Operating Instructions

Version 2.0

HYDROMETTE

BL UNI 11

EN

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1 Foreword

1.1 User Description

These instructions are intended for the end user of the product. The end user of the product is a person who has read and understood these operating instructions, is an experienced user of similar devices and is aware of all possible dangers and can act accordingly.

The device may only be used by persons aged 14 and over who have read and understood these operating instructions, are familiar with the operation of similar products and are aware of all possible dangers and act accordingly.

The device is intended for use by persons who have experience with moisture measurements (structural moisture, wood moisture, climate, etc.).

All personnel involved in the operation, installation, inspection and maintenance of the product must be qualified to carry out the associated work. If the personnel concerned do not already have the required knowledge and skills, appropriate training and instruction must be ensured.

All local regulations must be observed.

1.2 Intended Use

The Hydromette BL UNI 11 is an electronic, universal triple measuring device to which numerous active electrodes & TF sticks can be connected. It can be used to cover the measuring ranges of structural moisture, humidity and temperature.

Using the B 55 BL active electrode, the Hydromette can be used for the non-destructive detection of moisture in building materials of all kinds, as well as for detecting moisture distribution in walls, ceilings and floors.

With the active electrodes from the thermo-hygrometer family or with the TF sticks available in different versions, almost any measurement requirement in the field of climate measurement can be covered.

Special sensors even allow climate measurement within a solid. Using a permanently programmed sorption isotherm, the moisture can be determined for various building and insulating materials as a percentage by weight or mass.

Temperature measurements in solids or bulk materials are carried out with the Pt 100 temperature sensors. An extra active electrode is available for rapid surface temperature measurement using infrared measurement. The combination of the different measuring methods enables a quick and reliable assessment of dew point undershoots.

The Hydromette BL UNI 11 may only be used for structural moisture, air humidity and temperature measurements.

1.3 Non-Intended Use

The device is not intended for any applications that are not listed in these operating instructions.

The device, accessories, tools, software, etc. must be used in accordance with these instructions, taking into account the working conditions and the work to be performed. Using the product for work other than that for which it is intended will result in a hazardous situation.

The device may only be used together with the original accessories. The device must only be used within the specified performance limits as described in these instructions.

1.4 Explanation of the General Warnings

The following danger levels are used in this operating manual to indicate potentially dangerous situations and important safety instructions:

Danger Level	Description
 **DANGER**	Danger / Indicates a hazardous situation which, if not avoided, will result in death or serious irreversible injuries.
 **WARNING**	Warning / Indicates a hazardous situation which, if not avoided, could result in death or serious irreversible injuries.
 **CAUTION**	Caution / Indicates a hazardous situation which, if not avoided, could result in minor or moderate injuries.
 **INFORMATION**	Indicates important information.

1.5 General Safety Instructions

It must be ensured that the complete instructions and all safety instructions have been read and understood before using this device.

All instructions must be followed. This prevents accidents that can result in property damage or minor or moderate injuries.

INFORMATION

All safety information and instructions must be kept for future reference and passed on to subsequent users of the product.

The manufacturer shall not be liable for any damage to property or injuries to persons that can be attributed to incorrect handling or non-compliance with the safety instructions. In such cases, the warranty shall be void.

1.5.1 Persons at Risk

Persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge must be supervised or instructed in the safe use of the device and understand the associated hazards.

Children must be supervised to ensure that they do not play with the device. The device is not a toy. There is a risk of swallowing small parts of the device (e.g. battery compartment cover) or an accessory (e.g. TF-Stick, not for all BL device types).

This device is not intended for use by persons with reduced physical, sensory or intellectual capabilities, or lack of experience and/or knowledge.

WARNING

Risk of suffocation, injury or permanent disability. The device must not be used by persons under the age of 14!

Risk of suffocation! Keep packaging away from children.

1.5.2 Preparation and Start-up

Never store or place the device in a location where it can fall or be drawn into water or other liquids.

To avoid the risk of electric shock, never immerse the device in water or other liquids.

Always remove all packaging before operating the device.

WARNING

Fire hazard!
Do not use a damaged device.

In the event of visible damage, strong odours or excessive heating of components, the battery must be removed immediately and the appliance must not continue to be used.

1.5.3 Use / Operation

CAUTION

Risk of damage. The device is a highly sensitive measuring instrument. Only use the device in a controlled electromagnetic environment.

Do not let the device drop onto hard surfaces. This can result in malfunctions or functional failures. Normal use of the device, without excluding hazards to the user, cannot be guaranteed.

The device is fragile.

To avoid overheating, the device must not be covered or used near heat sources or direct sunlight and only be used at ambient temperatures between 0 °C and 40 °C.

The device may not be stored or operated in aggressive atmospheres or atmospheres containing solvents!

The measuring device may be operated in residential and commercial areas.

Measurements **must not** be carried out on conductive surfaces.

Static charge - At low humidity levels, static electricity with high voltage can build up, favoured by external circumstances (friction during material transport, high insulation value of the surrounding area), which can lead to strong fluctuations in measured values. Even the instrument operator may - inadvertently - contribute to the build-up of a static charge by the clothing worn. A considerable improvement can be achieved by the operator and the measuring instrument being absolutely still during measuring, as well as by earthing (contact with conducting metal, water or heating pipes, etc.).

1.5.4 Care, Maintenance and Inspection

CAUTION

Remove the battery before cleaning the product. Do not use abrasive cleaning cloths or chemicals to clean the product as these can damage the surface.

Stop using the product in the case of visible damage, strong odours development or excessive overheating of components.

Only use original accessories.

Changes to the device and technical modifications are not permitted without the written consent of the manufacturer.

All connection options and the device itself must not be sprayed directly or indirectly with water when cleaning (connections depend on the device! e.g. BNC-, 2.5 mm, 3.5 mm jack receptacle and mini-USB port).

Our recommendation: To ensure functionality, have all your measuring equipment checked by the manufacturer every 2–3 years (depending on the frequency of use).

1.5.5 Troubleshooting

Do not repair the device yourself. Contact the manufacturer if the device is not functioning properly.

1.5.6 Disposal

Electrical equipment, accessories and packaging must not be disposed of together with household waste (only for EU countries) and must be disposed of in compliance with the European Directive 2012/19/EU on waste electrical and electronic equipment and its implementation in accordance with national law. Electrical equipment that has reached the end of its service life must be collected separately and sent to an environmentally compatible recycling facility.

The WEEE symbol draws attention to the need for disposal.

The device contains a battery. Batteries must not be disposed of with normal household waste. They may contain toxic heavy metals and are subject to the hazardous waste ordinance. For this reason, dispose of the battery at a local collection point for the recycling of waste electrical and electronic equipment. Caution, there is a risk of explosion if the wrong type of battery is inserted. Handle used batteries according to the manufacturer's instructions.

Gann Mess- u. Regeltechnik GmbH accepts no liability for damage caused by non-compliance with the operating instructions or by violation of a duty to care during transport, storage or operation of the instrument, even if this duty to care is not specifically discussed in the operating instructions.

1.6 Specific Warnings

CAUTION

When using the **ET 10 BL** push-in sensor, there is a risk of injury due to careless handling of the measuring tip when piercing the material to be measured or when measuring temperatures in liquids. Before pressing the electrode tip into solids or bulk materials, it is essential to ensure by suitable means that there are no electrical cables, water pipes or other supply lines at this point.

CAUTION

The electrode **TF-IR BL** uses a laser in laser class 2 according to IEC 60825-1. The laser must never be directed at people or animals. Do not look directly into the laser beam and avoid reflections on reflective surfaces.

2 Specifications

2.1 Technical Data

Hydromette

Display:	LCD segment display with three lines
Display resolution:	0.1 % or 0.1 digits
Response time:	< 2 s
Storage conditions:	+ 5 to + 40 °C - 10 to + 60 °C (for a short time)
Operating conditions:	0 to + 50 °C - 10 to + 60 °C (for a short time) < 85 % R.H. non-condensing
Power supply:	9-V-block battery
Types that can be used:	Types 6LR61 and Type 6F22
Dimensions:	170 x 50 x 30 (L x W x H) mm
Weight:	approx. 170 g
Protection class:	III
Protection rating:	IP20

2.2 Prohibited Environmental Conditions

- Condensation. humidity continuously too high (> 85% R.H.) and wetness
- Permanent presence of dust and combustible gases. vapours or solvents
- Ambient temperatures continuously too high (> +50 °C)
- Ambient temperatures continuously too low (< 0 °C)

2.3 Transport- & Storage Conditions

Die Hydromette BL UNI 11 may **only be stored in the packaging provided by the manufacturer or available from the manufacturer as an accessory**. The manufacturer shall not accept any liability or warranty for damage that may occur to the device or to the sensor system as a result of non-compliance.

INFORMATION

In particular, **avoid keeping or storing the devices in foams not supplied by the manufacturer**, as these can damage the sensors due to possible outgassing and result in incorrect measurements.

2.4 Measuring Range

2.4.1 with Active Electrode B 55 BL

Scan mode: 0 to 200 digits

Building material characteristic:

Cement screed:	1.8 to 5.9 % by weight	and	0.7 to 4.0 CM-%
Anhydrite screed:	0.1 to 3.3 % by weight	and	0.1 to 3.3 CM-%
Concrete:	1.3 to 6.2 % by weight	and	0.3 to 4.2 CM-%
Cement mortar:	1.8 to 7.8 % by weight	and	0.6 to 5.6 CM-%
Lime mortar:	0.6 to 4.5 % by weight	and	0.6 to 4.5 CM-%
Mixed plaster:	2.2 to 11.0 % by weight	and	1.5 to 10.0 CM-%
Gypsum plaster:	0.3 to 10.0 % by weight	and	0.3 to 10.0 CM-%

2.4.2 with Combined Electrode TF-IR BL

Climate:

Humidity:	0 … 100 % R.H. ±1.8% R.H. in the range 10 to 90% R.H. (*)
Air temperature:	-20 … 80 °C ± 0.3 °C in the range 10 to 60 °C (*)

Infrared:

Surface temperature:	-40 … 380 °C ± 0.5 °C in the range 0 … 60 °C
at an ambient temperature:	0 … 50 °C (*)

(*) Typical sensor accuracy

2.4.3 with Special Probes of the RH-T 37 Family

(including sorption isotherms)

Humidity:	0 … 100 % R.H. ±1.8% R.H. in the range 10 to 90% R.H. (*)
Air temperature:	-20 … 80 °C ± 0.3 °C in the range 10 to 60 °C (*)

(*) Typical sensor accuracy

Structural moisture using Sorption Isotherms:

Building materials :	
Cement screed	0.8 – 8.0 % by weight
Anhydrite screed	0.1 – 1.6 % by weight
Concrete	0.5 – 7.5 % by weight
Cement mortar	0.5 – 5.1 % by weight
Gypsum plaster	0.1 – 1.6 % by weight
Lime sand brick	0.3 – 3.4 % by weight
Lime cement mortar	1.6 – 15.5 % by weight
Insulation- and Insulating materials :	
wood fibre insulation panels	5.7 – 199.9 % by weight
Mineral wool insulation	0.6 – 4.0 % by weight
Brick	0.2 – 5.5 % by weight
Wood:	
Hardwood / Beech	2.7 – 27.3 % by weight
Softwood / Spruce	3.9 – 20.1 % by weight

2.4.4 **with TF-Stick 16 K-25, 16 K-25 P,16 K-25 M**

Humidity:	0 … 100 % R.H. ±1.8% R.H. in the range 10 to 90% R.H. (*)
Air temperature:	-20 … 80 °C ± 0.3 °C in the range 10 to 60 °C (*)

2.4.5 **with Pt100 Temperature Sensor ET 10 BL, OT 100 BL, TT 40 BL**

ET 10 BL push-in temperature sensor:

Measuring Range: -50 … +250 °C

OT 100 BL surface temperature sensor:

Measuring Range: -50 … +250 °C

TT 40 BL immersion and flue gas temperature sensor:

Measuring Range: -50 … +350 °C

3 General Information

3.1 Standards and Directives

This measuring instrument fulfils the requirements of the applicable European and national directives (2014/30/EU) and standards (EN 61010). Appropriate declarations and documentation are held by the manufacturer.

To ensure trouble-free operation of the measuring instrument and operational reliability, the user must carefully read and understand the operating instructions.

3.2 Warranty

The measuring instrument may only be operated under the specified climatic conditions. These are listed in chapter 2.1 "Technical Data of the Hydromette".

This measuring instrument may only be used under the conditions and for the purposes that it has been designed for. Operational reliability and functionality are no longer ensured if the device is modified or adapted. Gann Mess- u. Regeltechnik GmbH shall not be liable for any damage arising from such modifications or adaptations. The risk is borne solely by the user.

The measuring instrument and any accessories may only be properly used as described in these instructions. Keep the device and accessories out of the reach of children!

The device must not be stored or operated in air that is corrosive or contains solvents!

The notes and tables in these instructions regarding permitted or normal humidity conditions in practice and the general definitions of terms have been taken from the specialist literature. Therefore, the manufacturer cannot guarantee the correctness. The conclusions to be drawn from the measurement results depend for each user on the individual circumstances and the knowledge gained from his professional experience.

The measuring instrument may be used in the residential and commercial sectors.

The measuring instrument may only be stored in the packaging provided by the manufacturer or available from the manufacturer as an accessory. The manufacturer accepts no liability for damage that may occur to the device or the sensor system as a result of non-compliance.

Gann Mess- u. Regeltechnik GmbH accepts no liability whatsoever for damage caused by non-compliance with the operating instructions or by breach of the duty of care during transport, storage and handling when operating the device, even if this duty of care is not specifically referred to in the operating instructions.

4 Description of the Product

The Hydromette BL UNI 11 is an electronic, universal triple measuring device to which numerous active electrodes & TF sticks can be connected. It can be used to cover the measuring ranges of structural moisture, humidity and temperature.

Using the B 55 BL active electrode, the Hydromette can be used for the non-destructive detection of moisture in building materials of all kinds, as well as for detecting moisture distribution in walls, ceilings and floors. Characteristic curves for various building materials are stored in the device. This enables direct display of the measured values in per cent by weight (wt.-%) or CM per cent (CM-%) (see chapter 15.3 Display values (digits).

With the active electrodes from the thermo-hygrometer family or with the TF sticks available in different versions, almost any measurement requirement in the field of climate measurement can be covered.

Special sensors even allow climate measurement within a solid (RH-T). Using a permanently programmed sorption isotherm, the moisture can be determined for various building and insulating materials as a percentage by weight or mass.

Temperature measurements in solids or bulk materials are carried out with the Pt 100 temperature sensors. An extra active electrode is available for rapid surface temperature measurement using infrared measurement. The combination of the different measuring methods enables a quick and reliable assessment of dew point undershoots.

The Hydromette BL UNI 11 has a 3-line LCD display. The silicone buttons give haptic feedback for important functions.

An internal memory is available for storing data.

5 Device Layout and Button Assignment

Figure 5-1: Front view of the Hydromette BL UNI 11

5.1 Switch on Device

If the instrument is switched on WITHOUT connecting an active electrode or a TF stick by pressing the "On" button, the display shows "InP SEn".

This message also appears if an active electrode or a TF stick is not correctly plugged into the jack receptacle or if there is a malfunction.

No settings are possible with this display.

Figure 5-2: Error message, no accessories recognised

The Hydromette BL UNI 11 features auto-sensor technology. It automatically recognises the connected electrode and adapts both the menu functions and the measured value display to the respective sensor type.

INFORMATION

The connected electrode is activated by pressing the measurement button for longer than 2 seconds. If an electrode is connected to the 3.5 mm jack receptacle and a TF stick is connected to the 2.5 mm jack receptacle at the same time, the measurement via the 2.5 mm jack receptacle has priority and the instrument switches off the 3.5 mm jack receptacle. This means that only the values of the TF stick are then displayed.

6 Connecting the Active Electrode B 55 BL

6.1 Display Symbols for non-destructive Measurement

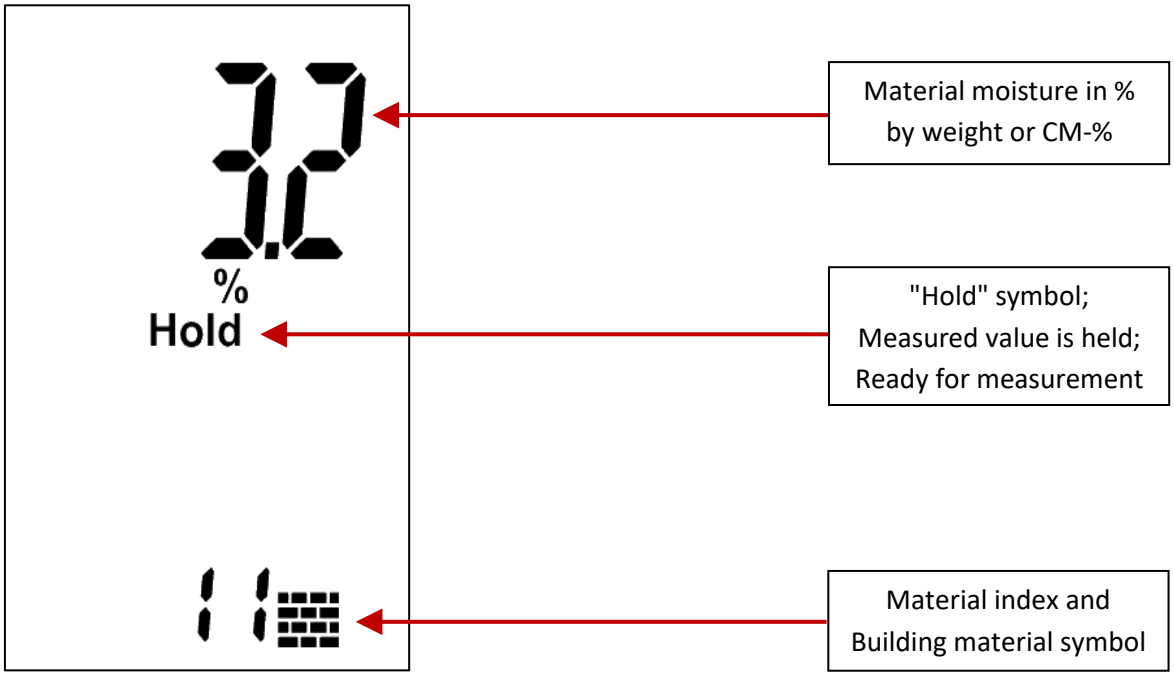

Figure 6-1: Main menu symbols

6.1.1 Other Symbols

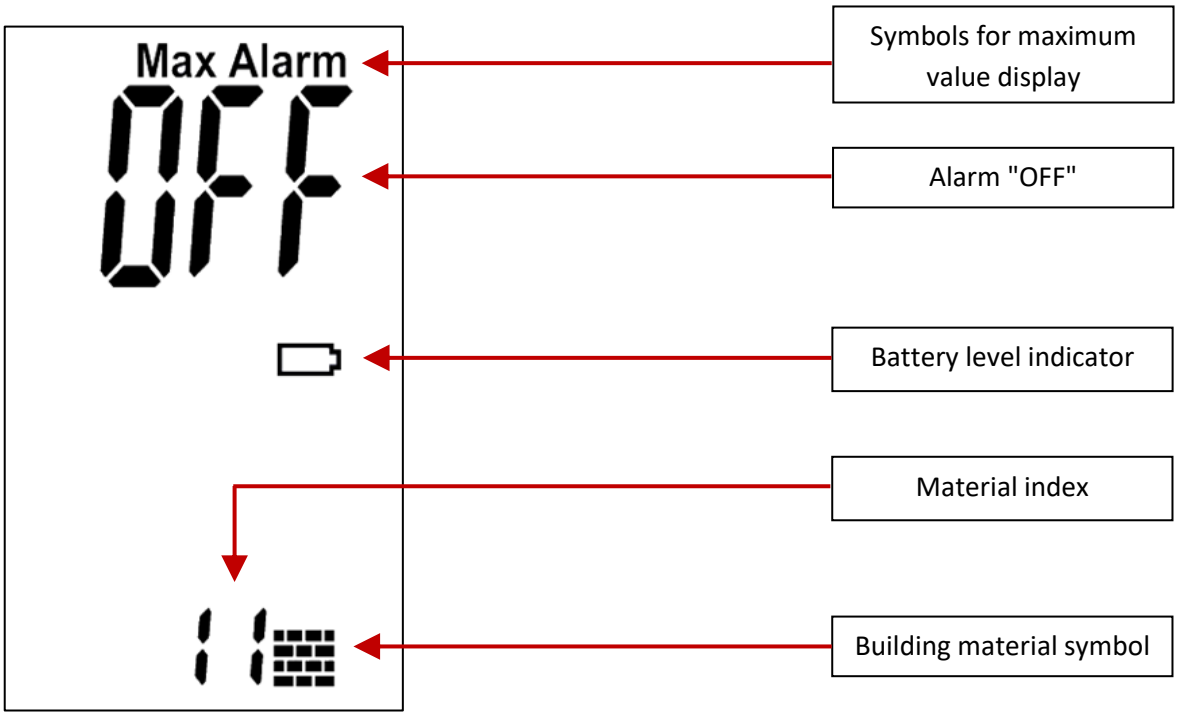

Figure 6-2: Other symbols

6.2 Switch on Device

The Hydromette BL UNI 11 and the B 55 BL active electrode must be connected to each other via the 3.5 mm jack receptacle. Ensure that the octagonal plug is correctly seated.

The instrument is switched on by pressing the "On" button ⏻. The Auto-Sensor technology now recognises the connected electrode. To activate capacitive measurement, the measuring button must be pressed for longer than 2 seconds. The instrument now starts in the measuring menu or main menu. The measuring process can be performed here [see Chapter 6.3.1 "Measurement menu (main menu)"]. The capacitive measurement remains active until the active electrode B 55 BL is replaced by another electrode or TF stick and its measuring mode is activated.

