humimeter.com®

by Schaller Messtechnik

User manual

Humimeter AW2 Meter

Scigiene

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2019

Your Humimeter AW meter at a glance

The main unit

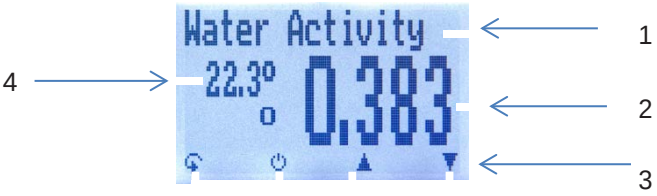
No.	Name
1	Connector for external sensor
2	USB port (optional)
3	Display
4	Keypad
5	Rubber protection cover

Rear of the main unit

No.	Name
1	Battery compartment

Measurement	Measuring range	Resolution	Accuracy
aw value	0 to 1	0.001 aw	
calibration:	0.00 to 0.98		see "15.2 Technical data"
temperature °C	0 °C to +50 °C	0.1 °C	+/- 0.5 °C (at 25 °C)
temperature °F	32 °F to 122 °F	0.2 °F	+/- 0.5 °F (at 77 °F)

The display



No.	Name
1	Sensor type
2	Water activity (see "7.1 Definition product types")
3	Display symbols
4	Temperature display

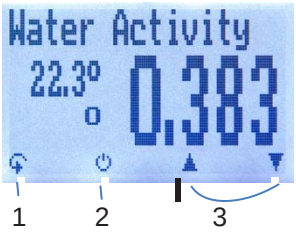
The display symbols

Symbol	Name	Symbol	Name
	Enter		No
	Up		Change input level
	Down	OK	OK
	Back		Change menu
0..9	Enter numbers		Enter data
A..Z	Enter letters		View measurements
	Continue / go right		Delete measurements
	Left		On/off button, display light
	Yes		Save measured value
	Auto save		Hold function

The menus

The device has three different menus: product selection, Data Log and main menu:

Sensor selection menu



No.	Name
1	Change menu
2	Display illumination / device on/off
3	For changing the sensor type

Data Log menu

1 2 3 4

No.	Name
1	Change menu
2	Display illumination / device on/off
3	Save measured value
4	Show the last recorded values

Main menu

The main menu comprises the following menu items:

- **Edit Logs:**
  Manual Logs, Auto Logs,Clear Logs
- **Print Logs:**
  Last Log, All Logs,Clear Logs
- **Send Logs:**
  Manual Logs, Auto Logs,Clear Logs
- **Options:**
  Bluetooth, Date/Time, Log Time, Emission ratio, Language, Unlock, °C/°F, BL On Time, Auto Off Time, Calibrate, Materialcalib., Online Send, Password, Reset
- **Status**

Table of contents

1. Introduction

1.1 Information about this operating manual

This operating manual is designed to enable you to use the humimeter RH2 safely and effectively. It is part of the device, has to be stored nearby and must be easily accessible to users at all times.

All users are required to carefully read and make sure that they have understood this operating manual before using the humimeter RH2. All of the safety and operating instructions detailed in this manual have to be observed to ensure the safety of the device.

1.2 Limitation of liability

All of the information and instructions provided in this operating manual have been compiled on the basis of the current standards and regulations, the state of the art, and the extensive expertise and experience of Schaller GmbH.

Schaller GmbH does not accept any liability for damage associated with the following, which also voids the warranty:

- Non-observance of this operating manual
- Improper use
- Inadequately qualified users
- Unauthorised modifications
- Technical changes
- Use of unapproved spare parts

This fast measuring procedure can be affected by a range of different factors.

We, as the manufacturer, do not accept any liability for any incorrect measurements and associated consequential damage.

1.3 Symbols used in this manual

All of the safety information provided in this manual is shown with a corresponding symbol.

ATTENTION

It is essential to observe this warning. Non-compliance can lead to damage to property or equipment.

Information

This symbol indicates important information that enables users to use the device more efficiently and cost-effectively.

1.4 Customer service

For technical advice, please contact our customer service department at:

Scigiene Corporation (Authorized Distributor)
Unit 16-18, 1295 Morningside Avenue, Toronto, M1B 4Z4, Canada

Telephone: +1 – 416-261-4865

E-Mail: support@scigiene.com
Website: www.scigiene.com

2. For your safety

The device complies with the following European directives:

- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS)
- Electromagnetic compatibility (EMC)

The device corresponds to state-of-the-art technology. However, it is still associated with a number of residual hazards.

These hazards can be avoided through strict observance of our safety information.

2.1 Proper use

- Easy to use device for quickly measuring the water activity of food
- Easy to use device for climate and environmental applications

2.2 Improper use

- The device must not be used in ATEX.
- The device is not waterproof and must be protected from water and fine dust.

2.3 User qualifications

The device must only be operated by people who can be expected to reliably take the measurements. The device must not be operated by people whose reaction times may be slowed due to, e.g. the use of drugs, alcohol or medication.

All persons using this device must have read, understood and follow the instructions provided in the operating manual.

2.4 General safety information

The following safety information has to be observed at all times to avoid damage to objects and injury to people:

- Remove the batteries if the device is not used for a prolonged period of time (4 weeks).
- In case of damages or loose parts on the device, remove the batteries and contact Schaller GmbH or your dealer

All of the device's technical features have been inspected and tested before delivery. Every device has a serial number. Do not remove the tag with the serial number.

2.5 Warranty

The warranty does not apply to:

- Damage resulting from non-observance of the operating manual
- Damage resulting from third-party interventions
- Products that have been used improperly or modified without authorisation
- Products with missing or damaged warranty seals
- Damage resulting from force majeure, natural disasters, etc.
- Damage from improper cleaning
- Damage due to leaking batteries

3. On receipt of your device

3.1 Taking the device out of its packaging

- Take the device out of its packaging.
- Next, make sure that it is not damaged and that no parts are missing.

3.2 Making sure that all of the components have been included

Make sure that all of the components have been included by checking the package contents against the following list:

3.2.1 Scope of supply

Three different water activity kit are offered: AW1, AW2 and AW3

Features	AW1	AW2	AW3
Humimeter RH2 (Basic Device)	Yes	Yes	Yes
Water Activity Measuring Chamber and 2 Sample Cup (Nalgene Jar)	Yes	Yes	Yes
Certified	Yes	Yes	Yes
Calibration Standards	NO	Yes	Yes
Thermal Barrier and Grinder	NO	NO	Yes
4 Pcs of Alkaline Batteries	Yes	Yes	Yes
Rubber Protection Cover	Yes	Yes	Yes
Plastic Case and Manual	Yes	Yes	Yes

Optional accessories:

- Humimeter USB data interface module – USB Flash drive with software and USB cable included (Ask for KitB Option while ordering, software available to use with all models AW1, AW2 and AW3)
- Certified Calibration Standard set of 10 (0.500 or 0.800)
- Sample Jar replacement set with twist off lid for Aw chamber (10 units)
- Battery operated portable thermal printer (only possible together with humimeter USB data interface module) - Described in a separate operating manual
- Bluetooth module - Described in a separate operating manual
- Wall holder, mounted on humimeter RH2
- Non-Contact IR temperature sensor 10:1 for RH2
- Moisture and temperature sensor with 2 meter connection cable
- Air humidity and temperature sensor (with no connection cable)

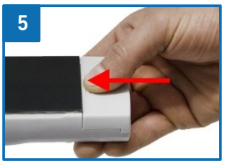
3.3 Inserting batteries

1. Remove the rubber protection cover. To do so, hold the rubber protection cover at the upper side and pull it over (figure 1 and 2). In case of a sensor being connected, disconnect it beforehand and if your device is provided with an optional USB port, remove the protection cap of the USB socket beforehand too.

