

Moisture Analyzer BM 113

User Manual



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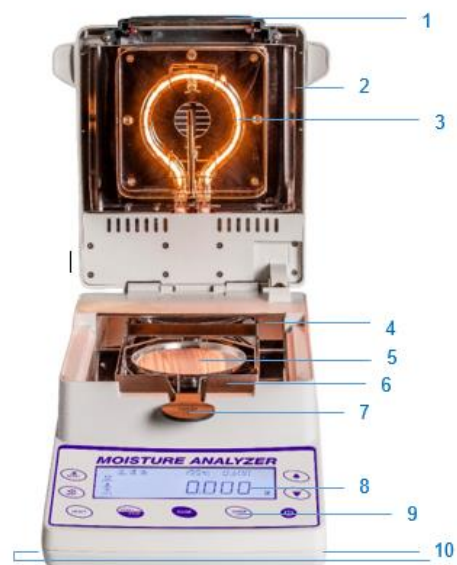
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Technical data sheet

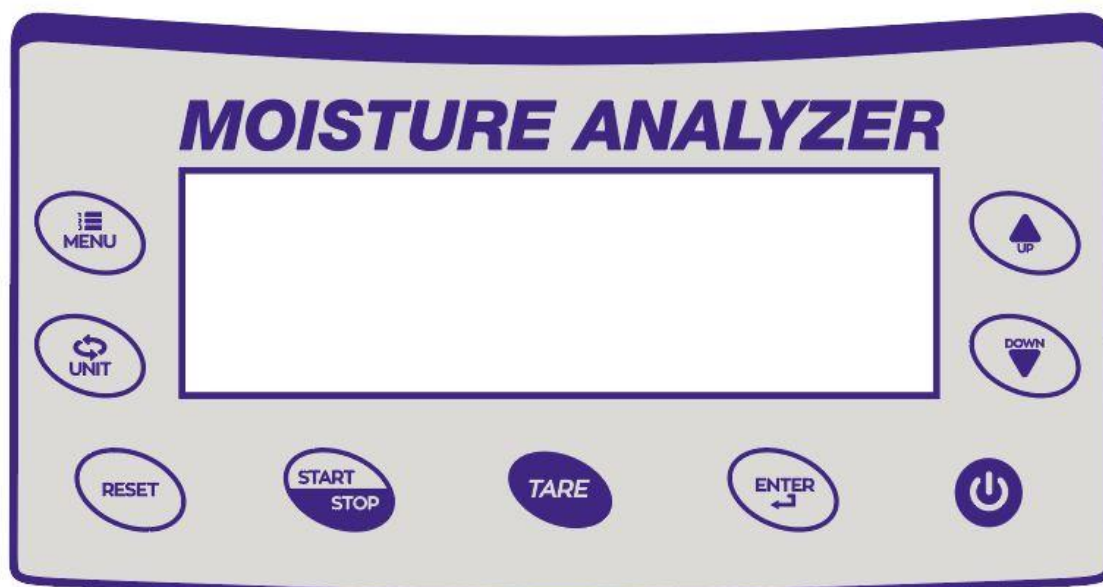
Capacity	110 g
Division	0,001 g
Repeatability	0,15 %
Humidity resolution	0,01 %
Minimum weight	0,008 g
Minimum test weight	1 g
Calibration	External (100g)
Time management	Timing – Automatic – Manual
Heating methods	Standard – Fast – Soft
Time range	1-99 minutes
Temperature range	40 – 199 °C
Plate Dimensions	Ø 90 mm
Lamp	Halogen 400 W
Memory	15 programs
Communication	Serial RS-232
Dimensions	340 * 200 * 180
Net weight	9 Kg
Power supply	220 V – 50Hz

General informations

1	Front panel
2	Heating cup
3	Halogen Lamp
4	Thermal shield
5	Aluminium plate
6	Air flow protection
7	Crankshaft bracket
8	Display
9	Keyboard
10	Adjustable feet
11	RS 232
12	Levelling bubble
13	Fan
14	Power input

