User manual

paper moisture meter RH5.1
with sword-sensor

version 2.0_en

User manual

Positioning the instrument

Insert the sword-sensor into the stack for only approx. 10 cm, and push it a few more centimetres into the stack every 10 seconds. Let your humimeter RH5 adequately adjust to the material (at least five minutes) before you start to measure, particularly when the material pile was stored at a different temperature than the device. When removing the sword-shaped sensor please ensure that there is no up or down movement, because this could deform the sensor. For heavy stacks and rolls please use the optionally available sword sensor holder and the tool for removing the sword sensor holder.

Measurement

To switch on the instrument, press the ⏻ key for three seconds.

After showing the logo, the measuring window opens and the current temperature and moisture value is displayed.

In the type selection menu the calibration curves can be changed by pressing ▲ or ▼. The calibration curves saved in the device can be found in the following list.

List of calibration curves

calibration curve	description	unit	measuring range
rel. humidity	relative humidity of air	% rh	0 to 100%
dew point	dew point	°C resp. °F	-55 to +60 °C r. -67 bis 140 °F

Description of definitions

Relative air humidity: indicates the relation between the current water vapour pressure and the maximal possible water vapour pressure (called saturation vapour pressure)

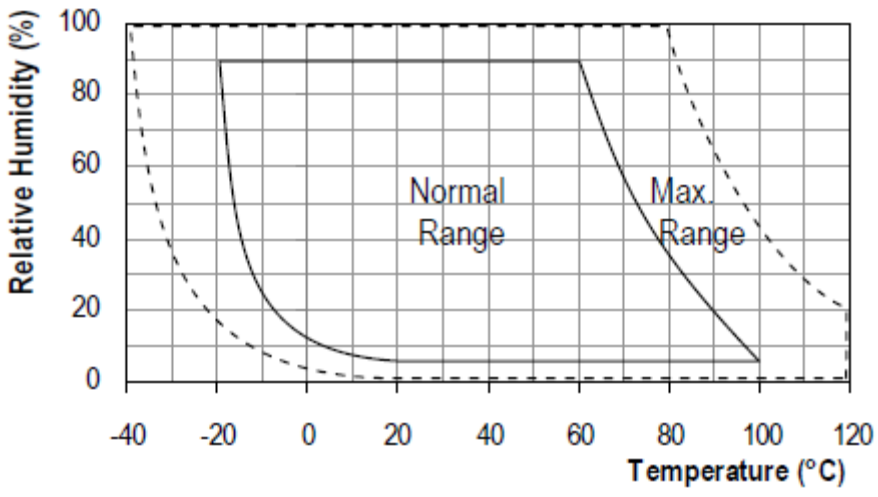
The relative humidity shows the degree the air is saturated with water vapour. For example:

50% relative humidity indicates that at the current temperature and the current pressure the air is saturated with water vapour for half of its value, 100% relative humidity means that the air is totally saturated. When the air has more than 100% of relative humidity, the excessive moisture would condense or form fog.

