



# 4-IN-1 PIN/PAD RH MOISTURE METER

*USER'S MANUAL*



## MMH800

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

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# INTRODUCTION

Thank you for purchasing General Tools & Instruments' MMH800 4-in-1 Pin/Pad RH Moisture Meter. Please read this user's manual carefully and thoroughly before using the meter.

The MMH800 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
- Measuring the surface moisture and/or moisture content of wood, drywall or concrete before painting, wallpapering, sealing or treating
- Locating water leaks in roofs, floors and walls
- Selecting dry lumber

Because it can measure ambient temperature and humidity in addition to moisture level, the MMH800 is particularly suitable for water damage restoration projects.

The meter has two LCDs: one displays moisture level and the other—a split-screen display—monitors temperature and humidity. A dedicated front-panel button selects the default temperature unit (degrees Fahrenheit or degrees Celsius).

The 4-in-1 part of the meter's name refers to its ability to measure: 1) temperature; 2) relative humidity; 3) moisture level using a pin sensor; and 4) moisture level using a pad sensor. The meter has both kinds of sensors, with a pair of pins on top and a split metal pad on the back. Both sensors base their measurements on the relationship between the moisture content of a material and its electrical conductivity. The wetter a material, the higher its conductivity. In both cases, the sensors serve as the electrodes of a conductivity meter optimized for measuring moisture content.

## ***Which sensor should you use?***

It depends on the application. The pad sensor is the only choice for measuring surface moisture of materials like finished wood, paint or wallpaper that cannot be marred by pinholes. If measurement accuracy is important, the pin sensor is the better option because pins can detect moisture below the surface that the pad sensor cannot.

However, for hard materials like wood or concrete, the meter's readings mostly represent surface moisture content because: 1) Moisture close to the surface has a greater effect on a reading than moisture deep below it; and 2) The factory-installed pins of the MMH800 are only 0.2 in. (5mm) long and cannot be driven deep into a hard material. For softer materials like soil, paper or powders, readings are more likely to reflect the average moisture level of the material between its surface and the penetration depth of the pins (usually far less than 0.2 in.). To improve the meter's overall measurement accuracy, the MMH800 ships with a 4-pack of pins: two are 0.4 in. (10mm) long, and the other two are 0.6 in. (15mm) long.

Moisture level readings are displayed as percentages on the upper LCD of the MMH800, which is factory-calibrated for use with wood/paper and building materials (concrete, bricks, wallboard, etc.). Because moisture affects the conductivity of wood/paper and building materials differently, the meter measures their moisture content using different scales:

- For wood and paper, the moisture level measurement range is 5 to 50%.
- For building materials, the range is 1.5 to 33%.

A front-panel button allows you to switch between the two materials. Display icons indicate which material is being tested, as well as whether the current reading is considered low, medium or high for the material. Any reading can be held by pushing another front-panel button; this feature makes it possible to make a measurement in a dark place, hold it, and display it later in a better-lighted area. The meter is also equipped with a repeating beeper that beeps faster with rising moisture level, which makes it easy to detect areas of peak wetness. The beeper can be disabled without affecting measurements.

The meter also has the following three features:

- It automatically powers off after three minutes of inactivity to extend battery life
- An icon on the upper display indicates when the meter's 9V battery is low on charge
- The protective pin cover can be used to check the meter's calibration

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## KEY FEATURES

- Pin (intrusive measurement of moisture content) and pad (non-intrusive measurement of surface moisture) sensors
- Separate 3-digit displays of moisture level and temperature + humidity
- Selectable wood or building materials measurement mode
- °F/°C unit selection
- Wide measurement range and high accuracy
- Audible and visual indications of high, medium and low moisture levels
- Holds moisture level readings for convenient viewing later
- Pin cover doubles as calibration checker
- Auto power off function
- Battery charge indicator
- Powered by single 9V battery