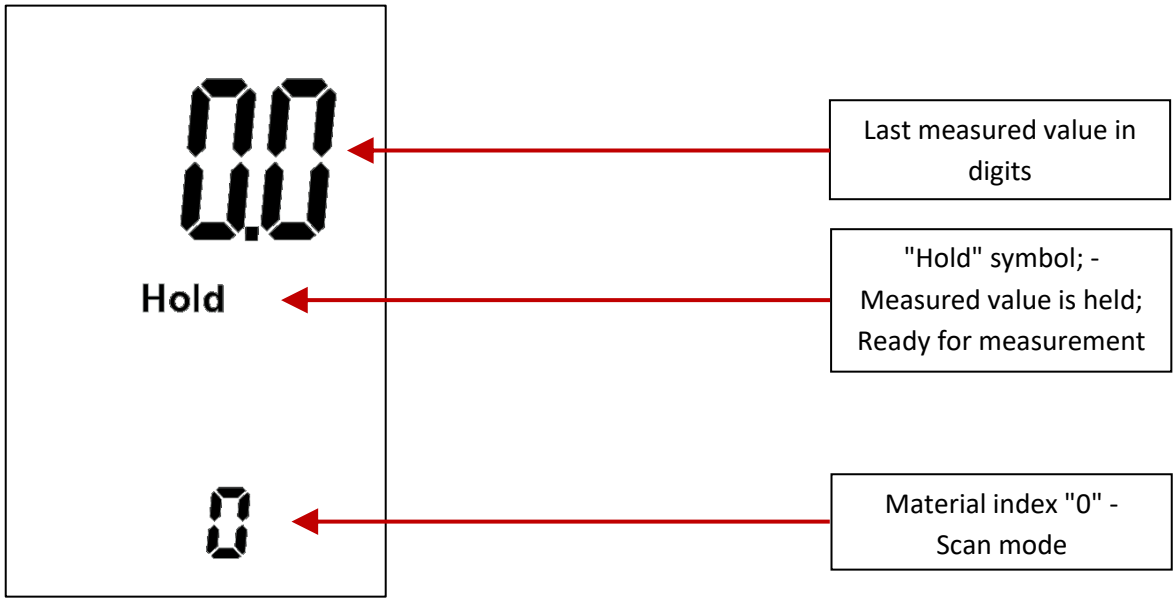

Figure 6-3: Scan mode display

6.3 Setting Menus

The following menu items can be selected one after the other by repeatedly pressing the "**Down**" button:

1. **Measuring Menu** (main menu): The measuring process can be performed here.
2. **Material setting**: The material can be selected here.
3. **Alarm value setting**: A measured value threshold can be set here, above which an acoustic signal sounds.
4. **Maximum value display**: The largest measured value is shown here.
5. **Memory Menu**: The last 5 measured values are stored here. The oldest value is overwritten after each measurement.

The menu items are selected in reverse order by pressing the **"Up"** button.

6.3.1 Measuring Menu (Main Menu)

After switching on, the device is in the measuring menu (main menu). The other menus can be accessed from here by pressing the **"Up"** or **"Down"** buttons.

In the measurement menu, the last measured values are displayed according to the material selection with the corresponding units (not for material code "0" / scan mode) and the note "Hold".

Measurements are taken by placing the ball electrode on the material to be measured. A new measurement is started by pressing the **"M"** button *(> 2 seconds*).

During the measuring process, the **"Hold"** symbol disappears from the display. After releasing the **"M"** button, the measured value is held and automatically stored in the ring memory. This overwrites the oldest stored value. The **"Hold"** symbol is displayed again.

If the new measured value is larger than the previous maximum value. **"Max"** flashes on the display. If the new value should be accepted, the **"M"** button must be pressed briefly *(< 1 second)*. If the value should not be saved, a new measurement can be started by pressing and holding *(> 2 seconds)* the **"M"** button without changing the previous maximum value.

If the **alarm function** is turned on (see chapter 6.3.3. Alarm value setting), a warning signal sounds if the adjustable alarm value is exceeded. At the same time, the selected alarm value is shown in the second line of the display.

If the measuring range of a selected material is exceeded or not reached, a flashing measured value warns you, which is also marked alternately with **"LO"** or **"HI"** (not for material code **"0"** / scan mode).

By default, the Hydromette BL UNI 11 in conjunction with the active electrode B 55 BL is supplied with the material code "0" (scan mode) as the factory setting.

The **material index "0"** stands for a measurement in digits. The scaling is then in the range of 0–200 digits. The % symbol and the material symbol disappear. This value allows you to quickly scan larger areas for the maximum moisture or the extent of moisture damage.

INFORMATION

Digital values are dimensionless measurement values and not real moisture values as a percentage! For this reason, the measurement values are displayed in digits WITHOUT %!

6.3.2 Material Setting

Measuring menu ⇨ **Press Down button once**

The material can be selected in this menu. Please refer to the material table in Chapter 15.1 in the appendix for the corresponding material data.

The set material index and the building material symbol are displayed (the building material symbol does not appear for material code number **"0"** / scan mode)

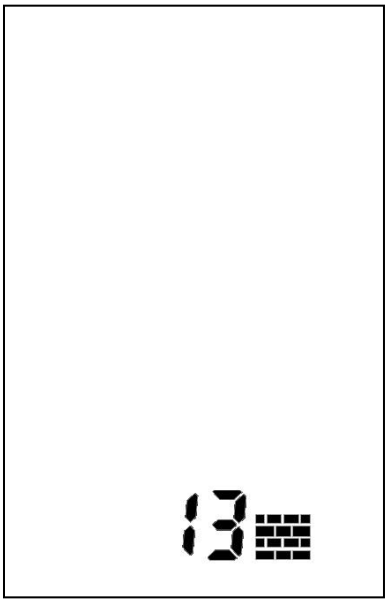

Figure 6-4: Display of material setting menu

To be able to make the material settings, the device must be switched on and in the measurement menu (main menu). Then press the **"Down"** button once to access the material settings. If you now want to change the setting for the material, press the **"M"** button briefly *(< 1 second)*.

The measuring mode display flashes and can be set using the **Up** and **Down** buttons. The change is saved by briefly *(< 1 second)* pressing the **"M**" button again.

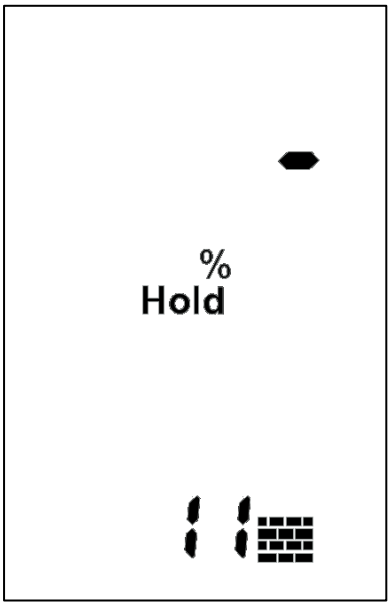

Figure 6-5: Display after a material change

After confirming the change, the display automatically jumps to the measuring menu of the (newly) selected material. This removes the values of the previous material from the display. Any stored **"Max"** values remain in the memory of the respective measuring mode.

Now a new measurement can be performed by pressing and holding *(> 2 seconds)* the **"M"** button.

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6.3.3 Alarm Value Setting

Measuring menu ⇨ **Press Down button**

The alarm function can be activated or deactivated in this menu. The alarm value can also be set. If the set alarm value is exceeded, an acoustic signal sounds.

The **"Alarm"** symbol, the set alarm value and the corresponding material index and material symbol are displayed. .

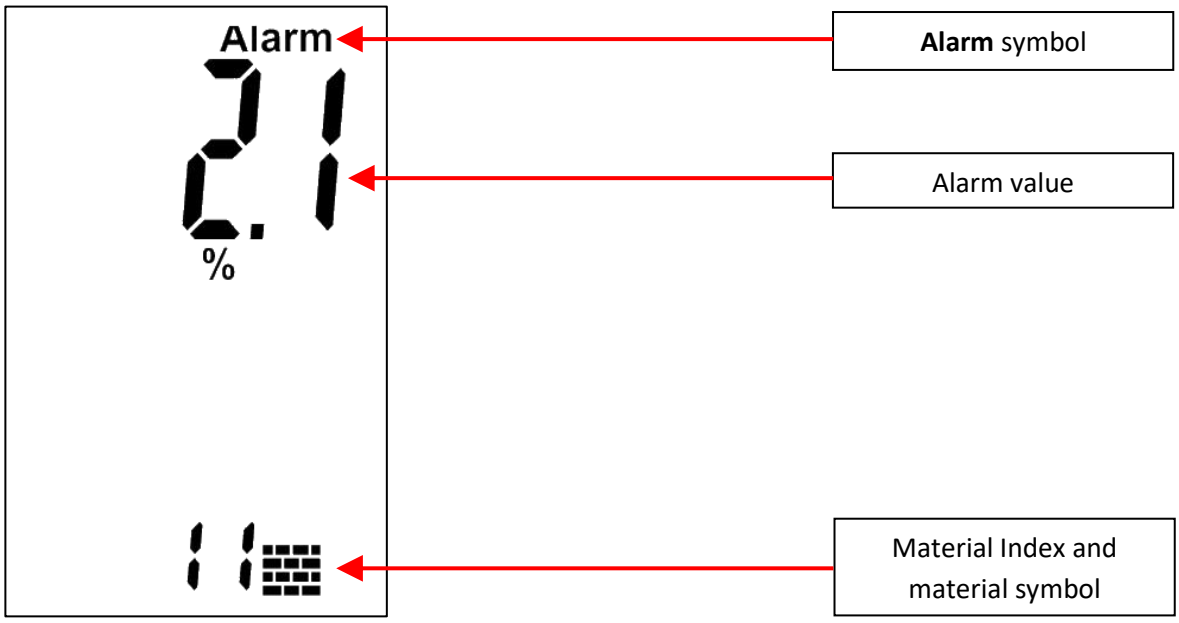

Figure 6-6: Display alarm value

The alarm function is set to **"OFF"** as the factory setting.

If you want to activate the function or enter a new alarm value. press the **"M"** button briefly *(< 1 second)*. The **"OFF"** display starts to flash.

A long *(> 1 second)* press on the **"M"** button activates the alarm value. The alarm value can be set separately for each material index set in measuring mode using the **"Up"** and **"Down"** buttons. As a factory setting, the maximum measuring range value is assigned to each material index as the alarm value. The default setting for material code number "0" is 80 digits.

If the desired value has been set or an existing value has been (re-)activated, the entry must be confirmed by briefly *(< 1 second)* pressing the **"M"** button. The instrument returns to the measuring mode.

If 0 is chosen as the material ID, the display will show in digits, without percentage data.

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6.3.4 Maximum Value Display

Measuring menu ⇨ **Press Down button 3 times**

The highest measured value of a measurement series is displayed together with the **"Max"** display symbol.

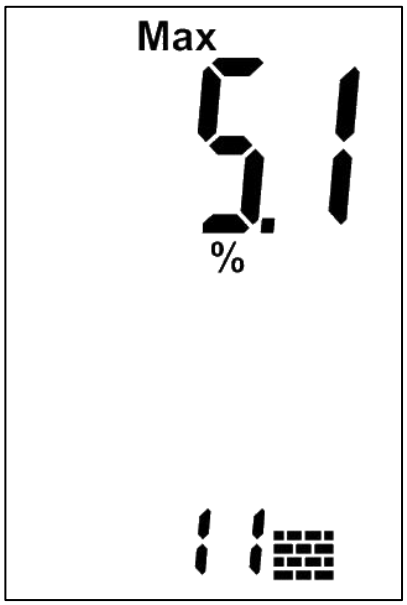

Figure 6-7: Maximum value display

A dash at the position of the measured value indicates that there is no maximum value (yet).

If an existing maximum value should be deleted, the displayed value must be selected by *briefly (< 1 second)* pressing the **"M"** button.

The value flashes and can now be deleted by pressing and holding *(> 1 second)* the **"M"** button. A dash at the position of the measured value indicates the successful deletion of the value.

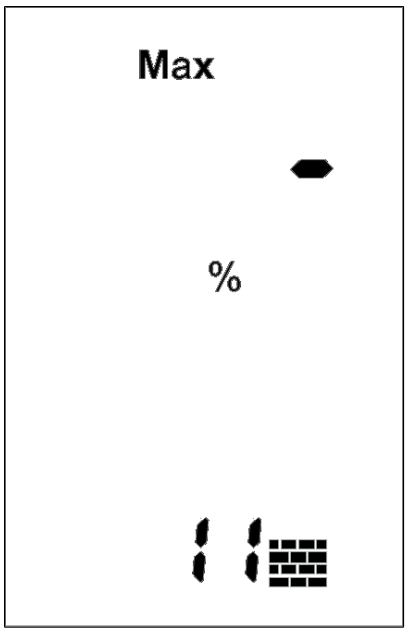

Figure 6-8: Deleted maximum value

The device returns to the measuring mode by *briefly (< 1 second)* pressing the **"M"** button again.

A new measurement can then be performed immediately by pressing and holding *(> 2 seconds)* the **"M"** button.

6.3.5 **Memory Menu**

Measuring menu ⇨ **Press Down button 4 times**

The ring memory symbol **"o"** and the corresponding memory location number are displayed.

As soon as you select the memory menu, the memory location number "o1" is displayed for approx. 1 second, and then the last measured saved value contained there is displayed.

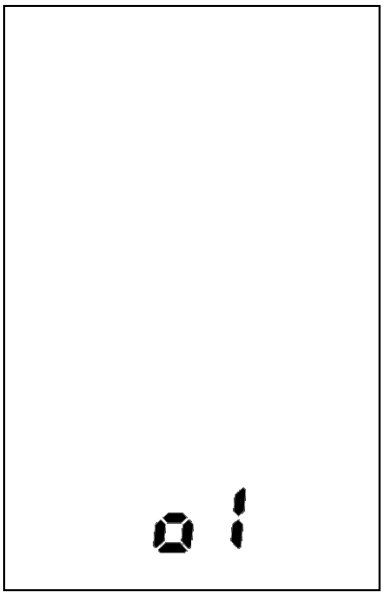

Figure 6-9: Memory location "o1"

As soon as you select the memory menu, the memory location number **"o1"** is displayed for approx. 1 second, and then the last measured saved value contained there is displayed.

By briefly *(< 1 second)* pressing the **"M"** button, the next memory location **"o2"** can be selected and the value it contains displayed.

The last 5 measured values are automatically saved and stored in the memory locations **"o1" – "o5".** The last measured value is in memory location **"o1".** The memory is designed as a ring memory. As soon as a sixth measured value is recorded, the oldest measured value in memory location "**o5"** is automatically removed from the memory.

After reaching the 5th memory location, the value of the 1st memory location is displayed again. Manual deletion of a memory value is not possible.

If the **"M"** button is pressed (and held) *for longer than 2 seconds*, the display of the memory value vanishes, only the memory location number is displayed. This signals that the user is still in the Memory Menu and not in the Measuring Menu. The memory value is retained in the background.

The saved values displayed can be identified by the fact that there is **no "Hold" symbol** in the display.

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7 Connecting the TF-IR BL Combination Electrode

7.1 Display-Symbols

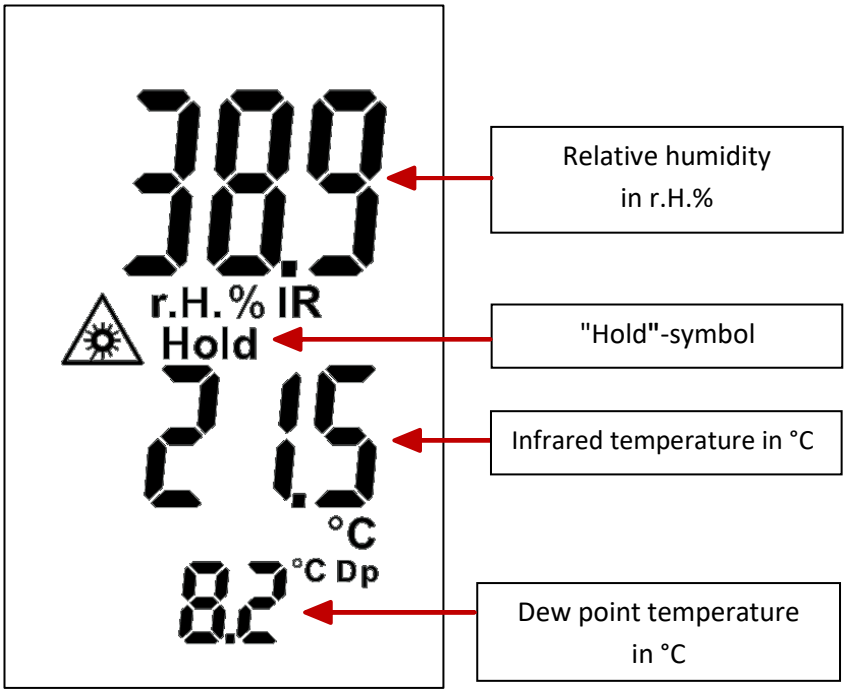

Figure 7-1: Main menu symbols

7.1.1 Other Symbols

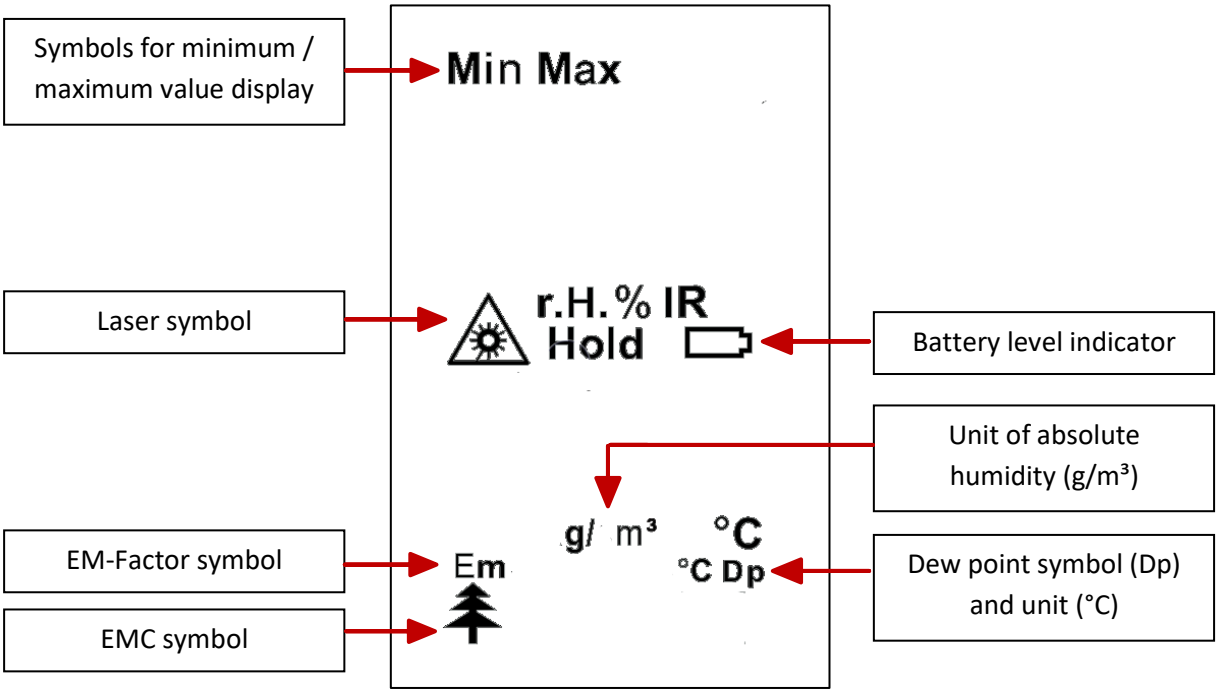

Figure 7-2: Other symbols

7.2 Switching the Device On

The Hydromette BL UNI 11 and the combination electrode TF-IR BL must be connected to each other via the 3.5 mm jack receptacle. Ensure that the octagonal plug is correctly seated.

The instrument is switched on by pressing the "On" button ⏻. The Auto-Sensor technology now recognises the connected electrode. To activate capacitive measurement, the measuring button must be pressed for longer than 2 seconds. The instrument now starts in the measuring menu or main menu. The measuring process can be performed here [see Chapter 7.3.1 "Measuring Menu (Main Menu)"]. The measuring mode of air humidity/surface temperature measurement remains active until the active electrode TF-IR BL is replaced by another electrode or TF stick and its measuring mode is activated.

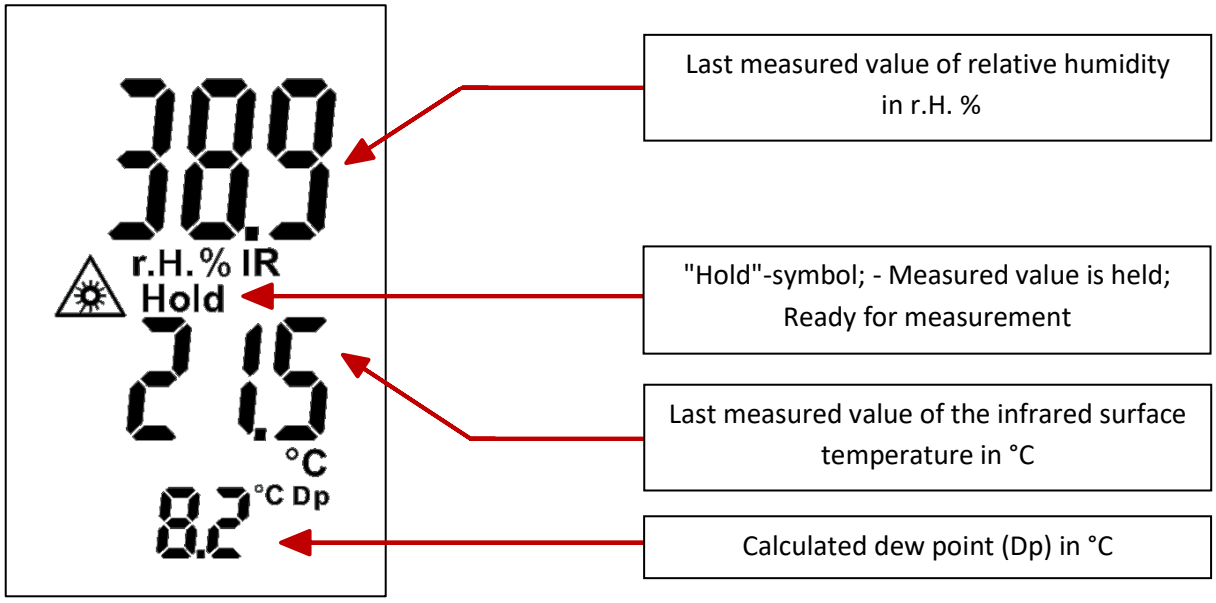

Figure 7-3: Standard Measuring menu

7.3 Setting Menus

The following menu items can be selected one after the other by repeatedly pressing the **"Down"** button:

1. **Measuring Menu** (main menu): The measuring process can be performed here.
2. **Measuring mode selection:** The different measuring modes can be set here.
3. **Laser-Pointer- / EM-Menu**: This menu can be used to disable/enable the laser pointer and to set the emissivity (EM factor).
4. **Maximum value display**: The largest measured value is shown here**.**
5. **Minimal value display:** The smallest measured value is shown here.
6. **Memory Menu:** The last 5 measured values are stored here. The oldest value is overwritten after each measurement.