2. Take hold of the device with one hand, press your thumb onto the engraved area of the battery compartment (1) and drag downwards (2) (figure 3).

3. Insert the batteries with negative and positive terminals matching those indicated on the battery compartment. Press down the batteries so that they lay flat on the bottom of the housing (figure 4).

   » As soon as all batteries have been inserted, the device switches on automatically.



4. Push the battery cover onto the housing until it clicks into place (figure 5). Then mount the rubber protection cover onto the housing, beginning at the end where the battery compartment is situated.

4. Using the device - Basics

4.1 Switching on the device

- Press the ⏻ button for 3 seconds.

» The display will then show the status indicator (figure "9. Checking the device's status").

» After inserting the batteries, the device switches on automatically.

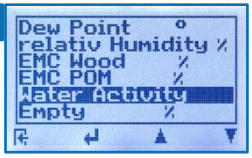
4.2 Selecting the product type

To do so: The device has to be in the product selection menu.

For an overview of the different product types and the criteria for selecting them, please refer to "7. Product types".

1. Press the ▽ or △ button to move from one product to the next Or
2. Press the ▽ or △ button for 2 seconds to open the product type overview (figure 6).

6



3. Use the arrow keys to move from one product type to the next
4. and keep any of them pressed to scroll through the types.
5. Confirm your selection by pressing ↵.

» The product type you selected will now be shown at the top of the display.

4.3 Exchanging the sensors

- If a sensor is already connected, unscrew it counterclockwise.
- Then plug the desired sensor into the device until both threads make contact.

» Pay attention to the elevation in the connector and its correct positioning (figure 8).

» Do not use excessive force to plug in the sensor, which is very easy to operate.

- Now tighten the thread.

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4.4 Taking a measurement

- For information on how to take a measurement, see section "5. The measuring process".

4.5 Switching the device off

To do so: The device has to be in the product selection or Data Log menu. It is not possible to switch off the device when it is in the main menu.

- Press the ⏻ button for 2 seconds.

5. The measuring process

5.1 Preparing Measurement

Connect the sensor plug of the aw sensor to the basic device. Now the switched on device shows the current temperature and activity of water value.

Fill the plastic container with material at least two thirds full (~50-60g). In case of coarse, lumpy material the container should be filled at least half-way so that the moisture conditioning can be guaranteed. The higher the filling, the faster the conditioning. A too low material quantity may cause a deviation of the measuring result.

The material to measure must not come into contact with the metal protective grid (the red line on the picture below is the absolute maximum level)

The material must not enter the inside of the grid!!

After the filling, close the measuring chamber tightly.

The right measuring value can be read off when the displayed value does not change any more over a longer period.

(Experience value for adjustment time: Change of aw value from 0.4 to 0.6 within 10 minutes).

With unpeeled materials such as nuts it may take longer until the sample releases moisture in its surroundings for the measurement (see AW3).

For a rapid conditioning (see AW3), the water activity measuring chamber is equipped with a ventilator. If the humimeter AW1 basic device is switched off, the conditioning time is extended. In case of using the automatic datalog with a datalog time of more than 30 seconds, the device switches off automatically between the measurements.

The filled and closed measuring chamber must not be turned over. Otherwise the measuring sensor positioned in the cap may be polluted by the sample material, which leads to wrong measuring results.

Do not fill above this line

Steps To "Real" a_w

Step 1: Insert Sample into AW Cup

Step 2: Grind / Homogenize Sample

Step 3: Close AW Cup

Step 4: Turn on to Log Readings To Stability; typically < 5 minutes

ATTENTION

Pollution of the sensor with material

If the screw-top jar is filled too high, the sensor can become polluted, which leads to incorrect measurements.

► Make sure that the metal protective grid does not come into contact with the material being measured.

ATTENTION

Pollution of or damage to the sensor

By tilting or turning over the filled water activity measuring chamber, the sensor can become polluted or damaged, which leads to incorrect measurements.

► Make sure to only lift the water activity mearuing chamber straight up into the air.

Information - Measuring accuracy

This rapid and non-destructive measuring procedure allows you to take multiple moisture readings of the same sample material. When saving the individual readings, the device will automatically calculate the readings' average (see "6.2.2 Saving several readings (a measurement series) at the same time").

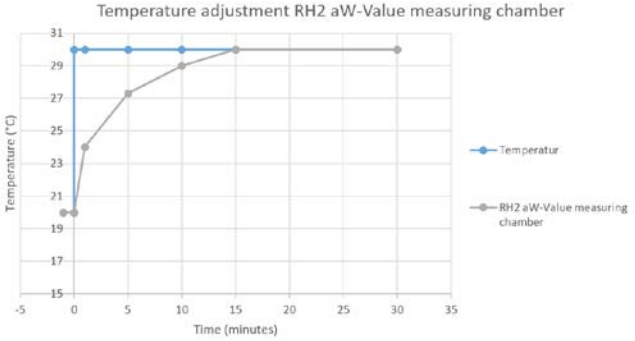
Information - Incorrect readings

Always make sure to select the correct product type for the material you are measuring. This prevents taking incorrect readings (see "13. Faults").

5.3 Adjustment behaviour of the sensor

In humidity and temperature measurement, several parameters are responsible for the adjustment behaviour (time until the actual measuring value is displayed). The parameter responsible for the highest measuring error is a temperature discrepancy between the sensor resp. the whole measuring instrument and the material being measured resp. the air.

Therefore, allow your humimeter device to adjust until the displayed temperature corresponds to the actual temperature. The graph below shows how long it takes to adjust from 20 °C to 30 °C.



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

	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)
0.1 aw	+/- 0.007 aw	+/- 0.006 aw	+/- 0.006 aw
0.5 aw	+/- 0.035 aw	+/- 0.032 aw	+/- 0.03 aw
0.9 aw	+/- 0.063 aw	+/- 0.057 aw	+/- 0.054 aw

At room temperature (20 °C / 68 °F) and an assumed water activity of 0.5, a temperature difference between the sensor and the material being measured of 1 °C / 1.8 °F causes a measurement error of 0.032 aw. A temperature difference of 3 °C / 5.4 °F would cause a measurement error of more than 0.1 aw.

6. Saving your readings

6.1 Hold function - Freezing the displayed values

The device can be configured in such a way that the information being shown on the display will freeze at the touch of a button until a new button is pressed. This function can be used if you want the measuring value to remain on the display.

6.1.1 Activating the Hold function in the Options menu

To do so: The device has to be switched on and be in the product selection menu.

