DRAMIŃSKI
TECHNOLOGY

HMM&G

MOISTURE METER FOR GRAINS

MANUAL

EN

ISO 9001 | CE

TABLE OF CONTENTS

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INTRODUCTION

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DRAMIŃSKI Company has developed an instrument invaluable in estimating moisture content grains.

HMM&G measures changes occurring in the electrical conductivity of grains and then converts it into a reading of moisture in percentage which is shown on the LCD display.
It provides both moisture and temperature readouts. The Moisture Meter is designed to be easy to use and maintain and to provide rapid tests.

Manufacturer - DRAMIŃSKI Company will share with its knowledge and experience to all users and simultaneously reserves the rights to make changes or technical/software improvements to its products.

DRAMIŃSKI Company reserves the rights to make changes in the instruction manual.

Read this instruction manual carefully before starting to use the ultrasound scanner. It will guarantee safe usage and long lasting, reliable functioning of the device.

Declaration of the device's conformity is available at the DRAMIŃSKI Company's office at Wiktora Steffena 21, 11-036 Sząbruk, Poland.

EQUIPMENT

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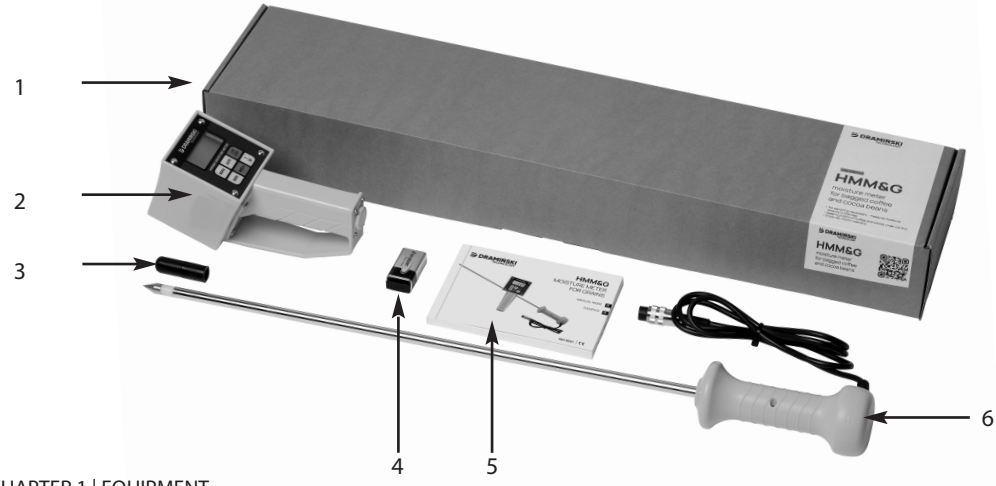
CHAPTER 1

HMM&G EQUIPMENT:

1. Transport packaging made of eco cardboard,
2. DRAMIŃSKI HMM moisture meter,
3. Special cover to protect the probe during transport and storage,
5. 1x9V 6LF–22 type alkaline battery,
6. Manual,
7. Measuring probe with a connecting cable.



