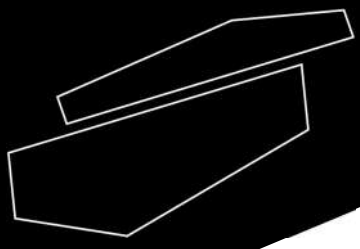
METRIA

MS Series moisture analyzer

Please read the User Manual carefully before use and follow all operating and safety instructions!



user manual

english

Preface

Users should read this Manual carefully, follow the instructions and procedures, and beware of all the cautions when using this instrument.

Service

In order to guarantee this equipment works safely and efficiently, it must receive regular maintenance. In case of any faults, do not try to repair it yourself. If help is needed, you can always contact your supplier or Labbox via **www.labbox.com.**

Please provide the customer care representative with the following information:

- Serial number
- Description of problem
- Your contact information

Warranty

This instrument is guaranteed to be free from defects in materials and workmanship under normal use and service, for a period of 12 months from the date of invoice. The warranty is extended only to the original purchaser. It shall not apply to any product or parts which have been damaged on account of improper installation, improper connections, misuse, accident, or abnormal conditions of operation.

For claim under the warranty please contact your supplier.

1. OVERVIEW

1.1 Safety precautions

To ensure the safe and reliable use of the moisture analyzer, please observe the following precautions:

- This instrument is suitable for the determination of the moisture content of the sample. When using a moisture analyzer, any improper operation can result in personal injury and damage to the instrument.
- Please confirm that the input voltage and plug type indicated on the label match the AC power used in your area.
- The power plug of this instrument is equipped with a grounding terminal. It is forbidden to disconnect the grounding plug of the instrument.
- Do not operate the moisture analyzer in a dangerous, humid or unstable environment.
- Unplug the power supply when cleaning the moisture analyzer.
- Do not switch the size and frequency of the input supply voltage during the test.
- Make sure there is enough space around the moisture analyzer and at least 1 meter above it.
- The moisture analyzer must be operated only by trained personnel who are familiar with the performance of the tested sample and the operation of the equipment.
- Please use the relevant safety equipment to operate the moisture analyzer, such as safety glasses, gloves, protective clothing and protective masks.
- After-sales service should only be provided by authorized personnel from the factory.

NOTE: The moisture analyzer works in a heated manner!

Do not place any flammable materials above, below or next to the moisture analyzer. Moisture Analyzers should be cautious when moving test samples during application. Samples, heating elements and surroundings may be very hot and prone to burns.

⚠CAUTION: Some samples require special care!

⚠ Carefully analyze the possible dangerous consequences for any sample material with safety hazards.
⚠ Fire/Explosion: Contains solvents, flammable or explosive samples that produce flammable or explosive gases or vapors when heated. When using such samples, work in an environment that is dry and low enough to avoid fire or explosion.
⚠ Toxic/combustible: Substances containing toxic or corrosive ingredients can only be dried in a fume hood.
⚠ Corrosion: Samples containing corrosive solvents will evaporate upon heating and release corrosive gases. Therefore, it is recommended to take a small amount of material for testing.

NOTE: The user is solely responsible for any damage caused by testing the above types of samples.

1.2 Use disclaimer

The settings of the MMB series moisture meter must be carefully selected according to the user's needs and the characteristics of the sample to be analyzed. This device operates at high temperatures and, in some cases, with samples that may be hazardous, so its use requires adequate knowledge of the technique and its associated risks.

The data provided in this manual is for reference only and does not replace proper training or expert evaluation for each specific application. The company assumes no responsibility for the misuse of this information or for any consequences resulting from its application.

2. INSTALLATION

2.1 List packaging

Standard configuration	Quantity	Remarks
Moisture analyzer	1	
Windshield	1	
Sample tray holder	1	
Powe cable	1	
Sample tray	1 box	10 aluminum pans per box
100 g weight	1	F2 type
Product operation manual	1	

2.2 **Placement selection**

- The moisture analyzer should be placed on a stable, level surface console.
- Choose a safe and well-ventilated location. Samples with corrosive or toxic fumes and other hazardous materials need to be specially prepared for placement.
- Avoid placing the moisture analyzer in areas with extreme temperature fluctuations, excessive humidity, airflow, vibration, electromagnetic fields, heat sources, or direct sunlight.

