

## 12.0 WARRANTY

The manufacturer warrants to the original purchaser that this product is of merchantable quality and confirms in kind and quality with the descriptions and specifications thereof. Product failure or malfunction arising out of any defect in workmanship or material in the product existing at the time of delivery thereof which manifests itself within one year from the sale of such product, shall be remedied by repair or replacement of such product, at the manufacturer's option, except where unauthorized repair, disassembly, tampering, abuse or misapplication has taken place, as determined by the manufacturer. All returns for warranty or non-warranty repairs and/or replacement must be authorized by the manufacturer, in advance, with all repacking and shipping expenses to the address below to be borne by the purchaser.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE OR APPLICATION. ELECTROMATIC SHALL NOT BE RESPONSIBLE NOR LIABLE FOR ANY CONSEQUENTIAL DAMAGE, OF ANY KIND OR NATURE, RESULTING FROM THE USE OF SUPPLIED EQUIPMENT, WHETHER SUCH DAMAGE OCCURS OR IS DISCOVERED BEFORE, UPON OR AFTER REPLACEMENT OR REPAIR, AND WHETHER OR NOT SUCH DAMAGE IS CAUSED BY MANUFACTURER'S OR SUPPLIER'S NEGLIGENCE WITHIN ONE YEAR FROM INVOICE DATE.

Some State jurisdictions or States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. The duration of any implied warranty, including, without limitation, fitness for any particular purpose and merchantability with respect to this product, is limited to the duration of the foregoing warranty. Some states do not allow limitations on how long an implied warranty lasts but, not withstanding, this warranty, in the absence of such limitations, shall extend for one year from the date of invoice.

Every precaution has been taken in the preparation of this manual. The manufacturer, assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of information contained herein. Any brand or product names mentioned herein are used for identification purposes only, and are trademarks or registered trademarks of their respective holders.

## TABLE OF CONTENTS

1.0	Introduction .....	2
2.0	Complete Kit .....	2
	2.1 Optional Equipment	
3.0	Overview .....	3
	3.1 Display	
	3.2 Keypad	
4.0	Menu Functions .....	5
5.0	Installing/Changing Batteries .....	6
6.0	Calibration Curves .....	7
	6.1 Determination of material reference moisture	
7.0	Operating Procedure .....	9
8.0	Printing Saved Data .....	12
	8.1 Online Printing	
9.0	Transferring Data to a PC .....	13
10.0	Troubleshooting and Maintenance .....	14
11.0	Specifications .....	15
12.0	Warranty .....	16

### NOTE:

This is a device for the quick determination of moisture. The moisture depends on multiple conditions and multiple materials. Therefore we recommend a plausibility check of the measuring results. Each device includes a serial number and the guarantee stamp. If those are broken, no claims for guarantee can be made. In case of a faulty device, please contact your dealer.

---

---

## 1.0 INTRODUCTION

Congratulations on your purchase of a BM2 biomass moisture meter. The BM2 is intended for use by suppliers and operators of heating plants that use biomass.

The BM2 provides accurate measurements, with automatic bulk density compensation, of water content of wood chips, barks, wooden pellets, elephant grass, wood shavings and sawdust.

## 2.0 COMPLETE KIT

The BM2 is supplied with the following hardware and software:

- BM2 Moisture Meter
- Measuring Bucket (3.43 gallons/13 liters)
- Interface for PC transfer
- Data link cable
- USB/RS-232 adapter
- LogMemorizer software
- 4 AA (1.5V) alkaline batteries

**NOTE:** A digital scale, not supplied, is required for operation

### 2.1 Optionally Available Equipment

- Digital scale: 10.000g with batteries and 220 volt power supply
- Thermal printer: Portable, battery operated thermal printer
- Factory calibration certificate protocol

---

---

## 11.0 SPECIFICATIONS

<b>Display Resolution</b>	0.5% water content 0.5°C temperature
<b>Display Size</b>	128 x 64 matrix display, lighted
<b>Measuring range</b>	5 up to 60% depending on the material
<b>Operation temperature</b>	32°F to 104 °F (0 °C to 40 °C)
<b>Storage temperature</b>	−4 °F to 140 °F (−20 °C to 60 °C)
<b>Temperature compensation</b>	Automatically
<b>Power supply</b>	4 pcs. 1.5 Volt AA Alkaline batteries (900 measurements)
<b>Auto Switch OFF</b>	After approximately. 6 minutes
<b>Current consumption</b>	60mA (with light)
<b>Dimensions</b>	19.3" x 11.4 x 11.8 (490 x 290 x 300 mm)
<b>Weight (approx.)</b>	11.60 lbs. (5.3 kg) including batteries
<b>Degree of protection</b>	IP 40
<b>Supplied components</b>	BM2 gauge, Measuring bucket 3.43 gallons (13 Liter) 4 x 1.5Volt AA alkaline batteries LogMemorizer Software Interface for PC transfer Data link cable USB-RS232 adapter

