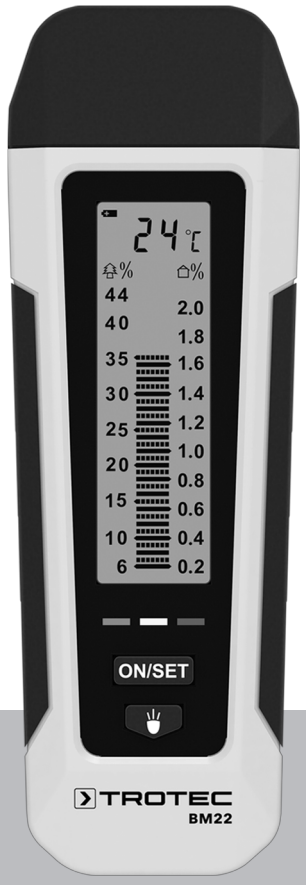
BM22



EN

INSTRUCTIONS
MOISTURE MEASURING DEVICE

TROTEC

TRT-BA-BM22-TC220331TTRT01-006-EN

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Information on the use of these instructions

Symbols

Warning
This signal word indicates a hazard with an average risk level which, if not avoided, can result in serious injury or death.

Warning of electrical voltage
This symbol indicates dangers to the life and health of persons due to electrical voltage.

Caution
This signal word indicates a hazard with a low risk level which, if not avoided, can result in minor or moderate injury.

Notice
This signal word indicates important information (e.g. material damage), but does not indicate hazards.

Info
Information marked with this symbol helps you to carry out your tasks quickly and safely.

Follow the manual
Information marked with this symbol indicates that the instructions must be observed.

You can download the current version of these instructions via the following link:



BM22

https://hub.trotec.com/?id=43339

Safety

Read this manual carefully before starting or using the device. Always store the manual in the immediate vicinity of the device or its site of use.

Warning
Read all safety warnings and all instructions. Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury. **Save all warnings and instructions for future reference.**

- Do not use the device in potentially explosive rooms or areas and do not install it there.
- Do not use the device in an aggressive atmosphere.
- Do not immerse the device in water. Do not allow liquids to penetrate into the device.
- The device may only be used in dry surroundings and must not be used in the rain or at a relative humidity exceeding the operating conditions.
- Protect the device from permanent direct sunlight.
- Do not expose the device to strong vibrations.
- Do not open the device.
- Do not remove any safety signs, stickers or labels from the device. Keep all safety signs, stickers and labels in legible condition.
- Use batteries of type AAA.
- Never charge batteries that cannot be recharged.
- Different types of batteries and new and used batteries must not be used together.
- Insert the batteries into the battery compartment according to the correct polarity.
- Remove discharged batteries. Batteries contain materials hazardous to the environment. Dispose of the batteries according to the national regulations.
- Remove the batteries from the device if you will not be using the device for a longer period of time.
- Never short-circuit the terminals of batteries!

- Do not swallow batteries! If a battery is swallowed, it can cause severe internal burns within 2 hours! These burns can lead to death!
- If you think batteries might have been swallowed or otherwise entered the body, seek medical attention immediately!
- Keep new and used batteries and an open battery compartment away from children.
- Observe the storage and operating conditions (see Technical data).

Intended use

Only use the device for moisture measurements of wood and building materials within the measuring range specified in the technical data.

Any use other than the intended use is regarded as misuse.

Reasonably foreseeable misuse

Do not use the device in potentially explosive atmospheres, for measurements in liquids or at live parts.

Any unauthorised changes, modifications or alterations to the device are forbidden.

Personnel qualification

People who use this device must:

- have basic knowledge of how to safely handle electrical equipment.
- have read and understood the instructions, especially the Safety chapter.

Residual risks

Warning
There is a danger of suffocation for children due to packaging material! Keep packaging films and parts away from children. There is a risk of death due to suffocation.