2.3 Component installation

		
（1） Place the windshield.	（2） Place the sample tray holder.	（3）Place the sample tray flat on the sample tray holder.

2.4 Connect the power supply

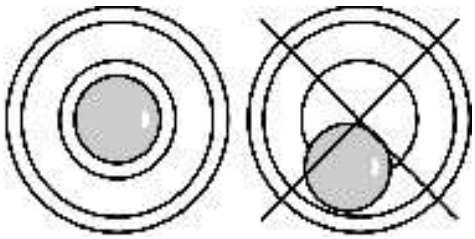
Plug the correct end of the supplied power cord into the power input slot on the back of the moisture analyzer and connect the other end to the power outlet.

NOTE: For best results, use or calibrate after at least 30 minutes of power up.

3. OPERATING

3.1 Adjustment level

The moisture analyzer has a horizontal bubble and two horizontal adjustment feet. To compensate for the effect of the tilting symmetry of the placement position during the weighing process, the horizontal foot can be adjusted until the horizontal bubble is at the center position.



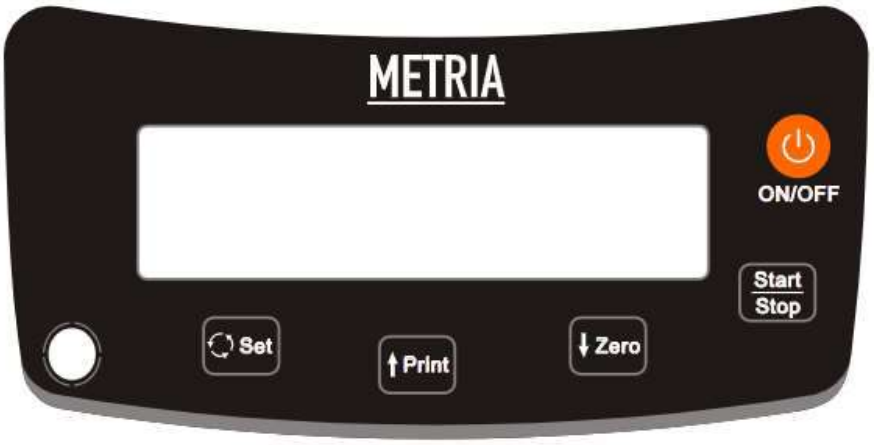
NOTE: The level must be re-adjusted each time the position changes.

3.2 Display

Logos descriptions:

g	Weight(grams)	Automatic mode test accuracy	Hi	High precision
%	Moisture content %		M	Medium precision
• g	weightlessness		Lo	Low accuracy
100 °C	Temperature (in Celsius)		Hand	Manual customization
10:00	Time setting: minutes and seconds	Heating method		fast
Operation mode	Auto			standard
	Time			slow

3.3 Control panel



Button	Function key	Operating	Features
Set	Setting	Hold	Set heating parameters
		Press	End of test: switch water content, solid content and other parameters
Print	Print	Hold	Date time setting
		Press	Print function key after the test is completed; parameter indicator icon change or numeric increase button
Zero	Tare	Hold	Tare function key in weighing state ; Parameter indicator icon change or number Reduction button
		Press	Enter calibration function

	Start/stop	Press	Return function after testing Test start/stop
	On/Off	Press	On/off

4. Parameter settings

Standby mode: When the moisture analyzer is connected to the AC power supply, it is in the standby state.

4.1 Moisture meter use

- Select the appropriate working mode test (set or select according to 4.2)
- Make sure to display the zero value before each test.
- The sample to be tested is evenly distributed on the surface of the sample tray, and the upper cover of the heating unit is placed down to check whether the sample weight is stable. After the indication is stable, press the "Start/Stop" button to test.
- When the time is not used or the humidity is large, the relative deviation of the test is large, and the heat engine can be properly used, and the data is not used as a reference. When the substance having a low moisture content is repeatedly tested, it is preferred that the temperature is lowered to normal temperature or 40 degrees or less.

4.2 Operation settings

The instrument stores 10 sets of commonly used parameters, each of which can be individually matched to test the moisture of a certain substance. Before the test, select different parameter groups according to different tested substances. Each set of parameters contains the following information：

- Test temperature: 45-160℃
- Control mode: automatic, timed, manual Temperature control speed: fast, standard, slow
- Test accuracy: high, medium, low, custom adjustment
- The user sets the parameters according to the characteristics of the substance they are testing and saves them in groups.