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Log Time** (figure 14). To do so, press  or  and confirm by pressing  .
4. Select **Hold** (figure 15). To do so, press  or  and confirm by pressing  .
   - » The setting has been saved.
5. Press  to leave the **Options** menu.
6. Press  to leave the main menu.

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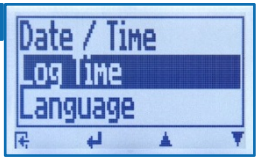

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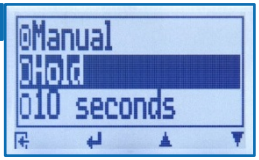
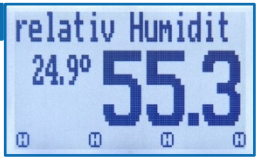


6.1.2 Using the Hold function

To do so: The device has to be switched on and be in the Data Log menu.

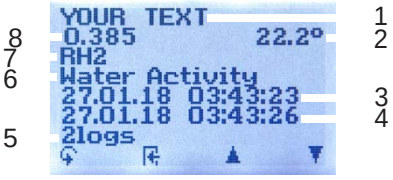
- Press  .
- » The current reading will be frozen. All of the four symbols will now be displayed as  (figure 16).
- To reactivate the frozen display, simply press any button.

16



6.2 Saving your readings manually

All of the readings can be saved, edited and viewed on the device. The figure below shows the overview screen of a single saved series of measurements.



No.	Name
1	Name of the measurement series (editable)
2	Temperature (average)
3	Date & start time of the measurement series
4	Date & end time of the measurement series
5	Number of saved readings
6	Product type
7	Device name
8	Water activity (average)

6.2.1 Saving individual readings

The device can be configured in such a way that the device will save a reading every time a button is pressed. This option (manual save function) is the device's default setting.

Activating the manual save function in the Options menu

To do so: The device has to be switched on and be in the product selection menu.

1. Press twice or hold for 2 seconds.
2. Select **Options**. To do so, press or and confirm by pressing .
3. Select **Log Time**. To do so, press or and confirm by pressing .
4. Select **Manual** (figure 17). To do so, press or and confirm by pressing .

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» The setting has been saved.

5. Press to leave the **Options** menu.

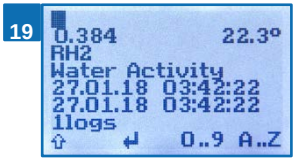
6. Press to leave the main menu.

Using the manual save function

To do so: The device has to be in the Data Log menu (see "Data Log menu" page 6).

1. Press .

» The display will now appear as shown in figure 18 and the measured value will be preceded by the digit one.

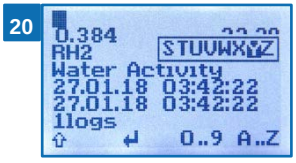


2. Press to enter a name for the saved reading and to finish the measuring process.

» The display will now appear as shown in figure 19.

3. The data you have inputted can be overwritten at any time.

4. Inputting letters:
Press and hold A..Z to quickly scroll to the required letter and either press it for 3 seconds or press to confirm the selected letter (figure 20).



5. Inputting numbers:
Press and hold 0..9 to quickly scroll to the required number and either press it for 3 seconds or press to confirm the selected number.

6. Moving forward/back:
Press to switch to another input level. Press or to move forward or back.

7. Confirm your entry by pressing .

» The data you entered has been saved.

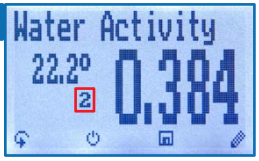
6.2.2 Saving several readings (a measurement series) at the same time

To do so: The device has to be in the Data Log menu (see "Data Log menu" page 6).

1. Take several readings (see "5. The measuring process").
2. To save a reading, press as soon as the reading has been taken.

» The display will now appear as shown in figure 21. The marked number shows the number of readings that have already been saved.

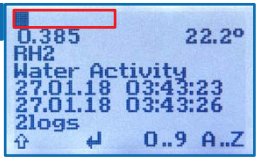
21



3. Press to enter a name for the saved reading and to finish the measuring process.

» The display will now appear as shown in figure 22.

22



4. The data you have inputted can be overwritten at any time.
5. Inputting letters:
   Press and hold A..Z to quickly scroll to the required letter and either press it for 3 seconds or press to confirm the selected letter (figure 23).

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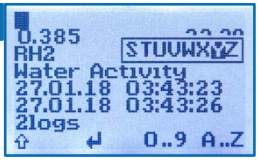

6. Inputting numbers:
   Press and hold 0..9 to quickly scroll to the required number and either press it for 3 seconds or press to confirm the selected number.
7. Moving forward/back:
   Press to switch to another input level.
   Press or to move forward or back.

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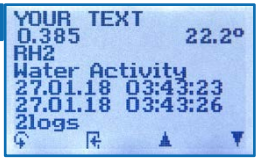

8. Confirm your entry by pressing .

» The data you entered has been saved.

6.3 Auto save function (time-based)

The device can be configured in such a way that it will automatically save a reading (log) at a selected time interval.

6.3.1 Activating the Auto save function in the Options menu

To do so: The device has to be switched on and be in the product selection menu.

1. Press twice or hold for 2 seconds.
2. Select **Options**. To do so, press or and confirm by pressing .
3. Select **Log Time** (figure 25). To do so, press or and confirm by pressing .
4. Navigate to the desired time interval (figure 26). To do so, press or and confirm by pressing .

   » The setting has been saved.
5. Press to leave the **Options** menu.
6. Press to leave the main menu.

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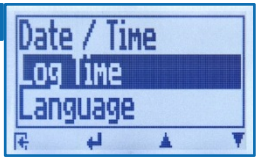

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6.3.2 Auto save function: Saving measured values

To do so: The device has to be in the Data Log menu (see "Data Log menu" page 6).

1. Press .

   » The device will save a reading at the selected time interval. The number of data saves will increase by one every time a reading is saved. The display will now appear as shown in figure 27.
2. Press to finish the measuring process and to enter a name for the saved readings.

   » The display will now appear as shown in figure 28.
3. The data you have inputted can be overwritten at any time.

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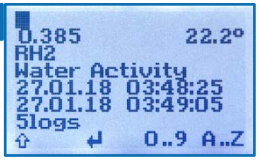


4. Inputting letters:
   Press and hold A..Z to quickly scroll to the required letter and either press it for 3 seconds or press ↵ to confirm the selected letter.
5. Inputting numbers:
   Press and hold 0..9 to quickly scroll to the required number and either press it for 3 seconds or press ↵ to confirm the selected number.
6. Moving forward/back:
   Press ⇧ to switch to another input level. Press ⇨ or ⇦ to move forward or back.
7. Confirm your entry by pressing ↵.

» The data you entered has been saved.

6.4 Viewing individual readings

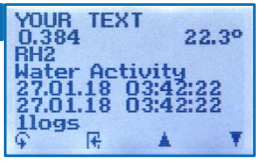
To do so: You must have saved a reading (e.g. **1 log**). The display will now appear as shown in figure 29.

