

PROMAT (HK) Limited 寶時（香港）有限公司

☎ : 2661 2392 📞 : 5196 8860 ✉ : info@promat.hk 🌐 : http://www.promat.hk



BM31

EN

OPERATING MANUAL
MOISTURE INDICATOR



 **TROTEC**
AT WORK.

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Notes regarding the operating manual

Symbols



Danger!

Warns of a hazard which can lead to injuries.



Caution!

Warns of a hazard which can lead to damage to property.

The current version of the operating manual can be found at:
www.trotec.de

Legal notice

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The scope of delivery may vary from product images. This document was created with all due care. TROTEC® accepts no liability whatsoever for possible mistakes or omissions.

The only party responsible for determining measured results to be valid, drawing conclusions and deriving actions is the user! TROTEC® accepts no claims of warranty for the correctness of the determined measured values or measured results. Further, TROTEC® accepts no liability whatsoever for possible mistakes or damage which have been caused by utilising the determined measured results. © TROTEC®

Information about the device

Description of the device

The dielectric moisture indicator serves the purpose of a quick, indicative and non-destructive localization of humidity or moisture distributions.

The measuring device is suited for the preliminary check of the building materials' readiness for covering for subsequent CM measurements. The moisture indication allows the localization of the most significant measuring spots to extract material for the CM measurement.

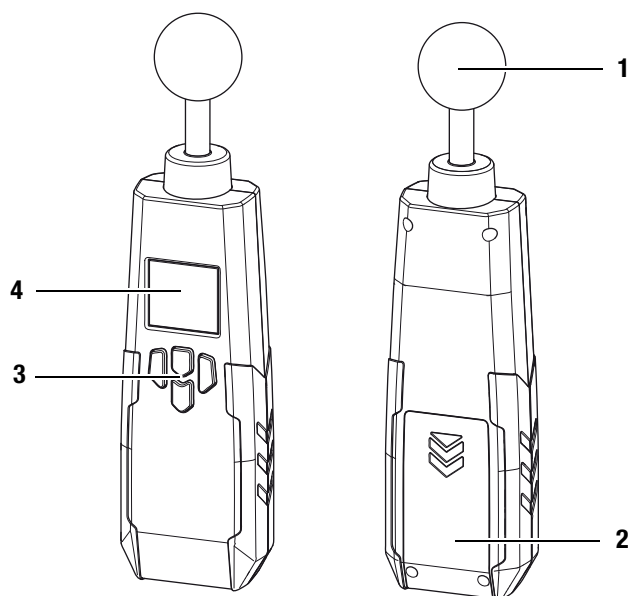
Further available for the assessment of the measurements is a Max/Min function.

The first measurement after switch-on is carried out automatically and serves for the purpose of calibration.

The measuring device comes equipped with a selectable display illumination.

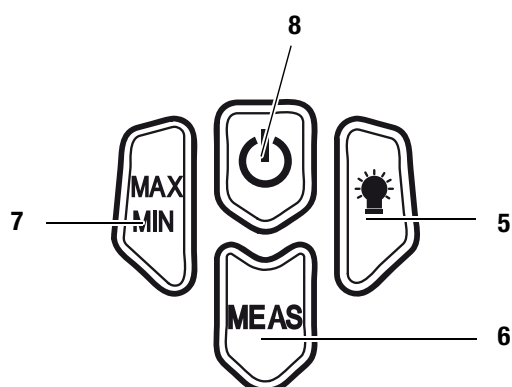
When not in use, an automatic switch-off saves the battery.

Device depiction



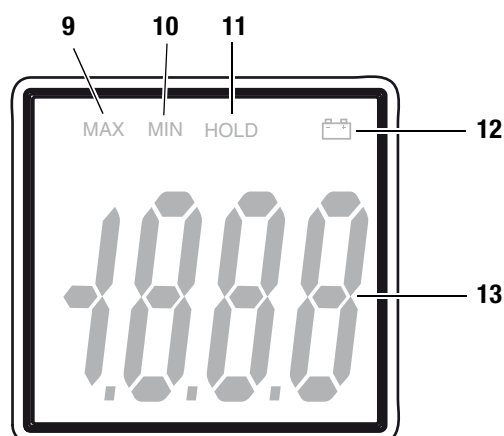
No.	Operating element
1	Sensor
2	Battery compartment with cover
3	Operating elements
4	Display

Operating elements



No.	Operating element
5	Lamp button
6	MEAS key
7	Max/Min button
8	On/Off key

Display



No.	Display element
9	MAX indication
10	MIN indication
11	HOLD indication
12	Measurement value display
13	Battery indication