Parameter setting example:

Storage group: Group 8; test temperature: 120 ° C; control mode: Automatic; Automatic mode accuracy: high precision; temperature control speed: standard

Button (command)	Step description	Display
Long press [Set]	Enter parameter setting item	
	Weighing area, showing the number and parameters of the currently used group	
	Parameter group number, blinking	〖1 〗
Short press [Print] / [Zero]	Adjust parameter group number	〖8 〗
Short press [Set]	Save the current settings and go to the next parameter selection	
	If you do not change the data of other parameter items, long press [Settings] to save the data and return to the test state	
	Control temperature adjustment	〖105°C〗
Short press [Print]/[Zero]	Adjust the control temperature value, the temperature step value is 5 ºC	
Short press [Set]	Save the current settings and go to the next parameter selection	

Button (command)	Step description	Display
If you do not change the data of other parameter items, long press [Settings] to save the data and return to the test state		
	Working mode selection	〖Auto Hi〗
Short press [Print] / [Zero]		
	Auto Mode: Hi, M, Lo Precision ; Time ; Hand	
Short press [Set]	Save the current settings and go to the next parameter selection	
If you do not change the data of other parameter items, long press [Settings] to save the data and return to the test state		

Time and manual settings:

Short press [Set]	Time Mode, Set the desired time after selection Second zone flashing	〖05:00〗
Short press [Print] / [Zero]	Set the number of seconds, step value 5 second	〖05:35〗
Short press [Set]	Save and enter the sub-settings, the partition flashes	
Short press [Print] / [Zero]	Set the number of seconds, step value 1 minute	〖12:35〗

Manual setting: weighing change adjustment within standard time (Generally not used)
Short press [Set] Save the current settings and go to the next parameter selection
If you do not change the data of other parameter items, long press [Settings] to save the data and return to the test state.

Short press [Print] / [Tare] Select heating method Heating method selection: standard, fast, slow
If you do not change the data of other parameter items, long press [Settings] to save the data and return to the test state.

4.4 Time Setting

Button (command)	Step description
Long press [Zero]	Year, month, day, hour, minute YY MM DD HH mm
Short press [Set]	Year, month, day, hour, minute, Flashing in sequence
Short press [Print] / [Zero]	Change the blink value in turn long press [Set]
Long press [Set]	T End Save your calendar information.

4.5 Moisture meter calibration

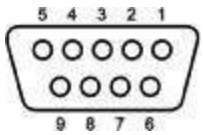
The moisture analyzer uses the relative weight to measure the result, so a small deviation from the absolute weight has less influence on the accuracy of the measurement. The moisture analyzer is stable in weighing performance and has a small temperature influence, which can maintain the calibration result for a long time, so weight calibration is not necessary. Before calibration, confirm that the moisture meter is empty in the weighing mode, and there is no foreign matter in the weighing pan.

Button (command)	Step description	Display
Long press [Zero]	Display ------" , Release button	〖100.000g〗
Place a 100g standard weight on the measurement sample tray		
Short press [Zero]	Display 100.000" flicker	
	Then shows	〖100.000g〗
	Remove the weight and the calibration is over.	

5. Data communication

5.1 RS232 pin connection

Port DB9 Connector



Pin 2 : TxD, send
Pin 3 : RxD, receive
Pin 5 : GND, ground

RS232 Data communication settings (factory default settings)

- Baud rate : 9600
- Data bit : 8
- Parity : N
- Stop bit : 1

5.2 Data Communication:

After the test completes a set of moisture values, the moisture value remains until the [Start/Stop] key is pressed. During this period, you can press the [Print] key to output the test value, dry weight of the material, print time, etc. To an external device.

RS232 Output format :

- INITIAL WEIGHT:7.909g
- FINAL WEIGHT:7.821g
- MOISTURE CONTENT:1.11%
- DATE TIME:

2015/12/20 11 : 03 : 30

- REMARKS:
  Test successfully printed end

Hint: Test results may vary slightly depending on the weight of the sample or the error in weighing. See Section 6 for optimization of the test.

