

User Manual

Thermo scale

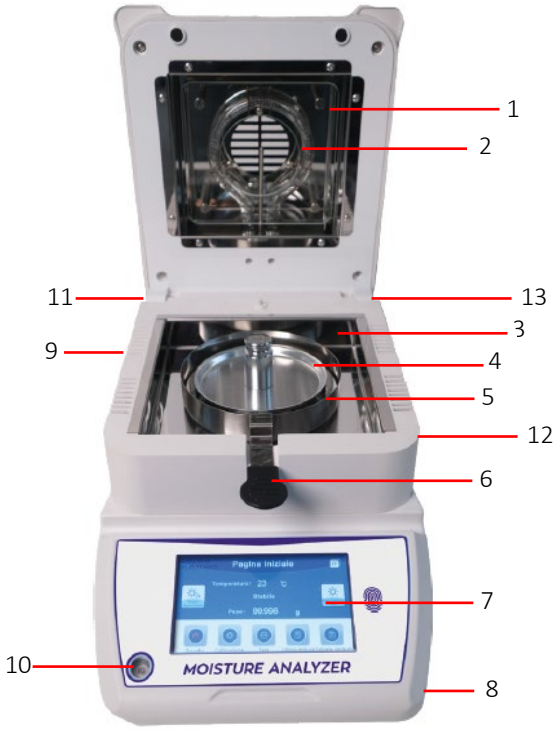
BM 203 Touch

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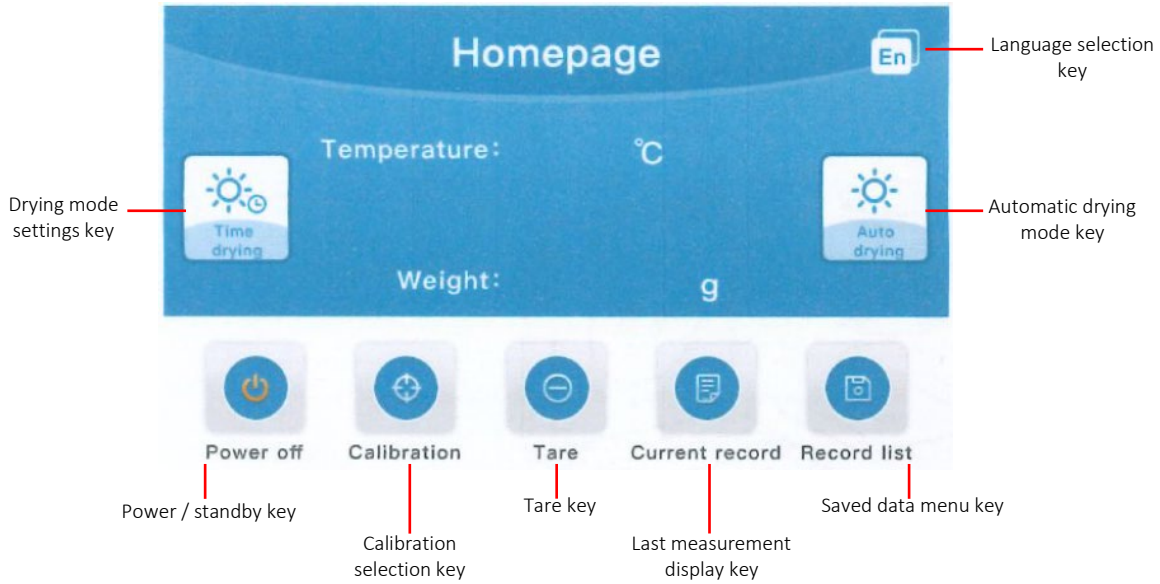
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1. Thermo scale overview

1 Heating hood
2 Halogen lamp
3 Thermal shield
4 Aluminium pan
5 Wind protection
6 Bracket for pan removal
7 Display Touchscreen
8 Adjustable feet
9 RS232 data transmission
10 Bubble level
11 Ventilation fan
12 Power supply
13 On/Off key