Warning of electrical voltage
There is a risk of a short-circuit due to liquids penetrating the housing!
Do not immerse the device and the accessories in water. Make sure that no water or other liquids can enter the housing.

Warning of electrical voltage
Work on the electrical components must only be carried out by an authorised specialist company!

Warning
The device is not a toy and does not belong in the hands of children.

Warning
Dangers can occur at the device when it is used by untrained people in an unprofessional or improper way! Observe the personnel qualifications!

Caution
When handling the device there is a risk of injury due to the exposed measuring tips.
Always put on the protective cap when not in use.

Caution
Keep a sufficient distance from heat sources.

Notice
Exclusively use the original measuring tips included in the scope of delivery. Other measuring tips might bend or damage the holder at the measuring device.

Notice
Never force the measuring device into the material to be measured or yank it out. Applying force can lead to bending or breaking of the measuring tips or to the destruction of the housing.

Notice
To prevent damages to the device, do not expose it to extreme temperatures, extreme humidity or moisture.

Notice
Do not use abrasive cleaners or solvents to clean the device.

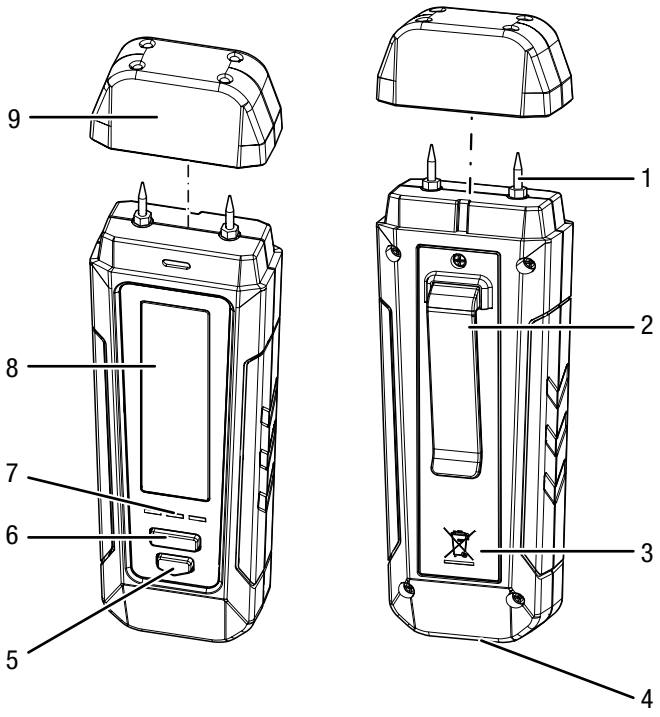
Information about the device

Device description

By use of the moisture measuring device BM22 the humidity level of wood and building material can be determined. Additionally, the ambient temperature can be measured in °C or °F.

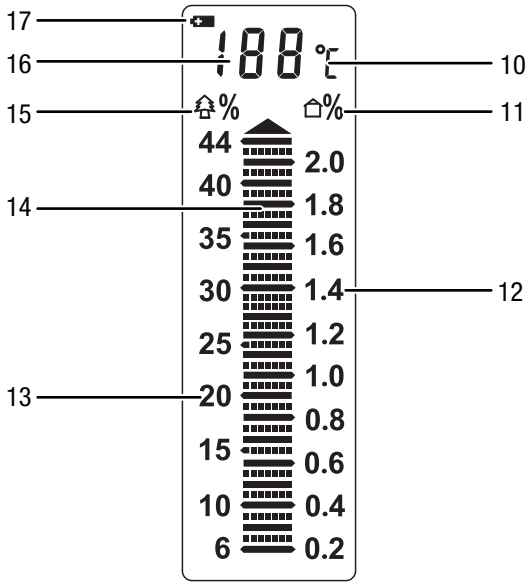
The device has a three-colour LED display for a quick assessment of the humidity level.