6. Test optimization

During the heat drying process, the moisture is determined by the weight loss of the sample.
The speed and quality during the measurement can be referred to the following parameters. The following parameters can also be determined by several trial experiments to determine the best settings. The best test results depend on the following settings:

- Heating temperature
- Heating time
- Sample weight
- Sample preparation
- Sample type

6.1 Heating temperature

The heating temperature controls the test time. (For example, if the temperature is too low, the drying time will be extended)
Choose a suitable heating temperature that requires neither decomposition nor change of the chemical structure of the sample, typically set at 105 ° C, unless otherwise required by the sample and industry.
Some samples have different moisture contents measured at different heating temperatures. In this case, try to adjust the heating temperature to compensate for the measurement deviation.

6.2 Heating time

The moisture meter offers three simple ways:
Auto Mode (Recommended) - When the Moisture Analyzer detects a change in the weighing result, it automatically stops when the sample weight loss is less than the specified or set fixed value within a specified time (generally one minute).
Manual mode - The user stops the ongoing test by pressing the button. If the test is stopped with less than 30 seconds, the test is invalid.
Timing mode - Manually set the heating time, that is, automatically stop heating after heating to the set time, and end the test.
Setting range: (0 to 99 minutes)

6.3 Sample weight

The weight of the sample affected the measurement time and the repeatability of the results, with a maximum sample weight of 50 g.
The greater the number of samples, the more water is evaporated, and the testing process is extended.
The recommended sample weight is around 5-10g. A 2 g sample can give a faster result, but it lacks measurement accuracy. A 20 g sample usually yields consistent results but takes longer to test.

Another way to determine the weight of a sample is to take advantage of the relationship between sample weight and repeatability result should be ±0.3%, and the table indicates that the sample weight should be at least 2 g. (The following test data is for reference only).

6.4 Sample preparation

Samples need to be representative of the test to obtain accurate and reproducible measurements. When preparing the sample, make sure that the sample is placed evenly on the sample tray to avoid accumulation and excessive quantities.

6.5 Sample type

- Pasty, fat-soluble substance

A glass fiber filter is used to increase the surface area of the sample, for example, butter. The moisture in these substances is more evenly distributed through the suction cup. Increasing the surface area of the sample causes the water to evaporate more quickly and completely.

- Liquid substance

Sample weight	Repeatability	Sample weight	Repeatability
0.5 g	±1.0%	5 g	±0.12%
1 g	±0.6%	10 g	±0.06%
2 g	±0.3%	20 g	±0.03%

The liquid will form water droplets on the sample tray, which will prevent rapid drying. In this case, the glass fiber filter can be used to evenly distribute the liquid sample over a large surface area, which can shorten the drying time.

- Easy to crust, temperature sensitive substance

Samples that form a shell on the surface completely obstruct the measurement of moisture. At this time, the sample is covered with a glass fiber filter, and the mildness and the appropriate heat are used to improve the repeatability of the sample.

- Sugary substance

Samples containing large amounts of sugar are easily coke. Make sure the sample is evenly distributed into a thin layer and choose a moderate temperature. It is also possible to cover the sample with a glass fiber suction cup to improve its repeatability.

7. Maintain

7.1 Sample risk

The following substances may present a risk of fire, explosion, damage or injury.
For any sample material that has a safety hazard, carefully analyze the possible dangerous consequences. In this case, the instrument should be guarded by someone.

⚠ Volatile matter

For volatile materials, it is recommended to heat the sample quickly so that it can limit moisture loss before the sample evaporates. Test work should be carried out in an air-dried, low-temperature environment to prevent fire or explosion. Use a small sample of 1g when doing the test.

⚠ Toxic Chemicals

Substances containing toxic or corrosive ingredients can only be dried in a fume hood.

⚠ Corrosive substance

Substances that generate corrosive gases (such as acidic substances) should be tested with a small amount of material because the vapor they generate can condense on the moisture analyzer components and cause corrosion.

7.2 Clean

- Disconnect the power before cleaning the moisture analyzer.
- Make sure that the inside of the moisture analyzer does not enter the solution.
- Make sure to cool the moisture analyzer before cleaning.
- Regularly clean the water analyzer.
- The surface of the cover and the temperature sensor can be slightly rubbed with a lint-free cloth or neutrally cleaned.
- Do not use solvents, irritating chemicals, ammonia or abrasive solvents.

