

MD918 Intelligent Inductive Moisture Meter

I. Introduction

You are welcome to use our product. Before using it, read the description carefully. It will tell you how to operate it correctly and inspect it in a simple way so that the durability of the instrument can be brought into play.

This is a precision instrument adopting HF electromagnetic waves to measure the moisture content ratio without damaging the object under test. It can be set depending on tree types to raise its measurement accuracy.

II. Performance characteristics

- * Measurement through HF electromagnetic sensing
- * 10 different timber density at option
- * Automatic temperature compensation
- * Setting of upper limit of moisture content ratio, prompting of overrunning
- * Ultra-large LCD ensuring clear readings
- * Automatic prompting of low voltage

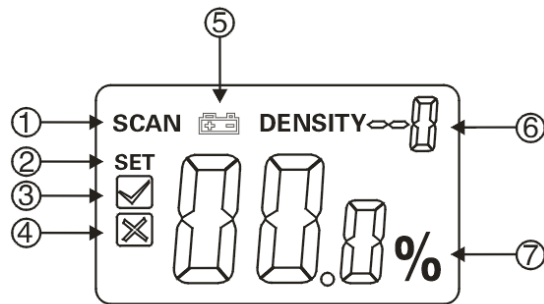
III. Technical specifications

Range of measurement:	4~80%
Max. error:	$\pm(1\%Rh+0.5)$
Resolution:	0.5%
Environment:	temperature: $-10^{\circ}C \sim 60^{\circ}C$ Humidity: 0~70%Rh
Power supply:	3×1.5V AAA battery
Weight:	95 g (not including battery)
Size:	132×67×26mm

IV. Indication

1. Measurement indication (Figure 1)

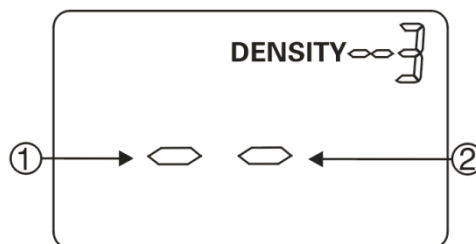
- ① Measurement prompt
- ② Upper limit setting prompt
- ③ Not exceeding set upper limit
- ④ Exceeding set upper limit
- ⑤ Low voltage prompt
- ⑥ Selection of timber density grade
- ⑦ Reading



(Figure 1)

2. Calibration indication (Figure 2)

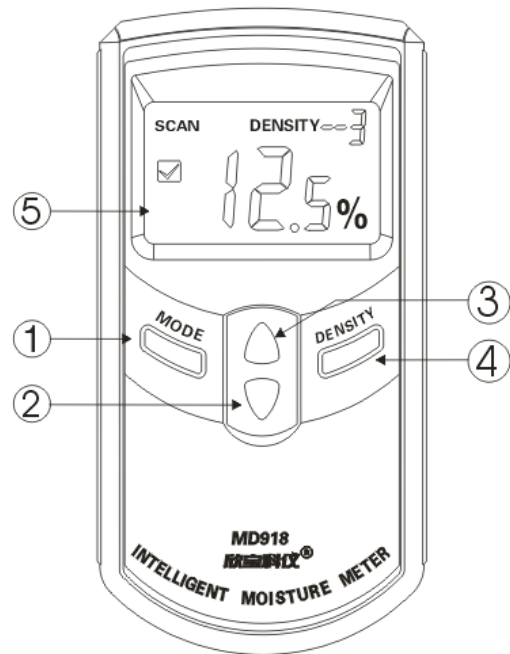
- ① Zero calibration prompt
- ② Temperature calibration prompt



(Figure 2)

V. Panel description

- ① Key for switching-on/off and setting upper limit
- ② Key for setting upper limit reading
- ③ Key for setting upper limit changeover
- ④ Key for adjustment of timber density grades
- ⑤ LCD



VI. Operational description

1. Switching on/off

Keep Mode key pressed for 2 seconds, the meter will be switched on to enter its measurement status and the screen will display "Scan". Upon completion of measurement, the meter will be switched off after Mode key is kept pressed for 2 seconds.

2. Setting of upper limit of moisture content

Touch Mode key after the meter is switched on, and the meter will enter the mode for setting upper limit of moisture content. The screen will display "Set", and a digit will blink at the display position.

Press " " key to adjust the blinking figure or press " " key to adjust the position of the blinking figure. Touch Mode key for confirmation to retreat from the set status and "Set" will disappear on the screen and Scan will be displayed to enter the measurement status. During measurement, on the left side of the display screen will appear prompt " " meaning not exceeding upper limit or " " meaning exceeding upper limit. If no upper limit has been set before measurement, neither " " nor " " will appear during measurement.

3. Selection of timber density grades

After the meter is switched on, press Density key to select 0~9 according to the table of timber absolute dry density.

4. Calibration status

With the meter switched off, take off the battery, keep pressed Mode key while installing the battery and then release Mode key. The meter will automatically enter its calibration status. While holding the two

sides of the meter in the air, press " " key to calibrate zero point. When the first " " blinks, zero point calibration is completed. Press " " key for temperature calibration. When the second " " blinks, temperature calibration is completed. After calibration, keep Mode key pressed to switch off the meter. When the meter is switched on again, it will enter its measurement status.