Technical data

Model:	BM31
Weight:	190 g
Dimensions (H x W x D):	190 mm x 55 mm x 32 mm
Measuring range:	0 to 100 digits
Measuring principle:	Dielectric
Measuring range resolution:	1 digit
Penetration depth:	5 to 40 mm
Operating temperature:	0 to 40 °C
Storage temperature:	-20 to 70 °C
Power supply:	1 x Alkaline 9 V battery
Automatic switch-off of the device:	After approx. 30 seconds of non-use

Scope of delivery

- 1 x moisture indicator BM31
- 1 x 9 V battery
- 1 x Getting started guide

Safety

Carefully read the operating manual before using the device and keep it within reach!

- Do not use the device in atmospheres containing oil, sulphur, chlorine or salt.
- Do not operate the device near open electrical wiring.
- Do not operate the device near medical equipment (e.g. pacemakers).
- Protect the device from permanent direct sunlight.
- Do not remove any safety signs, stickers or labels from the device. Keep all safety signs, stickers and labels in legible condition.
- Observe the storage and operating conditions (see chapter Technical data).

Intended use

Only use the device for moisture measurements at components within the measuring range specified in the technical data.

To use the device for its intended use, only use accessories and spare parts which have been approved by TROTEC®.

Improper use

Do not use the device in potentially explosive atmospheres, for measurements in liquids or at live parts. Do not use the device for measurements at metal components. TROTEC® accepts no liability for damages resulting from improper use. In such a case, entitlements to a warranty are forfeited. Any unauthorised modifications, alterations or structural changes to the device are forbidden.

Personnel qualifications

People who use this device must:

- have read and understood the operating manual, especially the Safety chapter.

Residual risks



Danger!

Do not leave the packaging lying around. Children may use it as a dangerous toy.



Danger!

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



Danger!

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



Caution!

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



Caution!

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

Transport and storage

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.
- protected from dust and direct sunlight.
- with a plastic cover to protect it from invasive dust, if necessary.
- The storage temperature is the same as the range given in the chapter Technical data.
- When storing the device for a long time, remove the batteries.

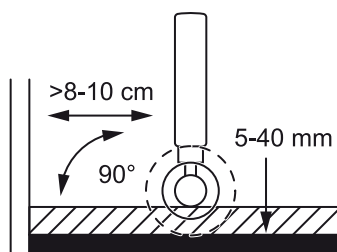
Measuring principle

The measurement is effected according to the dielectric measuring principle. In the course of the measurement the dielectric constant of the measured good is determined.

Please note:

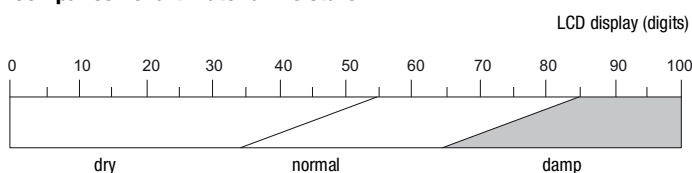
- The measurement results are only to be used as reference for a rough orientation.
- The displayed measured values are so-called unitless digit values in the range of 0-100. These do not resemble moisture data in mass % or volume %.
- The height of the measured value can be calculated from the determined dielectric constant of the measured material. Dry air has a constant of 1, water 80. Hence, the more humidity is contained in the material, the higher will be the displayed measured value.
- Another important variable influencing the measured value is the bulk density of the good to be measured. The higher the bulk density, the higher the measured value.
- Depending on the material's bulk density and degree of moisture penetration, the device's penetration depth amounts to 5 to 40 mm. Conclusions regarding zones located at a lower level cannot be drawn.

Disruptive influences



- During the measurement always hold the ball head in a vertical position to the measured material, press it to the surface and do not tilt it.
- Rough surfaces will always result in a too low measured value.
- With material thicknesses of less than 2 cm there is a danger of humidity values from adjacent material layers affecting the measured value.
- Material aggregates and their concentration, e.g. in screed or concrete, can also considerably influence the height of the measured value.

