PINLESS LCD MOISTURE METER WITH TRICOLOR BAR GRAPH

USER'S MANUAL

MM8

Please read this manual carefully and thoroughly before using this product.

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INTRODUCTION

Thank you for purchasing General Tools & Instruments' MM8 Pinless LCD Moisture Meter with Tricolor Bar Graph. Please read this user's manual carefully and thoroughly before using the instrument.

The MM8 is designed for use in woodworking, water damage restoration, building construction and home renovation. Examples include:

- Checking for moisture on or below the surface of carpets and subflooring
- Measuring the moisture content of wood, drywall or masonry before painting, wallpapering, sealing or treating
- Locating water leaks above ceilings, below floors or behind walls
- Selecting dry lumber

The meter is a non-invasive (pinless) instrument that can detect moisture up to 3/4 in. (19mm) below the surface of the following materials: wallboard, masonry, hardwood and softwood. It infers the level of moisture from the material's capacitance, which the meter measures by gauging its effect on an electric field that the meter generates each time it is powered on.

The meter exploits two physical phenomena to make its measurements:

1. The linear relationship between a solid material's moisture level and its dielectric constant—and therefore its capacitance.
2. The so-called fringing-field effect—the slight spreading of the electric field produced by current flowing between two electrodes when both electrodes are on the same side of a material.

Behind the top of the MM8 are two metal plates. When the meter is powered on, the plates are given small and opposite charges. The potential difference causes current to flow, creating a three-dimensional electric field.

When the top of the meter is placed against one side of a material with moisture on or slightly below its surface, the increased capacitance of the material distorts the electric field to an extent that can be sensed (as a change in flux over the sensing area) and measured. Displayed readings reflect the *average* moisture level of the material between its surface and the electric field's maximum penetration of 3/4 in. Moisture closer to the surface has a greater effect on readings than moisture at the maximum penetration depth.

The MM8 has been calibrated at the factory for use with wallboard, masonry, hardwood and softwood. The capacitance of wood and the capacitance of building materials are affected differently by moisture because they have different densities. The meter compensates for density by adjusting the gain of its internal sensing circuitry.

The **MODE** button on the front of the meter provides a convenient way to switch among the four materials. The name of the material selected appears on the LCD. Below the LCD is a bank of colored LEDs that roughly mirrors the digital reading above it in bar graph format, with green indicating "dry", red indicating "wet", and yellow indicating an intermediate moisture level. An audible out-of-range alarm (beeper) sounds whenever wood is tested and found to have a moisture content above 17%, or when drywall or masonry is found to be more than 70% wet.

Although the LCD displays measurements of drywall and masonry moisture content as % readings, these are actually relative readings with no accuracy specification. Despite that shortcoming, relative readings are useful for quickly comparing the moisture levels of materials, or the wetness of different areas of the same material. For example, you can use the meter to locate the source of

a water leak above a ceiling by comparing readings at various points on it. If the ceiling is level, the point that produces the highest reading is below the source of the leak.

Any digital reading can be held by pressing the **HOLD** button on the front of the meter. This button makes it possible to make a measurement in a dark place and display it after bringing the meter into a lighted area.

To extend battery life, the MM8 automatically powers off after two minutes of inactivity. The instrument is powered by a “9V” battery included in the blister pack.

KEY FEATURES

- Separate settings for drywall, masonry, softwood and hardwood
- 2 in. diagonal high-contrast, white-on-black backlit LCD + 3-color LED bar graph
- Non-invasive, non-marring detection technology with 3/4 in. (19mm) maximum sensing depth
- ±4% accuracy on wood
- Calibrates automatically or manually
- Reading **HOLD** button
- 2-minute Auto Power Off trigger
- Separate out-of-range alarms for wood and building materials
- Low battery indication
- Powered by “9V” battery (included)

PRODUCT OVERVIEW

Fig. 1 shows all of the controls, indicators and physical features of the MM8. Fig. 2 shows all possible display indications. Familiarize yourself with the position and function of all components before moving on to the Setup Instructions.

Fig. 1. The controls, indicators and physical features of the MM8

A. High-contrast, white-on-black LCD

B. LED bar graph; mirrors digital reading on LCD

C. **MODE** button. Cycles through four target options: Wallboard, masonry, softwood and hardwood

D. **HOLD** button. "Freezes" and releases digital readout. Also used to silence out-of-range alarms

E. ⏻ button. Powers meter on and off

F. Battery compartment

G. Inductive sensing area

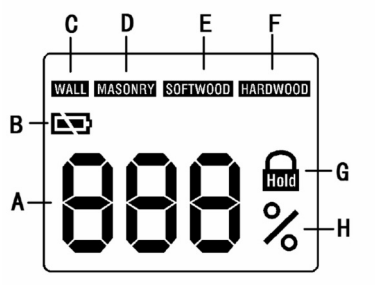

Fig. 2. All possible MM8 display indications

A. Moisture reading

B. Low battery indication

C. Drywall mode D. Masonry mode

E. Softwood mode

F. Hardwood mode

G. Held reading indicator

H. Moisture unit. Expressed as a percentage to make it easy to compare readings. All readings are relative.

SETUP INSTRUCTIONS

INSTALL BATTERY

Open the battery compartment at the bottom of the meter (Fig. 1, Callout F) and push the included "9V" battery inside the compartment with the connector facing in and following the polarity as indicated on the compartment. Close the compartment after installing the battery.