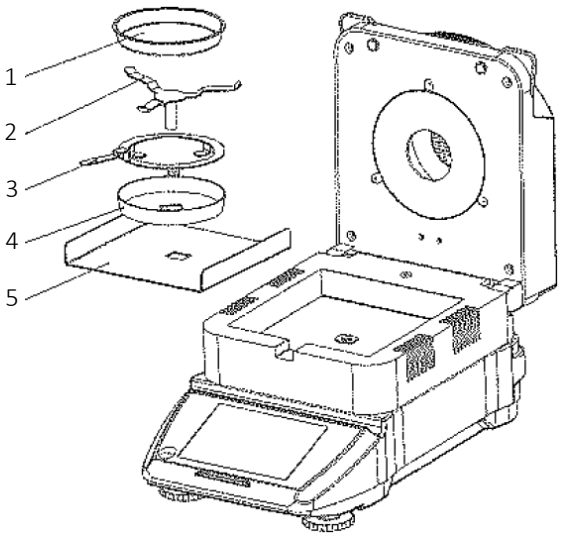


2. Display Touchscreen

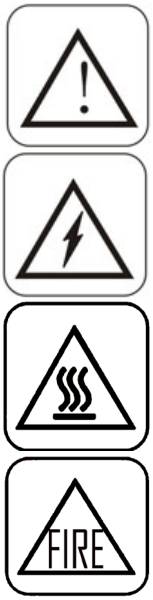


3. Installation

Install the thermo scale as illustrated.
The order of assembly is 5-4-3-2-1:
1. Aluminium pan
2. Triangular screw
3. Bracket for pan
4. Wind protection
5. Stainless steel plate



4. Safety instructions



Please read the steps below carefully before using the thermo scale:

- the instrument is designed for testing samples, any improper operation may cause personal injury and damage to equipment;
- plug the thermo scale into the power supply, in accordance with the instructions provided;
- ensure that the power cable does not interfere with the operation of user;
- do not use the thermo scale in dangerous, damp or unstable environments;
- disconnect the power supply before cleaning the thermo scale;
- maintain sufficient space around the instrument and at least 1 m from the top of the thermo 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 factory-authorised professional technicians;
- do not place flammable materials around the thermo scale;
- do not touch the lamp when it is operating;
- pay particular attention to hazardous samples;
- flammable and explosive materials: the testing of flammable and explosive materials will produce flammable gases or vapours;
- toxic and corrosive substances: keep toxic or corrosive samples in a well-ventilated environment.

Recommendations:

- wait 30 minutes after switching on before carrying out a calibration;
- do not close the cover with the calibration weight on the plate, the risk is to break the lamp.

Unpacking and checking:

Carefully remove the packaging, the plastic bag surrounding the thermo scale and set it in the indicated and suitable workspace.

Setting requirements:

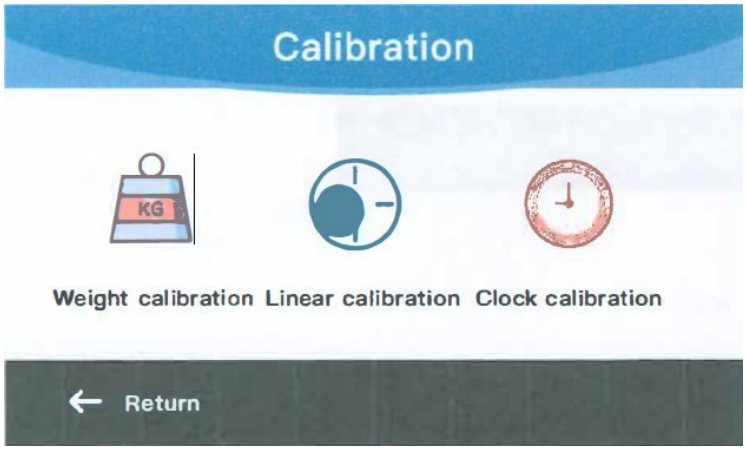
- stable and anti-vibrations worktable;
- stable room temperature;
- ventilated room.

5. Switching On/Off

1. Connect the thermo scale to the mains power supply;
2. level it using the levelling bubble;
3. switch on the thermo scale by pressing the key on the back;
4. wait until the basic configuration 0,000 g is displayed;
5. wait 30 minutes before using the thermo scale.

6. Weighing calibration

The calibration of the thermo scale weighing system is not necessary to determine the correct percentage of moisture present in the sample, as it performs a relative comparison measurement: the instrument calculates the percentage of moisture by calculating the difference between the mass before and after drying. However, the thermo scale must be calibrated if required by the analysis procedure.