The menu items are selected in reverse order by pressing the **"Up"** button.

7.3.1 Measuring Menu (Main Menu)

After switching on, the device is in the measuring menu (main menu). The other menus can be accessed from here by pressing the **"Up"** or **"Down"** buttons.

In the measuring menu, the last measured values are displayed according to the measuring mode selection made with the associated units and the note **"Hold"**.

A new measurement is started by pressing the **"M"** button *(> 2 seconds).*

During the measuring process, the **"Hold"** symbol disappears from the display. After releasing the **"M"** button, the measured value is held and automatically stored in the ring memory. This overwrites the oldest stored value. The **"Hold"** symbol is displayed again.

If the new measured value is larger than the previous maximum value**, "Max"** flashes on the display. If the new value should be accepted, the **"M"** button must be pressed *briefly (< 1 second)*. If the value should not be saved, a new measurement can be started by *pressing and holding (> 2 seconds)* the **"M"** button without changing the previous maximum value.

If the new measured value is smaller than the previous minimum value, **"Min"** flashes on the display. If the new value should be accepted, the **"M"** button must be pressed *briefly (< 1 second)*. If the value should not be saved, a new measurement can be started by *pressing and holding (> 2 seconds)* the **"M"** button without changing the previous minimum value.

7.3.2 Measuring Mode Selection

The measurement mode selection can be made in this menu. Various setting modes are available. The selected mode changes the display of the measuring menu. Depending on the mode, the appropriate physical dimension is also displayed. In detail, these are:

Measuring mode	**Measuring mode display**
"Dew Point IR"	rh / Ir / dP
"Surface temperature IR"	rh / t / Ir
"Relative humidity"	rh / t / rh
"Air temperature"	rh / t / t
"Dew Point Dp"	rh / t / dP
"Equilibrium wood moisture content, EMC"	rh / t / UGL
"Absolute humidity"	rh / Ah

The various measuring modes are described in more detail on the following pages.

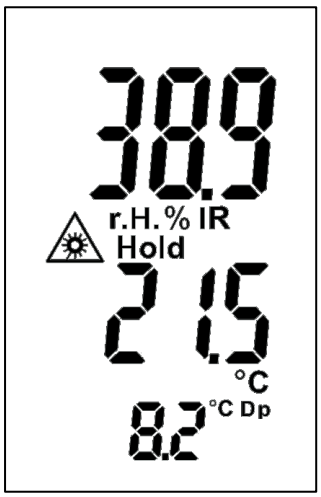

Figure 7-4: Measuring mode selection "Dew Point IR"

The device must be switched on and in the main measuring mode to be able to make the measuring mode settings. Press the **"Down"** button once to access the measuring mode selection. If the setting for the measuring mode should be changed now, the **"M"** button must be pressed *briefly (< 1 second).*

The measuring mode display flashes and can be set using the **"Up"** and **"Down"** buttons. The change is saved by *briefly (< 1 second)* pressing the **"M"** button again.

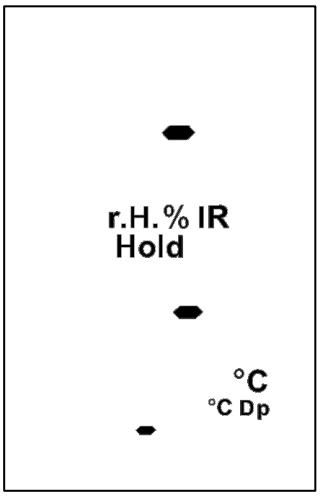

Figure 7-5: Display after a measuring mode change

After confirming the change, the display automatically jumps to the measuring menu of the (newly) selected measuring mode. This removes the values of the previous measuring mode from the display. Any stored **"Max"** or **"Min"** values remain in the memory of the respective measuring mode.

Now a new measurement can be performed by *pressing and holding (> 2 seconds)* **the "M"** button.

Different setting modes are available. The selected mode changes the display of the measuring menu. Depending on the mode, the appropriate physical dimension is also displayed. The measuring mode selection is designed as a ring menu, whereby the setting modes are scrolled through in the following order by pressing the **"Up"** button.

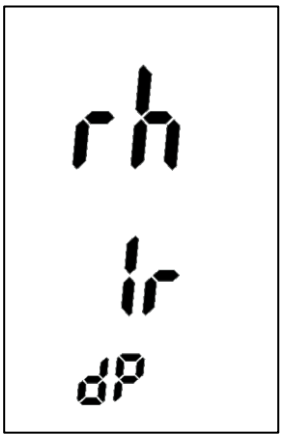

Figure 7-6: Measuring mode selection "Dew Point IR"

Measuring mode "Dew Point IR"

(rh / Ir / dP):

The relative humidity (in R.H.%), the measured IR surface temperature (in °C) and the dew point temperature (Dp in °C) are displayed. The laser symbol is only displayed if the laser pointer is activated.

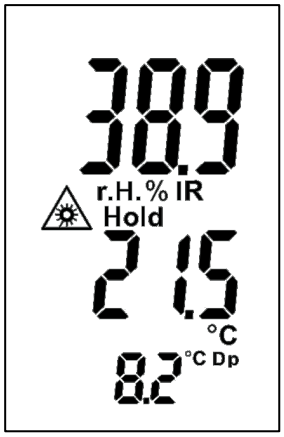

Figure7.7: menu "Dew Point IR"

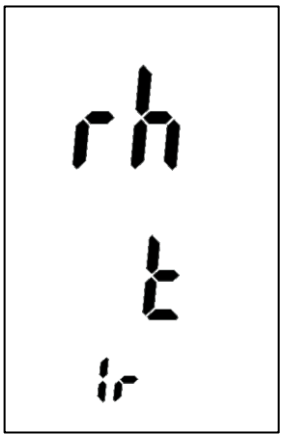

Figure 7-8: Measuring mode selection "Surface temperature IR"

Measuring mode "Surface temperature IR" (rh / t / Ir):

The relative humidity (in R.H.%), the air temperature (in °C) and the measured IR surface temperature (in °C) are displayed. The laser symbol is only displayed if the laser pointer is activated.

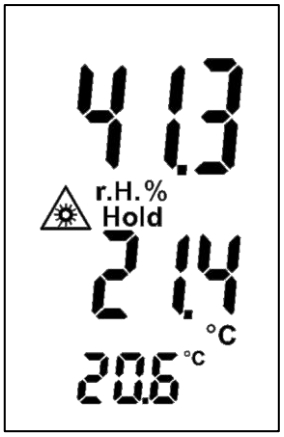

Figure 7-9: Measuring menu "Surface temperature IR"

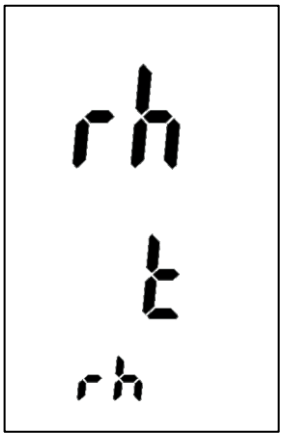

Figure 7-10: Measuring mode selection "relative humidity rh"

Measuring mode "Relative humidity rh" (rh / t / rh):

The relative humidity (in R.H.%), the air temperature (in °C) and the measuring mode symbol "rh" are displayed.

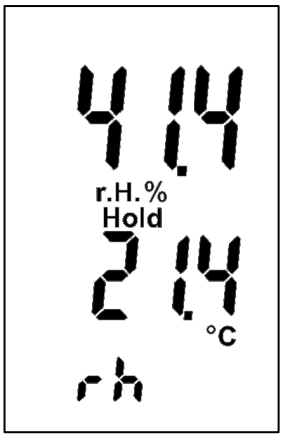

Figure 7-11: Measuring menu "relative humidity rh"

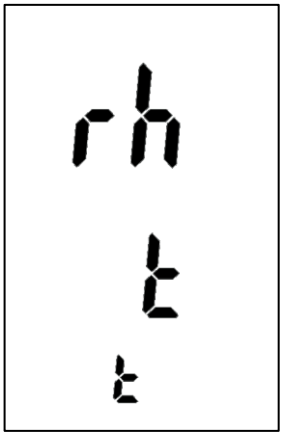

Figure 7-12: Measuring mode selection "air temperature, t"

Measuring mode "air temperature, t"

(rh / t / t):

The relative humidity (in R.H.%), the air temperature (in °C) and the measuring mode symbol "t" are displayed .

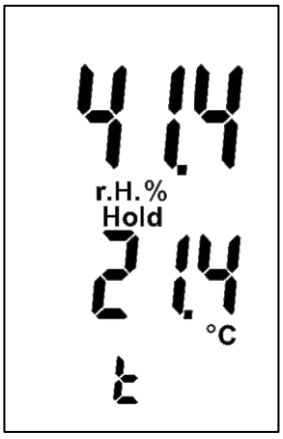

Figure7-13: Measuring menu "air temperature, t"

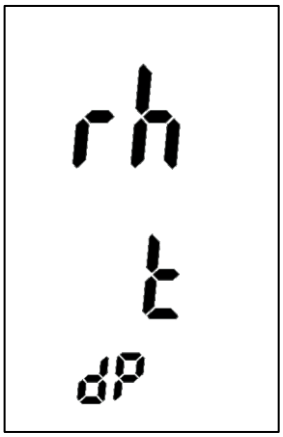

Figure 7-14: Measuring mode selection "Dew point, Dp"

Measuring mode "Dew point, Dp"
(rh / t / dP):

The relative humidity (in R.H.%), the air temperature (in °C) and the dew point temperature (Dp in °C) are displayed.

See dew point table in the appendix.

Figure 7-15: Measuring menu "Dew point, Dp"

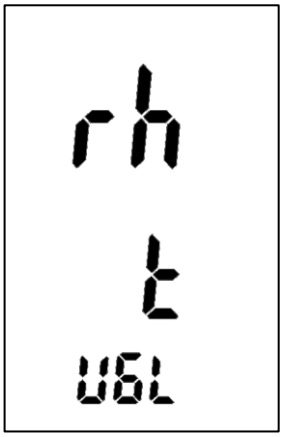

Figure 7-16: Measuring mode selection "Equilibrium wood moisture content, EMC"

Measuring mode "Equilibrium wood moisture content, EMC"
(rh / t / UGL):

The relative humidity (in R.H.%), the air temperature (in °C) and the measuring mode symbol "Wood" with corresponding EMC value in weight % are displayed.

See equilibrium wood moisture content table in the appendix.

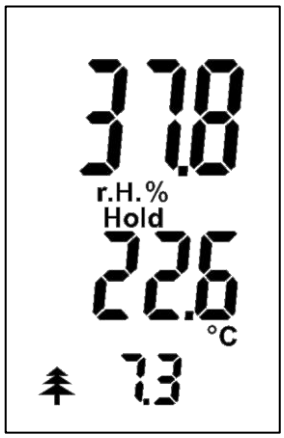

Figure 7-17: Measuring menu "Equilibrium wood moisture content, EMC"

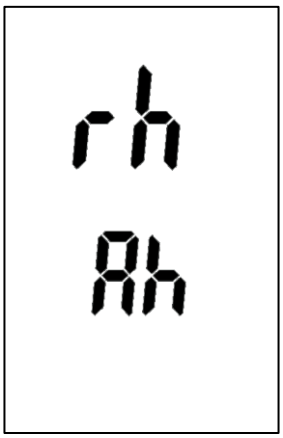

Figure 7-18: Measuring mode selection "absolute humidity, Ah"

Measuring mode "absolute humidity, Ah"
(rh / Ah):

The relative humidity (in R.H.%), the absolute humidity (in g/m³, i.e. grams of water in 1m³ of air) and the measuring mode symbol "Ah" are displayed.

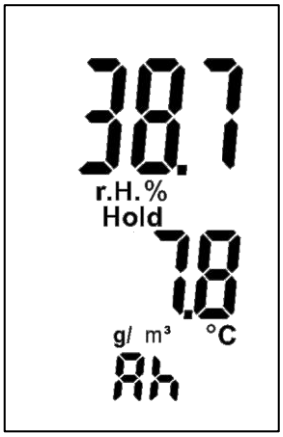

Figure 7-19: Measuring menu "absolute humidity, Ah"

7.3.3 Laser-Pointer- / EM-Menu

Measuring menu ⇨ **Press Down button twice**

Laser warning notice:

This device is equipped with a Class 2 laser. Never point this laser beam directly or indirectly into the eye through reflective surfaces.

Laser radiation may cause irreversible damage to the eye. The laser beam must be deactivated when measurements are made near people.

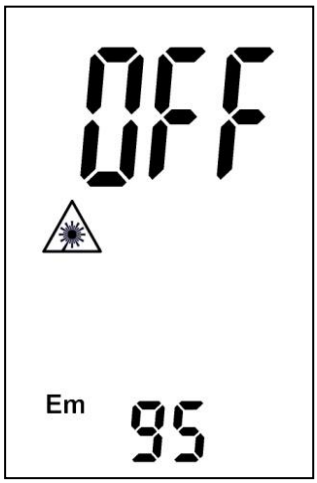

Figure 7-20: Laser-Pointer und EM-Faktor

"Off" or "On" indicates whether the laser pointer is switched off or switched on.

The laser pointer is only active when IR measurement mode is selected.

EM = Set emission factor in %

The device is delivered with an emission factor of **95** as a factory setting. If the default settings for emissivity (EM factor) and/or the laser pointer should be changed, press the **"M"** button *briefly (< 1 second)*. Emissivity (EM factor) and laser pointer display now start flashing.

EM factor adjustment:

The emissivity (EM factor) can now be set between 20% and 100% in steps of 1 using the **"Up"** and **"Down"** buttons. The change is saved by briefly pressing *(< 1 second)* the **"M"** button again.

An emission factor table can be found in the Appendix (see chapter 15.7).

Laser pointer setting:

By pressing and holding > 2 seconds) the **"M"** button, the state of the laser pointer can be changed from **"Off"** to **"On"** and vice versa. Press the **"M"** button *briefly (< 1 second)* to save the set status and return to the main menu.

7.3.4 Maximum Value Display

Measuring menu ⇨ **Press Down button 3 times**

The highest measured value of a measurement series is displayed together with the **"Max"** display symbol.

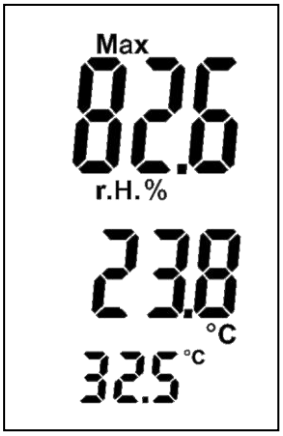

Figure 7-21: Maximum value display

A dash at the position of the measured value indicates that there is no maximum value (yet). If an existing maximum value should be deleted, the displayed value must be selected by *briefly (< 1 second)* pressing the **"M"** button.

The value flashes and can now be deleted by pressing and holding *(> 1 second)* the **"M"** button. A dash at the position of the measured value indicates the successful deletion of the value. The device returns to the measuring mode by *briefly (< 1 second)* pressing the **"M"** button again.

A new measurement can then be performed immediately by pressing and holding *(> 2 seconds)* the **"M"** button.

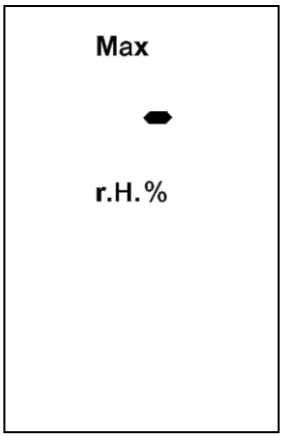

Figure 7-22: Deleted miaximum value

Different setting modes are available. The selected mode changes the display of the measuring menu. Depending on the mode, the appropriate physical dimension is also displayed. According to the selected measuring mode and the associated physical units, the maximum values (and the minimum values) are also evaluated and saved. In detail, these are:

Measuring mode	**Maximum and minimum value**
"Dew Point IR" (rh / Ir / dP)	Dew Point in °C
"Surface temperature IR" (rh / t / Ir)	Surface temperature IR in °C
"Relative humidity" (rh / t / rh)	Relative humidity in % r.H.
"Air temperature" (rh / t / t)	Air temperature in °C
"Dew Point dp" (rh / t / dP)	Dew Point Dp in °C
"Equilibrium wood moisture content, EMC" (rh / t / UGL)	EMC value in weight%
"Absolute humidity" (rh / Ah)	Absolute humidity in g/m³

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7.3.5 Minimum Value Display

Measuring menu ⇨ **Press Down button 4 times**

The lowest measured value of a measurement series is displayed together with the **“Min"** display symbol.

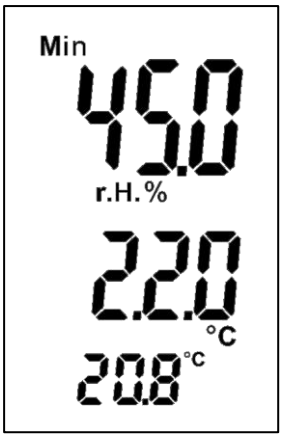

Figure 7-23: Minimum value display

A dash at the position of the measured value indicates that there is no minimum value (yet).

If an existing minimum value should be deleted, the displayed value must be selected by *briefly (< 1 second)* pressing the **“M"** button.

The value flashes and can now be deleted by pressing and holding *(> 1 second)* the **"M"** button.

A dash at the position of the measured value indicates the successful deletion of the value.

The device returns to the measuring mode by *briefly (< 1 second)* pressing the **“M"** button again.

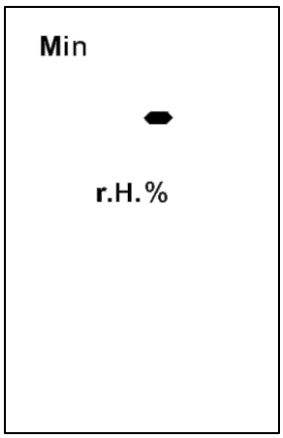

Figure 7-24: Deleted minimum value

A new measurement can then be performed immediately by pressing and holding *(> 2 seconds)* the **“M"** button.

7.3.6 **Memory Menu**

Measuring menu ⇨ **Press Down button 5 times**

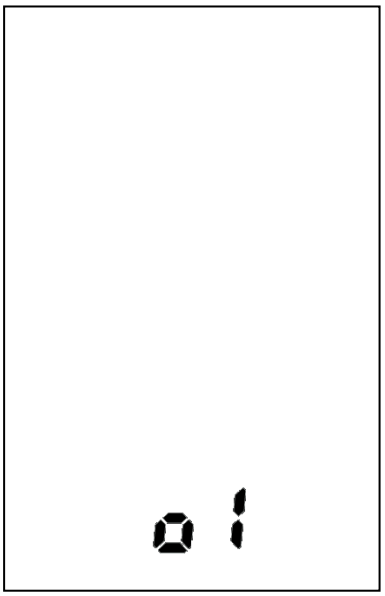

Figure 7-25: Memory location "o1"

As soon as you select the memory menu, the memory location number **"o1"** is displayed for approx. 1 second, and then the last measured saved value contained there is displayed.

By *briefly (< 1 second)* pressing the **"M"** button, the next memory location **"o2"** can be selected and the value it contains displayed.

The last 5 measured values are automatically saved and stored in the memory locations **"o1" – "o5".** The last measured value is in memory location **"o1"**. The memory is designed as a ring memory. As soon as a sixth measured value is recorded, the oldest measured value in memory location **"o5"** is automatically removed from the memory.

After reaching the 5th memory location, the value of the 1st memory location is displayed again. Manual deletion of a memory value is not possible.

If the **"M"** button is pressed (and held) for *longer than 2 seconds*, the display of the memory value vanishes, only the memory location number is displayed. This signals that the user is still in the Memory Menu and not in the Measuring Menu. The memory value is retained in the background.

The saved values displayed can be identified by the fact that there is **no "Hold" symbol** in the display.