7.3 Repair service information

Common fault information and solutions:

Fault phenomenon	Cause of issue	Solution
Can not boot	The moisture analyzer is not connected to the power supply	Check power connections, fuses, voltage
Err tt	Sample weighing value is too low	Increase sample size
OL	Light, not weighing	Place the sample tray holder and sample tray
OH	Overweight	Remove foreign matter from the sample tray
Low accuracy	Incorrect calibration Unstable working environment	Proper calibration Move the moisture analyzer to a stable position
Cannot calibration	Incorrect calibration	Use the correct calibration weight

If the fault message cannot be resolved or does not describe the problem with your moisture analyzer, please call our customer service department.

7.4 Technical data

	MMB
	BMAM-120-001
Max weighing	100g
Display division	0.001g
Readability (sample >10g)	0.01%
Heating source	Halogen lamp
Temperature setting	45°C - 160°C
Weight calibration	100g
Pan Size	ϕ110 (mm)
Dimensions	（D*W*H） 330*205*165(mm)
Package	（D*W*H） 410*315*335 (mm)
Net weight	3.2kg
Gross weight	4.6kg

8. Use environmental technical parameters

Ambient conditions

Technical parameters are valid in the following environments:

- **Ambient temperature:** 10°C - 30°C; operation is guaranteed in the environment of 5°C to 40°C, and the measurement accuracy of the moisture analyzer is not guaranteed under extreme temperature.
- **Relative humidity**: 15% - 80%, no condensation at 30°C.
- **Warm-up time**: At least 30 minutes after the moisture analyzer is connected to the power supply. When the end of standby, the moisture analyzer can be used immediately.
- **Altitude**: up to 2000 meters.
- **Power**: Input AC voltage:200VAC - 240VAC, 3A, 50Hz.
- **Voltage fluctuations**:220±10%
- **Power load**: The maximum power of this series of moisture meter is 400W during heating.
- **Protection**: Protection against dust and moisture, pollution level: Level 2, installation category: Level II.

Nota importante para los aparatos electrónicos vendidos en España

Instrucciones sobre la protección del medio ambiente y la eliminación de aparatos electrónicos:

Los aparatos eléctricos y electrónicos marcados con este símbolo no pueden ser eliminados en forma de residuos urbanos.

De conformidad con la Directiva 2012/19/UE, los usuarios de la Unión Europea de aparatos eléctricos y electrónicos, tienen la posibilidad de devolver sus RAEE para su eliminación al distribuidor o fabricante del equipo después de la compra de uno nuevo. La eliminación ilegal de aparatos eléctricos y electrónicos es castigada con multa administrativa.

Remarque importante pour les appareils électroniques vendus en France

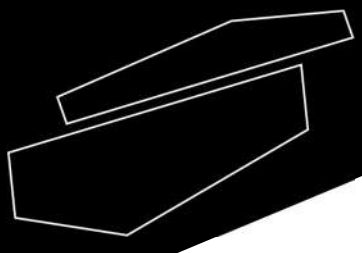
Informations sur la protection du milieu environnemental et élimination des déchets électroniques :

Les appareils électriques et électroniques portant ce symbole ne peuvent pas être jetés dans les décharges.
En réponse à la règlementation, Labbox remplit ses obligations relatives à la fin de vie des équipements électriques de laboratoire qu'il met sur le marché en finançant la filière de recyclage de ecosystem dédiée aux DEEE Pro qui les reprend gratuitement (plus d'informations sur www.ecosystem.eco).
L'élimination illégale d'appareils électriques et électroniques est punie d'amende administrative.

Nota importante per le apparecchiature elettroniche vendute in Italia

Istruzioni sulla protezione ambientale e sullo smaltimento dei dispositivi elettronici:

Le apparecchiature elettriche ed elettroniche contrassegnate con questo simbolo non possono essere smaltite come rifiuti urbani.
In conformità con la Direttiva 2012/19 / UE, gli utenti dell'Unione Europea di apparecchiature elettriche ed elettroniche hanno la possibilità di restituire i propri RAEE per lo smaltimento al distributore o al produttore di apparecchiature dopo averne acquistato uno nuovo. La rimozione illegale di apparecchiature elettriche ed elettroniche è punibile con una sanzione amministrativa.



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