Device depiction



No.	Designation
1	Measuring tips
2	Transport clip
3	Battery compartment with cover
4	LED illumination
5	*Light* button
6	*SET/ON* button
7	LED display (green / yellow / red)
8	Display
9	Protective cap

Display



No.	Designation
10	*Temperature unit* indication
11	*Building moisture measuring mode* indication
12	Numeric values for building moisture measurement
13	Numeric values for wood moisture measurement
14	Measured value scale (1 bar corresponds to 1 % of wood moisture or 0.05 % of building moisture)
15	*Wood moisture measuring mode* indication
16	*Temperature* indication
17	*Battery status* indication

Technical data

Measuring principle:	resistance measuring method
Dimensions:	145 x 44 x 34 mm
Weight:	132 g (incl. batteries)
Measuring range:	Wood moisture: 6 to 44 % Building moisture: 0.2 to 2.0 % Temperature: 0 to 40 °C (32 to 104 °F)
Measuring range resolution:	Wood moisture: 1 % Building moisture: 0.05 % Temperature: 1 °C (2 °F)
Accuracy:	Wood moisture measured value until 30 %: ± 2 % Wood moisture measured value from 30 %: ± 4 % Building moisture measured value until 1.4 %: ± 0.1 % Building moisture measured value from 1.4 %: ± 0.2 % Temperature: not specified
Ambient temperature:	0 to 50 °C with 0 to 85 % RH
Power supply:	4 x 1.5 V batteries AAA
Automatic switch-off:	after approx. 30 seconds

Scope of delivery

- 1 x Moisture measuring device BM22
- 1 x electrode tips set (2.2 x 8 mm)
- 1 x Quick guide

Transport and storage

Notice

If you store or transport the device improperly, the device may be damaged.
Note the information regarding transport and storage of the device.

Transport

For transporting the device use a suitable bag to protect it from external influences.

Storage

When the device is not being used, observe the following storage conditions:

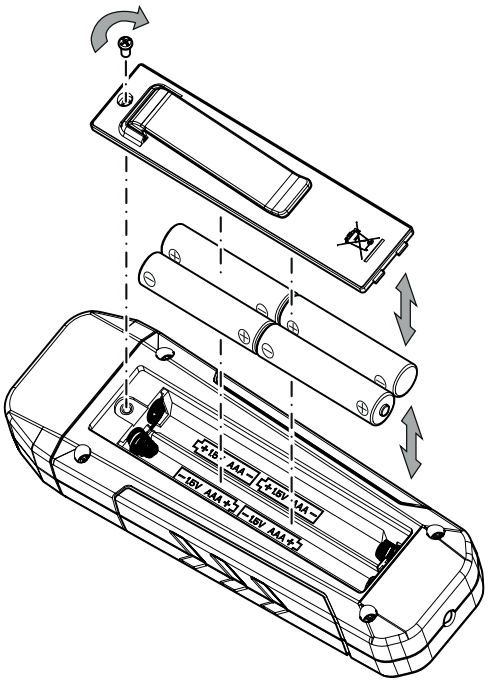
- dry and protected from frost and heat
- protected from dust and direct sunlight
- at the temperature specified in the technical data
- Batteries are removed from the device

Operation

Inserting the batteries

Notice

Make sure that the surface of the device is dry and the device is switched off.



1. Unscrew the screw from the battery compartment.
2. Remove the cover from the battery compartment.
3. Insert the batteries in the compartment with correct polarity.
4. Put the cover back onto the battery compartment.
5. Tighten the screw.