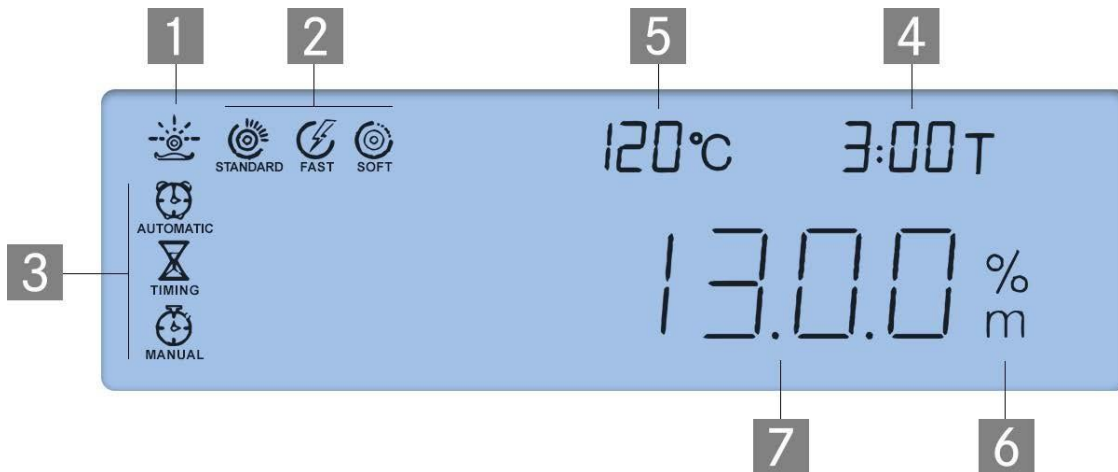









Keyboard



Key	Description
MENU	Program Menu
UNIT	Select the measure unit
RESET	<ul style="list-style-type: none">• Short press: Return to measurement mode / ESC• Long press: Calibration
START/STOP	Start and manual Stop of heating cycle
TARE	Tare
ENTER	Confirm and store settings
ON/OFF	Power On /Off the scale
UP	<ul style="list-style-type: none">• Increase the parameter• Turn on the backlight
DOWN	<ul style="list-style-type: none">• Decrease the parameter• Turn Off the backlight

Display



1			Heating process active
2	Heating methods	 STANDARD	Standard Drying
		 FAST	Fast Drying
		 SOFT	Slow Drying
3	Switch off criteria		Automatic Stop
		 TIMING	Timing Stop
		 MANUAL	Manual Stop
4		-	Time passed
5		-	Actual temperature
6		-	Humidity display in %
7		-	Subtotal

Security Instructions

Please read the following carefully before using the BM 113.

- The instrument can be used to test samples, any improper operation may cause personal injury and equipment damage;
- Connect the balance to the current according to the instructions given;
- Do not use the scale in hazardous, humid or unstable environments;
- Disconnect power supply before cleaning the scale;
- Keep enough space around the instrument and at least 1m from the top of the scale;
- During special tests, wear all necessary protective equipment;
- Do not change instrument components and other aspects.
Maintenance of this equipment must be carried out by authorized professionals from the factory.
- Do not place flammable materials around the moisture balance;
- Do not touch the lamp when it's working;
Pay particular attention to danger samples.
- Flammable and explosive materials: flammable and explosive materials testing will produce flammable gases or vapors, so it is necessary to lower the temperature in a dry environment to prevent the risk of fire or explosion.
- Toxic and corrosive substance: Keep toxic or corrosive samples in a well-ventilated area.
- Pay attention to not put excessive loads.
To prevent damages, there is a mechanical overload security under the plate, that blocks the measuring cell when load is more than 110 gr.



Suggestions

1. Wait at least 30 minutes of warm up before making a calibration;
2. Do not leave the weight used to calibrate on the plate and then close the balance, in this case the halogen lamp would be ruined.

Unpacking and checking

Carefully remove the packaging, the plastic bag that surrounds it and place it in the designated workspace.

Placement Requirements



Stable table – No vibrations



Stable room temperature.

