


User manual

LM6


leather moisture meter




Operation and handling:


Switching on: Press the  button for 3 seconds.

Changing the calibration curve:  or  key.

Switching on the display lighting: Press the  button briefly; the lighting switches off automatically after approx. 20 seconds. Pressing any key activates the lighting again and prolongs the switch-off time to 4 minutes.

Switching off: Press the  key for 5 seconds; the device will switch off after releasing the key. After approx. 4 minutes the device will switch off automatically.

Measuring procedure:

Switch on the humimeter LM6 by pressing the  key for 3 seconds. Select the appropriate calibration curve using the arrow keys.

Hold the device in one hand and press it onto the leather well-setted (4 kg compacting pressure).

The leather pile has to be at least 10mm high!

The display shows the water content immediately (large numbers).



Calibration curves

Name	Calibration curve	density
leather LD	leather of low density	0,55 g/cm ³
leather CR	leather chrome tanned	0,60 g/cm ³
leather MD	leather of medium density	0,65 g/cm ³
leather FOC	leather free of chrome, fire protection leather	0,70 g/cm ³
leather HD	leather of high density	0,75 g/cm ³
leather VHD	leather of very high density	0,80 g/cm ³
Reference	! Only for checking the instrument !	

Selection of calibration curves

Due to different manufacturing methods and different densities of the leather there is no standardised allocation of calibration curves.

In the above list of calibration curves you can find information regarding manufacturing methods and density that enables a preselection of the calibration curve.

To ensure the best accuracy of your measurement, we recommend to carry out a comparison measurement by kiln-drying (norm DIN 53304) once:

- 1.) Take a leather pile of 10-15mm of the format A6 with average moisture content.
- 2.) Measure the water content of this leather pile using all available calibration curves and write down the measuring results of the different calibration curves.
- 3.) Take the 2 top leather pieces of the pile and carry out a reference measurement according to DIN 53304.
- 4.) 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.

Determination of the reference water content

The humimeter LM6 determines the water content, which means that it calculates the moisture referred to the total mass (DIN53304):

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

Mn: **Mass with average moisture content**
Mt: **Mass of the dried sample**
%WG: **Calculated water content**

Short description of norm DIN53304:

Take a leather piece according to DIN 53302 T2 or DIN 53303 T2. For the determination of the water content, weigh the leather piece with an accuracy of 0,001 g (mass Mn). Put the piece of leather in a glass bowl that was dried at (102 ± 2) °C and was weighed after cooling to room temperature. Dry the opened glass bowl in a drying chamber at (102 ± 2) °C for 5 hours. After closing the glass bowl cool it in an exsiccator. Now determine the mass (Mt). After that, go on with the above described drying procedure in the drying chamber for one further hour, cool and weigh again. If the weight after the second drying period decreases less than 0,1 % of the initial weight, the assay is finished. If the decrease of weight is higher than 0,1 %, the drying has to be continued. The total period of drying must not exceed 8 hours.


Design of the device





Menu


There are 3 menu levels.


The symbols show the key functions in the different menus.


- 1. Type selection :    
- 2. Saving :    
- 3. Main menu

 Rolling menu: Use this key to enter the different menu levels and main menu.


 Power: Press this key for 3 seconds to switch the instrument off or on. Press this key briefly to activate the display lighting.


 Up: This key moves you to the next type/calibration curve.


 Down: This key moves you to the previous type/calibration curve.


 Disk: Use this key to save measurement values.

If the number in front of the disk symbol increases, the measuring value has been saved.

Alternatively:  Hold: The currently shown measurement value is held. It is released when another key is pressed.

 View logs: If no logs are active, you can use this symbol to view the saved measuring series.

Alternatively:  Edit logs: If logs are active, you can press this symbol and then enter e.g. batch number and supplier's data for the series.

In the saving level, press  (rolling menu) to enter the main menu.

Main menu

Edit logs
Manual logs
Clear logs





Print logs
Last logs
All logs
Clear logs

Send logs
Manual logs
Clear logs

Options
Date / Time
Logtime
Language
Unlock
°C / °F
Calibrate
o Userlevel
BL On Time
Auto Off time
Materialcalib.
Password
Reset
SN.
Logo
TM
Admin

Status

Key functions in the menu

-  Confirm – activates menu item
-  Up – long press => jumps to the start of the menu
-  Down – long press => jumps to the end of the menu
-  Exit – exits the menu item or menu

Common reasons for incorrect measurements

- **Wrong calibration curve**
Double check the correct selection of the calibration curve before measuring. The calibration curve „reference“ must NOT be used.
- **Inadequate thickness of the leather pile**
A single leather hide must NOT be measured. Pile the leather to ensure a thickness of at least 10 mm.
- **Metal below the material**
During the measurement there must NOT be any metal for at least 100 mm under the measured material.
- **Product temperature out of application range**
The application range is between 0 °C and +40 °C.
- **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.