## 10.0 TROUBLESHOOTING & MAINTENANCE

### BM2 Maintenance

To provide a long life for your device please does not drop it, expose it to strong mechanical loads, heat or direct sunlight exposure. Clean your device using a dry cloth. Clean the measuring chamber with a dry and soft brush.

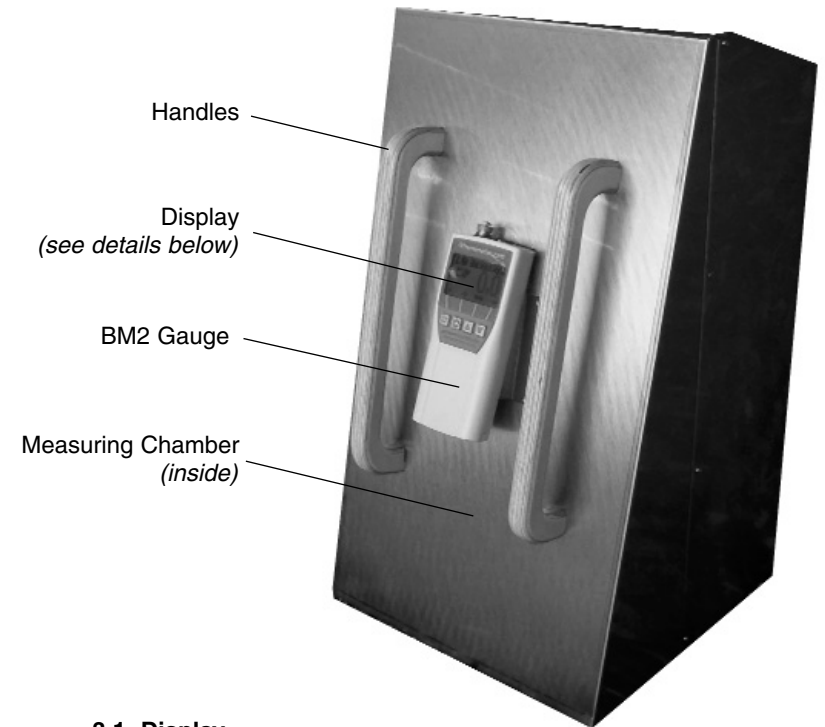
Any kind of wet cleaning damages the device. The instrument is not rainproof. Keep it in dry areas. When the device is not to be used for a long period (6 months) of time or when the batteries are empty, they should be removed to prevent battery acid leakage.

### Troubleshooting

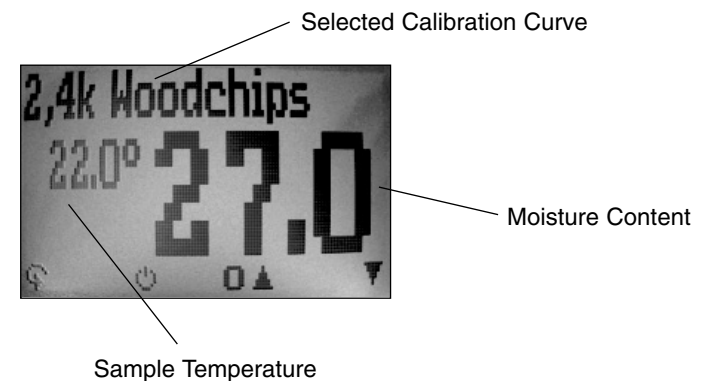
Following are the most common reasons for incorrect readings:

1. **Product temperature is out of application range.**  
Material under test is below 32 °F (0 °C) or above 104 °F (40°C) which may cause faulty measurements. The storage of cold material in a warm storage area usually creates water condensation, which may lead to major measuring errors.
2. **Gauge is not adjusted to the material under test.**  
Let your BM2 adjust to the surrounding temperature of the material for approximately 30 minutes before using.  
  