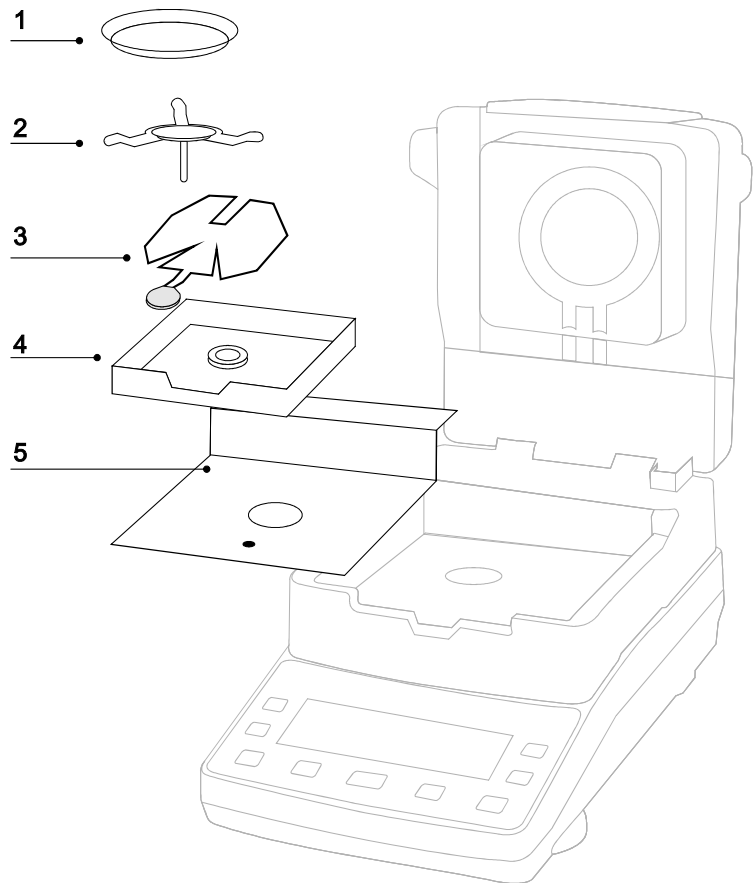


Ventilated environment

Assembly

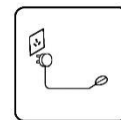
Fit the balance as shown in the figure.
The order is 5-4-3-2-1

1. Aluminium plate
2. Triangular screw
3. Plate bracket
4. Airflow protection
5. Stainless steel plate



Power On/Off

1. Connect the balance to the power supply



2. Press ON/OFF key to switch on the balance.



3. The display will turn on and the balance will auto-test. Wait until you see the basic configuration: 0,000g



4. Wait at least 30 minutes before using the scale.



Calibration

Weighing Adjustment

Balance adjustment is not necessary to determine the correct percentage of moisture present in the sample since it is relative. The instrument calculates the percentage of moisture by making the difference between the mass prior to drying and after.

However, the balance must be adjusted if it is provided by your procedure.

Procedure:

- Keep pressed **RESET key** until the display shows “-cal-”,
- “100.000” blink, so place the certificated sample mass weight on the plate, and the display shows “= = = = =”.
- Leave the weight until “100,000” is shown. Remove the weight, display shows “= = = = =” again, then wait until display shows “ 0.000 ”. Now calibration is complete.

Preparation of the sample

Solid sample



Place the dust or granular samples uniformly on the sample plate.

Crush the rough samples using a mortar or shredder. While grinding the sample, avoid overheating as this may cause moisture loss.

Liquid sample



For liquids, pads or melting samples, it is recommended to use a fiberglass filter. The fiberglass filter has the following advantages:

- Homogeneous distribution through the capillary attraction
- No drop formation
- Rapid evaporation due to a superior and homogeneous surface

Test settings

Setting drying parameters

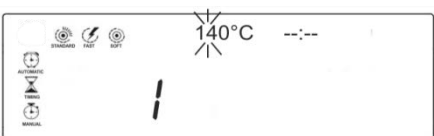
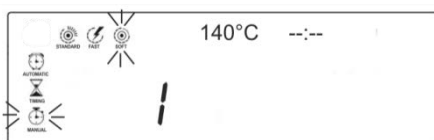
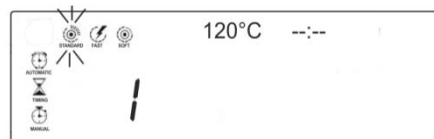
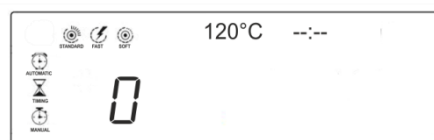
The device offers a wide variety of options that allow you to adapt a sample drying method.

Three heating profiles (standard drying, fast drying, slow drying) and three switch-off criteria (timer, automatic, manual).

Enter the id number for the drying method

There are 15 saved drying methods, which can be simply recalled and started according to the identified number (0-F) saved. To start the test it is always necessary to press the **START** key.

1. Press **MENU**, display shows "0 * "
2. Using arrows keys ▲▼ select a program
3. Press **ENTER** to confirm
4. Heating methods start blinking
5. Using arrows keys ▲▼ select desired method
6. Press **ENTER** to confirm
7. Shutdown criteria starts blinking
8. Using arrows keys ▲▼ select desired shutdown criteria
9. Press **ENTER** to confirm
10. Temperature value blink
11. Set the desired temperature value, using arrows ▲▼
12. Press **ENTER** to confirm
13. **Close the lid.**
If it is not well closed, the test does not start.
14. Press **START/STOP** key to start the test.