DESIGN

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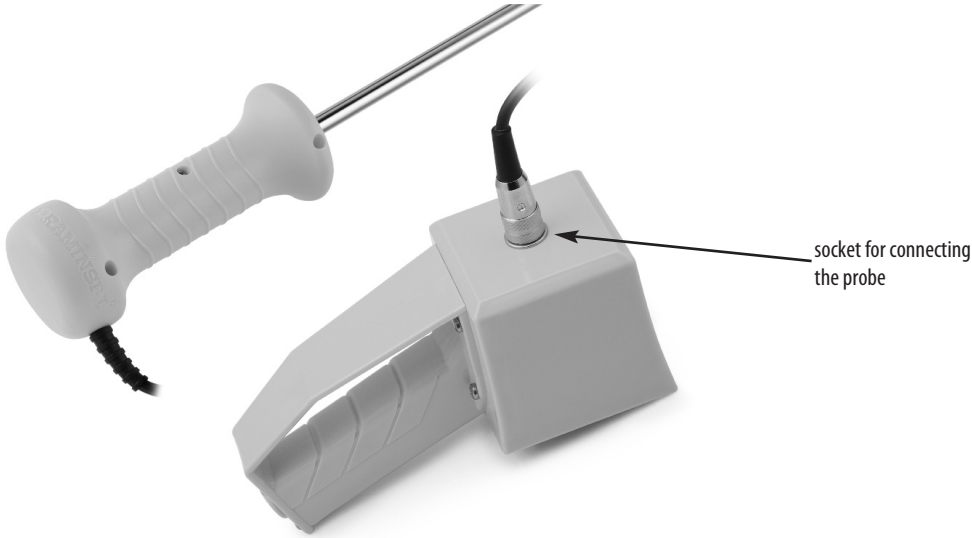
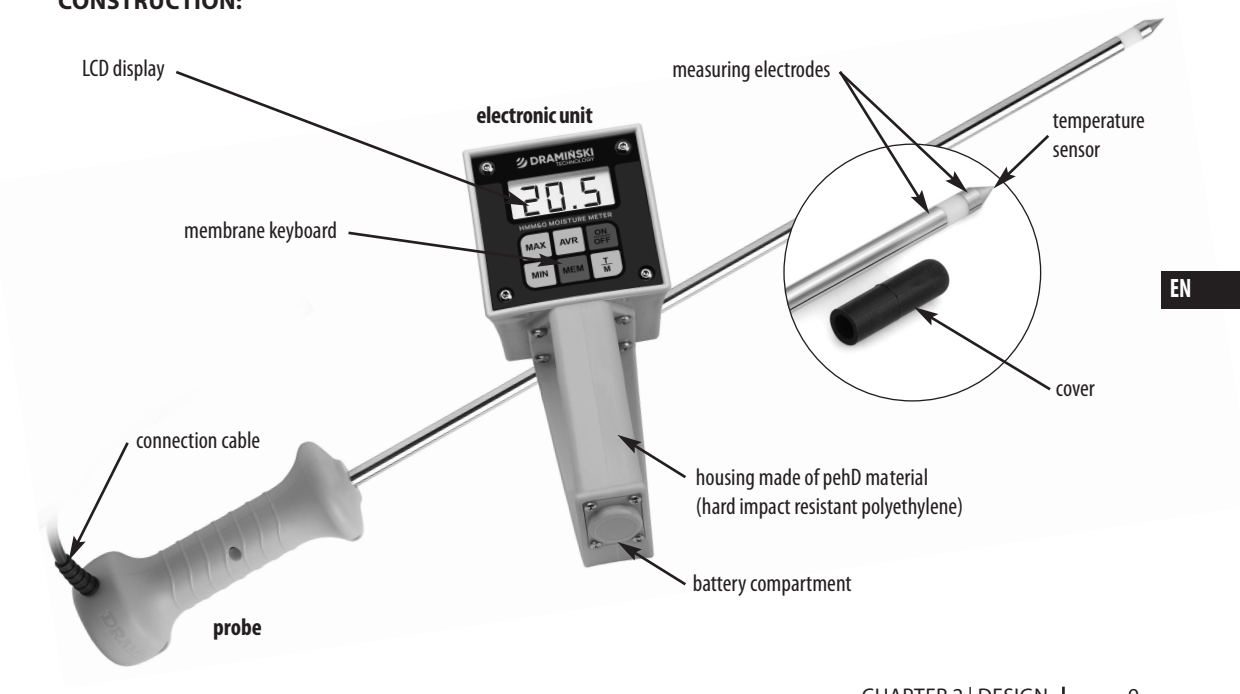
CHAPTER 2

The DRAMIŃSKI HMM&G Moisture Meter with detachable probe on cable



CONSTRUCTION:



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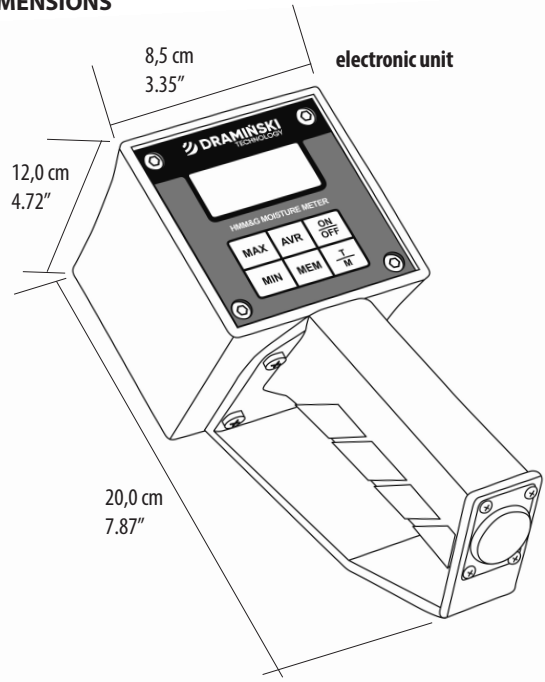
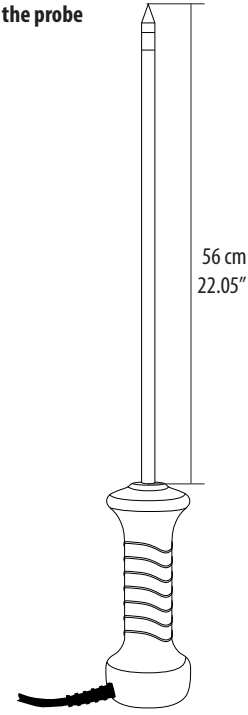
DIMENSIONS



Lenght of the probe



KEYBOARD FUNCTIONS

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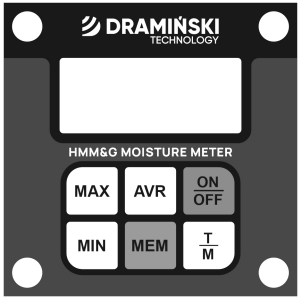
CHAPTER 3



ON / OFF	• ON / OFF - turning the device ON and OFF attention! the device will turn off automatically in 6 min if no button is used
MEM	• Saving measurement results in the memory
AVR	• average of the results saved in the memory
MIN	• Minimum value of the results saved in the memory • Setting a number while entering the code • Using the menu
MAX	• Maximum value of the results saved in the memory • Setting a number while entering the code • Using the menu
T / M	• Changing type of measurement from temperature to moisture and back • Confirming chosen option

OPERATION

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CHAPTER 4

1. Press **"ON/OFF"** button.

If the probe is not inserted into container with grains, letters "LO" will be displayed.

2. Push the probe into the container and then within few seconds moisture content in percentage will appear and will be displayed continuously.

The moisture measurement range is 10 - 80 %. If moisture content is below 10 % letters **"LO"** will be displayed. If moisture content is higher than 80 % letters **"HI"** will appear.

3. Press **"MEM"** button to store the result in instrument's memory. Remove the probe from the bale – **"LO"** will be displayed.

4. Repeat the procedure at least 5 times with the same bale for better accuracy.

The number of measurements that should be taken depends on the spread of first measurements' results. The bigger the difference between results, the more measurements should be taken.

you can store up to 50 readings in instrument's memory by pressing **"MEM"** button.

After the required number of measurements have been taken, you can find out the average result by simply pressing **"AVR"** button, or minimum and maximum results by pressing respectively **"MIN"** or **"MAX"** buttons.

5. To take temperature measurement, switch the instrument to the temperature mode by using **"T/M"** button.

6. Press **"ON/OFF"** button to switch the instrument off.

If no buttons are pressed and moisture content on the display doesn't change for minimum six minutes the instrument automaticly turns itself off.

HOW TO CHANGE THE TYPE OF THE MEASURED GRAIN

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CHAPTER 5

The device has a possibility to change the type of grain which you would like to measure.