“Weight calibration”:
after pressing the “Calibration” key from the start menu, press the “Weight calibration” key to start a single-point calibration (100 g) and follow the instructions on the display.

“Linear calibration”:
after pressing the “Calibration” key from the start menu, press the “Linear calibration” key to start a linear calibration on four points (50 g, 100 g, 150 g and 200 g) and follow the instructions on the display.

“Clock calibration” is used to set and change the date and time of the thermo scale.

7. Sample preparation

Solid sample:
set the dusty or granular samples uniformly on the sampling plate. Crush coarse samples using a mortar or grinder. Avoid overheating when grinding the sample, as this can cause moisture loss.



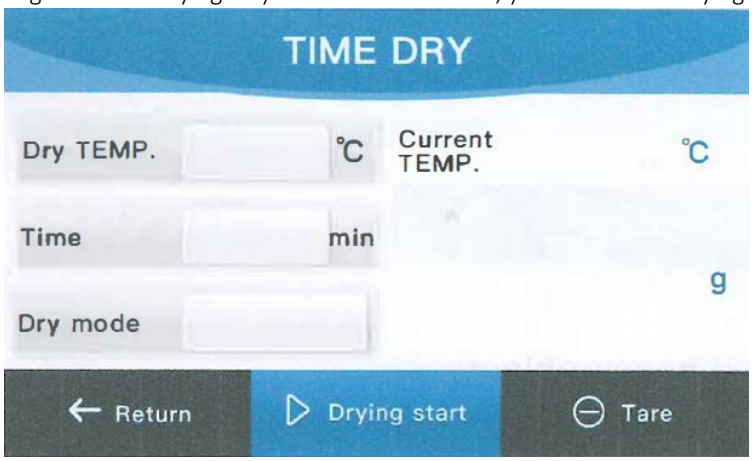
Liquid sample:
For liquids, tablets or melt samples, a fiberglass filter is recommended. The fiberglass filter has the following advantages:



- homogeneous distribution through capillary attraction;
- no formation of droplets;
- fast evaporation due to superior and homogeneous surface area.

8. Setting test parameters and drying methods

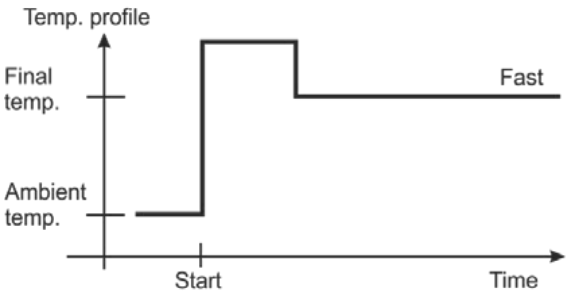
"Time drying": after pressing the 'Time drying' key from the start menu, you can set the drying parameters and methods.



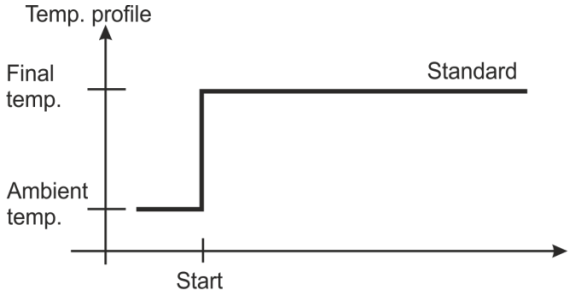
Drying temperature:
with this thermo scale, and in drying applications, temperatures between 40 °C and 180 °C can be reached, but most samples are measured in the range between 100 °C and 140 °C.

Drying methods:
moisture content (MC) is strongly influenced by the drying temperature used to remove moisture. Excessive heating can lead to high MC readings due to sample decomposition or changes in chemical structure. In addition to providing artificially high readings, results are very difficult to reproduce in testing when the drying profile is too aggressive. Conversely, lower heating levels may preserve sample integrity but prolong the drying process, making the test unrealistic for use in the process. The BM 203 Touch offers a range of drying programs that allow users to customize the drying profile of the sample. By customizing the drying program, moisture measurements can be optimized to improve drying conditions and reduce running times, minimizing sample decomposition or alterations in chemical structure and ultimately improving test accuracy and reproducibility.
The three temperature profiles are "Rapid", "Standard" and "Gentle" and can be customized by specifying one or more target temperatures.