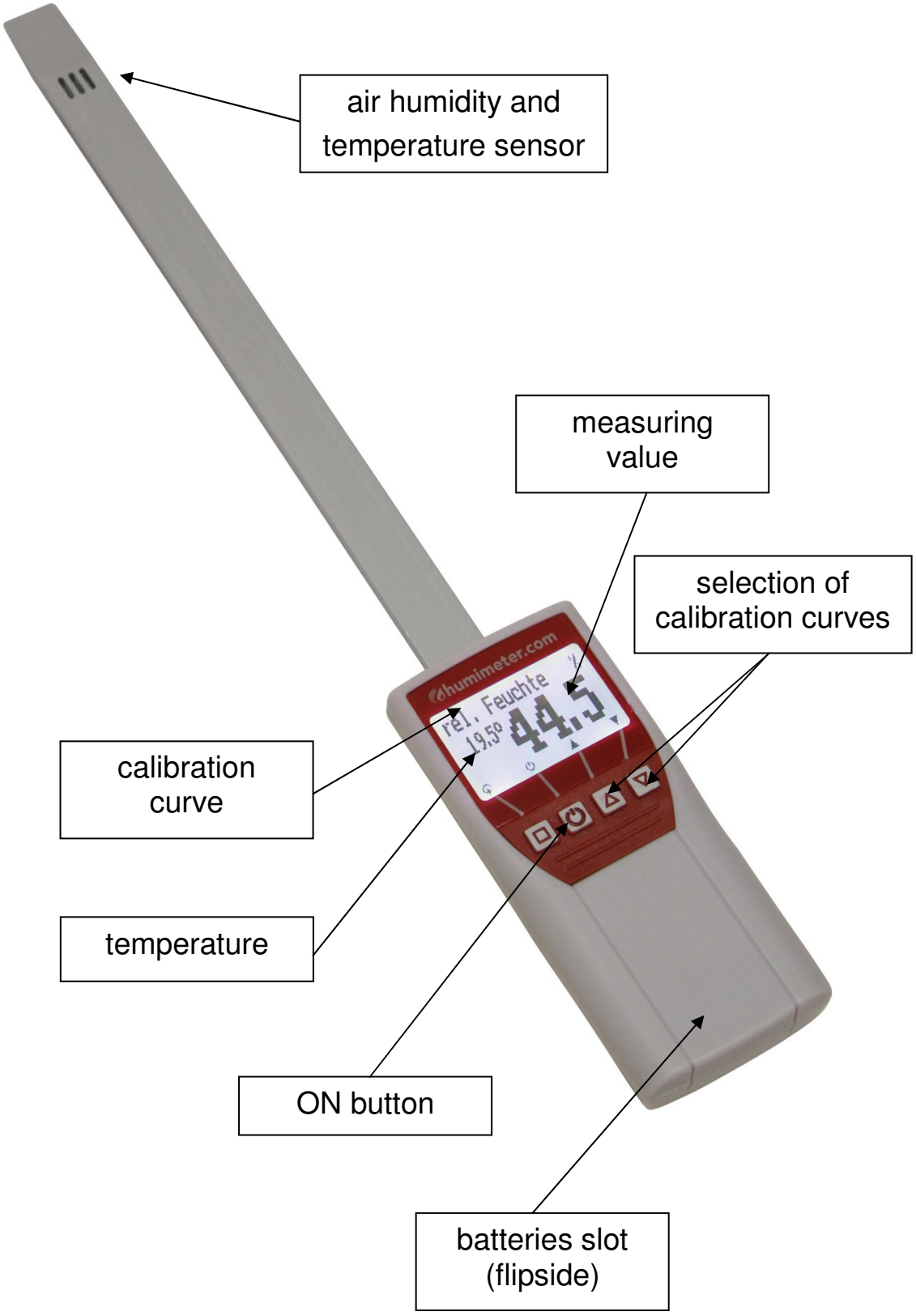
Dew point temperature: The dew point indicates the temperature that the not completely saturated air has to reach in order to be completely saturated with water vapour. If the room with the current relative humidity is cooled down to the dew point temperature, the water vapour begins to condense.

Application range

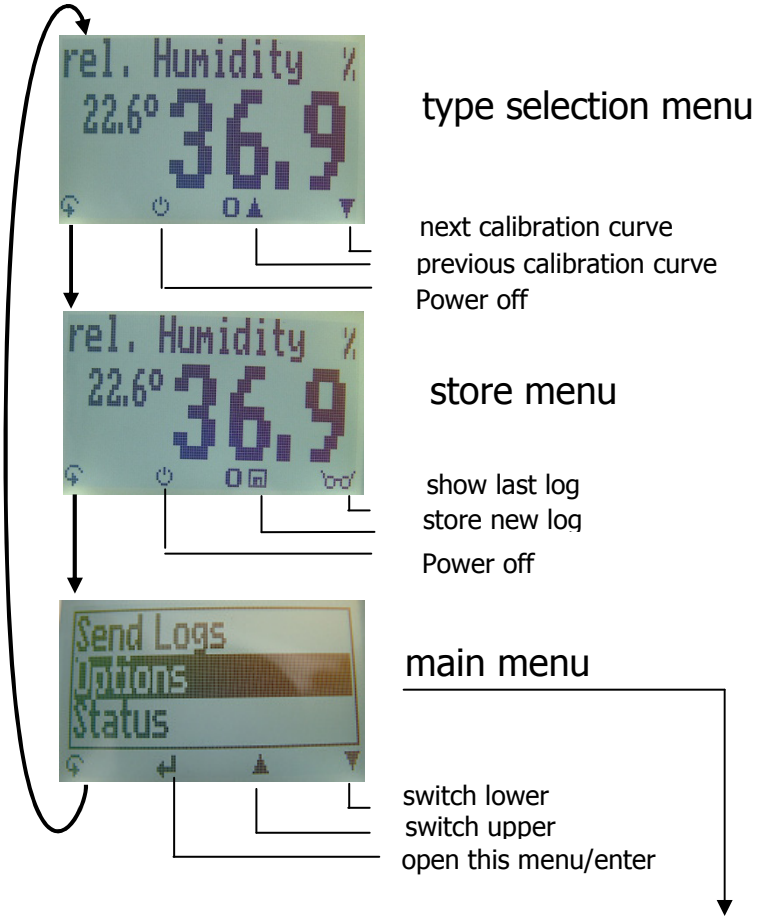
Within the normal application range (normal range) the accuracy of the device is as indicated. A long-term application beyond the normal application range (max. range), particularly at an air humidity of more than 80%, can lead to higher measuring errors (+3% after 60 hours). Back in the normal application range, the sensor will return to the indicated accuracy automatically.