29

1. Press 👓.
2. Select the required reading. To do so, press ▼ or ▲.

» The display will now appear as shown in figure 30

30



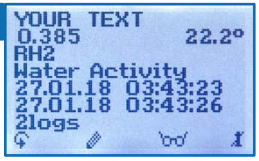
» Press ⎋ to leave this screen.

6.5 Viewing individual readings from a series of measurements

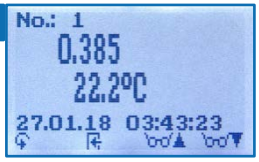
To do so: You must have saved a series of measurements (e.g. **2 logs**). The display will now appear as shown in figure 31.

1. Press .
2. Navigate to the required measurement series. To do so, press or .
   » The display will now appear as shown in figure 32.

3. Press to switch to another input level.
   » The display will now appear as shown in figure 33.



4. Press again.
   » The display will now appear as shown in figure 34.



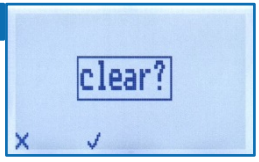
5. Navigate to the required reading (**No.: 1, No.: 2, No.: 3**). To do so, press .
6. Press to leave this screen.

6.6 Deleting all measured values (data log)

To do so: You must have taken and saved one or several readings.

1. Press twice or hold for 2 seconds.
2. Select **Edit Logs** (figure 35). To do so, press or and confirm by pressing .

3. Select **Clear Logs** (figure 36). To do so, press or and confirm by pressing .
4. The display will then show the message **clear?** (figure 37).



5. Confirm by pressing .
   » The data log has been deleted.

6. Press to leave the **Edit Logs** menu.

7. Press to leave the main menu.

6.7 Deleting individual measurement series

To do so: You must have saved a measured value (e.g. **1 log**) or a series of measurements (e.g. **3 logs**). The display will now appear as shown in figure 39.

1. Press .

2. Select the required reading. To do so, press or .

   » The display will now appear as shown in figure 39.

3. Press to switch to another input level.

   » The display will now appear as shown in figure 40.

4. Press .

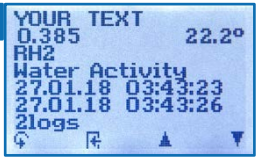
   » The display will then show the message **clear?** (figure 41).

5. Confirm by pressing .

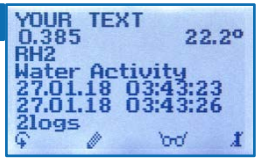
   » The value has been deleted.

38

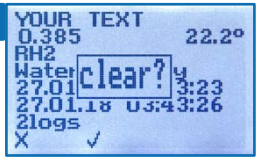
39



40



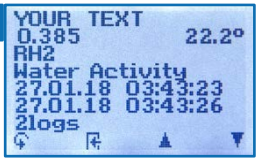
41



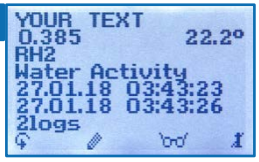
6.8 Deleting individual values from a single series of measurements

To do so: You must have saved a series of measurements comprising at least 2 logs. The display will now appear as shown in figure 42.

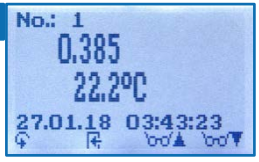
1. Press .
2. Select the required reading. To do so, press or .
   » The display will now appear as shown in figure 43.



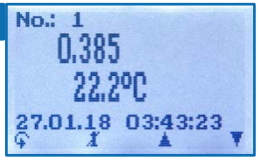
3. Press to switch to another input level.
   » The display will now appear as shown in figure 44.



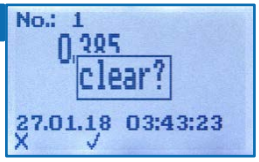
4. Press .
5. The display will now appear as shown in figure 45.



6. Select the required measured value. To do so, press or .
7. Press to switch to another input level.
   » The display will now appear as shown in figure 46.



8. Press to delete the value shown.
   » The display will then show the message **clear?** (figure 47).



9. Confirm by pressing .
   » The value has been deleted.
   » Deleted measuring values will be transferred to the LogMemorizer (see "8. Using the LogMemorizer program") and have to be deleted separately there.

7. Product types

Product type	Definition	Unit	Measuring range
Absolute Humidity	absolute air humidity	g/m³	0 to 130 g/m³
Dew Point	Dew Point	°C °F	-55 °C to +60 °C -67 °F to 140 °F
relativ Humidity	relative air humidity	% RH	0 to 100 %
EMC Wood	Wood equilibrium moisture content	% EMC.	2 to 30 % (wood moisture)
EMC POM	POM equilibrium moisture content	% EMC.	0 to 2 %
Water Activity	water activity	aw	0 to 1
Empty 1 - 5	Free curve for special products		

7.1 Definition product types

Absolute humidity

The absolute air humidity shows the contained amount of water in gram per cubic meter of air. The absolute humidity is a direct degree for the amount of water vapor contained in a certain air volume. It shows how much condensate can precipitate or how much water has to be evaporated in order to obtain the desired humidity.

Dew Point

The dew point is the temperature to which the air that is not completely saturated with water vapor must be cooled so that it is completely saturated. When a room with the current relative humidity cools down to the dew point temperature, the water vapor begins to condense.

Relative humidity

Indicates the relationship between the current water vapor pressure and the maximum possible, the so-called saturation vapor pressure.

The relative humidity shows the degree the air is saturated with water vapor. Examples:

50% relative humidity: At the current temperature and pressure, the air is half saturated with water vapor. 100% relative humidity means that the air is totally saturated with water vapor. If the air has more than 100% humidity, the excessive humidity would condense or precipitate as mist.

EMC wood

Shows the wood equilibrium moisture content (for wood stored under these conditions) in % wood moisture and the temperature in the selected unit (°C or °F).

EMC POM

Shows the POM granulate equilibrium moisture content (for granulate stored under these conditions) in % moisture content and the temperature in the selected unit (°C or °F).

Water activity

Water activity is also described as free, non-cellularly bound water in products such as food. The water activity is described in chapter "7.2 Definition water activity".

Free calibration curves

There are free calibration curves in the measuring device. These can be used for special products.

On request Schaller GmbH can develop customer-specific calibration curves for your product.

7.2 Definition water activity

Water activity is the ratio of the partial water vapor pressure in food (p) to the saturation vapor pressure of pure water (p0). It is an important indicator for the product quality in the food, tobacco and pharmaceutical industry and is represented in a aw value from 0 to 1.

The water activity is synonymous with the equilibrium moisture content – the relative humidity at which the material to be measured is in equilibrium with the ambient air. The relative humidity of air however is expressed in %.

The water activity is temperature-dependent. For the determination of the water activity at a desired temperature, the measuring device and the material being measured should be stored at the same temperature before starting the measurement.

The humimeter RH2 water activity measuring chamber is suited for the measurement of materials such as cereal products, coffee, cocoa, muesli, butter, mixtures of dried fruit, spices, granulates, mushrooms, sugar, xylitol, biscuits or dried sausage as well as many other types of food where a check of the water activity is necessary.