"Rapid" drying method
The rapid drying profile is suitable for samples with a higher moisture content, as it utilizes the available moisture to prevent the sample from burning. In this drying profile, the target temperature is exceeded by 40% for the first 3 minutes, then returns to the target temperature, which is maintained until the end of the measurement.

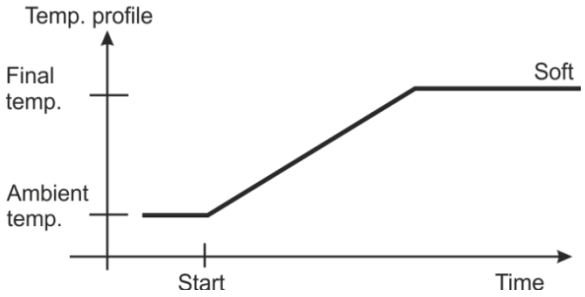


"Standard" drying method
The standard drying profile is the most common and is sufficient for most samples. In this drying profile, the target temperature is reached and maintained until the end of the measurement.



“Gentle” drying method

The gentle ramp drying system allows the user to gradually increase the temperature over time. This can be useful for drying substances with a high sugar content, where a slow increase in temperature will allow the bound water to evaporate before a caramelised layer forms and traps it inside.



“Auto drying”: Press the “Auto drying” key to access the automatic drying function, where you can set the temperature and start the program.

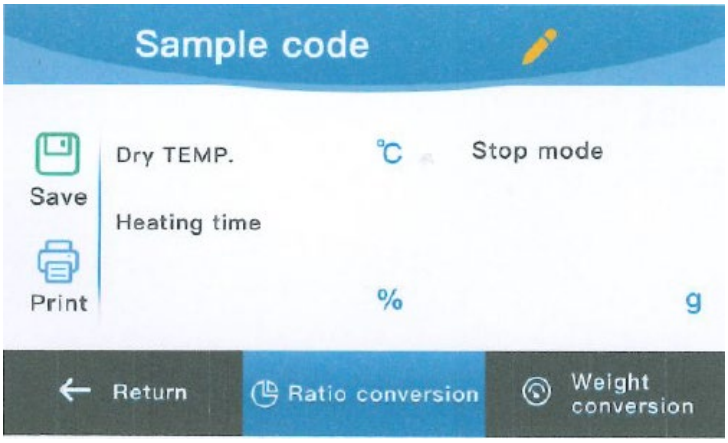


Note about “Switching off”: during drying, if you need to stop heating the scale, you can do so by pressing the stop key.
CAUTION: Depending on the temperature, combustion of the sample can easily occur in this measurement/stop mode. This mode should only be used if constant monitoring can be guaranteed. The advantage of this mode is that the sample can be dried for a long period of time to allow moisture deep within the sample to escape.