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8 Connection of the Special Probes from the RH-T Family as well as TF Sticks

8.1 Display-Symbols

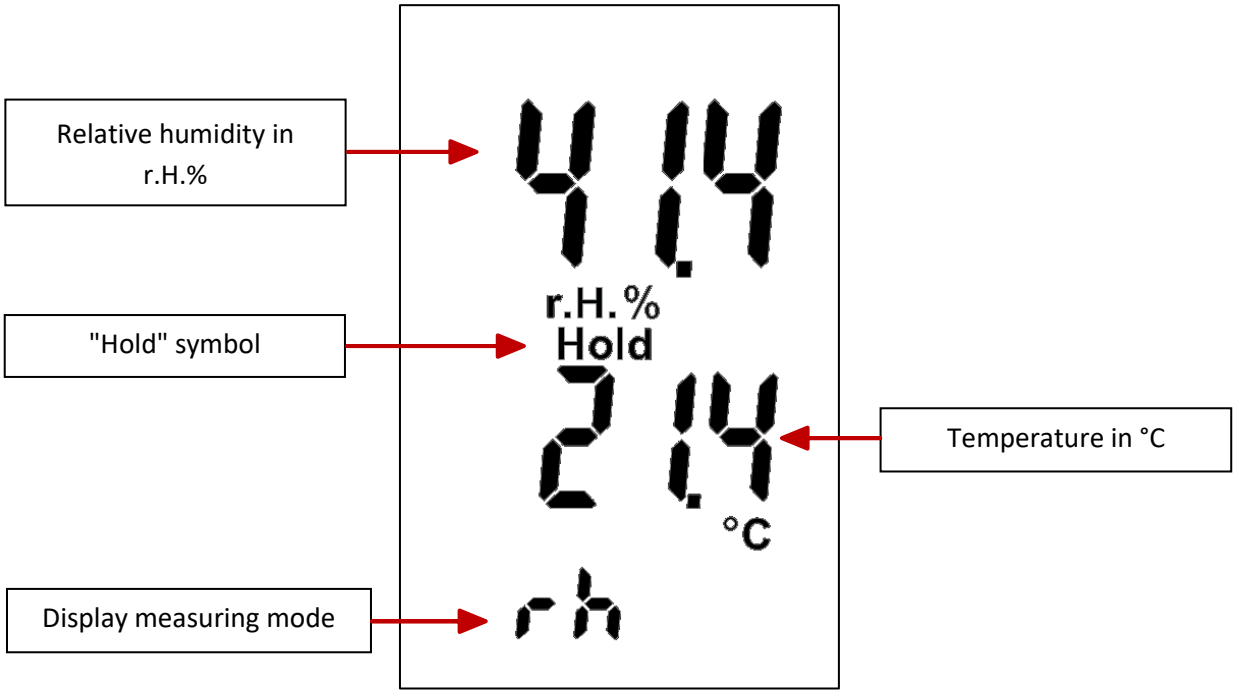


Figure 8-1: Main menu symbols

8.1.1 Other Symbols

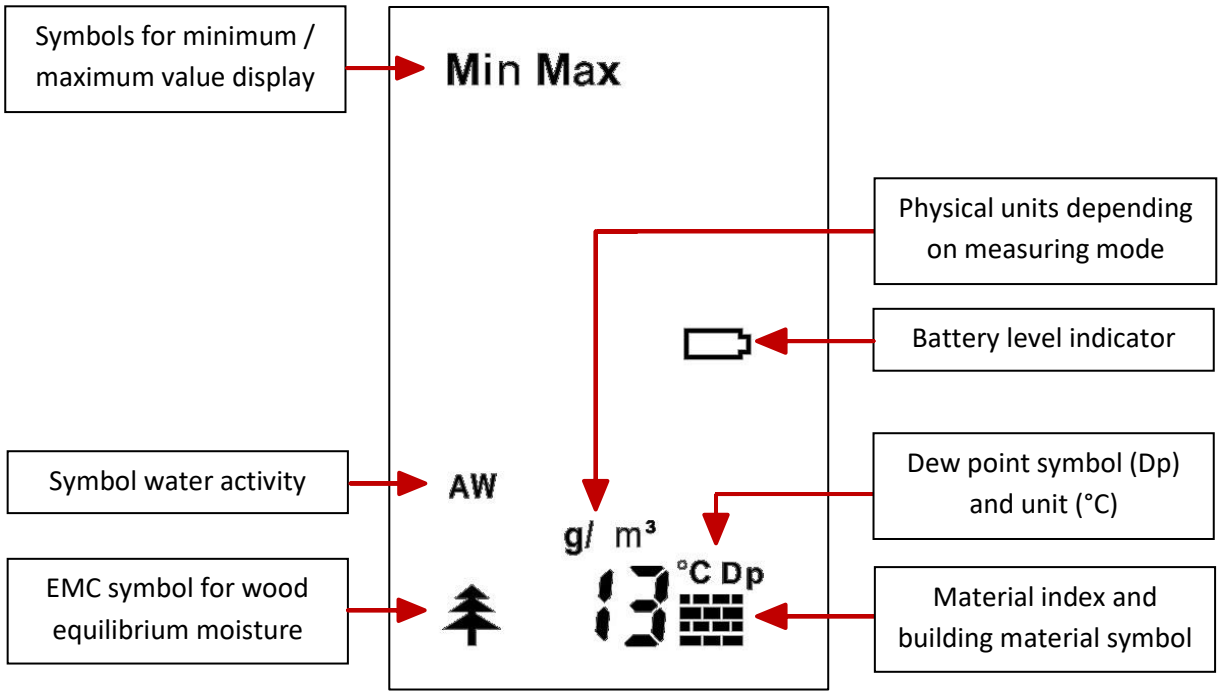


Figure 8-2: Other symbols

8.2 Switch on Device

The Hydromette BL UNI 11 and the special probes from the RH-T-37 family (RH-T 165, 320, RH-T flex 250, 350) must be connected to each other via the 3.5 mm jack receptacle. Ensure that the octagonal plug is correctly seated. When using the TF sticks (16 K-25, 16 K-25 P, 16 K-25 M), the 2.5 mm jack receptacle must be used.

The instrument is switched on by pressing the "On" button . The Auto-Sensor technology now recognises the connected electrode or TF stick. To activate, the measurement button must be pressed for longer than 2 seconds. The instrument now starts in the measuring menu or main menu. The measuring process can be performed here [see Chapter 8.3.1 "Measurement menu (main menu)"]. The measuring mode of air humidity measurement remains active until the active electrode RH-T 37 BL is replaced by another electrode or TF stick and its measuring mode is activated.

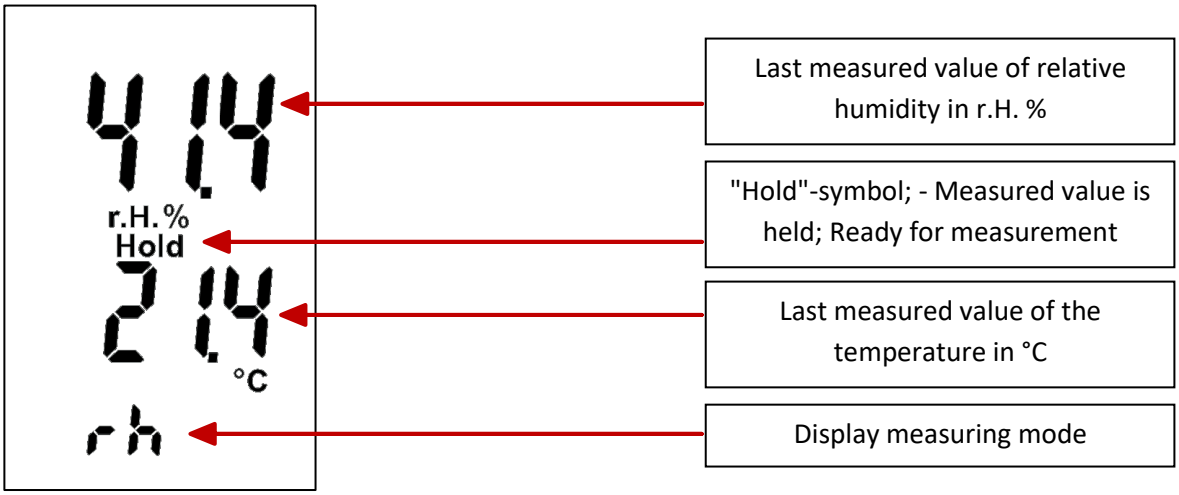


Figure 8-3: Standard measuring menu

8.3 Setting Menus

The following menu items can be selected one after the other by repeatedly pressing the **"Down"** button:

1. **Measuring Menu** (main menu): The measuring process can be performed here.
2. **Measuring mode selection:** The different measuring modes can be set here.
3. **Maximum value display**: The largest measured value is shown here.
4. **Minimal value display:** The smallest measured value is shown here.
5. **Memory Menu:** The last 5 measured values are stored here. The oldest value is overwritten after each measurement.

The menu items are selected in reverse order by pressing the **"Up"** button.

8.3.1 **Measuring Menu (Main Menu)**

After switching on, the device is in the measuring menu (main menu). The other menus can be accessed from here by pressing the **"Up"** or **"Down"** buttons.

In the measuring menu, the last measured values are displayed according to the measuring mode selection made with the associated units and the note **"Hold"**.

A new measurement is started by pressing the **"M"** button *(> 2 seconds).*

During the measuring process, the **"Hold"** symbol disappears from the display. After releasing the **"M"** button, the measured value is held and automatically stored in the ring memory. This overwrites the oldest stored value. The **"Hold"** symbol is displayed again.

If the new measured value is larger than the previous maximum value**, "Max"** flashes on the display. If the new value should be accepted, the **"M"** button must be pressed *briefly (< 1 second)*. If the value should not be saved, a new measurement can be started by *pressing and holding (> 2 seconds)* the **"M"** button without changing the previous maximum value.

If the new measured value is smaller than the previous minimum value, **"Min"** flashes on the display. If the new value should be accepted, the **"M"** button must be pressed *briefly (< 1 second)*. If the value should not be saved, a new measurement can be started by *pressing and holding (> 2 seconds)* the **"M"** button without changing the previous minimum value.

8.3.2 **Measuring Mode Selection**

The measurement mode selection can be made in this menu. Various setting modes are available. The selected mode changes the display of the measuring menu. Depending on the mode, the appropriate physical dimension is also displayed. In detail, these are:

Measuring mode	**Measuring mode display**
"Relative humidity"	(rh / t / rh)
"Air temperature"	(rh / t / t)
"Dew Point Dp"	(rh / t / dP)
"Equilibrium wood moisture content, EMC"	(rh / t / UGL)
"Absolute humidity"	(rh / Ah)
"Enthalpy"	(rh / En / En)
"Wet-bulb thermometer"	(t / to / to)
"Water activity"	(t / Aw / Aw)
"Building materials"	(t / building material symbol + material index)
"Wood"	(t / wood symbol + material index)

The various measuring modes are described in more detail on the following pages.

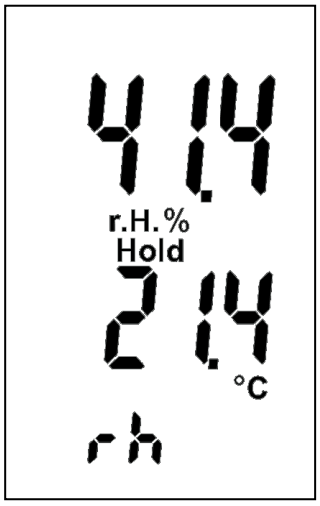


Figure 8-4: Measuring mode selection "relative humidity"

The device must be switched on and in the main measuring mode to be able to make the measuring mode settings. Press the **"Down"** button once to access the measuring mode selection. If the setting for the measuring mode should be changed now, the **"M"** button must be pressed *briefly (< 1 second).*

The measuring mode display flashes and can be set using the **"Up"** and **"Down"** buttons. The change is saved by *briefly (< 1 second)* pressing the **"M"** button again.

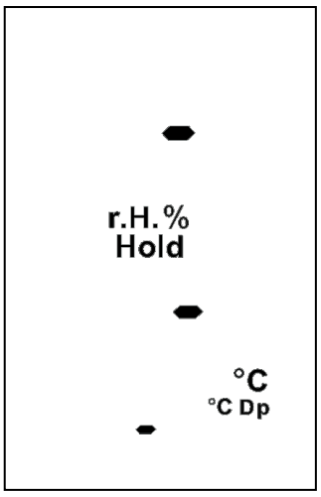


Figure 8-5: Display after a measuring mode change

After confirming the change, the display automatically jumps to the measuring menu of the (newly) selected measuring mode. This removes the values of the previous measuring mode from the display. Any stored **"Max"** or **"Min"** values remain in the memory of the respective measuring mode.

Now a new measurement can be performed by *pressing and holding (> 2 seconds)* **the "M"** button.

Different setting modes are available. The selected mode changes the display of the measuring menu. Depending on the mode, the appropriate physical dimension is also displayed. The measuring mode selection is designed as a ring menu, whereby the setting modes are scrolled through in the following order by pressing the **"Up"** button.

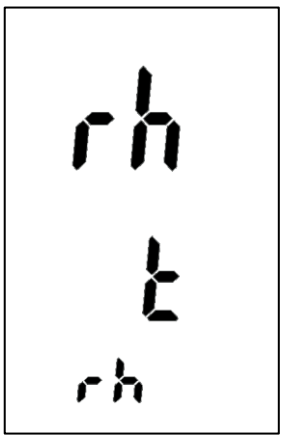


Figure 8-6: Measuring mode selection “relative humidity, rh”

Measuring mode “relative humidity, rh” (rh / t / rh):

The relative humidity (in r.H.%), the air temperature (in °C) and the measuring mode symbol "rh" are displayed“.

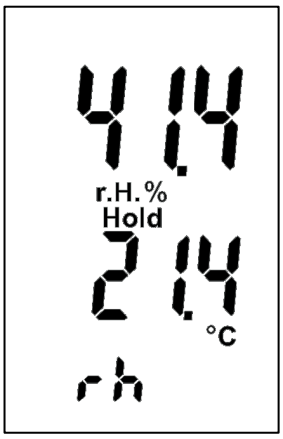


Figure 8-7: Measuring menu “relative humidity, rh”

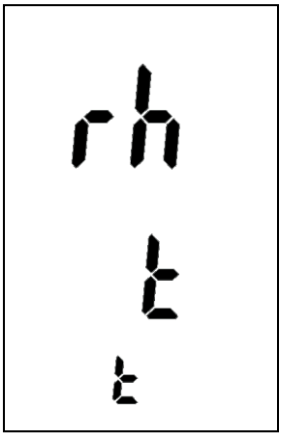


Figure 8-8: Measuring mode selection "air temperature, t"

Measuring mode "air temperature, t"
(rh / t / t):

The relative humidity (in R.H.%), the air temperature (in °C) and the measuring mode symbol "t" are displayed.

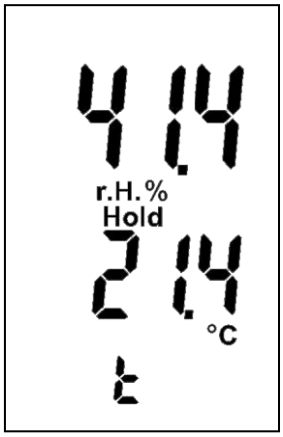


Figure 8-9: Measuring menu "air temperature, t"

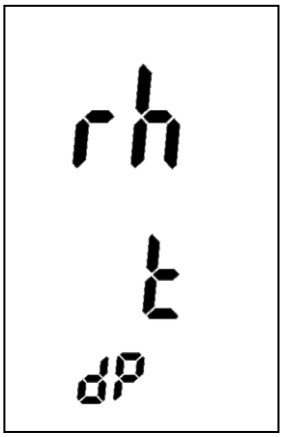


Figure 8-10: Measuring mode selection "Dew point, Dp"

Measuring mode "Dew point, Dp"
(rh / t / dP):

The relative humidity (in R.H.%), the air temperature (in °C) and the dew point temperature (Dp in °C) are displayed.

See dew point table in the appendix.

Figure 8-11: Measuring menu "Dew point, Dp"

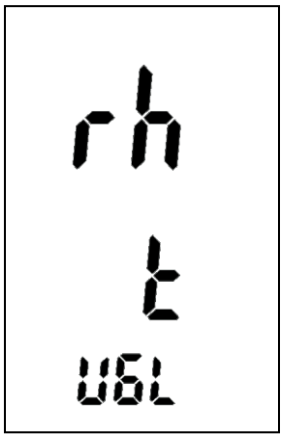


Figure 8-12: Measuring mode selection "Equilibrium wood moisture content, EMC"

Measuring mode "Equilibrium wood moisture content, EMC"
(rh / t / UGL):

The relative humidity (in R.H.%), the air temperature (in °C) and the measuring mode symbol "Wood" with corresponding EMC value in weight % are displayed.

See equilibrium wood moisture content table in the appendix.

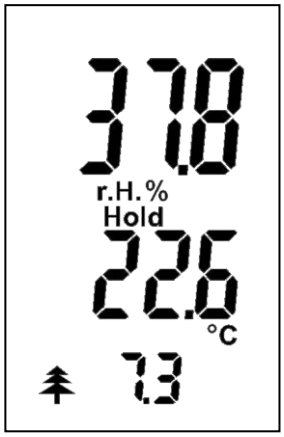


Figure 8-13: Measuring menu "Equilibrium wood moisture content, EMC"

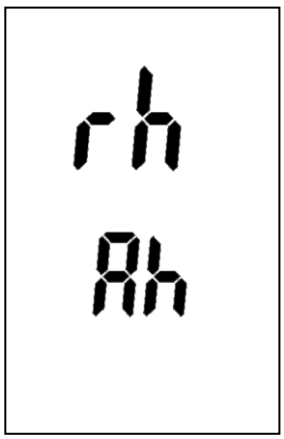


Figure 8-14: Measuring mode selection "absolute humidity, Ah"

Measuring mode "absolute humidity, Ah" (rh / Ah):

The relative humidity (in R.H.%), the absolute humidity (in g/m³, i.e. grams of water in 1m³ of air) and the measuring mode symbol "Ah" are displayed.

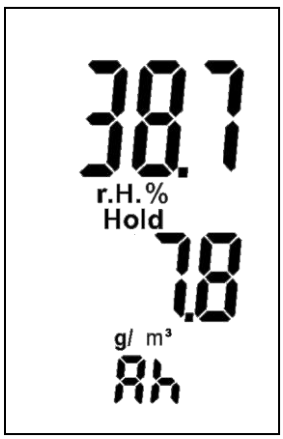


Figure 8-15: Measuring menu "absolute humidity, Ah"

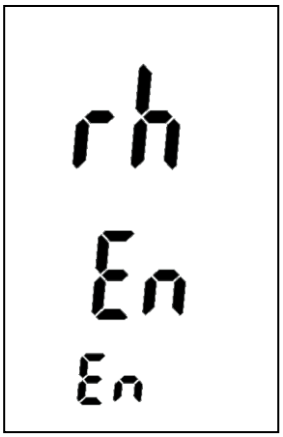


Figure 8-16: Measurement mode selection "Enthalpy, En"

Measuring mode "Enthalpy, En"

(rh / En / En):

The relative humidity (in R.H.%), the energy content of the air/water vapour mixture (in kJ/kg) and the measuring mode symbol "En" are displayed.

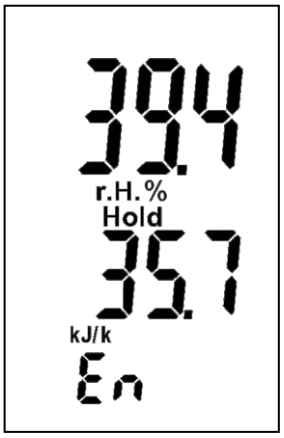


Figure 8-17: Measuring menu "Enthalpy, En"

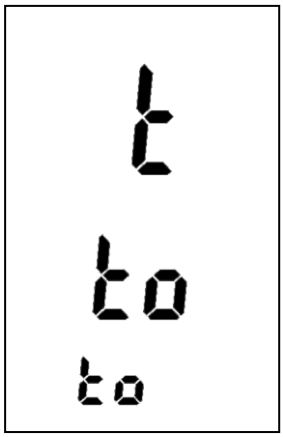


Figure 8-18: Measurement mode selection "wet-bulb thermometer, to"

Measuring mode "wet-bulb thermometer, to"

(t / to / to):

The temperature (in °C), the wet bulb temperature (in °C) and the measuring mode symbol "to" are displayed.

Figure 8-19: Measuring menu "wet-bulb thermometer, to"

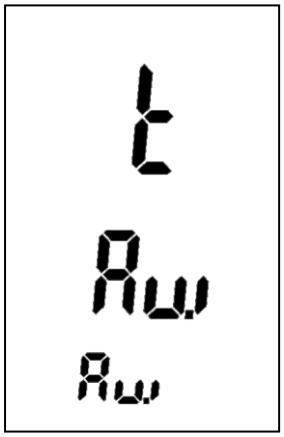


Figure 8-20: Measurement mode selection "water activity, Aw"

Measuring mode "water activity, Aw"

(t / Aw / Aw):

The temperature (in °C), the water activity (Aw) and the measuring mode symbol "Aw" are displayed.

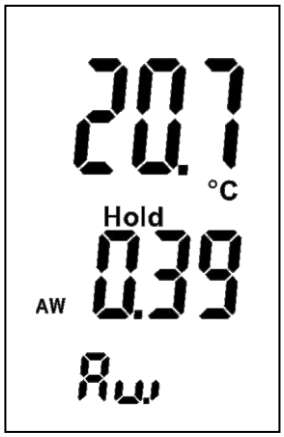


Figure 8-21:Measuring menu "water activity, Aw"

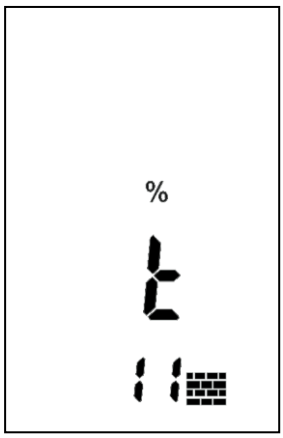


Figure 8-22: Measurement mode selection"building materials"

Measuring mode "building materials"

(% / t / building material symbol + material index):

The material moisture (in % by weight), the temperature (in °C) and the selected material are displayed.

Information on the selection options for building materials can be found in the material table in the appendix.

Figure 8-23:Measuring menu "building materials"

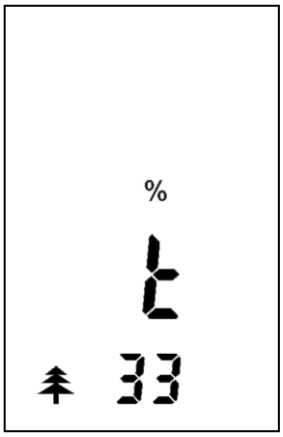


Figure 8-24: Measurement mode selection "wood"

Measuring mode "wood"

(% / t / wood symbol + material index):

The wood moisture (in weight-%), the temperature (in °C) and the selected type of wood are displayed.

Information on the selection options for wood can be found in the appendix in the material table and equilibrium wood moisture content table.

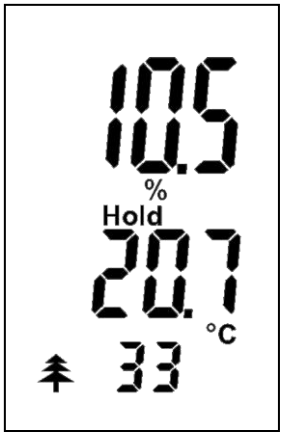


Figure 8-25: Measuring menu "wood"

8.3.3 Maximum Value Display

Measuring menu ⇨ **Press Down button twice**

The highest measured value of a measurement series is displayed together with the "Max" display symbol.

Figure 8-26: Maximum value display

A dash at the position of the measured value indicates that there is no maximum value (yet).

If an existing maximum value should be deleted, the displayed value must be selected by briefly (< 1 second) pressing the **"M"** button.

The value flashes and can now be deleted by pressing and holding (> 1 second) the "M" button.

A dash at the position of the measured value indicates the successful deletion of the value. The device returns to the measuring mode by briefly (< 1 second) pressing the **"M"** button again.