Switching the device on

Info

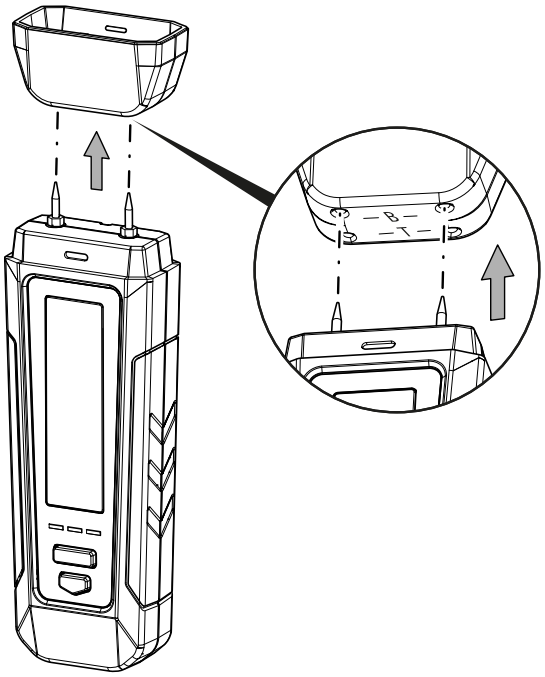
Please note that moving from a cold area to a warm area can lead to condensation forming on the device's circuit board. This physical and unavoidable effect can falsify the measurement. In this case, the display shows either no measured values or they are incorrect. Wait a few minutes until the device has become adjusted to the changed conditions before carrying out a measurement.

1. Press the *SET/ON* button (6).
   ⇨ The display switches on.
   ⇨ The device is ready for operation.

Performing a function test

1. Hold the measuring tips (1) to the contacts lettered -T- at the top of the protective cap (9) (device test).
   ⇨ The scale ought to indicate the value 19 % ±1.
2. Hold the measuring tips (1) to the contacts lettered -B- at the top of the protective cap (9) (battery test).
   ⇨ All scale bars (14) should be flashing.

⇨ If the device reacts as described, the general function test is completed with a positive result.



If the device does not react as described, please check the battery voltage or replace the batteries with new ones of high quality. If this does not solve the problem, please contact the Trotec customer service.

Measuring temperature

The ambient temperature determined by the device is displayed in the *Temperature* indication (16) in real time.

Moisture measurement

1. Remove the protective cap (9).
2. If possible, carefully prick the measuring tips (1) a few millimetres into the material.
   ⇨ When measuring wood moisture, read the measured value off the left-hand side of the scale (13).
   ⇨ When measuring building moisture, read the measured value off the right-hand side of the scale (12).
3. Carefully pull the device out of the material by gently moving it in turns to the left and to the right.
4. **Upon conclusion of the measurement put the protective cap back on the device.**

Reading the LED display

In the *wood moisture* measuring mode the LEDs are to be read as follows:

- At a measured wood moisture of less than 6 % none of the LEDs is illuminated.
- At a measured wood moisture between 6 % and 16 % the green LED is illuminated.
- At a measured wood moisture between 16 % and 20 % the yellow LED is illuminated.
- At a measured wood moisture of more than 20 % the red LED is illuminated.

In the *building moisture* measuring mode the LEDs are to be read as follows:

- At a measured building moisture of less than 0.2 % none of the LEDs is illuminated.
- At a measured building moisture between 0.2 % and 0.7 % the green LED is illuminated.
- At a measured building moisture between 0.7 % and 0.9 % the yellow LED is illuminated.
- At a measured building moisture of more than 0.9 % the red LED is illuminated.

Changing the unit °C / °F

1. Press the *SET/ON* button (6) for approx. 3 seconds.
   ⇨ The *Temperature unit* indication (10) changes to either °C or °F.
   ⇨ The measured value adapts to the selected unit.

Switching on the LED illumination

1. Press the *Lamp* button (5) for approx. 3 seconds to switch on the LED illumination (4).
2. Press the *Lamp* button (5) for approx. 1 second to switch the LED illumination (4) back off.

Switching the device off

The device switches off after approx. 30 seconds of non-use.

Info

Please bear in mind that with activated LED illumination the device will NOT switch off automatically. Switch off the LED illumination as formerly described.