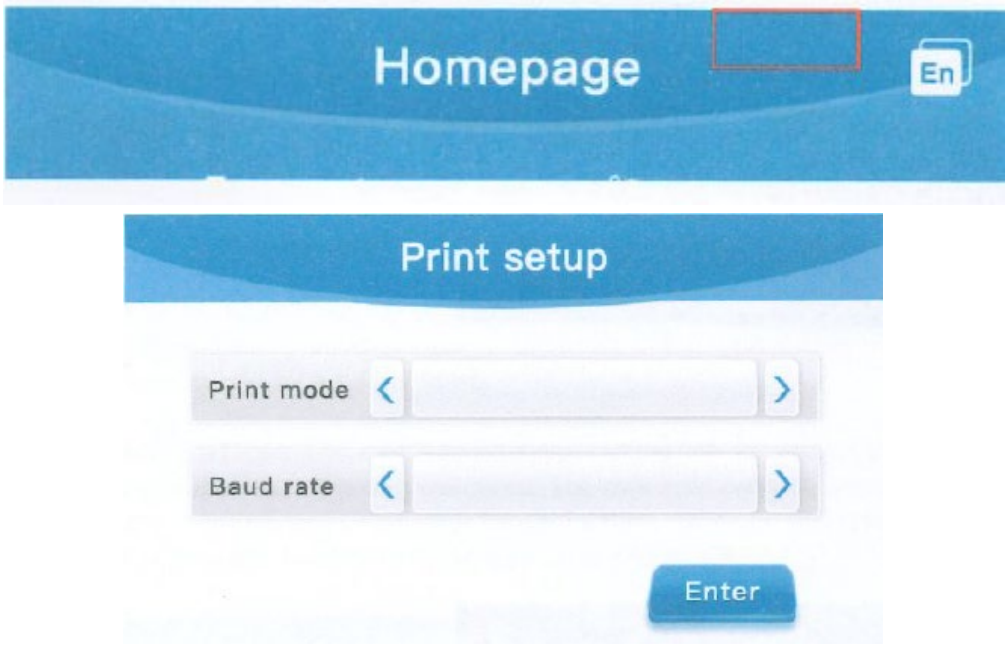
9. Saving and printing data

With the BM 203 Touch, you can save data from up to 32 drying cycles in its internal memory and print the measurement results using the XS Balance printer (sold separately).

- Ensure that the printer is configured correctly and that both devices are connected to each other;
- the sample code can be modified;
- default transmission speed is 9600 baud (but other modes can also be selected);
- nine-pin connection mode: 5 pins with grounding, 3 pins after sending;
- press the “Print” key to print the data.



Print settings: from the start menu, double-click on this exact point to access the print settings.



10. Troubleshooting

Errors	Cause	Solutions
ERR 1	Sample weight less than 0,5 g	Place more than 0,5 g of sample on the thermo scale and start weighing
ERR 2	The set temperature is below +40 °C	Restart the thermo scale
ERR 3	The set measurement time is less than 30 seconds	Restart the thermo scale
ERR 4	Halogen lamp problem	Replace the halogen lamp or contact technical support
ERR 5	The slow heating mode setting is less than 3 minutes	Restart the thermo scale
ERR 6	The temperature sensor is broken	Replace the temperature sensor or contact technical support

11. Data sheet

Capacity	200 g
Resolution	0,001 g
Repeatability	± 0,001 g
Minimum weighing	0,002 g
Minimum test weighing	0,5 g
Display	Touchscreen 5”
Calibration	External
Time control	Timing – Automatic – Manual
Heating control	Standard – Fast – Gentle
Time interval	1-99 minutes
Temperature range	40 – 180 °C
Pan size	Ø 90 mm
Lamp	Halogen lamp 400 W
Memory	32 drying cycles
Data transmission	RS-232
Overall size	370*215*195 mm
Net weight	4,5 kg
Power supply	220 V – 50Hz

12. Application table (food samples)

Samples	Sample mass (g)	Drying temperature (°C)	Drying time ca. (min)	Moisture % ca.	Solid mass % ca.
Sliced pineapple	5	110	14,4	6,71	-
Milk bath	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 mass	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	-
Dried carrots	5 - 7	110	10	6,21	-
Dried grain	8 - 10	160	5	0,26	-
Oat flakes	2,2	100	3,8	4	-
Hazelnuts	2,6	100	4,5	3,74	-
Peeled hazelnuts	1	160	5,5	6,45	-
Dog food	5	160	15	15,80	-
Yogurt	1	120	10	70,43	-
Instant coffee	5	140	17,3	9,32	-
Raw coffee beans	3	140	7	2,68	-
Roasted coffee beans	2 - 3	130	6 - 8	78,5	-
Coffee cream	3,5 - 4	120	8	8,53	-
Coffee seeds	2,5	105	4	3,45	-
Cacao	4 - 5	130	7,8	6,23	-
Cocoa beans	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
Corn starch	5	200	7,5	12,94	-
Almonds	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	1,5	160	11,1	-	45,78
Nougat mass	2,5	103	10	0,6	-
Noodle dough	0,55	160	5	12	-
Orange juice	1	140	10	88,89	-
Black pepper 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 (burnt)	3 - 3,5	100	4	5,92	-
Sunflower seed oil	10 - 14	138	2	0,1	-
Spaghetti	3	105	15,1	10,63	-
Black tea	2	105	4	7,67	-
Green tea	5	120	9	3,76	-
Pasta	1,5	120	8	10,64	-
Walnuts	2,8	100	5,6	3,5	-
Sugar	4-5	138	10	11,9	-
Sugar beets	2	130	13,4	-	30,94



Electrical and electronic equipment with this symbol affixed may not be disposed of in public landfills. In accordance with the WEEE Directive 2012/19/EU, European users of electrical and electronic equipment have the option of returning used equipment to the Distributor or Manufacturer when purchasing new equipment. Illegal disposal of electrical and electronic equipment is punishable by administrative fine.