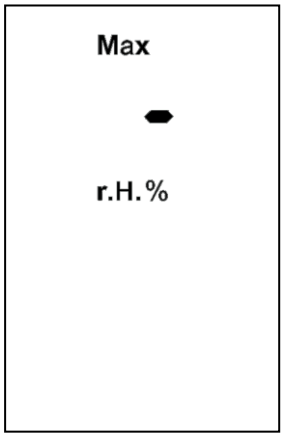


Figure 8-27: Deleted maximum value

A new measurement can then be performed immediately by pressing and holding *(> 2 seconds)* the **"M"** button.

Different setting modes are available. The selected mode changes the display of the measuring menu. Depending on the mode, the appropriate physical dimension is also displayed. According to the selected measuring mode and the associated physical units, the maximum values (and the minimum values) are also evaluated and saved. In detail, these are:

Measuring mode	**Maximum and minimum value**
"Relative humidity" (rh / t / rh)	Relative humidity in r.H.%
"Air temperature" (rh / t / t)	Air temperature in °C
"Dew Point Dp" (rh / t / Dp)	Dew point temperature in °C
"Equilibrium wood moisture content, EMC" (rh / t / UGL)	EMC value in weight %
"Absolute humidity" (rh / Ah)	Absolute humidity in g/m³
"Enthalpy" (rh / En / En)	Energy content in kJ/kg
"Wet-bulb thermometer" ((t / to / to)	Wet-bulb temperature in °C
"Water activity" (t / Aw / Aw)	Aw value (without dimension)
"Building materials" (t / building material symbol + material index)	Material moisture in weight %
"Wood" (t / wood symbol + material index)	Wood moisture in weight %

8.3.4 Minimum Value Display

Measuring menu ⇨ **Press Down button 3 times**

The lowest measured value of a measurement series is displayed together with the **“Min"** display symbol.

Figure 8-28: Minimum value display

A dash at the position of the measured value indicates that there is no minimum value (yet).

If an existing minimum value should be deleted, the displayed value must be selected by briefly *(< 1 second)* pressing the **“M"** button.

The value flashes and can now be deleted by pressing and holding *(> 1 second)* the **"M"** button.

A dash at the position of the measured value indicates the successful deletion of the value.

The device returns to the measuring mode by briefly *(< 1 second)* pressing the **“M"** button again.

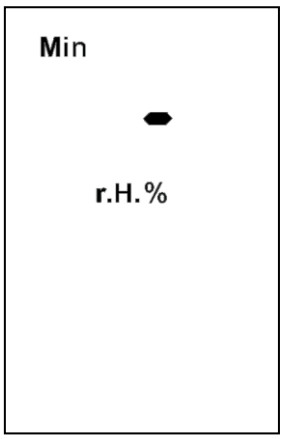


Figure 8-29: Deleted minimum value

A new measurement can then be performed immediately by pressing and holding *(> 2 seconds)* the **“M"** button.

8.3.5 Memory Menu

Measuring menu ⇨ **Press Down button 4 times**

The ring memory symbol **"o"** and the corresponding memory location number are displayed.

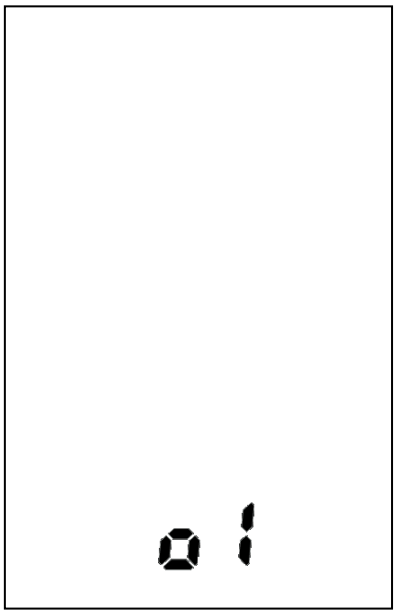


Figure 8-30: Memory location "o1"

As soon as you select the memory menu, the memory location number **"o1"** is displayed for approx. 1 second, and then the last measured saved value contained there is displayed.

By *briefly (< 1 second)* pressing the **"M"** button, the next memory location **"o2"** can be selected and the value it contains displayed.

The last 5 measured values are automatically saved and stored in the memory locations **"o1" – "o5".** The last measured value is in memory location **"o1"**. The memory is designed as a ring memory. As soon as a sixth measured value is recorded, the oldest measured value in memory location **"o5"** is automatically removed from the memory.

After reaching the 5th memory location, the value of the 1st memory location is displayed again. Manual deletion of a memory value is not possible.

If the **"M"** button is pressed (and held) for *longer than 2 seconds*, the display of the memory value vanishes, only the memory location number is displayed. This signals that the user is still in the Memory Menu and not in the Measuring Menu. The memory value is retained in the background.

The saved values displayed can be identified by the fact that there is **no "Hold" symbol** in the display.

9 Connecting the Pt100-Temperature Sensors

9.1 Display Symbols

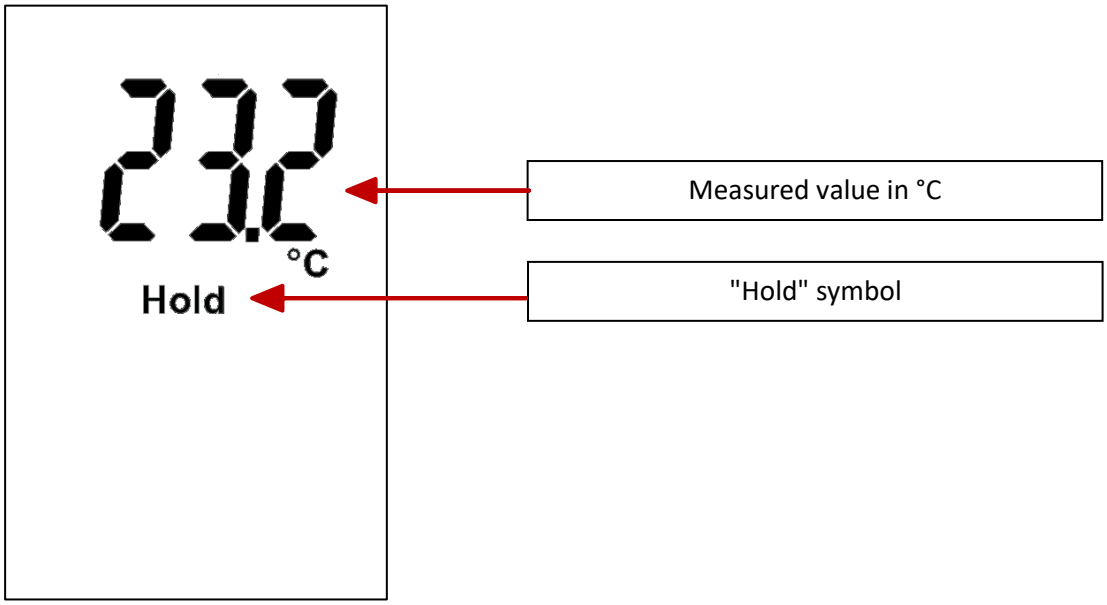


Figure 9-1: Main menu symbols

9.2 Switch on Device

The instrument is switched on by pressing the "On" button ⏻. The Auto-Sensor technology now recognises the connected electrode. To activate, the measurement button must be pressed for longer than *2 seconds*. The instrument now starts in the measuring menu or main menu. The measuring process can be performed here [see Chapter 9.3.1 "Measurement menu (main menu)"]. The measuring mode of temperature measurement remains active until the active electrode Pt100 is replaced by another electrode or TF stick and its measuring mode is activated.

9.3 Setting Menu

The following menu items can be selected one after the other by repeatedly pressing the "**Down**" button:

- **Measuring Menu** (main menu): The measuring process can be performed here.
- **Maximum value display**: The largest measured value is shown here.
- **Minimum value display**: The smallest measured value is shown here.
- **Memory Menu:** The last 5 measured values are stored here. The oldest value is overwritten after each measurement.

The menu items are selected in reverse order by pressing the **"Up"** button.

9.3.1 **Measuring Menu (Main Menu)**

After switching on, the device is in the measuring menu (main menu). The other menus can be accessed from here by pressing the **"Up"** or **"Down"** buttons.

In the measuring menu, the last measured values are displayed according to the measuring mode selection made with the associated units and the note **"Hold"**.

A new measurement is started by pressing the **"M"** button *(> 2 seconds)*.

During the measuring process, the **"Hold"** symbol disappears from the display. After releasing the **"M"** button, the measured value is held and automatically stored in the ring memory. This overwrites the oldest stored value. The **"Hold"** symbol is displayed again.

If the new measured value is larger than the previous maximum value**, "Max"** flashes on the display. If the new value should be accepted, the **"M"** button must be pressed *briefly (< 1 second)*. If the value should not be saved, a new measurement can be started by *pressing and holding (> 2 seconds)* the **"M"** button without changing the previous maximum value.

If the new measured value is smaller than the previous minimum value, **"Min"** flashes on the display. If the new value should be accepted, the **"M"** button must be pressed *briefly (< 1 second)*. If the value should not be saved, a new measurement can be started by *pressing and holding (> 2 seconds)* the **"M"** button without changing the previous minimum value.

9.3.2 **Measuring Mode Selection**

The Hydromette BL UNI 11 works in conjunction with the Pt100 temperature sensors:

- Push-in electrode ET 10 BL
- Surface temperature sensor OT 100 BL
- Immersion and flue gas temperature sensor TT 40 BL

Exclusively in temperature display mode.

9.3.3 **Maximum Value Display**

Measuring menu ⇨ **Press Down button once**

The highest measured value of a measurement series is displayed together with the **"Max"** display symbol.

Figure 9-2: Maximum value display

A dash at the position of the measured value indicates that there is no maximum value (yet).

If an existing maximum value should be deleted, the displayed value must be selected by *briefly (< 1 second)* pressing the **"M"** button.

The value flashes and can now be deleted by pressing and holding *(> 1 second)* the **"M"** button. A dash at the position of the measured value indicates the successful deletion of the value.

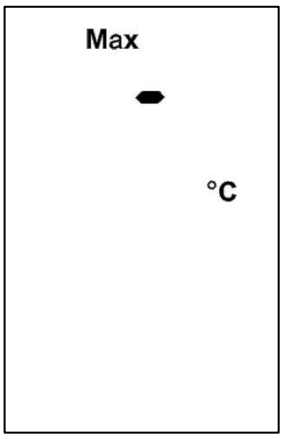


Figure 9-3: Deleted maximum value

The device returns to the measuring mode by *briefly (< 1 second)* pressing the **"M"** button again.

A new measurement can then be performed immediately by pressing and holding *(> 2 seconds)* the **"M"** button.

9.3.4 **Minimum Value Display**

Measuring menu ⇨ **Press Down button twice**

The lowest measured value of a measurement series is displayed together with the **"Min"** display symbol.

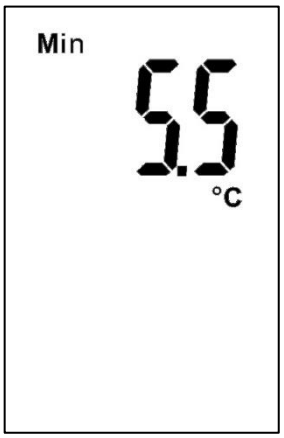


Figure 9-4: Minimum value display

A dash at the position of the measured value indicates that there is no minimum value (yet).

If an existing minimum value should be deleted, the displayed value must be selected by *briefly (< 1 second)* pressing the **"M"** button.

The value flashes and can now be deleted by pressing and holding *(> 1 second)* the **"M"** button A dash at the position of the measured value indicates the successful deletion of the value.

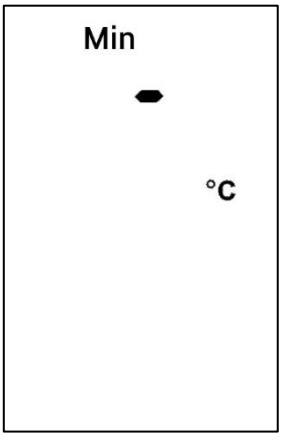


Figure 9-5: Deleted minimum value

The device returns to the measuring mode by briefly *(< 1 second)* pressing the **“M"** button again.

A new measurement can then be performed immediately by pressing and holding *(> 2 seconds)* the **“M"** button.

9.3.5 **Memory Menu**

Measuring menu ⇨ **Press Down button 3 times**

The ring memory symbol **"o"** and the corresponding memory location number are displayed

As soon as you select the memory menu, the memory location number **"o1"** is displayed for approx. 1 second, and then the last measured saved value contained there is displayed.

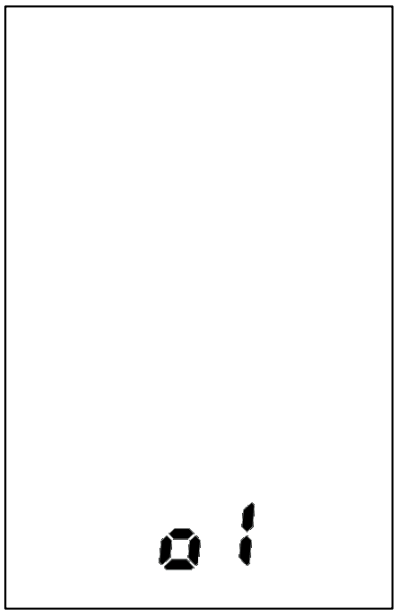


Figure 9-6: Memory location "o1"

By *briefly (< 1 second)* pressing the **"M"** button, the next memory location **"o2"** can be selected and the value it contains displayed.

The last 5 measured values are automatically saved and stored in the memory locations **"o1" – "o5".** The last measured value is in memory location **"o1"**. The memory is designed as a ring memory. As soon as a sixth measured value is recorded, the oldest measured value in memory location **"o5"** is automatically removed from the memory.

After reaching the 5th memory location, the value of the 1st memory location is displayed again. Manual deletion of a memory value is not possible.

If the **"M"** button is pressed (and held) for *longer than 2 seconds*, the display of the memory value vanishes, only the memory location number is displayed. This signals that the user is still in the Memory Menu and not in the Measuring Menu. The memory value is retained in the background.

The saved values displayed can be identified by the fact that there is **no "Hold" symbol** in the display.

10 Other Functions

10.1 Automatic Switch-Off

If no button is pressed within approx. 90 seconds, the device switches off automatically. The current values are retained and are displayed again after the device is switched on again.

10.2 Battery Monitoring

If the battery symbol is shown in the display, the battery is dead and must be replaced.
A list of battery types that can be used can be found in chapter „2.1 Technical Data".

The device serial number is also located in the battery compartment.

INFORMATION

Under no circumstances should you use the mini-USB interface to charge an empty battery – the device does not have a charging circuit. It is only supplied with the typical USB voltage. No measurements are possible when the USB connection is plugged in.

10.3 Querying the Device Firmware

To query the firmware version of the device, the "Down" button (▽) and the "Up" button (△) must be pressed simultaneously for approx. 2 seconds when the device is switched on. A **"V"** appears in the first line of the display, the firmware version number in the second line and a specific ID number (device-dependent) in the third line.

Briefly press the **"M"** button to return to measuring mode.

11 Installation of the PC-Software GANN Dialog Pro

The system requirements for the PC software GANN Dialog Pro are as follows:

- Operating system Windows 7 / Windows 8 / Windows 10 / Windows 11
- 2 GB free hard disk space
- 4 GB RAM memory
- USB-port
- Minimum screen resolution 1280 x 800 (1920 x 1080 is recommended)
- Internet connection for software downloads, updates and upgrades

The PC software GANN Dialog Pro is available for download free of charge at the following link:

http://download-ota.gann.de/dlg

Detail information about the PC software GANN Dialog Pro can be found in the associated user manual.

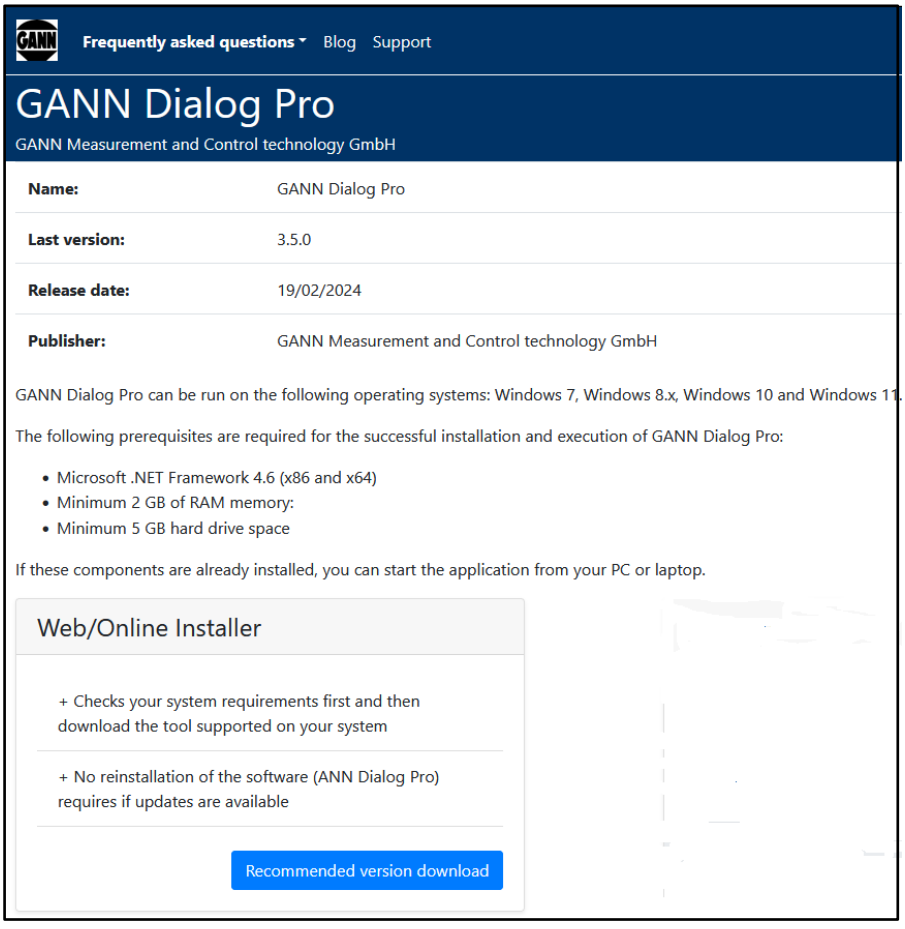


Figure_11_1: Download of the PC software GANN Dialog Pro

If you click on the "Download recommended version" button, you will be asked whether you want to download the software. Confirm this with "Save file" to start the download. Perform the installation steps of setup.exe.

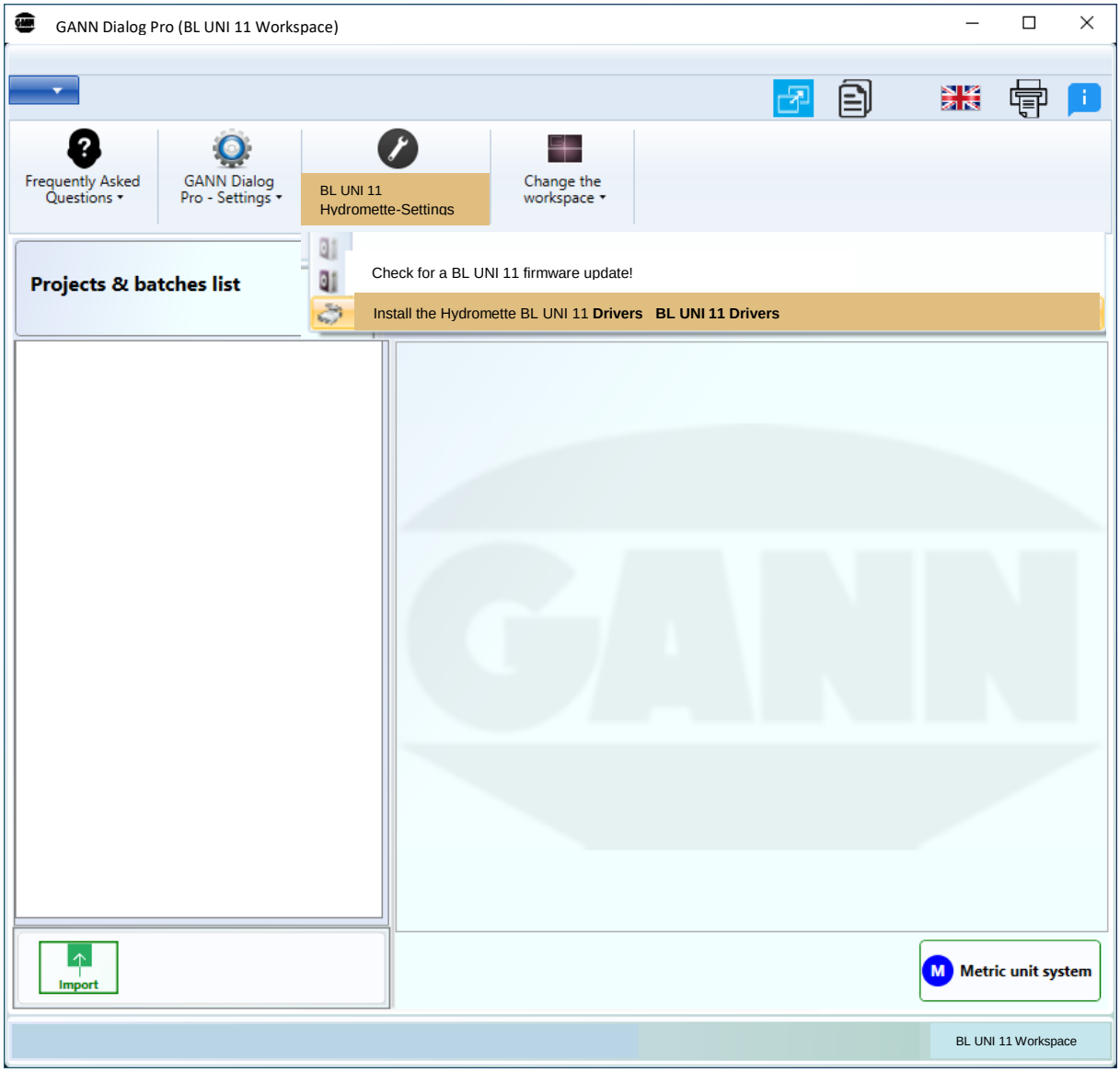


Figure_11_2: Download device drivers of the Hydromette BL UNI 11

To download the device drivers, the working range of the desired Hydromette must first be selected in the menu item "Select working range".

