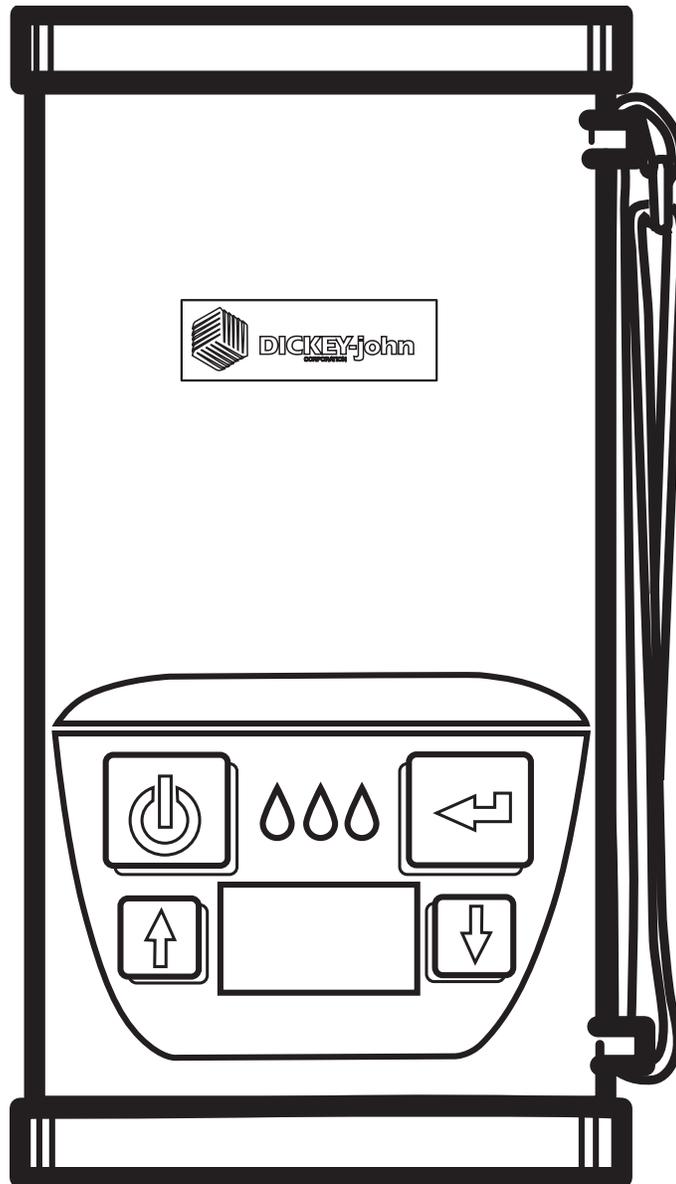# M-3G / M-20P
Portable Moisture Tester

Operation and File Handling
Instructions
(M-3G_M-20P_Operation.pdf)

DICKEY-john ®
CORPORATION

UNIT OPERATION

Introduction   The M-3G/M-20P Portable Moisture Tester is very simple to use and very intuitive in its operation. The M-3G and M-20P are identical exept that the M-3G has three grain capability while the M-20P can test twenty different grains. Operating and File File Handling instructions are virtually identical and will be treated as such. Four function keys coupled with a menu driven operating system make the unit usable even without written instructions. However, the following instructions and guidelines may provide additional insight into the unit's operation.

Basic Key Functions

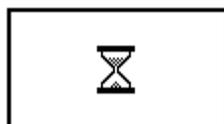| ⏻	↵	⬆	⬇
ON/HOME: Pressing this key will turn the unit on or return the unit to the main menu. Hold to turn unit off.	**ENTER:** Pressing this key will select an item pointed to by the cursor or store a value to be saved.	**UP Arrow:** Pressing this key will move the cursor up or increment a selected value.	**DOWN Arrow:** Pressing this key will move the cursor down or decrement a selected value.

