the batteries may be destroyed.

Hardware Reset

In case that your humimeter device does not respond to any key press or cannot be switched on, there can be carried out a hardware reset directly by the customer. Please note: the accumulator must be charged before your start the following procedure:

Slide a pair of tweezers or a small screw driver below the cover cap. If your tool stick, try again at another position (the arrows on the image show the positions). Do not use any force. Open the cover cap and push the push button using your tool. Now the humimeter will restart. Fix the cover cap again.

If it will not restart, please contact your technical support.

Exemption from liability

For miss-readings and wrong measurements and of this resulting damage we refuse any liability. This is a device for quick determination of moisture. The moisture depends on multiple conditions and multiple materials. Therefore we recommend a plausibility check of the measuring results. Each device includes a serial number and the guarantee stamp. If those are broken, no claims for guarantee can be made. In case of a faulty device, please contact Schaller GmbH (www.humimeter.com) or your dealer.

Transfer saved data to the PC

To send your saved logs to the PC, connect the humimeter device to your PC using the USB cable that was delivered with your device. Carefully loose the protection cap on your humimeter and plug in the USB mini B connector. The bigger connector has to be connected to a USB slot on your PC.

Start the LogMemorizer software on your PC and switch on your humimeter PM4.

The data transfer can be started on your humimeter or on the software:

Starting the data transfer on the humimeter:

Press the ⟳ key until you reach the menu (see image on the right). Then select „Send Logs" and confirm by pressing the ↵ key. Now select „Manual Logs" and confirm by pressing ↵ again. All saved logs will be sent to your PC.

Starting the data transfer on your PC:

Press the button „remote control" in the LogMemorizer software. A drop-down menu with several options opens (see image below).

For transferring the data you can select „Import last manual log" (the last saved measuring series is transferred) or „Import all manual logs" (all saved logs are transferred).

If you click on one of these menu items, the transfer starts immediately.

For the basic adjustments of the software please look through the instructions on the LogMemorizer USB flash drive.
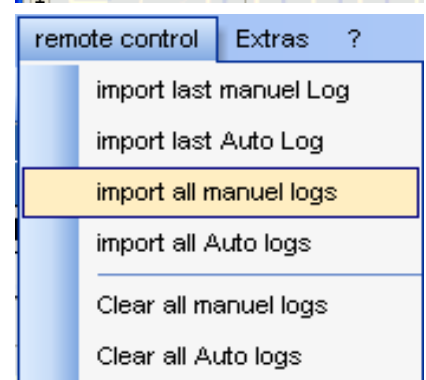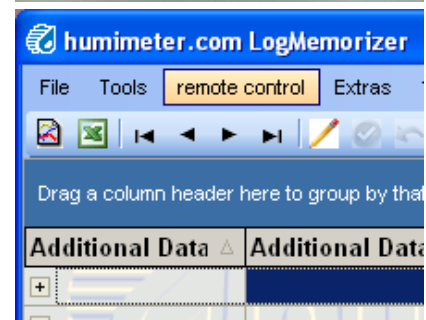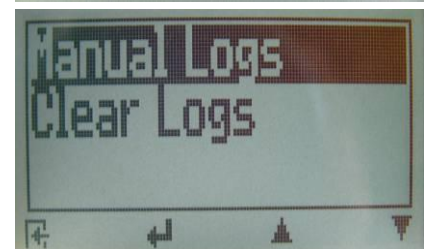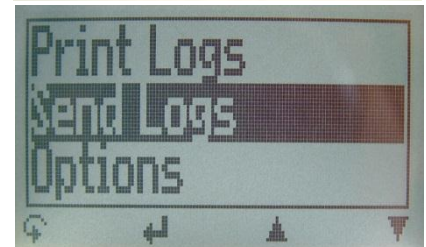
Print saved data (logs)

To print your saved data, connect the device to the printer using the printer cable that was delivered with your device. Carefully loose the protection cap on the humimeter PM4. At first plug in the side of the connector with the close plastic casing at the humimeter PM4. Then switch on the device.