5. Measurement

After the meter is switched on, keep its bottom in complete contact with the object under test (Keep a flat side of a small object in complete contact with the sensor at the meter bottom), and the display screen will show Scan. Select a proper grade according to the absolute dry density of the timber under measurement (grade 3 is the default). The figure displayed at this time is the moisture content ratio of the measured timber. If the upper limit has to be set, refer to VI. 2 setting upper limit of moisture content. 6. If the measured timber is not included in the table of timber absolute dry density, you may make the measurement by yourself using the following method:

Weight unit: gram

Volume unit: cubic cm


$$\text{Density} = \frac{100 \times \text{weight/volume}}{100 + \text{timber moisture content}}$$

Example:

If the timber is 100cm x 12cm x 2.5cm, then its volume is 3000 cubic cm. The measured weight of the timber is 1510g, its moisture content ratio is 12% (acquired in the baking method), and then the timber absolute dry density is:

$$\text{Density} = (100 \times 1510 / 3000) / (100 + 12) = 0.45$$

VII. Battery change

1. When the battery voltage is too low, the display screen will show “”, meaning that it is necessary to replace the battery. If it is not replaced in time, the measurement accuracy will be affected.
2. Open the battery door and take off the battery.
3. Install the battery correctly according to the marks on the battery compartment.
4. If the meter is not to be used for a long time, take off the battery to prevent liquid leakage and damage to the meter.

VIII. Points for attention

1. This meter has a temperature compensation function. Before using it, keep it at the same temperature as the object to be tested for at least 5 minutes.
2. Keep the meter away from water or any corrosive liquid to avoid damage.
3. Keep the meter away from any electrified object to avoid damage.
4. This meter will be influenced by the electric field. Do not make measurements in the vicinity of any electric wire whenever possible.

IX. Answers to technical questions

1. How many methods are there for measurement of moisture content rate?

They are drying method, electrometric method, dry distillation method, titration method and moisture method. Drying method and electrometric method are normally used in the production test. In the drying method, the moisture content ration is obtained by measuring the difference of moisture content of timber specimen before and after drying (absolute dry). Having a high accuracy and being time-consuming and tedious, it is usually used in laboratories. In the electrometric method, the moisture content ratio is measured according to some electrical properties of timber. It is quick and convenient, having an accuracy below that of the drying method, but it can meet the production and technological requirements, and is thus applicable to manufacturing of timber and bamboo products on a large scale.

2. What is the difference between inductive type and probe type moisture meters?

The electrometric method is mainly divided into DC resistance type (probe type) and AC dielectric type (inductive type). In the probe type, a probe is inserted into the inner layer of the timber to measure the resistance between the two electrodes within the measurement range of 2~70%. among the influential factors are: tree type, texture direction, temperature and insertion depth. Normally, the displayed figure is smaller in the horizontal direction than in the texture direction, latter being taken as the basis in most cases. The density of the tree type does not influence moisture content to a great extent. For instance, Chinese fir (a softwood) and oak (a hardwood) differ greatly with respect to density, but equilibrium moisture contents are about the same. Inductive type meter is the AC dielectric type meter. Such meters adopt tabular electrodes or punch electrodes. During measurement, the polar plate clings to the timber surface. Such meters allow quick and each operation, but their measurement accuracy is not as good as that of probe type.

3. Why do the measurement results of moisture meters differ from different manufactures and of different types?

Different tree types, different temperatures and timber from different regions influence electric parameters to a great extent, and most of the miniature meters can not offer corrections on tree type and humidity. Instead, they can only be based on a certain tree type and humidity. Different bases of different meters will certainly lead to difference in measurement results.

4. Does insufficient electric quantity of a battery influence the measurement result?

When the battery voltage is smaller than the rated voltage by 70~80%, a smaller measurement result will be displayed. For example, if the measured result is 14% under the rated voltage, then, the reading for the same object might be 11% or less, if the voltage is smaller than the rated voltage by 70%. When the low voltage symbol appears, it indicates insufficient electric quantity. Although the meter can work, the displayed reading is not accurate any longer, and replacement is necessary to guarantee the accuracy of the measurement.

Appendix:

Note: Select grade "0" for densities below 0.35.

Table of timber absolute dry density

Timber	Density	Grade	Timber	Density	Grade
Douglas fir /Pseudotsuga	0.45	2	Quercus	0.78	6
Pine/fir	0.45	2	White pine/sugar pine	0.35	1
Cedar	0.5	2	Poplar	0.45	2
Alder	0.47	2	Radiation wood	0.37	1
Aspen	0.42	2	Spruce	0.43	2
Manchurian ash/ Chinese ash	0.60	3	Shadlock	0.60	3
Linden	0.37	1	Black walnut	0.60	3
Birch	0.57	3	Manchurian walnut	0.47	2
Cherry tree	0.50	2	Beech	0.65	4
Cottonwood	0.40	1	Ormosia henryi	0.82	7
Cypress	0.40	1	Chicken wing wood	0.80	6
Elm	0.58	3	Rubber tree	0.65	4
Redwood	0.35	1	Olive tree	0.75	6
Hemlock	0.45	2	Hard firmiana	0.35	1
Kickory	0.75	6	Ipe	1.00	9
Larch	0.58	3	Iroko	0.60	3
Philippine mahogany	0.50	2	Jatoba	0.80	6
African mahogany	0.50	2	Keruing	0.60	3
Khaya	0.50	2	Keruing	0.65	6
Australian mahogany	0.85	6	Merbau	0.72	5
Maple/color wood	0.55	3	Okoume	0.40	1
Eucalyptus saligna	0.55	3	Ramin	0.55	3
Scarlet eucalyptus saligna	0.75	6	Cumaru	0.90	8
Red oak	0.65	4	Faber oak	0.70	5