OPERATING INSTRUCTIONS

To power on the meter, press and hold the ⏻ button (Fig. 1, Callout E) for at least three seconds. (To power off the meter, follow the same instruction.)

To measure the moisture level of drywall, masonry, hardwood or softwood, press the **MODE** button until the name of the target material appears on the LCD (**WALL** is short for drywall). Then scan the material by gently pressing the inductive sensing area (Fig. 1, Callout G) on the top of the meter against the material. The LCD will display the material's moisture content as a percentage.

Simultaneously, one or more bar graph LEDs will illuminate to place the material's moisture level within a spectrum bounded by "dry" and "wet". The color of the illuminated LED furthest to the right indicates which % band contains the material (see the Specifications section on p. 7 for the bands' boundaries).

To hold a reading, press the **HOLD** button briefly. The display will show the held value, along with a lock icon above the % sign. If the reading is above the alarm limit for that material, pressing the **HOLD** button will silence the alarm.

MEASUREMENT TIPS

For maximum accuracy, press the sensing area against a flat area of a representative sample of the target material. The sample's length and width should be at least as large as the dimensions of the inductive sensing area: 1.6 x 1.6 in. (40 x 40mm).

Ideally, the material should also be at least 3/4 in. thick. That is the meter's maximum measurement depth and the thickness it is calibrated for. If your sample is too thin, the meter will measure material beneath it as well and produce an inaccurate reading. One way to compensate for thin samples is to stack them.

Measurements of wood are skewed by two variables: ambient humidity and the

density of the wood species. The best way to compensate for the effect of these variables is to develop your own moisture level curves, based on your experience working with different species of wood on a day-to-day basis.

Although the MM8 auto-calibrates each time it is powered on, the meter can be manually calibrated. Perform a manual calibration whenever the meter cannot produce a reading, or if multiple measurements of the same sample produce very different readings.

To manually calibrate the MM8:

1. Power the meter on and hold it in one hand with the top in the air. Make sure your fingers are not touching or near the inductive sensing area.
2. Press and hold the **HOLD** button until the display reads **101**. Then release the button; this will change the reading to **102**. Wait a few seconds. When the reading changes to **000**, calibration is complete.

SPECIFICATIONS

Measurement Ranges	0 to 53% for softwood 0 to 35% for hardwood Relative readings for wallboard and masonry
Measurement Accuracy	±4% for hardwood and softwood
Maximum Sensing Depth (in wood)	3/4 in. (19mm)
Inductive Sensor Size	1.6 x 1.6 in. (40 x 40mm)
Out-of-Range Alarm Levels	>17% for wood >70% for drywall and masonry
LCD Size	2 in. (51mm) diagonal with three 0.5 in. (13mm) high digits
Display Resolution	1%
Bar Graph Composition	3 each green, yellow and red LEDs
LED Bands	For drywall and masonry: green = 0 to 30%, yellow = 31 to 70%, red = >70% For wood: green = 5 to 14%, yellow = 15 to 17%, red = >17%
Auto Power Off Trigger	2 minutes of inactivity
Operating Temperature	32° to 104°F (0° to 40°C) @ 5 to 95% R.H.
Storage Temperature	14° to 122°F (-10° to 50°C)

Dimensions	6.3 x 2.8 x 2.9 in. (160 x 70 x 73.5mm)
Weight	4.7 oz. (132g) without battery
Power Source	(1) “9V” battery (included)

WARRANTY INFORMATION

In the U.S, General warrants its instruments and accessories, and digital tools against defects in material or workmanship for one year from the date of purchase unless otherwise stated on the packaging, manual, and/or marketing materials. General also warrants its non-digital tools products against defects in material or workmanship on a limited lifetime term. The company will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the product.

Any implied warranties arising from the sale of a General product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. General shall not be liable for loss of use of the product or other incidental or consequential damages, expenses, or economic loss, or for any claim of such damage, expenses, or economic loss.

State laws vary. The above limitations or exclusions may not apply to you.

RETURN FOR REPAIR POLICY

Every effort has been made to provide you with a reliable product of superior quality. However, in the event your instrument requires repair, please contact our Customer Service to obtain an RGA (Return Goods Authorization) number before forwarding the unit via prepaid freight to the attention of our Service Center at this address:

General Tools & Instruments
75 Seaview Drive Secaucus, NJ 07094 212-431-6100

Remember to include a copy of your proof of purchase, your return address, and your phone number and/or e-mail address.

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