*

Note: Program 0 is the one set by default, and contains following settings:

- 120 ° C drying
- Standard heating profile;
- Automatic shut-off

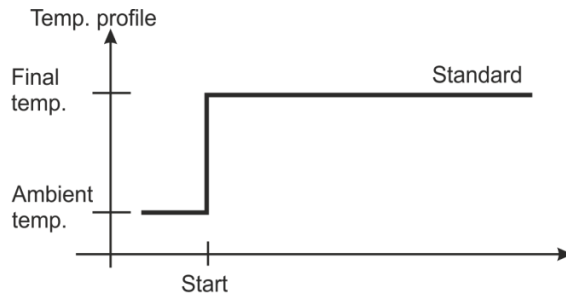
These settings can't be changed.

Heating methods

STANDARD drying



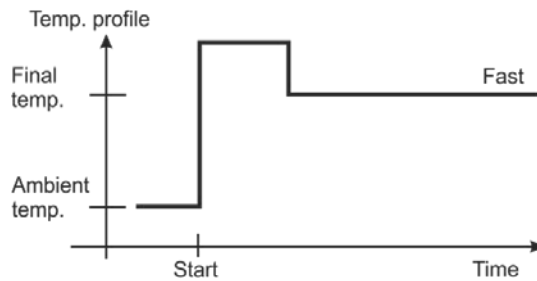
This drying mode is the factory setting, suitable for most samples. The sample is tested at a set temperature and maintained automatically throughout the test.



FAST drying



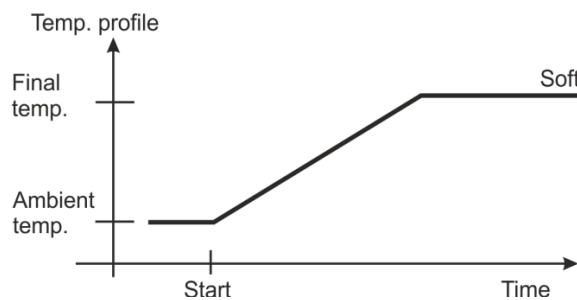
This mode is suitable for samples with a higher humidity content. The heating element will bring the chamber to a 30% higher than the set temperature, which will then be reduced to the set temperature. It will be maintained until the test ends automatically.



SOFT drying






This mode is suitable for samples with low humidity content when it is easy to burn the sample. The temperature will begin to rise gently, until stabilized.



Shutdown criteria

The shutdown criterion defines under which conditions the device must stop the drying process. The shutdown criteria allow you to save continuous checks and manually stop the drying processes. In addition, they ensure that measurements always end at the same conditions, providing repeatable measurements.

- AUTO**  The test stops automatically when it records a weight loss of less than 2 mg in 45 seconds.
The first 15 seconds from start up are not counted.
- TIMING**  The drying process continues until the counter reaches the time set.
- MANUAL**  The drying process ends when user press manually **STOP** key.

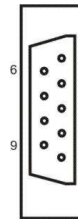
Troubleshooting

N.	Error	Causes and Solutions
1	ERR----1	Sample weight is less than 1g, please place more than 1g of sample, then repeat the test.
2	ERR----2	The set temperature is less than 40 ° C, set a higher temperature.
3	ERR----3	The test time is less than 30 seconds.
4	ERR----4	Halogen Lamp faulty.
5	ERR----5	The time setting for slow drying mode is less than 3 minutes.
6	ERR----6	Temperature sensor faulty.
7	---	Pressing start lamp does not heat: Close the lid.

RS-232 Communication

Technical data

Connection: 9 pin
Baud-rate: 1200 / 2400 / 4800 / 9600 selectable
Parity: 7 bit / 2 stop bit

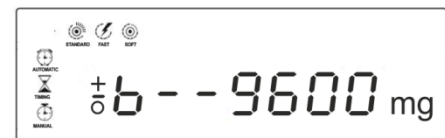
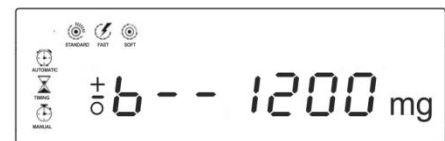