Not till then the other side of the cable has to be plugged in at the printer. Switch on the printer by pressing ⏻. Now the green LED is blinking. If it does not blink, please change the batteries and try again.

Press the ↻ button at your humimeter until you reach the menu (see image on the right). Select „Print Logs" and confirm by pressing ↵.

Now you can select if you want to print the last saved measuring series or all saved measuring series (logs). Confirm by pressing ↵ again. The selected logs are printed out now.

To save paper, please think of clearing the data storage regularly.

Emission ratio

The infrared temperature measurement depends on the emission ratio of the measured product. By default, the humimeter PM4 contains the emission ratio of paper (0.950). For changing this value, please proceed as follows:

Press the ↻ key as long as you reach the main menu. Choose the menu item "Options" and confirm by pressing ↵. Then choose the item "emission ratio" and confirm with ↵ again.

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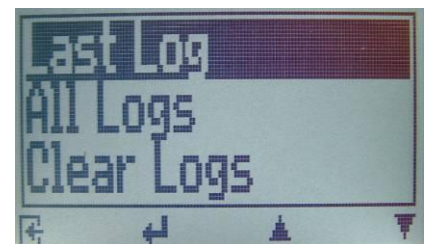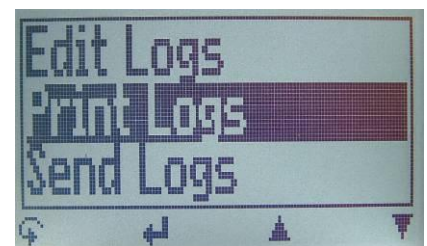
Technical data

Measuring depth	50 mm
Minimum material thickness	100 mm
Resolution	0.1% water content; 0.1°C; 0.3°F
Measuring range	1 to 25% water content
Temperature measurement	-25°C to +125°C; -13°F to 256°F
Angle temperature sensor	90°
Paper temperature	0°C to +80°C; 32°F to 176°F (for moisture measurement)
Surrounding temperature	0°C to +50°C; 32°F to 122°F (for measuring device)
Storage temperature	-20°C to +60°C; 32°F to 122°F (for measuring device)
Temperature compensation	automatically
Memory for measured values	up to 10.000 values
Menu languages	German, English, French, Italian, Spanish, Russian
Power supply	4 pcs. 1.5 Volt AA Alkaline batteries (for approx. 900 measurements)
Switch off time	after approx. 4 minutes
Power consumption	60 mA (with display lighting)
Display	128 x 64 matrix display, with LED backlighting
Dimensions device	182 x 75 x 54 mm
Weight device	340g
Protection class	IP 40
Dimensions case	340 x 275 x 83 mm
Weight case & device	1,1 kg
Scope of supply	humimeter PM4, accumulator, USB data interface, contact-free temperature sensor, plastic case, proof plate, protective rubber housing, user manual
Options	mobile printer

Common reasons for incorrect measurements

- *Wrong calibration curve*

  Double-check the correct selection of the calibration curve before measuring.

- *Inadequate thickness of the paper pile*

  A single sheet of paper must NOT be measured. Make sure that the paper pile below the steel clamps has a thickness of at least 100 mm.

- *Electro conductive material*

  Every metallic object as well as electro conductive packing material e.g. paper coloured by soot or wire has a negative effect on the accuracy of your measurement. Make sure that in an area of 20 cm below the sensor steel clamps there is no such material.

- *Product temperature out of application range*

  Paper temperature for moisture measurement must be between 0 and +80°C (32 and 176 °F).

- *Discrepancy in temperature between device and material*

  Please ensure that the device and the material under test are being stored at nearly the same temperature before measuring. A high temperature difference has a negative effect on the stability of the measurement results.

- *Measurement at the front side*

  A measurement at the front side of a paper roll will bring different measuring results. For that you have to select a different calibration curve.

- *Bended steel clamps*

  If the steel clamps (measuring area) are bended you might get wrong measuring results.

Please note:

- After measuring at the running paper roll for a longer period the steel clamps will get hot – don´t touch! => risk of getting burned!

- Measuring fine paper at the running roll may cause pressure marks on the paper => for possible damages at the paper we refuse any liability.