Measuring principle

The measuring device at hand serves for the rough determination of the material or wood moisture content according to the resistance measuring method. Fields of application are wood moisture measurements of sawn timber and firewood. Moreover, the measuring device can be used to detect the moisture in soft building materials such as gypsum or plaster.

The resistance measuring method is an indirect measurement method, since the moisture content of the measured material is deduced from the its conductivity.

Influencing variables suitable to change the conductivity, e.g. electrically conducting materials or dissolved salts, hence also have a direct influence on the determined measured values. Therefore, the displayed measured values can only be considered as indicator of the moisture content.

Notes on use regarding the wood moisture measurement:

For wood moisture measurement a calibration curve is stored in the device, which corresponds to the average of the relevant kinds of wood in Europe based on a wood temperature of 20 °C. Therefore, no further settings are required for a quick rough determination of the wood moisture content. If precise wood moisture values are required for other wood temperatures or with due regard of the type and bulk density of a certain timber, an additional control measurement applying the Darr procedure or else using a wood moisture measuring device with temperature comparison function and selection option for the specific wood type calibration is recommended.

- Always insert the measuring tips transverse to the wood fibre direction. The conductivity transverse to the wood fibre direction is lower than that in line with it.
- When selecting the measuring positions observe the following:
  - Always measure the material moisture at at least three different positions in order to achieve a sufficient accuracy by means of the arithmetic average.
  - Do not measure the face, because there are mainly dry areas.
  - Preferably do not measure at cracks, branches or resin pockets either.
- Oily and/or aqueous timber preservatives affect the measurement result.
- If possible, do not measure wood with a temperature below -5 °C. Too low wood temperatures distort the result of the measurement.
- Avoid static charge of the material to be measured due to friction. Static charge distorts the measurement result.
- With a wood moisture of less than 10 % RH, electrostatic forces may occur at the good to be measured. This can falsify the result of the measurement. Experience has shown that this occurs at the outlet of veneer drying plants. Remove the static charge by use of suitable grounding measures.
- The measurement's accuracy depends on the contact pressure of the measuring tips. The measuring tips must be connected to the wood in a way that the contact resistance is small as compared to the measuring resistance.

Notes on use regarding the material moisture measurement:

When assessing the measurement results one has to bear in mind that increased occurrences of soluble salts in the measured material can distort the result of the measurement. The more salts present, the higher the conductivity of the material and the higher will be the displayed measurement value.

Further observe disruptive influences due to electrically conducting substances:

If a construction material contains electrically conducting substances, it also has a lower resistance value, which then simulates high moisture values. Consequently, a too high measured value will be displayed.

From visual inspection it is not always apparent, whether there are any electrically conducting substances inside the construction material.

Some of the main error sources here are in particular reinforcements, metal laminations and conducting insulation such as slag in timber beam ceiling constructions. Especially in case of insulation materials with metal lamination, measured values are often misinterpreted during the resistance measurement. Quantitative conclusions about the moisture content of the mineral material to be measured can only be drawn by applying the Darr procedure or the CM method.

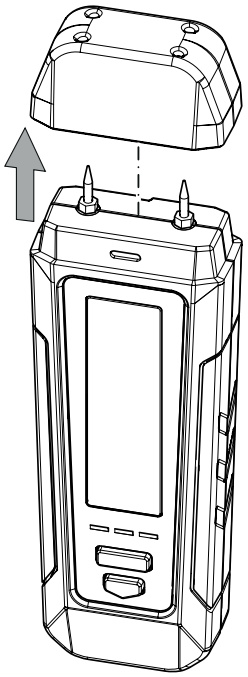
Maintenance and repair

Exchanging measuring tips

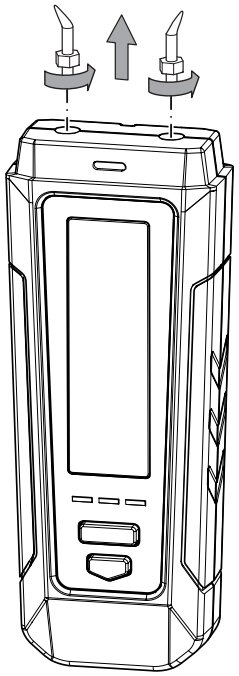
Exchange the measuring tips when they show signs of wear (e.g. oxidation, deformation, heavy, irremovable contaminations).