Every time you switch on the device there appears a symbol of the grain at which the device is set.
For example, „C01" means that the device is set to measure the moisture of coffee grain.

How to change the type of grain:
– switch on the device (it can be in the moisture measuring or temperature measuring mode)
– hold the button **T/M** for about 4 seconds
– you see the type of grain at which the device is currently set, for example: „C01"
– with the help of the buttons **MAX** (up-arrow) and **MIN** (down-arrow) select the type of grain which moisture you would like to measure
– then confirm your choice with the **T/M** button

Symbols available from the list of grains:
C01 – coffee
C02 – cacao
C03 – universal curve (to measure moisture)

Note
Other functions of the device are described in a standard user manual. Get familiar with the user manual before performing any measuring.

ADDITIONAL OPTIONS USING NUMERICAL CODES

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CHAPTER 6

HOW TO ACTIVATE NUMERICAL CODES:

– the device must be switched off
– to enter the numerical codes press 4 buttons at the same time **MAX + MIN + T/M + ON/OFF**
– when you see the message „CAL" set free all the buttons
– then you see a blinking semicolon (:) on the left and the value „00"
– with the help of the button **MAX** (up-arrow) and **MIN** (down-arrow) set a numerical code which you would like to activate
– when you set the code confirm it using the **T/M** button
– next switch off the device holding the **ON/OFF** button until you see the message „OFF"

1. How to switch on temperature compensation (enabled by default)

– set the code „101" and then confirm it with the **T/M** button
– you see the message „ko;'"
– then switch off the device

2. How to switch off temperature compensation

– set the code „100" and then confirm it with the **T/M** button
– you see the message „kOF"
– then switch off the device

3. How to switch the temperature to Celsius degrees (enabled by default)

– set the code „01" and then confirm it with the **T/M** button
– you see the message „°C"
– then switch off the device

4. How to switch the temperature to Fahrenheit degrees

– set the code „02" and then confirm it with the **T/M** button
– you see the message „°F"
– then switch off the device

MODIFYING THE MOISTURE INDICATIONS READINGS

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CHAPTER 7

Modifying the moisture indications readings

This option is used for the modification (adjustment) of moisture readings by increasing or decreasing the displayed value (of the device) by the same value in the entire measuring range. However, by modifying the displayed values we are changing the measuring range limits, i.e., when we make an adjustment by „+2%" the measuring range will change from 10%-80% to 12%-82%.

This modification is useful when the grains in the cointainer are poorly or very hard pressed, because the HMM&G curve is based on an average compression strength.

Procedure:

1. Press and hold four buttons at the same time: **"MAX"**, **"MIN"**, **"T/M"** and "**ON/OFF"**.
2. Hold 4 buttons pressed for about 1 second. Then release the buttons – letters "**CAL"** will be displayed.
3. Using **"MAX"** and **"MIN"** buttons set the number 399 and press **"T/M"**.
4. When the display shows „0" the device is ready for calibration.
5. Enter the requested adjustment, keeping the range from – 5 % to +5 % (e.g. „+2" or „–5")
6. Confirm the entered value with **„T/M"** button, then turn off the device.

An example of the correctly entered modification

1. When you have entered „–5", then each time the device is turned on, the display will show the following message **„CAL"**–5. This means that the device is changing the measuring range from 10%-80% to 5%-75%.

Back to the factory settings/cancelling the modification

Procedure:

1. Press and hold four buttons at the same time: **“MAX”**, **“MIN”**, **“T/M”** and “**ON/OFF”**.
2. Hold 4 buttons pressed for about 1 second. Then release the buttons – letters “**CAL”** will be displayed.
3. Using **“MAX”** and **“MIN”** buttons set the number 399 and press **“T/M”**.
4. The display will show the previously entered value of the modification, e.g. “+2”. Enter “0” and confirm the entered value with **„T/M”** button, then turn the instrument off. The device returns to factory settings, i.e. the measuring range will be 10%–80%.

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CALIBRATION OF TEMPERATURE SENSOR

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CHAPTER 8

Calibration of temperature sensor in a new probe for HMM&G

Attention: Doesn't concern a new device or a device sent from repair service.