12 USB- Communication with a PC

The software "GANN Dialog Pro" must be installed before the Hydromette BL UNI 11 is connected to a PC (see chapter 11, Abb_11_1). GANN Dialog Pro includes the associated device drivers, which must also be installed (see chapter 11, Abb_11_2).

If the Hydromette BL UNI 11 is connected to a PC with Windows operating system when it is switched off, the Hydromette starts in USB mode. No measurements can be performed during the communication with the PC. The GANN Dialog Pro software now provides the possibility to update the firmware of the Hydromette BL UNI 11 via the Internet. The Hydromette remains in USB mode after disconnecting the USB cable. The Hydromette will only restart in standard mode after it has been switched off and switched on again.

The USB connection must not be disconnected during the communication with the PC!

INFORMATION

If the connection is disconnected during a firmware update, the Hydromette BL UNI 11 can no longer be started. In this case, the problem can be solved by reconnecting to a PC and installing the firmware. If it is not possible to install firmware on the device after several attempts, GANN Support must be contacted.

13 Application Notes

13.1 Comparative Measurement or Reference Measurement

With this type of measurement, almost all (set) building materials or mixed materials or mixed structures can be measured comparatively. It is important that these measurements are only carried out on the same materials or structures.

A deliberately dry spot must be determined on the structure to be measured. Select up to 5 measuring points within an imaginary square with a side length of approx. 20 cm. A dry sample of material with minimum dimensions of 20x20x5 cm can also be used as a reference. When measuring using a sample piece, it is important that this measurement is carried out on a non-conductive surface (e.g. polystyrene). The mean value is now to be calculated from these up to 5 measured values. This forms the reference value for the dry condition of the material or structure. Larger areas can thus be analysed using increased display values, e.g. with regard to the maximum moisture or the extent of moisture damage, and a two-dimensional moisture profile can be created. Drying progress can also be checked and observed by repeating measurements at defined measuring points.

When assessing the display values using the **capacitive measuring method**, it should be noted that metal in the substrate (iron armouring, cables, pipes, plaster rails, etc.) can lead to an increase in the measured value depending on the overlap height. Furthermore, it must be ensured that the minimum distances of 8–10 cm to corners, angles and edges are observed. Measurements in drilled holes or mortises are always incorrect measurements and cannot be used for assessment. Please note that digit measurements taken with devices with a measuring range of 0–100 digits and devices with a measuring range of 0–200 digits are not comparable.

When assessing the display values using the **resistance-based measuring method**, it is essential that you use suitable means to ensure that there are **no** electrical cables, water pipes or other supply lines in this location **before** drilling holes for probes or before knocking electrode pins into walls, ceilings, floors, etc.

INFORMATION

Digit readings obtained using the resistance-based measurement methods are not comparable with digit readings obtained using the capacitive measurement method.
Digit values are non-dimensional measured values and no real humidity values in per cent (%)! For this reason, the measured values are displayed in digits WITHOUT %!

13.2 General Notes on structural Moisture Measurement

The structural moisture is mainly displayed in "digits" (depending on the device). Digit values are non-dimensional measured values and no real humidity values in per cent (%)! This can be used to measure almost all set building materials or mixed materials or mixed structures by comparative measurements within the same material or structure.

Pure building materials with corresponding characteristic curves are specified with weight percentages (wt.%) in relation to the dry weight or also in CM-% (moisture determination according to the calcium carbide method). Depending on the type of GANN Hydromette used, this is done using programmed characteristic curves or independent conversion using tables.

If a material is in a certain ambient climate for a longer period of time, it takes on a moisture content corresponding to this climate, which is also referred to as equilibrium moisture or practical moisture content. On reaching the equilibrium moisture content, the material no longer loses moisture if the surrounding climate remains the same and also no longer absorbs any moisture. The equilibrium values generally mentioned refer to a climate of 20 °C and 65 % relative humidity. However, these values must not be confused with the values at which the material can be worked or processed.

Floor coverings and paints must be considered and assessed in conjunction with the diffusion capacity of the material used. For example, when laying a PVC floor covering, the subsequent average levelling moisture content must be taken as a basis, i.e. in a centrally heated room with an anhydrite screed, installation should wait until a moisture content of approx. 0.6 % by weight has been reached. In contrast, wood parquet flooring can be laid on a cement screed with normal stove heating at a moisture content of 2.5 - 3.0 % by weight.

The respective long-term ambient climate must also be taken into account when assessing **wall surfaces**. The lime mortar plaster in an older vaulted cellar may well contain a moisture content of 2.6 % by weight, but a gypsum plaster in a centrally heated room would have to be labelled as too damp from a moisture content of 1.0 % by weight.

When evaluating the moisture content of a material, the surrounding climate is the primary consideration. All materials are subject to continuously changing temperatures and air humidity. The influence of the material moisture depends significantly on the heat conductibility, the thermal capacity, the resistance to water vapour diffusion and the hygroscopic properties of the material.

The "target humidity" of a material is the humidity that corresponds to the mean value of the equilibrium humidity under changing climatic conditions to which it is constantly exposed. The humidity values in living spaces in Central Europe are approx. 45 - 65 % R.H. in summer and approx. 30-45 % R.H. in winter. These fluctuations can cause damage in centrally heated rooms in winter.

It is not possible to lay down generally applicable values. Much more it always requires the technical and expert experience to correctly evaluate the measured values.

Different building materials, such as clay building materials, etc. cannot be measured with the usual accuracy due to their different mineral admixtures or burning times. However, this does not mean that comparative measurements in the same building material and on the same object are not meaningful. Different display values can be used, for example, to localise the extent of a moisture

field (water damage), or comparative measurements on dry interior walls and damp exterior walls can be used to determine progress in drying out.

Attention:

The notes and tables in these operating instructions on permitted or normal humidity conditions in practice and the general definitions of terms have been taken from the specialist literature. No responsibility can therefore be assumed by the manufacturer of the measuring instrument for the correctness of this information. The conclusions to be drawn from the measurement results are related to the individual conditions and the knowledge from professional experience for each user.

13.3 Notes on non-destructive Structural Moisture Measurement

The non-destructive structural moisture measurement is based on an electrical capacitance determination depending on the dielectric constant (DK) of the measurement object. During the measurement, water molecules are polarised by applying an electric field. The dielectric constant of water is very high compared to the building material and therefore determines the measurement result.

The measuring field is formed between the active sphere on the top of the device and the substrate mass to be analysed. The change in the electric field caused by the material and moisture is recorded and shown digitally on the display of the measuring device.

The bulk density of the building material has a measurable influence on the measured variable. With a higher bulk density, a higher dielectric constant is to be expected.

It is only possible to draw conclusions about the absolute moisture content in per cent by weight or the moisture content in per cent CM if the drying process is normal. If the building material dries out too quickly (e.g. due to warm air, dehumidifiers, underfloor heating, etc.), the measured values may be too low due to the low surface moisture.

It is difficult to make a generally valid statement on the accuracy of measurement in relation to weight or mass percentages. Pure building materials with specific characteristic curves can be measured with good accuracy, whereas mixed masonry and laminates made of different materials are less accurate. However, exact percentages are often not necessary and so-called comparative measurements are completely sufficient.

The following points must also be observed for capacitive measurement:

- Capacitive measuring devices are moisture indicators and not measuring devices with 100 % reliable measured value statements.
- The conversion tables or characteristic curves for capacitive measuring devices generally refer to pure building materials (not to layered building materials, e.g. plaster on masonry etc.).

- The measurement results obtained with the capacitive measuring devices alone are not reliable or sufficient for expert reports. The measurement results should always be backed up by a second measurement method (e.g. resistance or CM measurement).
- There are no exact values for the penetration depth. The depth effect depends, among other things, on the bulk density, the current moisture content, the roughness of the surface, the pore size and quantity and the moisture distribution in the material. Therefore, no binding statements can be made in this regard.

- Of course, this problem does not only apply to capacitive measuring instruments from GANN, but is the physical basis for all moisture probes and sensors that work dielectric constant (DK), high-frequency or microwave basis.

13.4 Using the Hydromette BL UNI 11

The Hydromette BL UNI 11 is a multi-purpose measuring instrument for measuring structural moisture, air humidity and temperature. The instrument uses different measuring principles at this. This means that the instrument can be used in conjunction with different active electrodes depending on the measuring task.

The active electrodes or the Pt100 sensors must be connected to the measuring instrument via the 3.5 mm jack receptacle. Ensure that the octagonal plug is firmly seated. The TF sticks are plugged into the 2.5 mm jack receptacle. Correct engagement is important here as well. The measuring instrument now automatically recognises the connected accessories. To activate the corresponding measuring mode, press the **"M"** button for longer than 2 seconds.

If an electrode is connected to the 3.5 mm jack receptacle and a TF stick is connected to the 2.5 mm jack receptacle at the same time, the measurement via the 2.5 mm jack receptacle has priority and the instrument switches off the 3.5 mm jack receptacle. This means that only the values of the TF stick are then displayed.

TIP: To prevent misinterpretations, we recommend only ever taking measurements with a connected accessory.

INFORMATION

Measure:

Press and hold the **"M"** button for longer than 2 seconds. A measurement process is carried out as long as the Measure button is kept pressed. After releasing the **"M"** button, the measurement process is interrupted and the **"Hold"** symbol is displayed.

13.4.1 Using the Active-Electrode B 55 BL

The active electrode B 55 BL must be connected to the measuring instrument via the 3.5 mm jack receptacle. Ensure that the octagonal plug is firmly seated. The measuring instrument now automatically recognises the connected accessories. To activate the capacitive measuring mode, press the **"M**" button for longer than 2 seconds.

Please refer to the corresponding chapters for the use of the menu items "Maximum value display" (see Chapter 6.3.4), and "Memory menu" (see Chapter 6.3.5).

To prevent the user's hand from influencing the electrode, only the lower half of the electrode may be covered by the hand during the measurement and control process. The upper half of the electrode must remain free.

INFORMATION

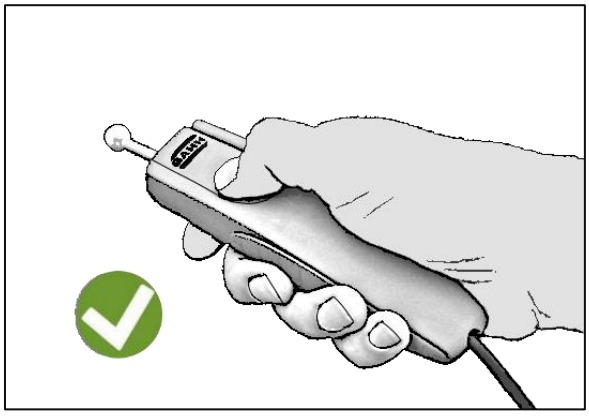


Figure 13.1: Proper handling

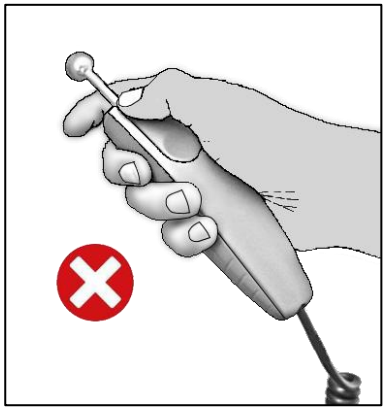


Figure 13.2: Improper handling

Check:

INFORMATION

Connect the electrode connecting cable to the measuring instrument. Hold the electrode at the rear end and hold it in the air. Press and hold the measuring button **"M**" button for longer than 2 seconds. The display value must be between 0.0 and 5.0. Take a measurement in the palm of your hand. The display value must be above 170.0.

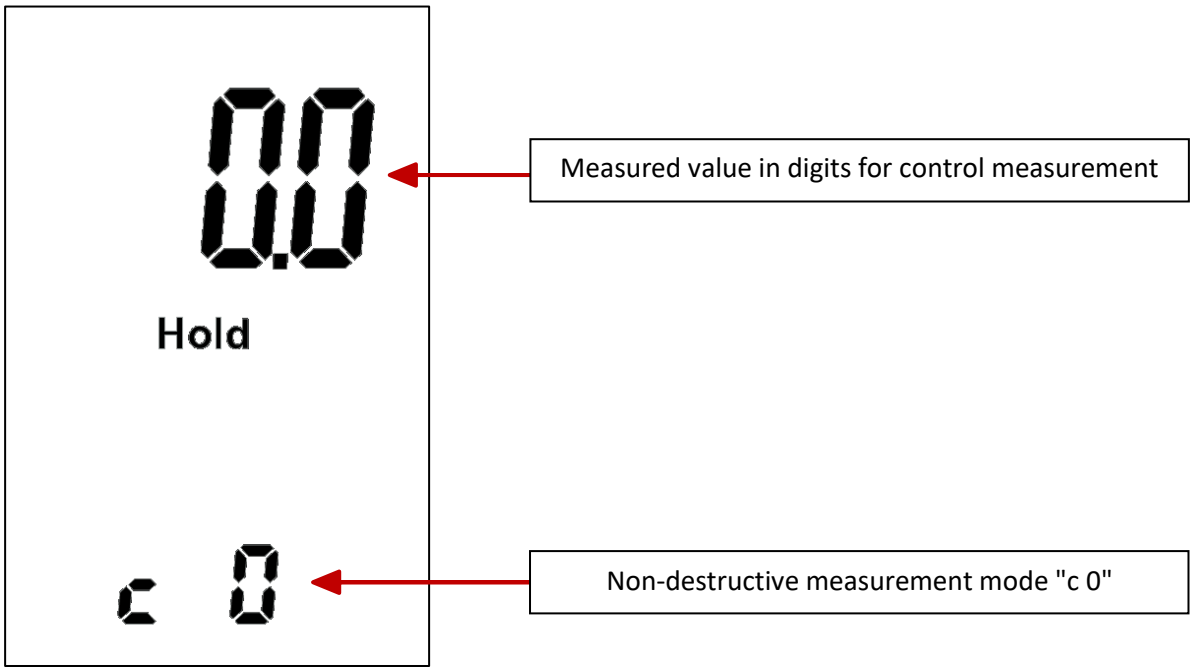


Figure 13-3: Capacitive measuring mode "c 0" display

Measuring:

INFORMATION

Press the measurement button **“M”** for longer than 2 seconds, and scan the area to be inspected. The electrode must rest firmly on the building material and be held as vertically as possible (approx. 90°) to the area. A measuring process is carried out as long as the measurement button is pressed. After releasing the **"M"** button, the measuring process is interrupted and the **"Hold"** symbol is displayed.

Measurements in drill holes lead to faulty measurements. This results in an overlay of the measuring field and thus an increase in the measured value.

Figure 13-4: Incorrect use – measurement in drill hole

In the corner/angle area, it is essential to maintain a distance of approx. 8 - 10 cm from the edge/angle.

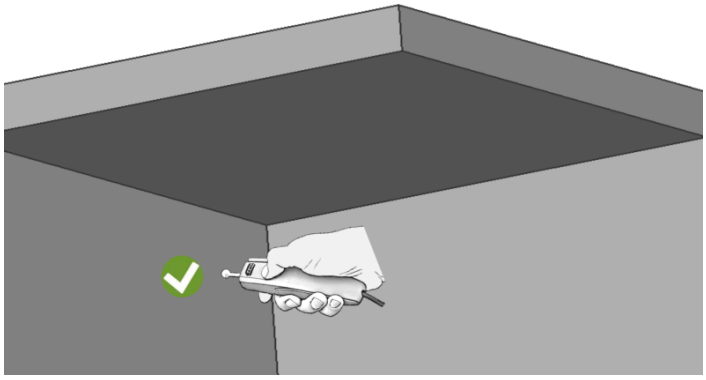


Figure 13-5: Correct use of distances when measuring

Measurements directly in the corner/angle area lead to an overlapping of the measuring field and thus change the measured value!

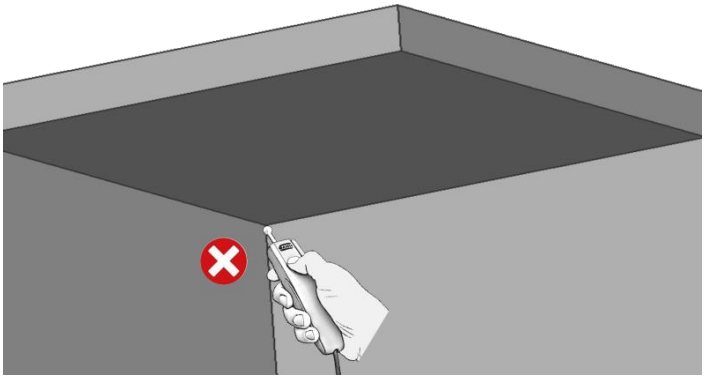


Figure 13-6: Incorrect use in corner/angle area

13.4.2 **Display Values (Digits) in Relation to the Bulk Density**

Density of the building material kg/m³	Corresponding relative humidity in % 30---------- 50----------70----------80----------90----------95----------100 Display in Digits*					
	very dry	normal dry	semi dry	moist	very moist	wet
up to 600	10 - 20	20 - 40	40 - 60	60 - 90	90 - 110	above 110
600 - 1200	20 - 30	30 - 50	50 - 70	70 - 100	100 - 120	above 120
1200 - 1800	20 - 40	40 - 60	60 - 80	80 - 110	110 - 130	above 130
above 1800	30 - 50	50 - 70	70 - 90	90 - 120	120 - 140	above 140

* Digital values are dimensionless measurement values and not real moisture values as a percentage!

Figure 13-7: Display values as a function of the material bulk density

13.4.3 **Orientation Values**

The following data serves as an orientation guide for anticipated display values:

Residential spaces		**Cellars (old buildings)**	
dry	20 - 40 Digits	dry	40 - 60 Digits
moist	80 - 140 Digits	moist	100 - 150 Digits

Caution:

Dew point undershoots or condensation on the surface to be measured can cause higher display values and thus make the wall appear more humid than is actually the case! It is therefore always advisable to carry out an additional indoor climate measurement and dew point calculation (Hydromette BL Compact TF-IR 2, TF 3 & RH-T). This can prevent misinterpretations. If readings exceed 130 digits, condensation may already be starting to form, depending on the bulk density.

Depending on the height of the covering, metal in the subsurface (iron reinforcements, wires, pipes, stucco bars, etc.) can raise the measurement value. This should be considered when evaluating the displayed values in relation to the covering.

13.5 General Notes on Humidity / Air Temperature Measurement

Humidity, also known as air humidity, is the water vapour content of the air. Like any *other substance, air only has a limited capacity to absorb water. This limit is known as the saturation limit.* Above the saturation point, the excess water content accumulates in the form of very fine water droplets (condensate). The temperature plays a decisive role here

The absolute humidity is given in g/m³ and its maximum value depends on the temperature. It increases at higher temperatures and decreases accordingly at lower temperatures. Relative humidity, on the other hand, indicates the ratio between the current absolute humidity and the maximum vapour content (saturation humidity), i.e. what percentage of the maximum water vapour content in the air has been reached. Relative humidity is given in % RH (relative humidity) or % RH (relative humidity).

The relative humidity has an effect on human perception. In this context, we speak of a comfort range. This range lies approximately at a temperature between 20 °C and 24 °C and a relative humidity between 40 % and 60 % RH.

Physically, warm air can absorb more moisture than cold air. This means that when the warm air cools down, moisture may be released which condenses on surfaces or building components. If this happens in the long term, walls, for example, become damp, which can lead to the formation of mould.

The humidity affects the material moisture. If a material is in a certain ambient climate for a longer period of time, it takes on a moisture content corresponding to this climate, which is also referred to as equilibrium moisture or practical moisture content. On reaching the equilibrium moisture content, the material no longer loses moisture if the surrounding climate remains the same and also no longer absorbs any moisture. The equilibrium values generally mentioned refer to a climate of 20 °C and 65 % relative humidity. However, these values must not be confused with the values at which the material can be worked or processed.

When evaluating the moisture of a material, the surrounding climate is the primary consideration. All materials are subject to continuously changing temperatures and air humidity. The impact on the material moisture significantly depends on the thermal conductivity, the thermal capacity, the resistance to water vapour diffusion and the hygroscopic properties of the material.

The "expected moisture content" of a material is the moisture level that corresponds to the average of the equilibrium moisture content under changing climatic conditions that it is continuously exposed to. The humidity values in living spaces in Central Europe are approx. 45–65 %RH in summer and approx. 30–45 %RH in winter. These fluctuations can cause damage in centrally heated rooms in winter (see also table in the appendix: Comparison Graph of Humidity – Material Moisture Content).

13.6 Using the TF-IR BL Combination Electrode

Measure:

Press and hold the **"M"** button for longer than 2 seconds. A measurement process is carried out as long as the Measure button is kept pressed. After releasing the **"M"** button, the measurement process is interrupted and the **"Hold"** symbol is displayed.

Measuring error:

Measurements below 20% R.H. and above 80% R.H. should preferably not be taken over a prolonged period of time (continuous measurements). Other measurement falsifications can occur due to shielding with body parts (e.g. hand) as well as blowing or speaking/breathing in the direction of the sensor.

Caution:

- The sensor is not designed for continuous measurements above 80% R.H. (longer than approx. 36 hours at a time without regeneration at 30-40% R.H. in the same time frame).
- The measuring device may only be exposed to temperatures above 50 °C for short periods.

13.6.1 Precautions

The sensor can be irreparably damaged by various mechanical or environmental influences.

These include in particular:

- direct contact of the sensor with the fingers
- direct contact with solid or sticky materials or objects
- measurement in environments containing solvents, oil vapours or other high levels of contaminants
- storing the sensor in foam materials NOT provided by us

13.7 Measuring relative Humidity

The response speed of the sensor is very high, so that even small air flows (door gap, leaky window, etc.) influence the measured value display. An absolute standstill of the display can therefore only be achieved in a climate box.

The response time of the humidity sensor in slightly moving air is approx. 8 seconds* at an ambient temperature of 25 °C for 63 % of the humidity difference. The inserted filter fabric delays the response time. By swivelling the device (ventilation of the sensor), the response time can be shortened in the event of air standstill or low air velocity.