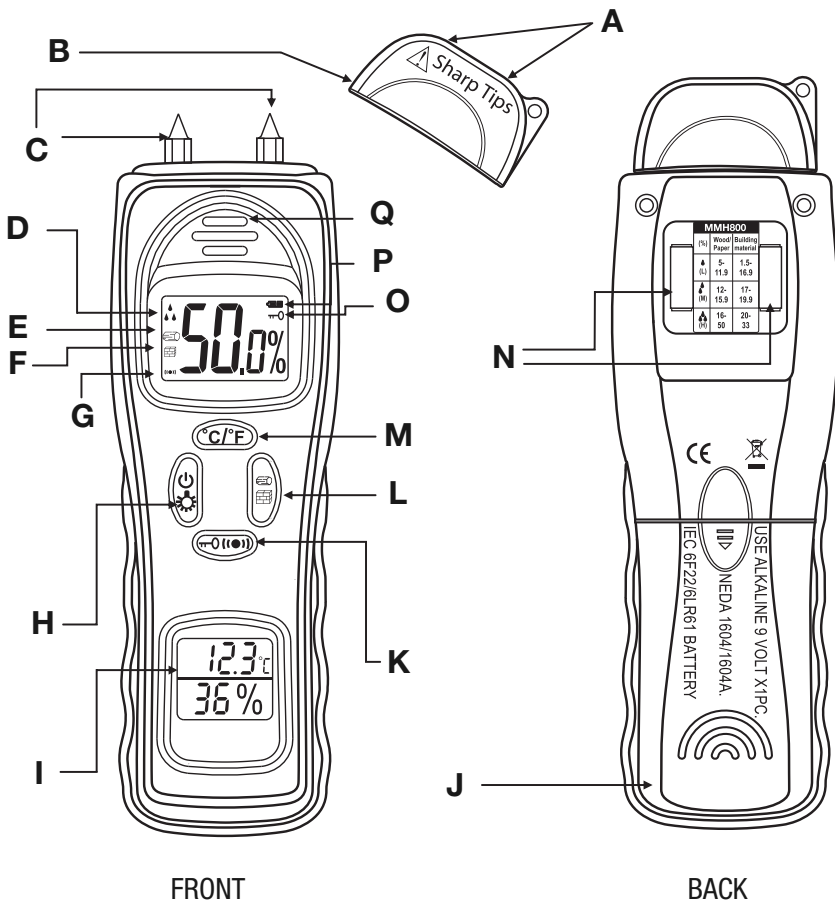
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






## WHAT'S IN THE CASE

The MMH800 comes in a custom hard carrying case along with a 9V battery, two pairs of extra test pins (10mm and 15mm long), and this user's manual.

# PRODUCT OVERVIEW

The figure below shows all of the controls and indicators on the front of the MMH800, as well as the locations of the sensor and battery compartment on its back.



- A. Calibration holes
- B. Protective cover
- C. Replaceable test pins
- D.  Low  
Medium  
High low/medium/highmoisture level icon (high moisture shown)
- E.  Wood icon
- F.  Building materials icon
- G.  Beeper enabled icon
- H. Dual function button:  Power on/off (press and hold for >3 seconds);  
Backlight on/off (press briefly)
- I. Temperature and humidity split-screen display
- J. Battery compartment cover
- K. Dual function button:  Beeper on/off (press and hold for >3 seconds);  
Moisture reading hold/release (press briefly)
- L.  button: Selects wood or building materials
- M.  button: Toggles between temperature units
- N. Split metal pad sensor
- O.  icon: Indicates display is locked or “frozen”
- P.  icon: Battery charge indicator (see p. 11)
- Q. Temperature/humidity sensor vent

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## SETUP INSTRUCTIONS

### ***INSTALL BATTERY***

To open the battery compartment, turn the meter over and use your thumb to slide the battery compartment cover down and away from the unit. Plug a fresh 9V battery into the wired socket inside the compartment. The terminals of the battery and the socket mate in only one way, with the smaller male terminal plugging into the larger female terminal. Close the battery compartment by replacing its cover and snapping it shut.


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# OPERATING INSTRUCTIONS


**To power on the meter**, press the  button and hold it for at least three seconds.





(To power off the meter, follow the same instruction.)




## MEASURING MOISTURE LEVEL

**To measure the moisture level of wood or a building material**, first make sure that its icon appears on the left side of the display. If it does not, press the  button briefly to toggle between wood and building materials. Next, decide which sensor to use (the meter's pins or pad) after considering their pros and cons presented in the introduction. Either 1) Gently press or push the pins at the top of the meter on or into the material or 2) Press the split pad sensor on the back against a flat area of the material, making sure that both sides of the pad touch the surface being measured.

The MMH800 provides three indications of a material's measured moisture content:

1. A percentage reading on the upper display.
2. One, two or three droplet icons (  ) on the left side of the upper display to indicate whether the reading is low, medium or high for the material. The moisture-level range for each category is different for wood/paper and building materials; see the Specifications section for the exact percentages.
3. If enabled (the factory default), the meter's repeating beeper will sound at one of three rates (slow, medium or fast) corresponding to the measured moisture level (low, medium or high). The audible changes make it very easy to pinpoint areas of peak wetness.

**To hold a measurement**, press the  button briefly. This “freezes” the display and makes the  (lock) icon appear at the right of the reading. This feature makes it possible to make a measurement in a dark place, hold the reading, and display it later in a better-lighted area. **To release the lock**, press the  button briefly again. This makes the  icon disappear.

The meter's beeper is enabled by default. **To disable the beeper**, press the  button and hold it for at least three seconds. This makes the  icon at the lower left of the display disappear. **To re-enable the beeper**, press and hold the  button again for at least three seconds. Each time the meter is powered on, the unit reverts to the default state: beeper enabled.



### ***Some measurement tips:***

1. To locate the source of a leak behind wood, plaster, drywall or a ceiling, make measurements at different locations. The leak is where the meter displays the highest reading.
2. Never use force to drive the test pins into a hard surface.
3. When measuring the moisture level of soil, surface readings will be lower than readings with the test pins deep in the soil.