A very high temperature difference has a negative effect on the stability of the measurement results.
3. **The wrong calibration curve is being used.**  
Before beginning a measurement session, double check that the appropriate calibration curve has been selected. See section
4. **Measuring chamber filled with incorrect amount of test sample.**  
Make sure that the correct weight ( $\pm 0.01\text{kg}$ ) of material to be tested has been placed in the measuring chamber.
5. **Wet or moldy material.**
6. **Frozen measuring material.**

## 3.0 OVERVIEW











### 3.1 Display










### 3.2 Keypad Symbols

#### Measuring Window:

-  Rolling Menu
-  Power ON/OFF
-  Switch Upper
-  Switch Lower
-  Save
-  Hold
-  Watch the Saved Data
-  Suppliers Data Can Be Added

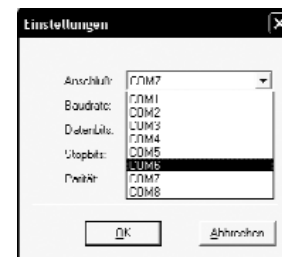
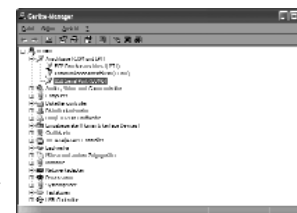
#### Menu:

-  Enter
-  Switch Upper
-  Switch Lower
-  Exit
- 0...9** Enter Numbers
- A...Z** Enter Letters
- >** Next or Right
- <** Left
-  Yes
-  No
-  Shift
- OK** OK

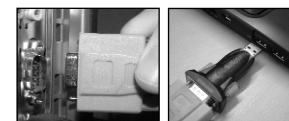
### 9.0 TRANSFER DATA TO A PC

1. Connect the USB or RS232 adapter to your PC. In Windows XP and Vista the adapter for the operating system is automatically recognized. Follow the instructions for the operating system. In order to adjust the correct connection of the LogMemorizer software you have to know the port number (COM1-COMx). You can find this setting in the device manager, directory ports (COM & LTP)—see print screen at right.



The port number shown in the device manager COMx (in our example COM6) for the USB/RS232 adapter has to be selected in the LogMemorizer software, directory: Extras – Settings – Device. Close the dialog using the ( **OK** ) button.

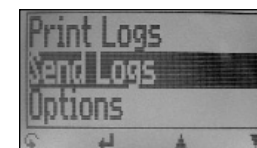



2. To send your saved logs to your PC, connect the BM2 to your PC using the cable that was delivered with your device. You can connect it directly to a serial port on your PC or use the enclosed serial-USB adapter.

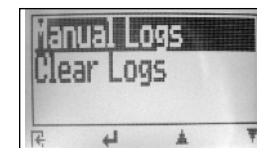


3. **Start the LogMemorizer software on your PC. For installation and the required settings, read the separate LogMemorizer manual.**

4. Press the (  ) key until you reach the menu shown on the right. Choose **SendLogs** from the menu and confirm with (  ) .



5. Now you can choose **Manual Logs** and confirm with (  ) again. The selected Logs will be sent to your PC.



If no transmission is performed, please check your cable connection and the LogMemorizer settings and try again.

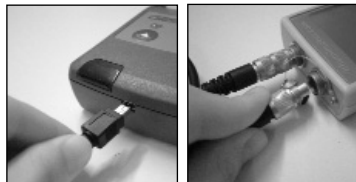
6. If your device supports online-sending, this can be activated in the **Options** menu. See section 8.1



## 8.0 PRINTING SAVED DATA

To print your saved logs follow the procedure below:



1. Make sure that the printer is turned off. Connect the printer to the BM2 serial interface using the cable that was delivered with the BM2.

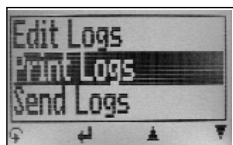



2. Switch on the print switch on the printer by pressing **ON/OFF** button.

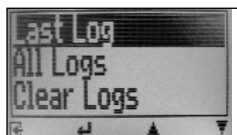
If the printer is correctly switched on, the **green LED blinks** regularly. If it does not, replace the batteries and try again.



3. Press the (  ) key until you reach the menu (shown at right). Then choose "Print Logs" from the menu and confirm with (  ).



Now you can choose if you want to print only the last log or all recorded logs. Make your selection and confirm with (  ) again.