Design of the device



Menu level overview



Edit Logs Manual Logs Auto Logs Clear Logs *Print Logs* Last Logs All Logs Clear Logs *Send Logs* Manual Logs Auto Logs Clear Logs	*Options* Date/Time DataLog Time Language Unlock °C/°F User level Light ON Time Auto OFF Time Calib. Material calib. Setting Password Reset *Status*

Keypad symbols

Measuring window:

- Rolling Menu
- Power ON / OFF
- Switch upper
- Switch lower
- Save
- Hold
- Autolog
- Watch saved data
- Enter suppliers data

Menu:

- Enter
- Switch upper
- Switch lower
- Exit
- 0..9 Enter numbers
- A..Z Enter letters
- Next or right
- Left
- Yes
- No
- Shift
- OK

Operating the instrument

Switching on: Press ⏻ for three seconds.

Changing the calibration curve: ▲ or ▼.

Setting date and time: 2 times ⊕ - *Options – date / time*

Set date and time using the button 0..9, according to the format indicated (JJ.MM.TT). After entering the year, press the button ▸ for entering the month and ▸ again for entering the day. For changing from date to time also press the button ▸ . After finishing, press OK for saving the entered data.

Datalog: Select your desired interval in the menu *Options – Log Time* using the arrow keys, and confirm by pressing **OK**. Now in the store menu appears the symbol 🕒. By pressing this 🕒 symbol you can activate the AutoLog.

Info: In order to save battery power the device switches off automatically at a log interval of 1 minute or longer, and activates again for saving the logs!

For completing the AutoLog, switch on the device (if necessary) and press the 🕒 button. If you want to add supplier´s data please press the ☄ button. Supplier´s data can also be entered on the PC subsequently.

Switching on the display lighting: Press the ⏻ key briefly; the display lighting switches off automatically after approx. 20 seconds. Pressing any key activates the display lighting again, and the period for switching off again is prolonged to four minutes (The display lighting time can be modified in menu level *Options – BL On Time).*

Switching off: Press the ⏻ key for ´five seconds. The instrument switches off after releasing the key. The instrument switches off automatically after approx. four minutes. (The turn-off time can be modified in menu level O*ptions – Auto Off Time).*

Other instrument functions – overview

- Manual saving of single measuring values in a measurement series
- Display of measuring series and measuring values directly on the instrument
- Automatic single-point adjustment at 50% humidity standard
- Selection of menu language (DE, EN, FR, IT, ES, RU)
- Display of temperature in Celsius or Fahrenheit

Single-point adjustment with 50% humidity standard

For the adjustment the appropriate calibration equipment as well as calibration ampoules resp. humidity standards of 50 % r.h. are required.

Proceedings

Preparation

To ensure as good as possible inspection results it is essential that the measuring device, the calibration equipment and the calibration ampoules have approximately the same temperature.

This temperature has to be between 20°C and 26°C.

The best way to ensure the same temperature of the different components is to store all components together in a room with only small temperature fluctuations minimum over night – better for 24 hours.

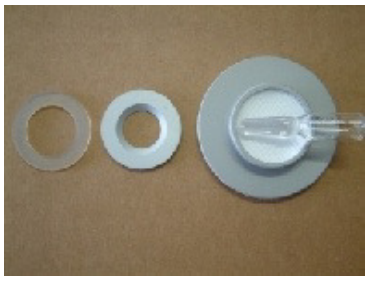
Components of calibration equipment

In this image you can see the components of the calibration equipment and a calibration ampoule with humidity standard.