Comparison chart material moisture



plaster and anhydrite in M/CM % (M % = CM %)	0.3	0.5	1.4	2.0	2.5	2.7	%
cement-based materials in CM %	1.5	2.1	3.0	3.5	4.0	CM %	
cement-based materials in mass %	2.7	3.6	4.5	5.5	6.0	M %	

CM % = percentage due to calcium carbide method

M % = mass %

- Before measuring, the measuring point is to be cleared of any impurities (e.g. paint residues, dust).
- If the material to be measured contains metal (e.g. nails, screws, lines, pipes, etc.) and is situated within the sensor's measuring field, the measured value skyrockets due to intense reflections.
- When the ball head is held to corners (e.g. window frames), the measured value is generally higher, because there is more matter in the measuring head's stray field. Toward a corner a distance of more than 8 to 10 cm has to be observed.

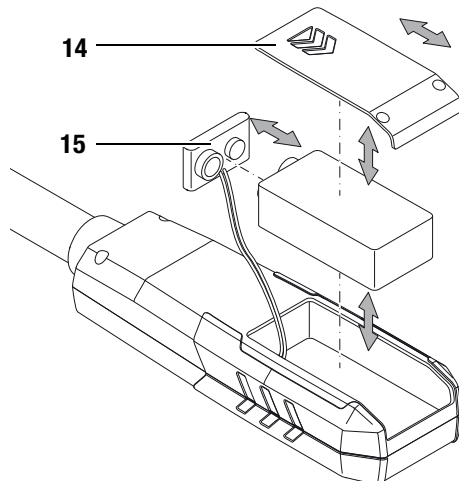
Operation

Inserting the battery



Caution!

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



1. Remove the cover (14) from the device by sliding it in the direction of the arrow.
2. Use the battery clip (15) to connect the new battery with correct polarity.
3. Slide the cover (14) back on the device.

Switching on

- Press the on/off key (8).
 - The display is switched on.
 - The device is automatically calibrated.
 - The device is ready for operation.

Note:

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.

Calibrating the measuring device

The device is calibrated anew whenever it is switched on.

1. Hold the measuring device preferably somewhere near the bottom and in one hand (corrugated rubber coating).
2. Point the measuring device away from the body and any objects into clear space.
3. Press the MEAS key (6) until the calibration is completed.
 - The flashing *CAL* indication appears on the display.
 - After approx. 5 seconds the flashing stops.
 - The calibration is then complete.
 - The next measurement can be carried out as usual.

Carrying out a measurement

1. Place the measuring device in a vertical position on the component.
2. Press and hold the MEAS key (6) until the desired measurement interval is completed.
3. Let go of the MEAS key (6) again.
 - The indication HOLD (11) appears on the display.
 - The last measured value is displayed.
 - To perform a so-called moisture scan, run the device over the surface to be measured without a break. Keep the MEAS key (6) pressed uninterruptedly and check the displayed digit value for possible changes.

MAX/MIN function

1. Press the MAX/MIN button (7) before measuring.
 - MAX (9) appears on the display.
2. Press the MAX/MIN button (7) again.
 - MIN (10) appears on the display.
3. Carry out the measurement with the desired setting.

Note:

Only the highest or lowest measured value during a measurement will be displayed.

Switching on the display illumination

1. Switch on the measuring device.
2. Press the Lamp button (5).
 - The display illumination goes on.
3. Press the Lamp button (5) again.
 - The display illumination switches off.

Switch-off

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

- Press the on/off key (8).
 - The device will be switched off.

Maintenance and repair

Battery change

A battery change is required, when the Battery indication (12) can be seen in the display or the device can no longer be switched on. See Inserting the battery on page 5.

Cleaning

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

Repair

Do not modify the device. Never open the device housing or install any spare parts. For repairs or device testing, contact the manufacturer.

Disposal



In the European Union, electronic equipment must not be treated as domestic waste, but must be disposed of professionally in accordance with Directive 2002/96/EC of the European Parliament and Council of 27th January 2003 concerning old electrical and electronic equipment. At the end of its life, please dispose of this instrument in a manner appropriate to the relevant legal requirements.

Declaration of conformity

in accordance with the EC Low Voltage Directive 2006/95/EC and the EC Directive 2004/108/EC about electromagnetic compatibility.

Herewith, we declare that the moisture indicator BM31 was developed, constructed and produced in compliance with the named EC directives.

The CE marking is found on the rear of the device.

Manufacturer:
Trotec GmbH & Co. KG
Grebbener Straße 7
D-52525 Heinsberg

Phone: +49 2452 962-400
Fax: +49 2452 962-200
E-mail: info@trotec.com

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Managing Director: Detlef von der Lieck

PROMAT (HK) Limited 寶時（香港）有限公司

☎ : 2661 2392 📞 : 5196 8860 ✉ : info@promat.hk 🌐 : <http://www.promat.hk>