The humimeter RH2 water activity measuring chamber is generally not suited for liquids as well as juices (syrup), acidic food such as onions, fruits and tropical fruits or food and beverages containing alcohol, such as filled chocolates. Vinegar and acids destroy the calibration and the sensor.

Materials with a moisture content above the fiber saturation point, this means an aw value above 1, cannot be measured. For such materials only the water content can be determined.

The water activity must not be confused with the water content – the percentage of water contained in a product.
The water content is used for billing according to the dry content of food and materials, it shows the ratio of water to the total mass in percent (kg/kg)x 100.

The water activity influences the following characteristics of a product:

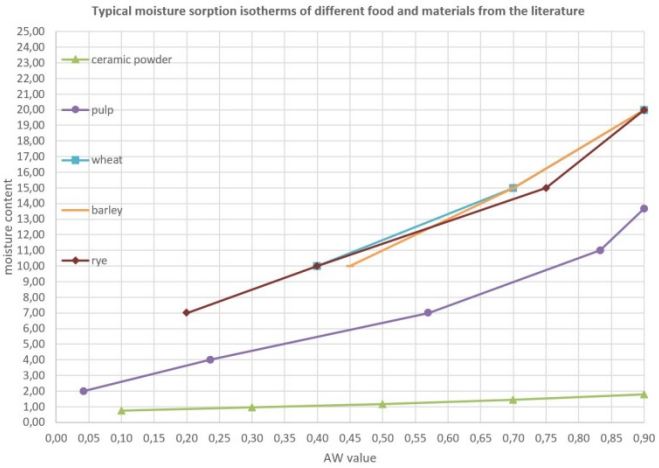
- microbiological stability
- chemical stability
- enzymatic stability
- color, taste and nutritional value
- content of proteins and vitamins
- stability of composition
- shelf life
- storage and packaging

All forms of life are dependent on water. The water activity indicates the amount of water available for micro-organisms such as bacteria, fungi, moulds, etc. Each type of microorganism needs a certain minimum water activity value for being able to grow.

Typical minimum water activity values taken from literature:

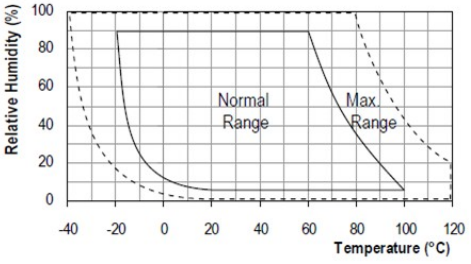
Water activity	Organism
aw = 0.91 - 0.95	Bacteria
aw = 0.88	Yeast
aw = 0.80	Mould
aw = 0.75	Halophilic bacteria
aw = 0.70	Osmiophilic yeast
aw = 0.65	Xerophilic mould

Typical sorption isotherms of various foods and materials taken from literature:



7.3 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.



8. Using the LogMemorizer program

To do so: The device is provided with USB interface, and the USB stick with LogMemorizer software and USB cable are available.

8.1 Installing/opening the program

1. Insert the USB stick with the LogMemorizer program into the USB port on your computer.
2. Open the **setup** application.
3. Follow the installation instructions.
4. Open LogMemorizer.

» The screen will now display the LogMemorizer's interface (figure 48).

» Before using LogMemorizer, please refer to the the separate LogMemorizer operating manual for the correct configuration of the USB COM Port.

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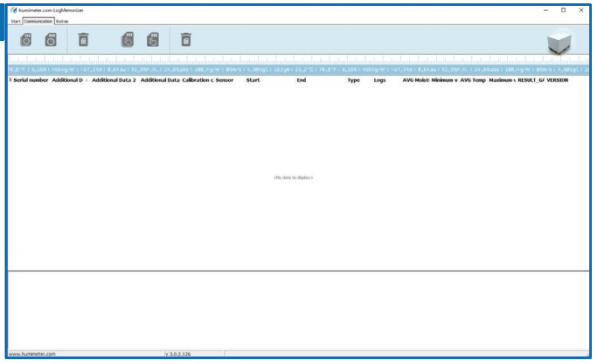

For more information on LogMemorizer, please refer to the separate LogMemorizer operating manual supplied with the device.

8.2 Exporting measured values to a computer

To do so: LogMemorizer must be installed. And you must have taken and saved one or several moisture readings.

Options: You can export moisture readings from the humimeter RH2 or initiate the export at your computer.

Exporting moisture readings from the humimeter RH2

Connect the humimeter RH2 to your computer using the supplied USB cable.

1. Insert the USB Mini B connector into the humimeter RH2 (figure 49).
2. Insert the USB connector into the computer.
3. Open LogMemorizer on your computer.
4. Switch on the humimeter RH2.
5. Press twice or hold for 2 seconds.
6. Select **Send Logs** (figure 50). To do so, press or and confirm by pressing .
7. Select **Manual Logs** or **Auto Logs** (figure 51). To do so, press or and confirm by pressing .
8. The display will then show the message **Send** (figure 52).

» All of the measuring values saved on the humimeter RH2 will now be sent to your computer.

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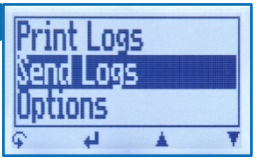
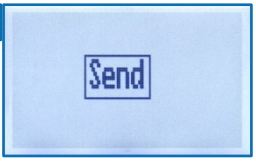


51

52



Initiating the data export at your computer

Connect the humimeter RH2 to your computer using the supplied USB cable.

1. Insert the USB Mini B connector into the humimeter RH2 (figure 53).
2. Insert the USB connector into the computer.
3. Open LogMemorizer on your computer.
4. Switch on the humimeter RH2.
5. Open the **Communication** tab in LogMemorizer (figure 54).

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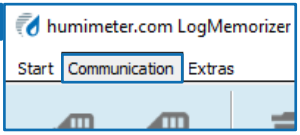
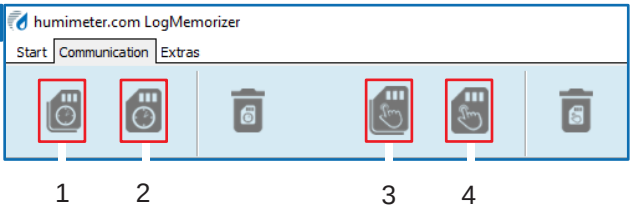


6. Select and click on one of the buttons shown in figure 55:

» **Import all auto save logs** (for importing all automatically saved readings)
» **Import most recent auto save series** (for importing the most recent automatically saved logs)
» **Import all manual logs** (for importing all manually saved readings)
» **Import most recent manual log** (for importing the most recent manually saved log).

55

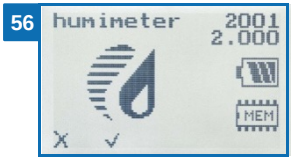


No.	Name
1	Import all auto save logs
2	Import most recent auto save series
3	Import all manual logs
4	Import most recent manual log

» The measuring values saved on the humimeter RH2 will now be sent to your computer.