*Specifications of the sensor manufacturer

INFORMATION

For particularly precise measurements, especially at temperatures below room temperature (20–25 °C) or if there are significant temperature differences between the intrinsic temperature of the measuring instrument and the ambient climate, the device should be exposed to the ambient climate for approx. 10 to 15 minutes or until the temperature has equalised. The sensor adapts to the respective climate even when it is not switched on.

13.8 Equilibrium Wood Moisture Content (EMC)

Equilibrium wood moisture content is the moisture content adopted by the wood when it is exposed to constant climate (constant humidity and constant temperature) for sufficiently long time.

The device can simultaneously display relative humidity, temperature, and equilibrium wood moisture content. This makes it easier for parquet installers and interior finishers to assess whether wooden components may be exposed to the existing ambient climate or whether damage to the wood, such as cracking, shrinkage or swelling, is to be expected. An appropriate Equilibrium wood moisture content table can also be found in the appendix.

13.9 Measuring Air Temperature

The response speed of the sensor is very high, so that even small air flows (door gap, leaky window, etc.) influence the measured value display. An absolute standstill of the display can therefore only be achieved in a climate box.

The response time of the air temperature sensor in moving air is approx. 5–30 seconds for 63 % of the temperature difference*. The inserted filter fabric delays the response time.

*Specifications of the sensor manufacturer

INFORMATION

For particularly precise measurements, especially at temperatures below room temperature (20–25 °C) or if there are significant temperature differences between the intrinsic temperature of the measuring instrument

and the ambient climate, the device should be exposed to the ambient climate for approx. 10 to 15 minutes or until the temperature has equalised. The sensor adapts to the respective climate even when it is not switched on.

13.10 Dew Point Temperature

The dew point temperature is the temperature at which the air is saturated with water vapour. The relative humidity is then 100%. If this dew point temperature is undershot, the moisture contained in the air condenses on a component / surface. The dew point temperature is generally lower than the air temperature, except at 100% R.H. where both temperatures are the same. As the relative humidity increases, the dew point temperature approaches the air temperature.

The display of the calculated dew point in the measuring modes "Dew point, IR" (rh / Ir / Dp) and "Dew point, Dp" (rh / t / Dp) is based on the relative humidity and air temperature parameters. A dew point table for calculating condensation can also be found in the Appendix.

13.11 Measuring using Infrared Temperature Measurement Technology (IR)

13.11.1 General

All bodies with a temperature above "absolute zero" (= 0 °K or -273 °C) emit infrared radiation, also known as thermal radiation. The intensity of this thermal radiation, taking into account the emissivity, is considered a measure of the surface temperature. The infrared measuring head receives the emitted heat radiation without contact and converts it into a voltage signal.

Advantages compared to contact measurement using a mechanical sensor:

- Very fast response or measuring time
- No heat removal at the object being measured.
- No damage or contamination of the measuring surface
- Measurement of live or moving parts possible

13.11.2 Measuring using IR Sensor

If measurements are taken for more than 10 seconds in the immediate vicinity of hot or cold parts (exhaust pipe, radiant heater or ice / refrigeration unit), the measured value may be falsified. After approximately 10 minutes waiting time (temperature equalisation of sensor housing and ambient temperature), the measurement can be repeated. To achieve accurate measurements, the temperature of the measuring instrument must match the respective ambient temperature.

To avoid measurement errors and to prevent the device from being damaged, you should…

- … not press the sensor opening of the probe directly onto the object to be measured.
- … not measure in air that contains vapours or is heavily contaminated.

- … not measure through very hot air (shimmering heat.)
- … not measure objects that are exposed to direct sunlight (shade these objects).
- … not measure objects located in immediate vicinity of equipment radiating large amounts of heat (interrupt thermal radiation).
- … not expose this high-quality measuring instrument to very high or low temperatures (e.g. transporting the device in the boot of a car).
- … not expose the unit to high humidity (condensing).
- … not measure in the immediate vicinity of electromagnetic or electrostatic sources (HF generators, electric motors, ignition voltages etc.).

13.11.3 **Emissivity**

The Hydromette BL Compact TF-IR 2 provides manual emissivity adjustment in the range of 20% to 100%. An emissivity table can be found in the Appendix.

The measuring instrument is set to a default emissivity of 95%. This value applies to most building materials, plastics, textiles, papers and non-metallic surfaces. The following list is used to estimate the emissivity, which is influenced, among other things, by the gloss and roughness of the object to be measured. Emissivity is reduced on smooth and glossy surfaces while it is increased on rough and matt surfaces. As the emissivity for metals ranges from 10% to 90% depending on the surface (glossy, oxidised or rusted), an exact measurement is not possible. We therefore recommend using special stickers (IR 30/E95 **order no. 31005833**) made of paper with a factor of 95% for metals or glossy metallic surfaces and objects with different emissivity values

Mathematical correction of the temperature measured value using emissivity requires the ambient temperature and the coefficient of the temperature equalisation between measuring probe and ambient temperature to be known.

The following applies to the correction:

$$T_{Measurement\ Object} = T_{Environment} + \frac{(T_{Display} - T_{Environment}) \times 100}{Emissivity\ (\%)}$$

13.11.4 **Measurement Spot Size**

The measurement spot diameter depends on the distance and is 5 mm immediately before the probe opening. By increasing the distance (A) of the measuring instrument from the object to be measured, the measuring spot diameter (D) increases proportionally in the ratio of approx. 6:1. With a distance (A) of 250 mm, the measurement spot diameter (D) is 46 mm. For the measuring distance (A) between the surface to be measured and sensor, we recommend using 20 to 50 mm. The respective diameter can be determined using the figure below.

A= Distance to the object to be measured

D= Measurement spot diameter

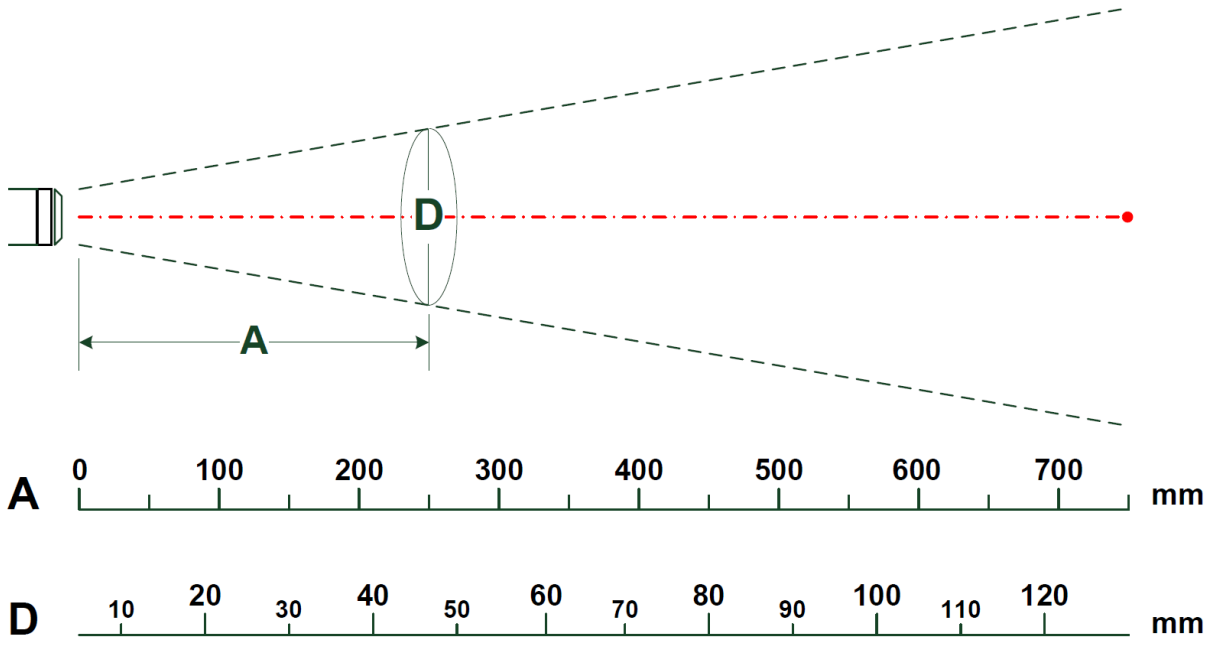


Figure 13-7: Measurement spot size depending on distance

13.12 General Notes on Humidity / Air Temperature Measurement

Humidity, also known as air humidity, is the water vapour content of the air. Further description, see Chapter 13.5.

13.13 Handling the Special Probes from the RH-T Family

Measure:

Press and hold the **"M"** button for longer than 2 seconds. A measurement process is carried out as long as the Measure button is kept pressed. After releasing the **"M"** button, the measurement process is interrupted and the **"Hold"** symbol is displayed.

Cleaning:

The inserted filter fabric is sensitive to mechanical damage and offers no protection against liquids. Under no circumstances should it be washed out with cleaning fluids or blown free with compressed air if it becomes dirty. Cleaning should only be carried out from the outside using a soft brush. If the filter fabric is damaged or heavily soiled/encrusted, it can only be replaced at the factory.

Sinter filter:

The sintered filter, which is available as an optional accessory. See chapter Accessories Humidity/air measurement), offers increased protection for use with dusty air or coarse dirt as well as for measurement at high air velocities (from 2 m/s). The filter can be washed out in residue-free cleaning liquids and/or blown free with compressed air if it becomes dirty. If the sintered filter is used, the response times are considerably longer. The diameter of a drill hole must be adapted (min. 12 mm).

Measuring error:

Measurements below 20% R.H. and above 80% R.H. should preferably not be taken over a prolonged period of time (continuous measurements). Other measurement falsifications can occur due to shielding with body parts (e.g. hand) as well as blowing or speaking/breathing in the direction of the sensor

Caution:

- The sensor is not designed for continuous measurements above 80% R.H. (longer than approx. 36 hours at a time without regeneration at 30-40% R.H. in the same time frame).
- The measuring device may only be exposed to temperatures above 50 °C for short periods.

13.13.1 **Precautions**

The sensor can be irreparably damaged by various mechanical or environmental influences.

These include in particular:

- direct contact of the sensor with the fingers
- direct contact with solid or sticky materials or objects
- measurement in environments containing solvents, oil vapours or other high levels of contaminants

- storing the sensor in foam materials NOT provided by us
- removal from the drill hole too hastily. This can cause the sensor cap to get stuck in the drill hole and tear off. The entire sensor pipe and sensor may be irreparably damaged
- Tearing off the sensor cap due to a drill hole that is too narrow, resulting in damage to the sensor pipe and the sensor.

13.14 Measuring Relative Humidity

The response speed of the sensor is very high, so that even small air flows (door gap, leaky window, etc.) influence the measured value display. An absolute standstill of the display can therefore only be achieved in a climate box.

The response time of the humidity sensor in slightly moving air is approx. 8 seconds* at an ambient temperature of 25 °C for 63 % of the humidity difference. The filter used to protect the sensor (in RH-T models and the TF-Sticks 16 K-25 M / P) delays the response time. By swivelling the device (ventilation of the sensor), the response time can be shortened in the event of air standstill or low air velocity.

*Specifications of the sensor manufacturer

INFORMATION

For particularly precise measurements, especially at temperatures below room temperature (20–25 °C) or if there are significant temperature differences between the intrinsic temperature of the measuring instrument and the ambient climate, the device should be exposed to the ambient climate for approx. 10 to 15 minutes or until the temperature has equalised. The sensor adapts to the respective climate even when it is not switched on.

13.15 Equilibrium Wood Moisture Content (EMC)

Equilibrium wood moisture content is the moisture content adopted by the wood when it is exposed to constant climate (constant humidity and constant temperature) for sufficiently long time.

The device can simultaneously display relative humidity, temperature, and equilibrium wood moisture content. This makes it easier for parquet installers and interior finishers to assess whether wooden components may be exposed to the existing ambient climate or whether damage to the wood, such as cracking, shrinkage or swelling, is to be expected. An appropriate Wood Moisture Equilibrium table can also be found in the appendix.

13.16 Water Activity (Aw)

Water activity is defined as the relative humidity that has to prevail in the surrounding medium to prevent an exchange of water between air and material. In practice, it corresponds approximately to the equilibrium moisture content of a material, but is not given as a percentage value but as a value between 0 and 1 aw.

The water activity is a measure of the degree of freedom of the free water (of various types) bound in a material.

The Aw value is an important measure concerning the shelf life of foodstuffs and influences the incidence of microorganisms that have differing requirements for freely available water. With a lack of free water, growth processes are slowed or prevented, whereas others are accelerated. Therefore, the Aw value is an important measure in the chemical and food industries.

13.17 Measuring Air Temperature

The response speed of the sensor is very high, so that even small air flows (door gap, leaky window, etc.) influence the measured value display. An absolute standstill of the display can therefore only be achieved in a climate box.

The response time of the air temperature sensor in moving air is approx. 5–30 seconds for 63 % of the temperature difference*. The filter used to protect the sensor (in RH-T models and the TF sticks 16 K-25 M / P) delays the response time.

*Specifications of the sensor manufacture

For particularly precise measurements, especially at temperatures below room temperature (20–25 °C) or if there are significant temperature differences between the intrinsic temperature of the measuring instrument and the ambient climate, the device should be exposed to the ambient climate for approx. 10 to 15 minutes or until the temperature has equalised. The sensor adapts to the respective climate even when it is not switched on.

13.18 Dew Point Temperature

The dew point temperature is the temperature at which the air is saturated with water vapour. The relative humidity is then 100%. If this dew point temperature is undershot, the moisture contained in the air condenses on a component / surface. The dew point temperature is generally lower than the air temperature, except at 100% R.H. where both temperatures are the same. As the relative humidity increases, the dew point temperature approaches the air temperature.

The display of the calculated dew point in the measuring modes "Dew point, Dp" (rh / t / Dp) is based on the relative humidity and air temperature parameters. A dew point table for calculating condensation can also be found in the Appendix.

13.19 Enthalpy

Enthalpy (En) is a measure of the energy content of air-water vapour mixtures, in kJ per kg.

13.20 Wet-Bulb Thermometer

The **wet-bulb temperature** is the lowest temperature that can be achieved with evaporative cooling.

The release of water from the damp surface is in balance with the ability of the surrounding atmosphere to absorb water and thus saturates the surrounding air with water vapour. Because of the evaporative chill, the wet-bulb temperature is dependent on the relative air humidity and lies under the air temperature. The temperature difference is the larger, the drier the surrounding air is. Using the temperature difference, the relative humidity can thus be determined.

The wet-bulb temperature (in the drawing (**T2**)) is determined with a psychrometric measurement with a thermometer provided with a damp material cover.

The wet-bulb temperature is mainly of interest where large amounts of liquids evaporate, such as in wood drying machinery.

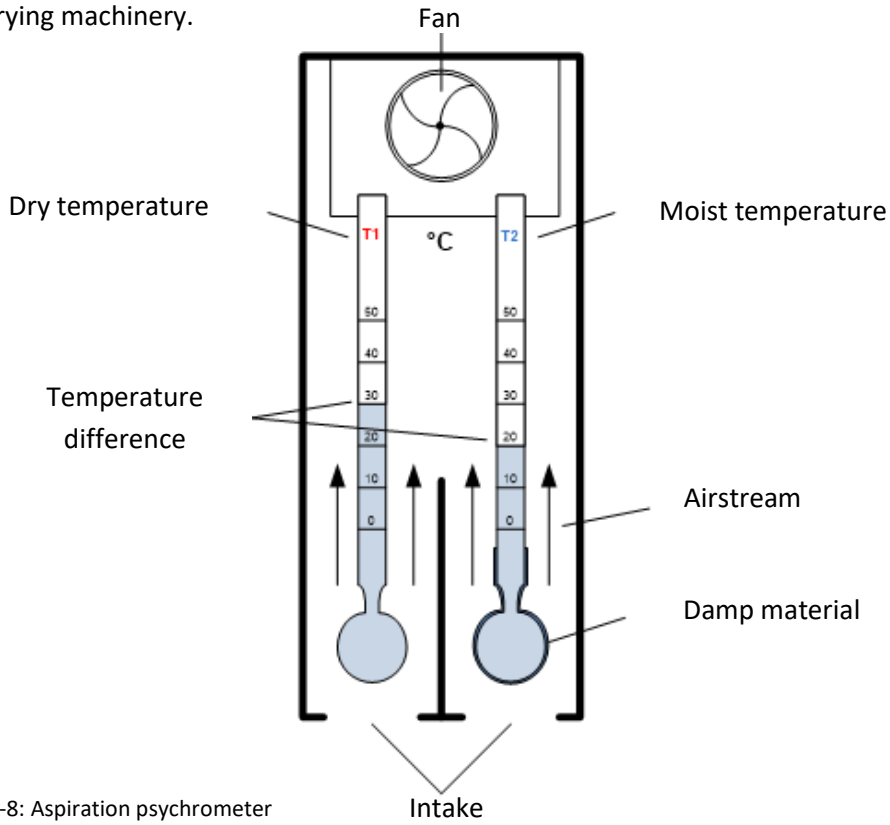


Figure 13-8: Aspiration psychrometer

13.21 Measuring the relative Air Humidity in Building Materials

The method for measuring the relative air humidity/equilibrium moisture content in screeds has been used for a long time in Great Britain and the Scandinavian countries. Compared to the non-destructive measurement or the resistance measurement, it is, however, more time-consuming and requires suitable drilled holes. On the other hand, it provides very reliable results when an equilibrium moisture content is sought in the drill hole.

This method is also used for depth measurements in older building materials (e.g. sandstone, quarry stone, damp walls, etc.) where the resistance measurement method does not provide reproducible results.

The "drill hole method" increases safety where there is insufficient information about the composition of the screed / building substance.

For measurements over a long period at multiple points or at different depths, drilled holes should be closed.

The measurement results obtained via the humidity / air temperature measurement are then converted into weight percentages using **sorption isotherms**. Sorption isotherms describe the equilibrium state of the sorption of a material on a surface at a constant temperature. In this equilibrium state, the relationship between water content and equilibrium moisture content of the surface (i.e. of the material) can be described and represented by a curve. Each moisture value can be allocated to an appropriate water content of the material using this curve.

Different materials also have different sorption behaviour depending on the specific properties of the material.

As these processes are extremely complex, the sorption curves are obtained empirically, i.e. they relate to practical data and experience. For each material, its own characteristic curve must be obtained experimentally.

A material table can be found in the appendix. For materials not included in it, there are currently no sorption isotherms confirmed or checked by us.

13.21.1 **"Drill hole" Method**

For the measurement, a hole with a diameter of min. 7 mm or 8 mm (flex) and a depth of at least 40 mm is drilled. A sharp drill bit, a high impact rate and a low speed are important.

If the drill hole is very hot, wait for the temperature to equalise before measuring. Before measuring in the drill hole, it must be carefully cleaned of drilling dust and blown out. There must be no free water in the hole.

The drill hole should then be sealed to prevent air exchange with the environment. The equilibrium moisture content in the hole is indicated after approx. 30 minutes, given temperature equilibrium (same temperature in material being measured and the tube sensor).

Without air circulation, e.g. when measuring in a drill hole, the response time of the sensor is extended. It is recommended to read an initial value after approx. 1 minute and to measure again in increments of 3–5 minutes until a constant value has been established.

WARNING

Before drilling holes for probes into walls, ceilings, floors, etc., make absolutely sure by suitable means that there are **no** electrical cables, water pipes or other supply lines in this location.

13.22 Notes on Temperature Measurement

For correct temperature measurement using our mechanical sensors, a temperature equalisation must be established between the sensor and the object to be measured. This is easily possible when measuring large quantities of liquids or objects with a high heat content. It is important to ensure that the sensor (entire metal tube, measuring head, sensor plate, etc.) is not influenced by a different temperature (ambient air temperature) at certain points.

We therefore recommend that you ensure that the sensors are fully immersed or that a shield is fitted. A piece of polystyrene with a diameter of at least 30 mm and a corresponding length or an equivalent piece of foam of good (dense) quality should be used for this purpose. For the surface sensor, a corresponding cuboid with an edge length of at least 30 mm is sufficient for the surface sensor, e.g. to keep out convection heat or cold during wall temperature measurements.

Correct temperature measurement with mechanical sensors is often not possible for technical reasons on insufficiently heat-conducting materials or materials with a low heat content (e.g. polystyrene, rock wool, glass, etc.). In order to achieve usable results, either the ambient temperature must be used or approximate measurements must be carried out.

13.23 Handling the Pt100 Temperature Sensors

The Pt100 temperature sensors ET 10 BL, OT 100 BL and TT 40 BL must be connected to the measuring instrument via the 3.5 mm jack receptacle. Ensure that the octagonal plug is firmly seated. The measuring instrument now automatically recognises the connected accessories. To activate the temperature measuring mode, press now the **"M"** button for longer than 2 seconds.

INFORMATION

Information: In conjunction with the Pt100 temperature sensors, the Hydromette BL UNI 11 operates exclusively in temperature display mode. A material setting or direct display in weight or CM % is not possible.

INFORMATION

Measure:

Press and hold the **"M"** button for longer than 2 seconds. A measurement process is carried out as long as the Measure button is kept pressed. After releasing the "M" button, the measurement process is interrupted and the **"Hold"** symbol is displayed.