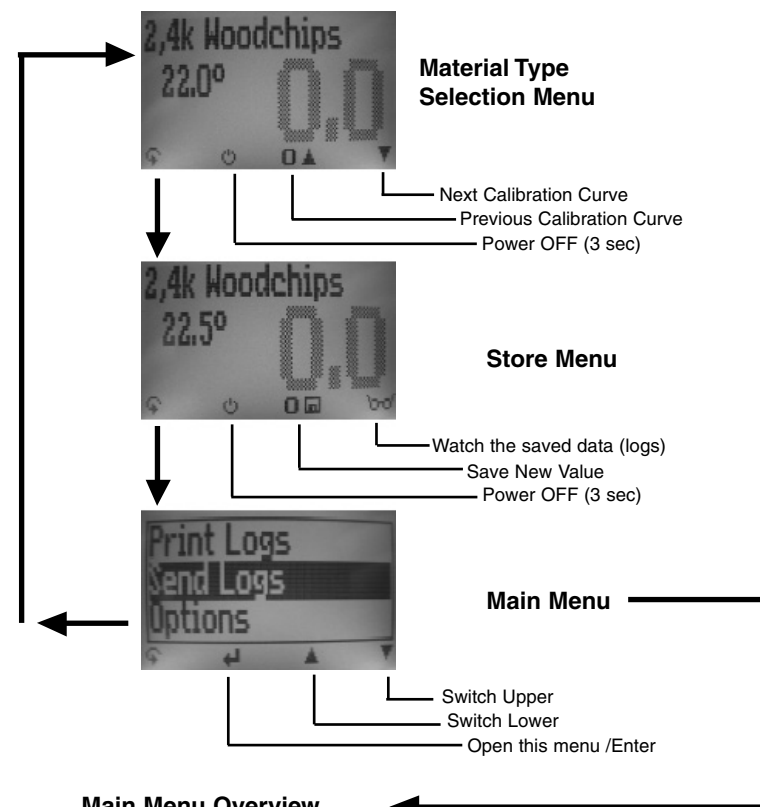


The selected logs will be printed out.

### 8.1 Online Printing

If your device supports online-printing, this can be activated in the Options menu. If the option is active, and the printer is active and switched on, every newly recorded log will immediately be printed.

## 4.0 MENU FUNCTIONS



### Main Menu Overview






<b>Edit Logs</b>	Manual Logs Clear Logs	<b>Options</b>	Date / Time Log Time Language Unlock °C / °F o User level BL On Time Auto Off Time Materialcalib. o Online Send o Online Print Password Reset
<b>Print Logs</b>	Last Log All Logs Clear Logs		
<b>Send Logs</b>	Manual Logs Clear Logs		
<b>Options</b>			
<b>Status</b>			

## 5.0 INSTALLING AND CHANGING BATTERIES


The BM2 is provided with 4AA alkaline batteries. The battery compartment is located on the back side of the gauge. The procedure to install and change the batteries follows:

1. Press with your finger on the back of the battery compartment cover and slid it towards you until the battery compartment is completely accessible.
2. If required, carefully remove the used batteries.
3. Insert four new batterie. Be sure to follow the polarity indicated on the battery compartment
4. Slid the battery compartment closed and press up with gentle pressure until the cover closes with a click.



12. To save the results in the save menu press the  (  button). The storage was successful when the number in front of the symbol  increases. To reach the store menu please press (  ) until the  appears.



13. To name the saved results press the (  ) button.



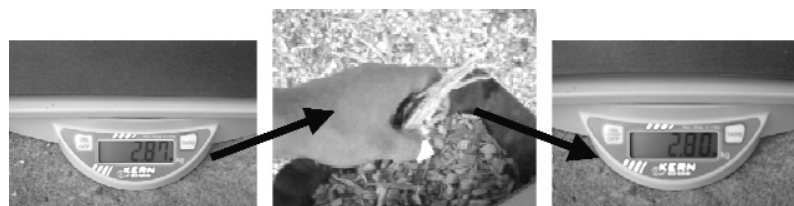
14. Empty the BM2 measuring chamber completely. It is important not to allow sample material to accumulate in the measuring chamber.

### NOTE:

**Measuring process of wooden pellets:** Measure wooden pellets with the calibration curve “5,00kg pellets”. For this measurement the bucket not has to be full of pellets, you must fill in 5,00 kilograms of wooden pellets every time.

**Measuring process of dry wood-shavings:** If the 13 litre bucket is not big enough for 1.00 kilogram of shavings, the measuring device has to be filled separately (e.g. 2 x 0.,50kg). During the filling process the measuring material has to be slightly and constantly compressed in the measuring chamber in order to provide enough place for 1.00kg of shavings. After finishing the filling process, all of the measuring material has to be 5cm below the back case edge.