Pin 3 – TxD

Pin 5 - GND

Baud Rate settings

1. Press the **ON/OFF** button, then press the **TARE** key immediately.
The currently displayed Baud Rate is displayed on the display
2. Select the Baud rate using arrows ▲▼
3. Press **ENTER** to confirm



Printing

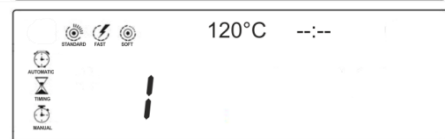
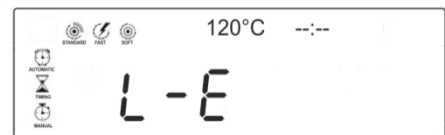
BM113 store automatically last 5 cycle results with details (1=last one....5=oldest one)

To print results, when the cycle is ended, press **MENU** and keep pressed until display shows "PRINT."

Display shows "L-E".

Press ENTER to confirm.

Using arrows ▲▼ Select which cycle to print (1....5) and confirm with **ENTER** key.



Samples

Sample	Mass of the sample (g)	Drying temperature (°C)	Drying time approx (min)	Humidity % about	Solid mass% about
Sliced pineapple	5	110	14.4	6.71	-
Milk	3	80	27.4	83.87	-
Blue-veined cheese	2	160	13.3	-	53.06
Beans	4.5	150	9.7	11.85	-
Butter	1.7	140	4.3	-	84.95
Corn flakes	2-4	120	5-7	9.7	-
River water	5	130	20	8	-
Sugar	2	155	7.6	34.07	-
Milk flakes	3-4	150	5.7	6.35	-
Dried beans	5-7	110	9.6	5.89	-
Dried peas	5.5-6	120	3	4.92	-
Dry carrots	5-7	110	10	6.21	-
Dry grain	8-10	160	5	0.26	-
Oat flakes	2.2	100	3.8	4	-
Hazelnuts	2.6	100	4.5	3.74	-
Hazelnuts (peeled)	1	160	5.5	6.45	-
Food for dogs	5	160	15	15.80	-
Yogurt	1	120	10	70.43	-
Coffee, in a cup	5	140	17.3	9.32	-
Coffee beans, raw	3	140	7	2.68	-
Coffee beans, roasted	2-3	130	6-8	78.5	-
Coffee cream	3.5-4	120	8	8.53	-
Coffee seeds	2.5	105	4	3.45	-
Cocoa	4-5	130	7.8	6.23	-
Cocoa seed	12-14	160	5	0.05	-
Limestone	2.5-3.0	130	5.8	12.46	-
Potato powder	3-4	106	7.5	6.9	-
Ketchup	2	120	18	74.44	-
Garlic powder	2	100	7.3	5.36	-
Lentils	4	135	5.4	12.49	-
Skimmed milk powder	4	90	5.5	3.67	-
Low-fat cheese	1.2	130	8	-	18.5
Cornstarch	5	200	7.5	12.94	-
Almonds (natural)	2.5	100	5.3	4.19	-
Margarine	2.2	160	4	19.15	-
Mayonnaise	1	160	10	20.6	-
Flour	8-10	130	4.5	12.5	-
Milk	1	140	7.3	88	-
Mozzarella cheese	1.5	160	11.1	-	45.78
Noodle mass	2.5	103	10	0.6	-
Noodle paste	0.55	160	5	12	-
Orange juice	1	140	10	88.89	-
Pepper, black, powder	2	85	8.8	7.97	-
Curd	1	140	7	-	18
Curd cheese	1.2	130	8	-	23
White rice	5	200	12.3	15.12	-
Red wine	3-5	100	15-20	97.4	-
Salt	5	200	10	0.08	-
Melted cheese	1.5	70	15	35.65	-
Chocolate	3	140	6	2.4	-
Chocolate powder	2-4	100	4	1.9	-
Lard	0.70	160	3.5	1.2	-
Mustard	2.5-3	80	19	-	34.69
Soy flour	4.6	95	4.9	4.8	-
Soy beans, granulated	5	110	22.6	12.16	-
Sunflower seeds burned	3-3.5	100	4	5.92	-
Sunflower oil	10-14	138	2	0.1	-
Spaghetti	3	105	15.1	10.63	-
Tea, black	2	105	4	7.67	-
Green tea	5	120	9	3.76	-
Pasta	1.5	120	8	10.64	-
Wot	2.8	100	5.6	3.5	-
Sugar	4-5	138	10	11.9	-
Sugar beets	2	130	13.4	-	30.94