9. Checking the device's status

1. Press twice or hold for 2 seconds.
2. Select **Status**. To do so, press or and confirm by pressing .
   » The display will then show the status indicator **humimeter**.
   » The display will show the following information (figure 56):



No.	Name
1	Serial number
2	Software version
3	Battery status
4	Memory status

3. Confirm by pressing .
4. Press to leave the main menu.

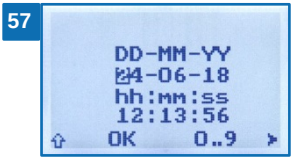
10. Configuring the device

10.1 Turning on Bluetooth

The information on Bluetooth is provided in a separate operating manual.

10.2 Adjusting the date/time

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Date/Time**. To do so, press  or  and confirm by pressing  .
4. The display will now appear as shown in figure 57.
   - » The format for the date is **DD-MM-YY** (Day-Month-Year).
   - » The format for the time is **hh:mm:ss** (hour:minutes:seconds).



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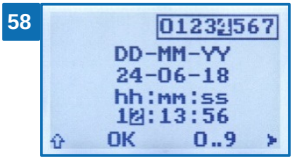
5. Inputting numbers:
   Press and hold  to quickly scroll to the required number and either press it for 3 seconds or press  to confirm the selected number (figure 58).



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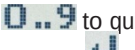
6. Moving forward:
   To move forward between **DD-MM-YY** and **hh:mm:ss**, press  .
7. Moving back:
   Press  to switch to another input level. To move backward between **DD-MM-YY** and **hh:mm:ss**, press  .
8. Confirm the date/time by pressing  .
   - » The settings have been saved.
9. Press  to leave the **Options** menu.
10. Press  to leave the main menu.

10.3 Setting the emission ratio

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Emission ratio**. To do so, press  or  and confirm by pressing  .
4. Overwrite the current emission ratio. To do so, press and hold  to quickly scroll to the required number and either press it for 3 seconds or press  to confirm the selected number.

   Moving back:
   Press  to switch to another input level.
   To move back, press  .
5. Confirm the new emission ratio by pressing  .

» The setting has been saved.

6. Press  to leave the **Options** menu.
7. Press  to leave the main menu.

10.4 Selecting a language

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Language**. To do so, press  or  and confirm by pressing  .
4. Navigate to the required language. To do so, press  or  and confirm by pressing  .

» The setting has been saved.

5. Press  to leave the **Options** menu.
6. Press  to leave the main menu.

10.5 Activating options

To do so: Some of the options must be deactivated.

1. Press twice or hold for 2 seconds.
2. Select **Options**. To do so, press or and confirm by pressing .
3. Select **Unlock**. To do so, press or and confirm by pressing .
   - » The display will now appear as shown in figure 59.
   - » On delivery, the four-digit password is the device's serial number.

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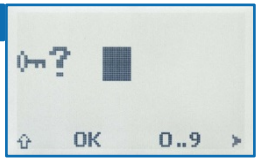
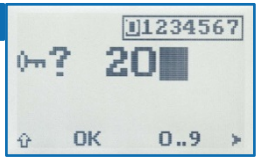


4. Inputting numbers:
   Press and hold 0..9 to quickly scroll to the required number and either press it for 3 seconds
   or press to confirm the selected number (figure 60).

60



5. Moving back:
   Press to switch to another input level.
   To move back, press .
6. Confirm the four-digit password by pressing OK.
   - » The setting has been saved.
   - » The **°C/°F, BL On Time, Auto OFF Time, Calibrate, Materialcalib., Online Send, Password, Reset** options are now activated.
7. Press to leave the **Options** menu.
8. Press to leave the main menu.

10.6 Deactivating options

Once the device has been switched restarted, the **°C/°F, BL On Time, Auto OFF Time, Calibrate, Materialcalib., Online Send, Password, Reset** options will be deactivated again.

10.7 Selecting °C/°F

To do so: All of the options must be activated (see "10.5 Activating options").

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **°C/°F**. To do so, press  or  and confirm by pressing  .
4. Navigate to the required temperature scale, i.e. Celsius (**°C**) or Fahrenheit (**°F**). To do so, press  or  and confirm by pressing  .

   » The setting has been saved.

5. Press  to leave the **Options** menu.
6. Press  to leave the main menu.

10.8 Reducing the device's power consumption

10.8.1 Configuring the display illumination time

To do so: All of the options must be activated (see "10.5 Activating options").

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **BL On Time**. To do so, press  or  and confirm by pressing  .
4. Select the required display illumination period (30 seconds, 2 minutes, 5 minutes, 10 minutes). To do so, press  or  and confirm by pressing  .

   » The setting has been saved.

5. Press  to leave the **Options** menu.
6. Press  to leave the main menu.

10.8.2 Configuring automatic switch-off

To do so: All of the options must be activated (see "10.5 Activating options").

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Auto Off Time**. To do so, press  or  and confirm by pressing  .
4. Select the period of time you want the device to stay switched on (3 minutes, 5 minutes, 10 minutes, 20 minutes, 30 minutes). To do so, press  or  and confirm by pressing  .

   » The setting has been saved.
5. Press  to leave the **Options** menu.
6. Press  to leave the main menu.

10.9 Calibrating the device

For information on how to calibrate your device, see section "12. 2-point (optionally 3-point) calibration".

10.10 Configuring the material calibration function

The type calibration function is described in a separate operating manual.

10.11 Online Send

To do so: All of the options must be activated (see "10.5 Activating options").

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Online Send**. To do so, press  or  and confirm by pressing  .

   » The setting has been saved.

   » The device now automatically sends the stored measured value to the PC each time the memory button is pressed.
4. Press  to leave the **Options** menu.

5. Press  to leave the main menu.

10.12 Changing the password

To do so: All of the options must be activated (see "10.5 Activating options").

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Password**. To do so, press  or  and confirm by pressing  .

   » The display will show the current password.

4. Overwrite the current password. To do so, press and hold  to quickly scroll to the required number and either press it for 3 seconds or press  to confirm the selected number.

   Moving back:
   Press  to switch to another input level.
   To move back, press  .

5. Confirm the new four-digit password by pressing  .

   » The setting has been saved.

6. Press  to leave the **Options** menu.
7. Press  to leave the main menu.

10.13 Resetting the device to its factory settings

To do so: All of the options must be activated (see "10.5 Activating options").

1. Press twice or hold for 2 seconds.
2. Select **Options**. To do so, press or and confirm by pressing .
3. Select **Reset**. To do so, press or and confirm by pressing .
   - » The display will then show the message **Reset?** (figure 61).
4. Confirm by pressing .
   - » The device will now be reset to its factory settings. All of your personal settings will be lost.
   - » The display will show the status indicator **humimeter** (figure 62).
   - » Resetting the device will not affect the saved measuring values.

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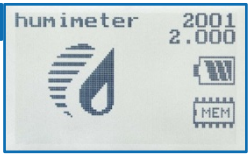

11. Cleaning and maintenance

Regularly cleaning and maintaining the device will ensure that it will have a long service life and stay in good condition.

11.1 Changing the batteries

The device constantly monitors the charge level of the batteries. The current battery status is shown on the status screen.