✓ Make sure that the device is switched off.

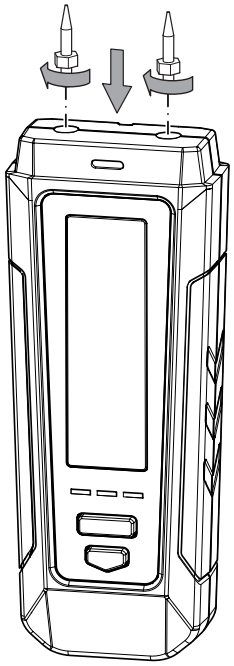
1. Remove the protective cap from the device.



2. Detach the screwed-on measuring tips from the device.



3. Screw the new measuring tips into the device.



4. **Put the protective cap back on.**

Cleaning

Clean the device with a soft, damp and lint-free cloth. Make sure that no moisture enters the housing. Do not use any sprays, solvents, alcohol-based cleaning agents or abrasive cleaners, but only clean water to moisten the cloth.

Repair

Do not modify the device or install any spare parts. For repairs or device testing, contact the manufacturer.

Errors and faults

The device has been checked for proper functioning several times during production. If malfunctions occur nonetheless, check the device according to the following list.

Display segments are only faintly visible or flicker:

- Check the charging status of the battery. Change the battery, if required (see chapter Inserting the battery).
- Make sure that the battery is properly positioned. Check the polarity is correct.

The device displays implausible measured values:

- Check the charging status of the battery. Change the battery, if required (see chapter Inserting the battery).
- Make sure that the battery is properly positioned. Check the polarity is correct.

Disposal

Always dispose of packing materials in an environmentally friendly manner and in accordance with the applicable local disposal regulations.



The icon with the crossed-out wheeled bin indicates that this device and any associated components (e.g. remote controls) must not be disposed of with household waste at the end of their life, in accordance with the Waste Electrical and Electronic Equipment Directive (2012/19/EU) and national laws.

You will find collection points for free return of waste electrical and electronic equipment in your vicinity. The addresses can be obtained from your municipality or local administration. You can also find out about other return options that apply for many EU countries on the website https://hub.trotec.com/?id=45090. Otherwise, please contact an official recycling centre for electronic and electrical equipment authorised for your country.

The separate collection of waste electrical and electronic equipment aims to enable the re-use, recycling and other forms of recovery of waste equipment as well as to prevent negative effects for the environment and human health caused by the disposal of hazardous substances potentially contained in the equipment.



This icon with the crossed-out wheeled bin indicates that batteries or accumulators must not be disposed of with household waste at the end of their life. If the device contains batteries or accumulators that contain mercury, cadmium or lead, the respective chemical symbol (Hg, Cd or Pb) is shown below the icon of the crossed-out wheeled bin. To prevent environmental pollution, do not carelessly leave batteries or electrical and electronic equipment containing batteries in public areas. In the European Union, batteries and accumulators must be returned to a designated collection point in accordance with REGULATION (EU) 2023/1542 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 July 2023 concerning batteries and waste batteries. Remove batteries/accumulators and dispose of them separately according to the relevant legal requirements.

Only for United Kingdom

According to Waste Electrical and Electronic Equipment Regulations 2013 (SI 2013/3113) (as amended) and the Waste Batteries and Accumulators Regulations 2009 (SI 2009/890) (as amended), devices that are no longer usable must be collected separately and disposed of in an environmentally friendly manner.

Trotec GmbH

Grebbener Str. 7
52525 Heinsberg
Germany
+49 2452 962-0
+49 2452 962-200

online@trotec.com
www.trotec.com