8. Fill the measuring device with the sample material. Distribute the material evenly to ensure reproducible results.
9. Remove material till the next lower weight range is reached. If only a little is missing (e.g. 0.10kg) to fill to the next higher level, it should be filled up to that stage. The actual weight is shown on the scale.



10. Smooth the material by hand to ensure even distribution within the measuring chamber .

11. Select the correct calibration curve for the material under test. Begin by pressing the ( ▲ ) or ( ▼ ) key for three seconds. A list of available curves will appear in the display. Press the ( ▲ ) or ( ▼ ) keys until the correct curve appears highlighted. Press the ( ← ) key to confirm. The main menu will return with the correct calibration curve shown.



The display shows the water content.

**NOTE:** The weight of the material in the measuring chamber must be the same as the calibration curve.

**IMPORTANT** If the measure value is blinking, the valid measuring range is exceeded. In this case the accuracy will be reduced. If you are measuring wood chips, select the next higher weight class and refill wood chips to reach the higher filling weight.

## 6.0 CALIBRATION CURVES

Name Of Calibration Curve	Material Under Test	Filling Quantity	Measuring Range Limit
2.0k Woodchips	Woodchips according to P16	2.00 kg	28 %
2.4k Woodchips	Woodchips according to P16	2.40 kg	35 %
2.8k Woodchips	Woodchips according to P16	2.80 kg	40 %
3.5k Woodchips	Woodchips according to P16	3.50 kg	50 %
4.5k Woodchips	Woodchips according to P16	4.50 kg	60 %
2.8k Coarse WC	Woodchips according to P45	2.80 kg	50 %
3.5k Coarse WC	Woodchips according to P45	3.50 kg	50 %
2.8k Fresh WC	Fresh woodchips (see below)	2.80 kg	50 %
3.5k Fresh WC	Fresh woodchips (see below)	3.50 kg	50 %
2.4k Barks	Barks	2.40 kg	35 %
2.8k Barks	Barks	2.80 kg	50 %
5.0k Pellets	Pellets made of wood	5.00 kg	14 %
1.0k Shavings	Shavings	1.00 kg	20 %
1.3k Sawdust	Sawdust	1.30 kg	28 %
2.0k Sawdust	Sawdust	2.00 kg	50 %
1.0k Miscanthus	Miscanthus chopped	1.00 kg	25 %
Empty	For customer calibration		
Empty	For customer calibration		
Reference	To test the BM2. Not for use of measuring the moisture!		

**Woodchips:** Standard stored chips of wood according to CEN/TS 14961:2005 class P16. Use this calibration curves only for stored wood chips, for fresh chips use the curves “fresh WC”

**Coarse Woodchips:** Stored chips of wood according to CEN/TS 14961:2005 class P45.

**Fresh Woodchips:** For chips of wood according to P16 and P45 which are not older than two weeks after chipping and for stored coarse woodchips without fine.

If the wood was stored longer than four weeks before chipping, you have to use the standard woodchips calibration curves.

### List of calibration curves

Pressing the ( ▲ ) or ( ▼ ) keys in the keypad for at least three seconds and a list with all available curves will appear. Select your curve by pressing ( ▲ ) or ( ▼ ) and confirm it with the ( ← ) key. The measurement will continue automatically.



## 6.1 Determination of the material reference moisture

The principle is a comparison measurement with the dehydration method according to CEN/TS 14961:2005. Take the measured sample and weigh it. Dry it out in an oven and weigh it again.

$$\%F = \frac{M_n - M_t}{M_n} \times 100$$

$M_n$ : Mass with average moisture content

$M_t$ : Mass of the dried sample



$\%F$ : Calculated moisture content

## 7.0 OPERATING PROCEDURE

1. Place the digital scale on an even and sturdy work surface. Place the BM2 in the center of the scale.
2. If you are using the optional digital scale available from Check•Line, zero the scale by The display will show 0.00kg.



**NOTE:** If you are not using the digital scale available from Checkline, follow the manufacturer's instructions to zero the unit.

3. Fill the supplied 13 litre bucket with sample material taken from varying locations in sample storage.
4. Check that the measuring chamber is completely empty. It is important that no material is left in the measuring chamber when you turn on the BM2.
5. Switch on the BM2 by pressing the power button (  ) for 3 sec.
6. Perform the self-calibration. The word "Reinitialize?" will show up on your display. Accept by pressing the (  ) button.
7. The self calibration is finished when the display menu appears in the measuring window.





# BM2 Biomass MOISTURE METER

**BM2**