If the battery´s charge is very low, the battery symbol will be shown with an exclamation mark. In that case, the batteries must be changed immediately (figure 63).

For changing the batteries, see section "3.3 Inserting batteries".

As the device's user, you are responsible by law for properly disposing of all used batteries, which must not be disposed of as domestic waste (Battery Directive).

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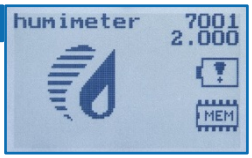
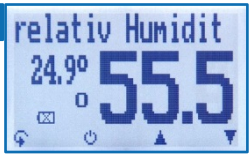


64



11.2 Care instructions

- Do not leave the device out in the rain. The device is not waterproof.
- Do not immerse the sensor in water.
- Do not expose the device to extreme temperatures.
- Protect the device from strong mechanical shocks and loads.

11.3 Cleaning the device

ATTENTION

Do not clean with fluids

Water or cleaning fluid getting inside the device can destroy the device.

► Only clean with dry materials.

Plastic housing

Clean the plastic housing with a dry cloth.

Water activity measuring chamber

Clean the screw-top Nalgene jar with a cloth and cleaning alcohol.
The sensor cannot be cleaned. In case of a polluted sensor please contact your dealer.

12. 2-point (optionally 3-point) calibration

12.1 Preparing the water activity measuring chamber

Preparation

To ensure proper results it is essential that the components of the calibration equipment have approximately the same temperatures. The best way to do that is to leave the calibration components at room temperature (+20°C to +26°C) for at least 60 minutes (or more if you have time available).

Temperature must 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 ideally overnight (even better if done for 24 hours).

Components of calibration equipment

Aw Salt Standard Solutions (0.754 saturated solution in screw-top Nalgene Jar, 0.500 and 0.800 solutions in vials), Calibration Jar (Container jar with sponge base), Screw-Top Nalgene jars, RH2 Water Activity (Aw meter) and measuring chamber (Sensor).

Precaution:

0.754 Aw saturated salt standards are reusable and should be used as it is supplied along with the jar. It is not meant for pouring into any other containers.

Please note the Aw standards shouldn't be left open. Close the lid immediately when not in use with the Aw measuring unit. Store and use at room temperature and away from sunlight (at +15°C to +25°C).

12.2 Cross Verification using 0.754 Aw standard:

1. Open the lid of the calibration jar. Open the lid of the Aw standard and place the whole plastic jar on top of sponge inside the calibration jar. Quickly close the plastic jar using the sensor head of the water activity measuring chamber.
2. Make sure the other end of Aw sensor is connected to the RH2 meter and turn the device ON.
3. Change the scales to Water Activity (Aw) using UP and DOWN arrows. Let the whole set-up stay there until you see a stable reading on the screen (could take around 10 to 20 minutes to stabilize).

ATTN: If the meter reads within the tolerance of standard solution +/-0.02 (i.e., Aw between 0.734 and 0.774), then Recalibration is not required. If it differs from that tolerance range, we recommend carrying out a recalibration as follows (**12.3 Performing a recalibration**):

12.3 Performing a recalibration

To be done: Only when the deviation revealed is higher than 2% relative air humidity (i.e., +/-0.02AW while cross checking with the .754 saturated standard in the earlier page).

To do so: All of the options must be activated (see "10.5 Activating options"). Use Aw standards 0.500 (50% RH) or 0.800 (80% RH) calibration vials (one time use vials). Contact Scigiene if you do not have the standards.

ATTN: To begin recalibration the AW meter should be RESET and AUTO-OFF time adjusted. Please follow the following steps:

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Reset** (input password if asked –which is serial number of your device). Once you select reset a prompt will ask to confirm. Select the checkmark sign to confirm Reset.
4. Press  twice or hold for 2 seconds to go to the main Menu.
5. Select **Options** and Scroll to find "Auto OFF Time". Select and set it to 5 mins.
6. Press  twice to go back to main menu

12.3.1 Determination of calibration values

To be done: Microsoft Excel calculation sheet is required (available via email, on request by phone or by email to support@scigiene.com , Phone: +1-416-261-4865).

To do so: Begin with 0.500Aw vials (50% RH). Make sure to bring the vial to room temperature similar to other components of calibration set up.
-Open one vial and pour the liquid on one of the clean sample cup (screw-top Nalgene jar).
-Place the Nalgene jar containing 0.500 standard on top of the sponge inside the calibration Jar. Quickly close the calibration jar using the sensor head of AW measuring chamber.

1. Press  twice or hold for 2 seconds.

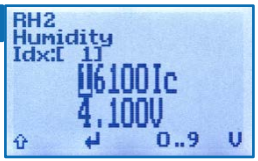
2. Select **Options**. To do so, press ▼ or ▲ and confirm by pressing ↵.

3. Select **Calibrate**. To do so, press ▼ or ▲ and confirm by pressing ↵.

4. Select **Humidity**. To do so, press ▼ or ▲ and confirm by pressing ↵.

» The display will then show the first index, Index1 (Idx:[1]) (figure 66).

66



5. Enter the indices 1 to 6 of the Ic values already stored in the device into the corresponding fields of the MS Excel calculation sheet, paying attention to the volt values (figure 67) ein. Navigate through the indices by pressing ◄ twice until you have returned to Index1 (Idx:[1]).

67

	Factory calibration values	
	IC-Values	V-Values
Idx [1]	16 383 Ic	4,785 V
Idx [2]	11 180 Ic	3,380 V
Idx [3]	7 220 Ic	2,300 V
Idx [4]	5 274 Ic	1,760 V
Idx [5]	2 400 Ic	0,896 V
Idx [6]	1 086 Ic	0,500 V

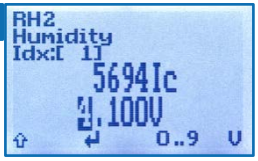
6. Press U.

7. The Ic value (upper line) has to change (figure 68).

» If Index7 (Idx:[7]) is displayed after the key is released, the key has been pressed too long.

» In that case navigate back to Index1 (Idx:[1]) by pressing ◄ and press U shorter

68



8. Now enter the real humidity value, the temperature, the displayed humidity value and the new Ic value (point 7) of the humidity standard used into the correspon- ding fields in the MS Excel calculation sheet (figure 69).

69

	Determined calibration values			
	real humidity	shown temperature	shown relative humidity	assumed IC-values
at approx. 35%	35,0%			5 637 Ic
at approx. 50%	50,0%			7 600 Ic
at approx. 80%	80,0%			11 128 Ic

» If you forget to enter one value, the calculation is wrong.

9. Now do not press any other key on the device and wait until it switches itself off (by default this takes about 5 minutes).

» Up to this point, no changes have been made to the calibration.

10. Take the 0.500 standard Nalgene jar out of the calibration jar and tightly screw its lid and set aside. Now repeat the process by pouring a vial of 0.800 AW standard into a second clean sample cup (another screw-top Nalgene jar). Place the cup in the calibration jar and quickly close it using the sensor head of the AW measuring chamber. Turn on the unit and repeat the steps 1-9 .