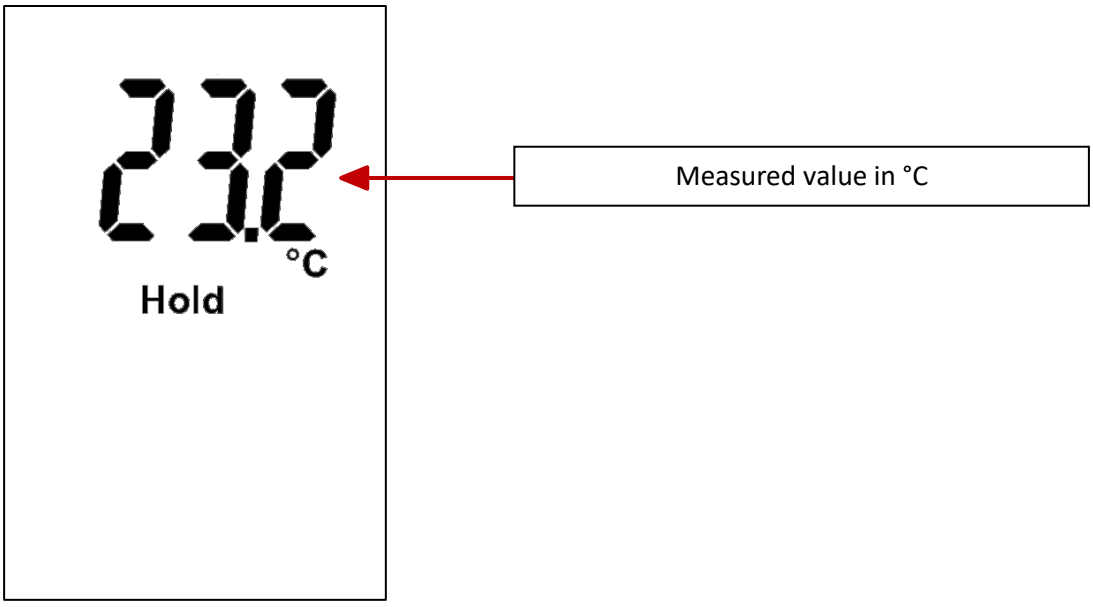


Figure 13-9: Temperature measurement display

13.23.1 **Push-in Electrode ET 10 BL**

The ET 10 BL is a simple penetration temperature sensor for measuring temperatures in semi-solid materials (e.g. frozen goods), bulk materials, liquids and for measuring core temperatures in a drill hole.

INFORMATION

Immerse the sensor tip at least 4 cm into the liquid to be measured or insert it into the product to be measured and trigger the measuring process. When measuring core temperatures, keep the drill hole as small as possible. Remove dust from the drill hole and wait for the temperature to equalise (due to the heat generated by drilling). Coat the sensor tip with commercially available silicone heat-conducting paste if necessary and insert it. Small drill holes can be filled directly with a little heat-conducting paste.

Depending on the material to be measured, the response time is between approx. 20 (liquids) and 120 seconds (T^{90}).

- Measuring range: -50 to + 250 °C

- Sensor pipe: length 100 mm, Ø 3 mm

13.23.2 **Surface Temperature Sensors OT 100 BL**

The OT 100 BL is a special sensor with a particularly low mass for measuring temperatures on surfaces. It has a spring-mounted sensor tip with thermal separation and the resulting optimised measured value acquisition, e.g. on solid wall surfaces.

INFORMATION

The sensor plate must be in full contact. There must be no air (only a very thin layer of heat-conducting paste) between the sensor plate and the object to be measured. Trigger the measurement process as described. Depending on the material to be measured, the response time is between approx. 10 and 40 seconds (T^{90}). In order to achieve good measurement results, the material to be measured must have a sufficient heat content and good thermal conductivity.

Caution:

- If the surface is rough, apply a small amount of silicone heat-conducting paste to the sensor head (sensor plate) and press it against the object to be measured.
- Damage is possible due to excessive pressure or kinking of the spring-loaded tip.

- Measuring range: -50 to + 250 °C

- Sensor pipe: length 110 mm, Ø 5 mm

13.23.3 **Immersion and Flue Gas Temperature Sensor TT 40 BL**

The TT 40 BL is a robust special sensor for measuring temperatures in liquids and core temperatures in a drill hole or viscous materials, e.g. glues, hot-melt adhesives or in asphalt or tar as well as in smoke/flue gases from burners.

INFORMATION

Immerse the sensor tip at least 6 cm deep into the medium to be measured and trigger the measuring process. When measuring core temperatures, keep the drill hole as small as possible. Remove dust from the drill hole and wait for the temperature to equalise (due to the heat generated by drilling). Coat the sensor tip with commercially available silicone heat-conducting paste if necessary and insert it.

Depending on the material to be measured, the response time is between approx. 10 (liquids) and 180 seconds (T^{90}).

- Measuring Range: -50 to + 350 °C

- Sensor pipe: length 380 mm, Ø 5 mm

14 Accessories

Connection cable MK 26 – Length: 1.80 m (order no. 31016920)

For device connection with a USB port.

14.1 Explanation of the Characters

Structural Moisture

Air Humidity

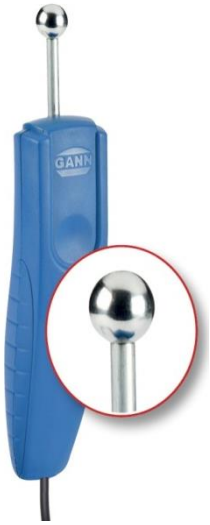
Temperature: Air

Temperature: Surface

Temperature: Material

14.2 Accessories for Structural Moisture Measurement

14.2.1 **Active-Electrode B 55 BL**



(order no. 31013755)

The B 55 BL is an electronic structural moisture indicator for non-destructive measurement in building materials using the dielectric constant/high frequency measurement method. It is an ideal pre-tester for all CM devices and resistance-based measuring devices.

Applications

- Moisture measurement with the spherical head in the wall, ceiling or floor
- Non-destructive structural moisture measurement with the ball electrode
- Structural moisture (for measuring ranges, see Chapter 2.4.1, material table for active electrode B 55 BL)

14.3 Accessories for Humidity and Air Temperature Measurement

14.3.1 Combined Electrode TF-IR BL

(order no. 31013100)

The TF-IR BL is a **combined electrode** that can be used to simultaneously perform climate measurements (air humidity and air temperature) and infra-red surface temperature measurements. The combination of the different measuring techniques allows dew point undershoots to be quickly and reliably assessed.

Applications

- Air humidity – Capacitive measurement (comparative graph air humidity – material moisture)
- Air temperature - (see Chapter 2.4.2 for measuring ranges)
- Surface temperature infrared measurement (dew point table, emissivity table, wood equilibrium moisture content EMC)

14.4 Accessories for Humidity and Air Temperature Measurement + Structural Moisture

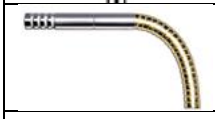
14.4.1 Special Probes of the RH-T 37 Family

(including sorption isotherms)

(Order no. see table)
Special probes of the RH-T 37 family for **air humidity and air temperature measurements** - particularly suitable for use in bulk materials and solid materials (e.g. brickwork or screeds).

Applications:

- Damage assessment
- Monitoring of construction drying
- Testing the readiness for laying floor and wall coverings
- Humidity analyses
- Determination of the readiness for laying or the moisture content of certain set building materials using sorption isotherms – air moisture measured in the borehole –

Measuring ranges: (for measuring ranges, see Chapter 2.4.3)				
Figure	Designation	Sensor pipe Length x Ø mm	Design	Order no.
	RH-T 37 BL 160	165 x 5.5	straight	31013140
	RH-T 37 BL 320	320 x 5.5	straight	31013141
	RH-T 37 BL FLEX 250	250 x 6.5	gooseneck *	31013142
	RH-T 37 BL FLEX 350	350 x 6.5	gooseneck *	31013143
	**Sintered filter (special accessories)**	Filter cap for protection in dusty air and for measurement at high air velocities	for RH-T 165/320 internal-Ø 5.5mm external-Ø 10 mm	31014601
			for RH-T flex 250/350 internal -Ø 6.5 mm externa-Ø 10 mm	31014602

*slim, flexible sensor pipe for measuring locations that are difficult to access

14.4.2 **TF-Stick 16 K**

Plug-in moisture sensors with compact design Used to measure air temperature and air humidity. The TF-Sticks 16 K-25, 16 K-25 M und 16 K-25 P differ in the different filters for protection against dust and moisture.

Measuring ranges: (for measuring ranges, see Chapter 2.4.4)				
Figure	Designation	Design	Order no.	Accessories
	**TF-Stick 16 K 25**	without filter	31003262	**Connection cable MK 18** Length: 1.80 m  Use: For connecting a TF-Stick to a Hydromette with integrated jack socket Order no. 31016720
	**TF-Stick 16 K 25 M**	with metal filter	31003264	
	**TF-Stick 16 K 25 P**	with PTFE-filter	31003266	

14.5 Accessories Temperature Measurement (Pt100)

14.5.1 **Push-in Electrode ET 10 BL**

(Order no. 31013165)

The ET 10 BL is a simple penetration temperature sensor for measuring temperatures in semi-solid materials (e.g. frozen goods), bulk materials, liquids and for measuring core temperatures in a drill hole.

- Measuring range: -50 to +250 °C
- Sensor pipe: length 100 mm, Ø 3 mm

14.5.2 **Surface Temperature Sensor OT 100 BL**

(Order no. 31013170)

The OT 100 BL is a special sensor with a particularly low mass for measuring temperatures on surfaces. It has a spring-mounted sensor tip with thermal separation and the resulting optimised measured value acquisition, e.g. on solid wall surfaces.

- Measuring range: -50 to +250 °C
- Sensor pipe: length 110 mm, Ø 5 mm

14.5.3 **Immersion and Flue Gas Temperature Sensor TT 40 BL**

(Order no. 31013180)

The TT 40 BL is a robust special sensor for measuring temperatures in liquids and core temperatures in a drill hole or viscous materials, e.g. glues, hot-melt adhesives or in asphalt or tar as well as in smoke/flue gases from burners.

- Measuring range temperature: -50 to +350 °C
- Dimension: Sensor pipe: length 380 mm, Ø 5 mm

15 Appendix

15.1 Material Table for Active-Electrode B 55 BL

Material index	Material
0	Scan-mode (Display in digits)
11	Cement screed in weight-%
12	Anhydrite screed in weight-%
13	Concrete in weight-%
14	Cement mortar in weight-%
15	Lime mortar in weight-%
16	Mixed plaster in weight %
17	Gypsum plaster in weight %
18	Cement screed in CM %
50	Anhydrite screed in CM %
54	Gypsum plaster in CM %
55	Lime mortar in CM %
58	Cement mortar in CM %
72	Mixed plaster in CM %
73	Concrete in CM %

15.2 Material-Table for Special Probes from the RH-T-37-Family

Material index	Material
11	Cement screed in weight-%
12	Anhydrite screed in weight-%
13	Concrete in weight-%
14	Cement mortar in weight-%
17	Gypsum plaster in weight %
19	Lime sand brick in weight-%
20	Lime cement mortar in weight-%
22	wood fibre insulation panels in weight %
23	Mineral wool insulation in weight %
25	Brick in weight-%
32	Hardwood / Beech
33	Softwood / Spruce

15.3 Display Values (Digits) by Weight Percentage or CM Percentage

Display in Digits		40	50	60	70	80	90	100	110	120	130
Cement screed	wt.-%	1.8	2.2	2.7	3.2	3.6	4.1	4.5	5.0	5.5	5.9
	CM-%	0.7	1.0	1.4	1.8	2.1	2.5	2.9	3.2	3.6	4.0
Anhydrite screed	wt.-%	0.1	0.3	0.6	1.0	1.4	1.8	2.2	2.5	2.9	3.3
	CM-%	0.1	0.3	0.6	1.0	1.4	1.8	2.2	2.5	2.9	3.3
Concrete C12/15, C20/25, C30/37	wt.-%		1.3	1.9	2.5	3.2	3.8	4.4	5.0	5.6	6.2
	CM-%		0.3	0.8	1.3	1.7	2.2	2.7	3.2	3.7	4.2
Cement mortar	wt.-%	1.8	2.7	3.5	4.6	6.0	7.0	7.8			
	CM-%	0.6	1.5	2.3	3.1	4.0	4.8	5.6			
Lime mortar	wt.-%	0.6	2.0	3.3	4.5						
	CM-%	0.6	2.0	3.3	4.5						
Lime cement mortar	wt.-%	2.2	3.6	5.0	6.4	7.8	9.2	10.6	11.0		
	CM-%	1.5	2.7	4.0	5.2	6.4	7.6	8.8	10.0		
Gypsum plaster	wt.-%	0.3	0.5	1.0	2.0	3.5	6.5	10.0			
	CM-%	0.3	0.5	1.0	2.0	3.5	6.5	10.0			

15.4 Equilibrium Wood Moisture Table

Wood Moisture Equilibrium					
	Air temperature in °C				
	10 °C	15 °C	20 °C	25 °C	30 °C
Relative air humidity	Wood moisture content				
20%	4.70%	4.70%	4.60%	4.40%	4.30%
30%	6.30%	6.20%	6.10%	6.00%	5.90%
40%	7.90%	7.80%	7.70%	7.50%	7.50%
50%	9.40%	9.30%	9.20%	9.00%	9.00%
60%	11.10%	11.00%	10.80%	10.60%	10.50%
70%	13.30%	13.20%	13.00%	12.80%	12.60%
80%	16.20%	16.30%	16.00%	15.80%	15.60%
90%	21.20%	21.20%	20.60%	20.30%	20.10%

15.5 Dew Point Table

Air-temperature °C	Dew point temperature in °C at a relative humidity of:							**Saturation moisture =** **a**mount of water in g/m³
	30 % °C	40 % °C	50 % °C	60 % °C	70 % °C	80 % °C	90 % °C	
30	10.5	14.9	18.5	21.2	24.2	26.4	28.2	30.4
28	8.7	13.1	16.7	19.5	22.0	24.2	26.2	27.2
26	7.1	11.3	14.9	17.6	19.8	22.3	24.2	24.4
24	5.4	9.5	13.0	15.8	18.2	20.3	22.2	21.8
22	3.6	7.7	11.1	13.9	16.3	18.4	20.3	19.4
20	1.9	6.0	9.3	12.0	14.3	16.5	18.3	17.3
18	0.2	4.2	7.4	10.1	12.4	14.5	16.3	15.4
16	-1.5	2.4	5.6	8.2	10.5	12.5	14.4	13.6
14	-3.3	-0.6	3.8	6.4	8.6	10.6	12.4	12.1
12	-5.0	-1.2	1.9	4.3	6.6	8.5	10.4	10.7
10	-6.7	-2.9	0.1	2.6	4.8	6.7	8.4	9.4
8	-8.5	-4.8	-1.6	0.7	2.9	4.8	6.4	8.3
6	-10.3	-6.6	-3.2	-1.0	0.9	2.8	4.4	7.3
4	-12.0	-8.5	-4.8	-2.7	-0.9	0.8	2.4	6.4
2	-13.7	-10.2	-6.5	-4.3	-2.5	-0.8	0.6	5.6
0	-15.4	-12.0	-8.1	-5.6	-3.8	-2.3	-0.9	4.8

Dew point temperatures depending on air temperature and relative humidity for condensation calculation.

15.6 Equilibrium Moisture Values in Percent by Weight

Building materials	at 20°C approx. 50% RH	at 20°C approx. 65% RH	at 20°C approx. 90% RH
Cement screed (sealed, applied rel. dry)	1.5	1.7 - 1.8	3.1
Cement screed (unsealed, applied rel. wet)	2.0	2.4 - 2.6	3.8
Cement mortar 1: 3	1.5	1.7 - 1.8	3.2
Lime mortar 1: 3	1.6	1.8 - 1.9	3.4
Gypsum plaster, plasterboard	0.5	0.6 - 0.7	1.0
Gypsum screed	0.6	0.8 - 0.9	1.3
Magnesite screed	7.0	8.3 - 8.7	13.0
Stone wood according to DIN	11.0	13.5 - 14.5	16.7
Gas concrete (Co Hebel)	8.5	11.0 - 12.0	18.0
Elastizell screed	1.6	1.8 - 2.2	2.8
Anhydrite screed	0.5	0.6 - 0.7	0.9
Concrete (200 kg cement/m³ sand)	1.4	1.6 - 1.7	3.0
Concrete (350 kg cement/m³ sand)	1.6	1.8 - 2.0	3.4
Concrete (500 kg cement/m³ sand)	1.8	2.0 - 2.2	3.8

15.7 Emissivity table

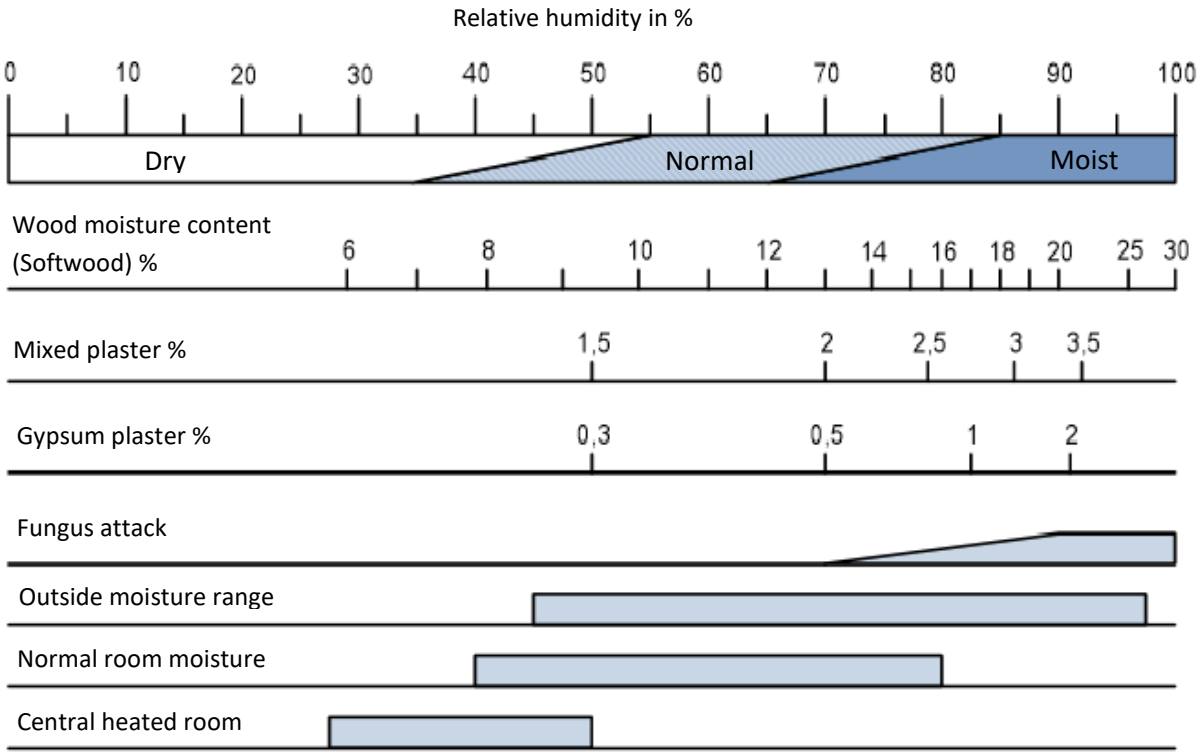
Material	Condition	Temperature*	EM-Factor
Aluminium**	non-oxidised	25	2
		100	3
	heavily oxidised	100	20
	highly polished	100	9
	slightly polished	100	18
Asbestos			95
Asphalt			95
Lead**	oxidised		28
	bare metal	230	6
Stainless steel**	matt		60
	oxidised		16
Ice	surface		100
Iron**	enamelled		88
	oxidised		80
	corroded		64
	nickel-plated, matt		12
	nickel-plated, polished		6
	zinc-plated		27
Soil	dry		92
	humid		95
Paint	black, matt		96
	black, glossy		92
	other colours		95
	clear coat		87
Gypsum	bulk material		81
	processed		91
Glass	flat		94
	convex	100	80
	concave	100	82
Gold**			2
Graphite			98

Material	Condition	Temperature*	EM- Factor
Rubber	dark		95
	bright		86
	hard		88-95
	soft		67-84
Casting**	grey cast iron		94
	cast iron, polished		21
Skin		38	98
Wood			80-90
Lime			30-40
Lime mortar			93
Copper**	highly polished		7
	heavily oxidised		78
Marble			93
Brickwork			95
Brass**	polished		5
	oxidised		60
Nickel**	polished		5
	oxidised		32
Porcelain			93
Plaster	Lime plaster		92
Sand			90
Snow		-10	85
	smooth		95
Bolts **			85
Silver**			3
Steel**	oxidised		80
	rolled		24
Tar			83
Water			96
Brick	Clay brick		93
Zinn**			5

*(no value given in the "Temperature" field indicates that the values shown are valid for a standard temperature of 20 °C).

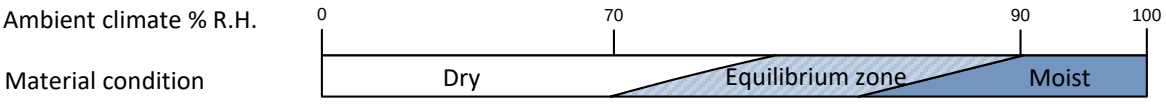
** (metals cannot be measured accurately due to their surface (e.g.: oxidised/polished surface → emissivity between 2 and 100%). We therefore recommend using the paper sticker (IR 30/E95 order no. 31005833) with emissivity of 95%. This makes exact measurement of the object temperature possible.

15.8 Comparison Graph of Humidity – Material Moisture Content



Notes on graphic:

The areas shown in the graphic mean:



White zone: dry

Equilibrium moisture.

Pale zone: equilibrium zone

Caution! Non-diffusing coverings or adhesives should not be used. Please ask the respective manufacturer.

Dark zone: moist

Machining or processing at very high risk!

15.9 General Concluding Remarks

The notes and tables in these operating instructions on permitted or normal humidity conditions in practice and the general definitions of terms have been taken from the specialist literature. No responsibility can therefore be taken by the manufacturer of the measuring device for the correctness of this information.

The conclusions to be drawn from the measurement results are related to the individual conditions and the knowledge from professional experience for each user. In cases of doubt, for example concerning the permitted moisture content in coating or screed substrates when laying floor coverings it is recommended to contact the manufacturer of the coating or floor covering and to take account of the recommendations of the trade associations/guilds.

Please note:

The instructions for use for the device and any accessories should be carefully observed, as supposed simplifications in handling often lead to measurement errors.

-Subject to technical changes- Status: September 2024

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16 EU Declaration of Conformity

Document no. / order no.: 30011440

Product identifier: **HYDROMETTE BL UNI 11**

We declare that the hand-held meter and related accessory correspond with the protection requirements and if used according to their intended purpose, comply with the requirements of the directives:

☒ 2014/30/EU EMC Directive

☒ 2011/65/EU RoHS

Applied harmonized standards:

☒ EN 61326-1 : 2013 General EMC requirements

☒ EN IEC 63000 : 2018 Restriction of hazardous substances

This declaration is given in responsibility for:

Gann Mess- und Regeltechnik GmbH

Schillerstr. 63

70839 Gerlingen

Germany

issued by:

name: Michael Gann

Position in the company of manufacturer: Managing Director

Place / date: Gerlingen, 12 December 2024

(Legally valid signature)