Procedure:

1. before starting calibration process it is necessary to prepare:
   – a bucket/bowl etc. filled with water and ice. Ice flowing in the water guarantees that the water will have 0 °C (or 32 °F).
   – a bucket/bowl etc. filled with warm water
   – a thermometer
2. Attach the new probe to the main unit. Put the probe into the bucket with warm water and leave it inside for about 5 minutes until the probe will reach temperature similar to the temperature of water. Put the thermometer into the bucket and measure the temperature of water.
3. Press and hold 4 buttons: **„MAX"**, **„MIN"**, **„T/M"** and **„ON/OFF"**. Keep holding the buttons for about 1 second. Release all buttons, letters **„CAL"** will be displayed.
4. Using **„MAX"** and **„MIN"** buttons set the number 233 and press **„T/M"**.
5. Using **„MAX"** and **„MIN"** buttons choose **„HI"** and press **„T/M"**.
6. If the temperature displayed on the screen is different from readings of the thermometer, correct it and set proper temperature with **„MAX"**, **„MIN"** buttons and confrm it with **„T/M"**.
7. Put the probe into the bucket filled with water and ice and leave it inside for about 5 minutes until the probe will reach temperature similar to the temperature of water.
8. Using **„MAX"** and **„MIN"** buttons choose **„LO"** and press **„T/M"**.
9. If displayed temperature is different from „0" °C (or „32" °F), modify it with **MAX** and **MIN** buttons, until you reach „0" (or „32"). Confirm with **T/M**.
10. Turn the device off. The temperature sensor in the new probe is now properly calibrated.

BATTERY REPLACEMENT

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CHAPTER 9

Low battery level is indicated by the words **"LO BAT"** flashing on the LCD display. A new battery is required when this indicator appears.

To exchange the battery:

- unscrew four screws which fix the battery compartment cover and take out exhausted battery,
- insert new battery according to +/- polarization,
- replace the cover and tighten the screws screwdriver, pay your attention to place a rubber seal under battery cover in correct position.

Manufacturer recommends to use good quality batteries. Poor quality batteries after exhaustion can leak which can cause damage of the device.

REMARKS

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CHAPTER 10

- The best accuracy is maintained by keeping the Moisture Meter clean and free from damage or extreme temperatures.

- It is essential to take readings at several different points of the container. Remember to test not only the middle but also the sides of the container.

- The accuracy of the measurements is affected by the grain compression in the container, because it produces different pressure on the probe and thus on the moisture and temperature sensors.

- Results are more reliable when the container is densely packed as a tight compression enables direct contact between the probe and the grain.

- Windrow, loose grains should not be tested.

- When not in use, store the Moisture Meter in a dry place at normal room temperature. Remember to protect it against water, especially the probe and the cable connector.

Please remove the battery if the device is not in use for a long time to reduce possibility of damage of the device by a battery leak.

TECHNICAL DATA

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CHAPTER 11

Weight (with battery)	800 g (1.72 lbs)
Lenght of the probe	56.0 cm (22.05″)
Connection cable length	140.0 cm (55.12″)
Dimensions of reader	20.0 x 8.5 x 12.0 cm (7.87″ x 3.35″ x 4.72″)
Moisture measurement method	resistivity
Power supply	1 x 9 V battery, type 6F-22
Battery low indication	automatic
Power input	about 4 mA
Measurement control	single chip microcomputer
Estimated working time on one battery pack	about 100 h
Display	LCD, 3.5 digits
Keyboard	membrane
Measurement resolution	humidity – 0.1%, temperature – 1.0 °C (1.8 °F*)
Data modification	using keyboard – Data modification option
Moisture measuring range	10 – 80 %
Range of temperature measurement	1.0 – 100.0 °C (33.8 – 212.0 °F*)
Accuracy of temperature measurement	± 1.0 °C (1.8 °F*)
Recommended storage temperature	5.0 – 45.0 °C (41.0 – 113.0 °F*)

* Only in version for North america and a ustralia

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