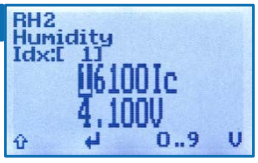
12.3.2 Entering the calculated calibration values into the RH2

To do so: The Microsoft Excel calculation sheet has been filled in correctly.

1. Press  twice or hold for 2 seconds.
2. Select **Options**. To do so, press  or  and confirm by pressing  .
3. Select **Calibrate**. To do so, press  or  and confirm by pressing  .
4. Select **Humidity**. To do so, press  or  and confirm by pressing  .

» The display will then show the first index, Index1 (Idx:[1]) (figure 70).

70



5. Overwrite the current Ic-value with the new calculated Ic-value for this index (figure 71). To do so, press and hold 0..9 to quickly scroll to the required number and either press it for 3 seconds or press ↵ to confirm the selected number (figure 72).

71

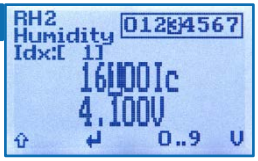
	new calibration values	
	IC-Values	V-Values
Idx [1]	15 971 Ic	4,785 V
Idx [2]	11 128 Ic	3,380 V
Idx [3]	7 445 Ic	2,300 V
Idx [4]	5 637 Ic	1,760 V
Idx [5]	2 708 Ic	0,896 V
Idx [6[	1 772 Ic	0,500 V

Moving back:

Press ⇧ to switch to another input level.

To move back, press ←.

72



6. Navigate to the next index by pressing ↵ twice.

7. Repeat steps 5 and 6 for the rest of the calculated indices, leaving index7 (Idx:[7]) untouched.

8. Press ⇧ to switch to another input level and ⇦ to leave the **Humidity** menu.

» The recalibration has been saved.

9. Press ⇦ to leave the **Calibrate** menu.

10. Press ⇦ to leave the **Options** menu.

11. Press ⇦ to leave the main menu.

12. In case of an incorrect recalibration, it is possible to reset the device to its factory settings (see "10.13 Resetting the device to its factory settings").

» By restoring the factory calibration, recalibrations that have already been carried out successfully are deleted.

13. Faults

If the measures listed below fail to remedy any faults or if the device has faults not listed here, please contact Schaller GmbH.

Fault	Cause	Remedy
Measuring error	The temperature is outside the operating temperature: lower than -10 °C or higher than +60 °C	Only use the device in temperatures between -10 °C and +60 °C.
	Measurement error due to too short temperature adjustment time	Let the device adjust to the surroundings (see "5.3 Adjustment behaviour of the sensor").
	Wrong product type	Check whether you have selected the right product type before taking a reading (see "7. Product types").
	Filling volume too low	Fill the screw-top jar to at least two thirds with fine material or at least half-way with coarse material.
	Dripping water or sprayed water	Direct contact of the sensor with dripping or sprayed water will destroy it.
	Irreversible damage of the sensor due to aggressive gases	Please contact your dealer.
	Condensation caused by a change in temperature	Condensation on the sensor interferes with the calibration. Let the device adjust to the surrounding temperature.
	Polluted sensor	Please contact your dealer.
	Foreign particles on the sensor	Please contact your dealer.

Fault	Cause	Remedy
Data transfer to Log-Memorizer failed	Interface has not been configured	The interface only has to be configured once. To do so, press the F1 key on your computer and read the Help file for your LogMemorizer program.

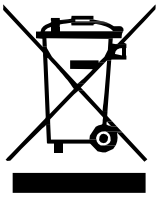
14. Storage and disposal

14.1 Storing the device

The device must be stored as follows:

- Do not store outdoors.
- Store in a dry and dust-free place.
- Protect the device from sunlight.
- Avoid mechanical shocks/loads.
- Remove the batteries if the device is not used for a period of 4 weeks or longer.
- Storage temperature: -20 °C to +60 °C

14.2 Disposing of the device



Devices marked with this symbol are subject to Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).
If the device is being operated outside the European Union, the national regulations on the disposal of such devices that apply in the country of use must be observed.

Electronic devices must not be disposed of as domestic waste.

The device must be disposed of appropriately using appropriate collection systems.

15. Device information

15.1 EC declaration of conformity

CE DECLARATION OF CONFORMITY

We Schaller GmbH
Max-Schaller-Straße 99
A – 8181 St. Ruprecht

in accordance with the following Directives:

EMV - Richtlinie 2014/30/EU,
RoHS - Directives 2011/65/EG,

hereby declare that the following product types:

Product: humimeter

Types: RH1 ; RH2 ; RH5 ; RH5.1 ; RH6

are in conformity with the applicable requirements of the following documents

- EN 61326–1:2013 Electrical equipment for measurement, control and laboratory use – EMC requirements
- EN 50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances:

I hereby declare that the equipment named above has been designed to comply with the relevant Sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives.

St. Ruprecht a.d. Raab, 21.03.2016

Max Schaller

.....

Schaller GmbH
Maximilian Schaller
General Manager

15.2 Technical data

Display resolution	0.1 g/m³ absolute humidity, 0.1 % rel. air humidity, 0.1 °C / 0.3 °F dew point, 0.1 °C/ 0.3 °F temperature, 0.1 % EMC Wood, 0.01 % EMC POM, 0.001 aw
Measuring range rel. air humidity	0 % to 100 % RH
Calibration rel. air humidity	0 % to 90 % RH
Measuring range dew point	-55 °C to +60 °C
Measuring range EMC Wood	2 % to 30 %
Calibration EMC Wood	5 % to 15 %
Measuring range EMC POM	0 % to 2 %
Calibration EMC POM	0 % to 2 %
Measuring range Water Activity	0 to 1.00
Calibration Water activity	0 to 0.98
Accuracy rel. air humidity	+/- 1.5 % (at 25 °C)
Accuracy temperature	+/- 0.3 °C (at 25 °C) / +/- 0.5 °F (at 77 °F)
Accuracy EMC Wood	+/- 0.5 % (at 25°C)
Accuracy EMC POM	+/- 0.05 % (at 25°C)
Accuracy Water activity (at 25 °C)	+/- 0.01 from 0.10 to 0.80 +/- 0.04 from 0.00 to 0.10 & 0.80 to 0.98
Operating temperature	-10 °C to +60 °C
Storage temperature	-20 °C to +60 °C
Temperature compensation	Automatic
Data memory	Up to 10,000 measuring values
Power supply	4 pcs. of 1.5 Volt AA Alkaline batteries
Current consumption	60 mA (incl. display illumination)
Menu languages	German, English, French, Italian, Spanish, Portuguese, Czech, Polish, Russian, International

Display	128 x 64 illuminated matrix display
Device dimensions	249 x 75 x 30 mm
Dimensions water activity measuring chamber	ø 85 x 102 mm (186 ml) ø 85 x 111 mm (245 ml)
Device weight	210 g
Weight water activity measuring chamber	542 g (186 ml) 556 g (245 ml)
Device IP rating	IP 40

Climate Environment

Materials

Food

Buildings

Bioenergy

Paper / Board

Schaller Messtechnik develops, produces and sells professional moisture meters and turnkey solutions.

Scigiene

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