## **ACCOUNTING FOR TEMPERATURE AND HUMIDITY**



Measurements of wood moisture level 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 in your neighborhood.

For example, the humidity level affects the dryness of interior wood considered “acceptable” for finishing. In the steamy Deep South, where 60% relative humidity is the norm, fine carpenters have learned how to work with wood with 11% moisture content. But in bone-dry Nevada, Utah, and Arizona, where 30% humidity is common, the same piece of wood would have to have less than 6% moisture to be considered ready for finishing.

Moisture levels are just as important to know when joining wood, but for a different reason. If two work pieces have different moisture levels when they are joined, when they dry out they will contract by different amounts at different rates. In the extreme, the result could be a warped board or a weakened joint.


Temperature also affects moisture levels to the extent that it affects relative humidity levels. The hotter the air, the more water it can hold. A relative humidity level of 50% means that the ambient air is holding only half the moisture it is capable of holding.

The MMH800’s split-screen lower display can help you develop your own custom moisture level curves by providing real-time temperature and humidity readings. Both measurements are made and displayed continuously whenever the meter is powered on.

The meter’s default temperature unit is degrees Celsius (°C). **To change the measurement unit to degrees Fahrenheit (°F)**, press the  button. Each time the meter is powered on, the unit reverts to the default °C. If you prefer to work in °F, you must press the  button to begin each measurement session.

## CHECKING CALIBRATION

As mentioned earlier, the meter is factory-calibrated for measuring the moisture level of wood and building materials on different scales. **To check the calibrations**, remove the protective cap from the top of the meter, taking care not to stab yourself with the two sharp pins beneath it. Then flip the cap over and place the two holes in its top over the meter's two test pins.

The upper display should read 17.5%  $\pm$ 3% with the meter in wood measurement mode and 16.4%  $\pm$ 3% in building materials measurement mode. You can toggle the  button to check both calibrations without removing the protective cap.

If either calibration check produces a readout outside the stated range for that mode, and the meter is still under warranty, call General's Customer Service Department at 212-431-6100 to arrange to return the meter for service or replacement.



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## SPECIFICATIONS

Moisture Level Measurement Range	5 to 50% for wood/paper; 1.5 to 33% for building materials
Measurement Accuracy	$\pm$ 3%
Measurement Resolution	0.1%
Temperature Measurement Range	32° to 140°F (0° to 60°C)
Temperature Measurement Accuracy	$\pm$ 2°F ( $\pm$ 2°C)
Humidity Measurement Range	25 to 95%
Humidity Measurement Accuracy	$\pm$ 5% from 32° to 104°F (0° to 40°C)
Display Type/Size	99.9 count LCD with 0.56 in. (15mm) high digits
Droplet Icon Ranges	Low/Medium/High moisture: >5%/12%/16% for wood and paper; >1.5%/17%/20% for building material
Auto Power Off	After 3 minutes with 0% reading
Low Battery Warning Level	<7.25V
Operating Temperature	32° to 122°F (0° to 50°C) @<80% relative humidity
Dimensions	7.13(L) x 2.17(W) x 1.57(H) in. (181 x 55 x 40mm)
Weight	4.06 oz. (115g) without battery
Current Consumption	<20mADC
Power Source	9V battery (included)

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## MAINTENANCE TIPS

The battery charge icon at the upper right of the display shows two bars  when the voltage of the installed battery is between 7.25 and 9V. When the charge drops to between 6.3 and 7.25V, the icon will show only one bar on the right, like this: .

When the battery charge drops below 6.3V: 1) the last bar of the icon will begin flashing, 2) the beeper will sound repeatedly, and 3) the unit will automatically power itself off in 15 seconds.

It is now time to replace the battery by following the Setup Instructions on p. 7.

When the tips of the meter's factory-installed 5mm test pins show signs of wear, replace them with a pair of 10mm or 15mm pins included in the case.

Remove the battery when storing the meter for an extended period of time.

Do not drop or disassemble the meter or immerse it in water.

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## WARRANTY INFORMATION

General Tools & Instruments' (General's) MMH800 4-in-1 Pin/Pad RH Moisture Meter is warranted to the original purchaser to be free from defects in material and workmanship for a period of one year. Subject to certain restrictions, General will repair or replace this instrument if, after examination, the company determines it to be defective in material or workmanship

This warranty does not apply to damages that General determines to be from an attempted repair by non-authorized personnel or misuse, alterations, normal wear and tear, or accidental damage. The defective unit must be returned to General Tools & Instruments or to a General-authorized service center, freight prepaid and insured.

Acceptance of the exclusive repair and replacement remedies described herein is a condition of the contract for purchase of this product. In no event shall General be liable for any incidental, special, consequential or punitive damages, or for any cost, attorneys' fees, expenses, or losses alleged to be a consequence of any damage due to failure of, or defect in any product including, but not limited to, any claims for loss of profits.

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## 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  
80 White Street  
New York, NY 10013  
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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## Specialty Tools & Instruments

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MMH800 User's Manual

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