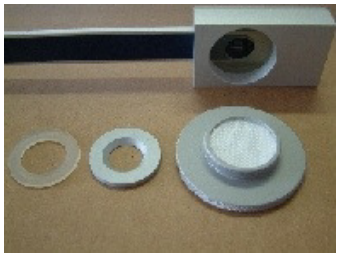
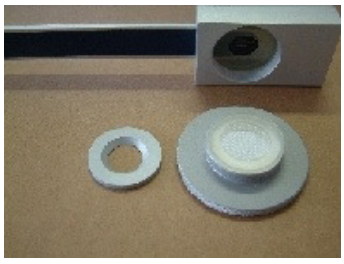
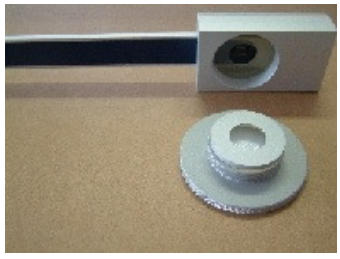
Assembly of calibration equipment

1. Put in the first gasket ring in the upper part of the calibration device.
2. Push in the sword sensor in the upper part as shown in the picture.
3. Now put the second gasket ring into the upper part.
4. Lay in the textile pad in the bottom part of the calibration device, and pour the humidity standard carefully at the textile pad.

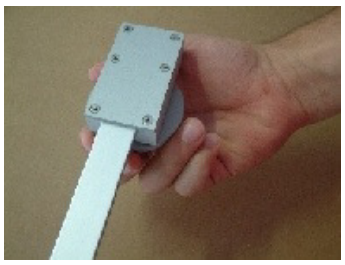


5. Now put the third gasket ring into the bottom part.
6. Fit the metal ring on the third gasket.
7. Take the upper part with the RH5.1 and attach these carefully at the bottom part of the calibration device.

8. Pick up the RH5 together with the calibration device STRAIGHT and DON´T TURN IT AROUND. Screw it up like shown in the picture.


Then put the RH5 with the calibration device down on a table carefully and proceed as follows.

Conditioning the sensor

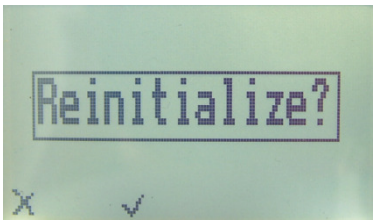
To achieve best results, let the sensor adjust for two hours.

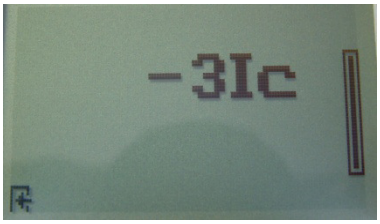
The temperature has to be between 20°C and 26°C.

If the shown measuring value differs more than the factory tolerance (2.0% r.h.) , we recommend to carry out a recalibration as follows.

Offset adjustment

1. Leave the measuring device in the calibration equipment, and switch it on.
2. Press the Rolling Menu button ↻ until you reach the main menu.
3. Select the menu item *Options* by pressing the button ▼ and confirm by pressing OK.
4. Navigate to Setting using the ▼ button and confirm by pressing OK again.
5. Enter the superuser password using the buttons 0..9 resp. A..Z and confirm by pressing ↵.
    - The superuser password after consignment is the serial number of the device, shown on the display after switching on the device or in menu item Status.
6. A query if a setting is desired appears. Confirm by pressing √.
7. Wait until the bar has risen completely. The device adjusts by itself and automatically jumps back to the measuring window. The adjustment is completed now.
8. Check the result before you remove the device from the calibration equipment. Depending on the temperature the display should show a humidity around 50% now.





If you made a mistake during the setting, you can reset to the factory calibration as follows:

Reset to factory calibration

1. Press the button 2 times to reach the menu point *Options.*
2. Select the menu item *Reset* using the button and confirm by pressing OK.
3. Enter the superuser password using the buttons 0..9 resp. A..Z and confirm by pressing ↵.
   - The query **reset?** appears on the display.
4. Press the button ✓ for resetting the device to the factory calibration.
   - The software reloads the factory calibration data and reboots the device. This will need about 15 to 20 seconds.
5. Pressing the button ✗ you can exit without any changes.

Conditioning of the sensor

The conditioning of the sensor (time until the device shows the actual measuring value) depends on several parameters. The parameter responsible for the highest measuring error is a temperature discrepancy between the sensors resp. the whole measuring instrument and the material to measure resp. the air.

In order to fasten the conditioning, the following proceedings are possible:

Spaced insertion of the sword sensor

- Insert the sword-sensor into the stack for only approx. 10 cm, and push it a few more centimetres into the stack every 10 seconds.
- In case of a high temperature difference repeat this action – if necessary several times!
- If you use the sword sensor holder, please ensure that both the sword sensor and the sword sensor holder are adjusted to the surrounding temperature of the material.
- In this case insert the sword sensor holder at frequent intervals and leave the sword sensor in the sword sensor holder for an appropriate period.