Looking after the instrument

Do not drop the instrument or expose it to excessive temperatures. Only clean it with a lint-free, dry cloth. The instrument is not waterproof.

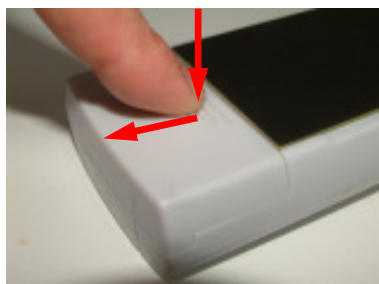
How often you need to check the instrument depends on the use and the required level of accuracy in your field of operation. For a fee, Messtechnik Schaller GmbH can also carry out a calibration at their factory. In this case you will also receive a calibration certificate.

Changing the batteries

Your new device is provided with batteries. Please find enclosed the manual for changing of batteries:

At first remove the rubber protective housing. For that, hold the rubber housing at the upper side and pull it over. If your humimeter is provided with an optional USB port, you have to remove the protection cap before. Press with your finger onto the arrow of the battery cap und pull it back.

Remove the empty batteries. Put four new batteries in the device. Make sure that the position of the battery poles is correct. Press down the batteries and close the cap.



Exemption from liability

For miss-readings and wrong measurements and of this resulting damages we refuse any liability. As this rapid measurement procedure is influenced by product-specific and application-specific conditions, we recommend to carry out a plausibility check on the measurement results. Each instrument has a serial number and a warranty seal. If this is broken we cannot provide warranty. If the instrument is defective, contact Messtechnik Schaller GmbH or your supplier.

Checking the calibration

We recommend to check the calibration of the humimeter LM6 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 LM6 in one hand and press it onto the grey proof plate (compacting pressure of 4,0kg).

The shown measuring value should range between **14,5** and **15,5**. If the shown value is out of this range, you have to carry out a calibration (see instructions below)



Calibration

By a zero point adjustment you can correct a too high deviation of the calibration check.

For that please proceed as follows:

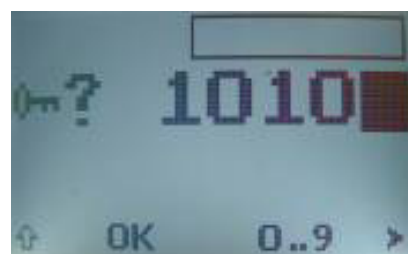
Press the left key twice to reach the menu level. Navigate to the menu item „Options“ using the arrow keys. Confirm by pressing the **↵** button.



Select the menu item „Calibrate“ using the arrow keys and confirm by pressing the **↵** key.



This menu item has to be unlocked. For that you have to enter the 4-digit serial number of your humimeter LM6. You can find the serial number on the top right edge of your display a short time after switching on the instrument, or on the sticker in the battery slot.



Press the third button as long as the black bar stands on the first digit of the serial number. After a waiting time of a few seconds the device accepts the entered digit. Now the other 3 digits have to be entered. When the 4-digit number has been entered correctly (see picture), press the **↵** button to confirm.



The request “Reinitialize?” will appear at the display.

Hold the humimeter LM6 in one hand and make sure that nothing stands behind the measuring field (black plate). 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 must NOT be touched.

The device is ready when the shown picture on the right disappears automatically.



Technical data

Measuring depth	5 mm
Minimum material thickness	10 mm
Measuring range	3% to 65% water content
Temperature measuring range	-10 °C to +50 °C
Resolution	0.1% water content ; 0.5 °C
Operation temperature range	0 °C to +40 °C
Storage temperature	-20 °C to 60 °C
Temperature compensation	automatically
Memory for measured values	approx. 10.000 values
Menu languages	German, English, French, Italian, Spanish, Russian
Power supply	4 x 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	147 mm x 75 mm x 30 mm
Weight	265g (incl. batteries)
Protection class	IP 40
Scope of supply	LM6, 4 x 1,5 Volt AA Alkaline batteries, wooden case, proof plate, rubber protective housing, user manual
Options	PC interface incl. software and cable, mobile printer (only with option 1)