Care instructions

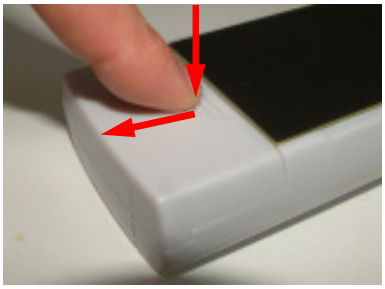
Do not drop the instrument or expose it to excessive temperatures. The instrument is not waterproof. Do not immerse the sensor in liquid.

The intervals for checking the instrument depend on your operational demands and the required level of accuracy. In general the drift of the sensor

according to the degree of use (constant humidity or use within the whole moisture measuring range) is beneath 0.5 % per year. You can check **humimeter RH5.1** instruments by yourself using the calibration equipment (see optional accessories). For a fee, Messtechnik Schaller GmbH can also carry out a calibration at their factory. On demand you will also receive a calibration certificate.

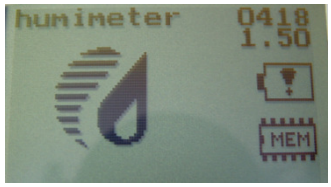
Changing the batteries

Press with your finger onto the arrow of the battery cap und pull it back. Remove the empty batteries. Put four new **1.5 Volt AA Alkaline batteries** in the device. Make sure that the position of the battery poles is correct. Press down the batteries and close the cap.



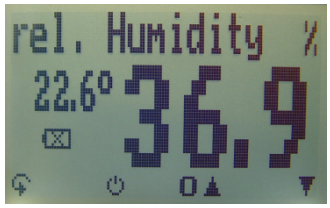
Exemption from liability

For miss-readings and wrong measurements and of this resulting 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



If the battery symbol appears in the measuring window resp. if a critical charge of battery is shown in the status, the batteries have to be changed IMMEDIATELY.

If you do not use your humimeter device for a longer period, remove the batteries. For eventual resulting damages we cannot provide any warranty.



In case of a faulty device, please contact Schaller GmbH (www.humimeter.com) or your dealer.

Technical data

Measurement:	Measuring range /	resolution /	accuracy
rel. humidity:	0 to 100% rh	/ 0.1%	
calibration	10 to 90%		/ ±2.0% rh (at 25°C)
temperature °C:	-10 to +60°C	/ 0.1°C	/ ±0.3°C (at 25°C)
temperature °F:	14 to 140°F	/ 0.3°F	/ ±0.5°F (at 77°F)
dew point °C:	-55 to +60°C	/ 0.1°C	
dew point °F:	-67 to 140°F	/ 0.3°F	

Operation temperature range:	-10°C to 60°C / 14 to 140°F
Storage temperature:	-20°C to 60°C / -4 to 140°F
Temperature compensation:	automatically
Data storage:	approx. 10.000 measuring values
Menu languages:	English, German, French, Italian, Spanish, Russian
Power supply:	4 pcs. 1.5Volt AA Alkaline batteries (for approx. 1800 measurements)
Auto Off time:	after approx. 4 minutes
Power consumption:	30 mA (with display lighting)
Display:	128 x 64 matrix display, with LED backlighting
Dimensions housing:	145 x 63 x 29mm
Dimensions sword sensor:	295 x 20 x 4mm
Weight:	approx. 260g (incl. batteries)
Protection class	IP 40
Scope of supply	4 pcs. 1.5Volt AA Alkaline batteries, user manual

!IMPORTANT! Please read!

Common reasons for incorrect measurements

- **Sunlight or other sources of heat or cold that doesn´t correspond to the surrounding temperature**
- **Dripping or sprayed water**
- **Irreversible damage of the sensor due to aggressive gases**
- **Danger of condensation because of changing temperature**
- **Polluted moisture sensor**
- **Foreign objects on the sensor**
- **Measuring errors due to too short conditioning**

To demonstrate the importance of temperature adjustment, the table below shows measuring errors due to a temperature difference of only 1°C / 1.8°F between the measuring instrument and the substance to be measured at different ambient temperatures.

	10°C (50°F)	20°C (68°F)	30°C (86°F)
10%r.h.	±0,7%	±0,6%	±0,6%
50%r.h.	±3,5%	±3,2%	±3,0%
90%r.h.	±6,3%	±5,7%	±5,4%

At room temperature (20°C/68°F) and assumed paper moisture value of 50%r.h. a deviation of 1°C / 1.8°F between the measuring sensor and the substance to be measured results in a measuring error of 3.2%r.h. A deviation of 3°C / 5.4°F would result in a measuring error of over 10%.

Further examples can be found in the Mollier h-x diagram.