The unit powers off automatically if no activity is sensed. However, it can be manually turned off by holding the ON/HOME key depressed until the display goes blank.
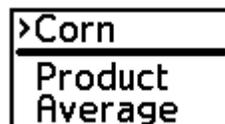
The ENTER key is typically used to initiate a selection or cause a save operation. For example, the ENTER key must be used to save a new bias adjustment.
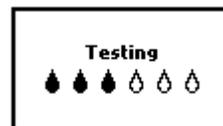

Testing A Grain Sample

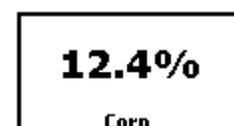| Turn unit on with the ON/ HOME key and allow unit to go through self-test*.	When the unit has completed the self-test, fill the cell with grain and press the ENTER key.	Unit will show that the sample is being tested.	When the unit has completed the test, the moisture value will be displayed.
⧖	>Corn / Product / Average	Testing ♦♦♦◊◊◊	12.4% Corn

IMPORTANT: Cell must be empty and pouring cup removed before turning unit on and while ⧖ is showing.

An empty cell reference measurement is taken immediately after power-up. This reference measurement is used for all product testing until the unit powers down. Thus, it is critical that the cell be clean and completely empty when the unit is powered up and the ⌛ showing. Keep the measurement cell opening clear of hands or other objects during this period.

If the unit is to be used for an extended time period without a normal automatic power down, periodically force a power down such that a new empty cell reading can be taken. This is only in a case where continuous sample measurements are being made with no off time.
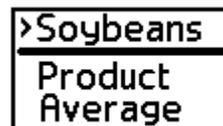

Changing The Product (Grain)

From the main menu, Select PRODUCT. Press the ENTER key.

```
 Corn
>Product
 Average
```
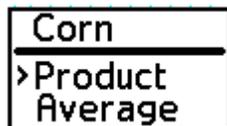
On the PRODUCT screen, select the grain to be tested. Press the ENTER key. See Note 1.

```
Product
 Corn
>Soybeans
```

The main menu is displayed with the product name at the top.

```
>Soybeans
 Product
 Average
```

Detail Screen (Reference Note 1)

```
Soybeans
111120002A.txt
Soybeans
7-22%
R
18Sep03
```

**Note 1:** If the cursor dwell on a product longer than 5 seconds, a detail screen appears for that product. The product can still be selected using ENTER or other products selected using the arrow keys.

The M-3G can hold four calibration files. It typicallly comes from the factory with three products. This allows one grain to have a low and a high range. Thus, the M-3G can hold up to four products; less if multiple ranges are used for a product. The M-20P can hold twenty calibration files. Likewise, this unit can hold up to twenty products; less if multiple ranges are used for a product.

---

**Adjusting the Unit Bias (Matching to Elevator)**

From the main menu, select BIAS. Press the ENTER key.

Soybeans
Average
>Bias
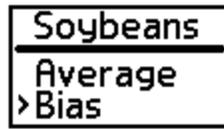
On the first BIAS screen, select ADJUST (or DEFAULT to restore factory values). Press the ENTER key.

If ADJUST was selected, use the arrow keys to modify the shown value. See Note 2. Press the ENTER key to store the new bias.

Note 2:

Reading without Bias ──→
Bias Factor ──→

Bias
14.5%
1.064 ▷ 15.0%
Soybeans

←── Reading with Bias
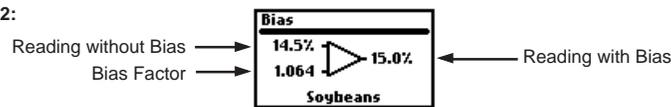
Biasing is performed by forcing the moisture readout value to the value desired. This can be done even if an Error 20 (reading below the lowest limit of the calibration table) or Error 22 (reading above the upper limit of the calibration table) exists. The ENTER key must be depressed to save the new bias.

The bias value is associated with a given calibration file. Thus, the low moisture corn bias is unique and independent of the high moisture corn bias as well as other product calibrations. Each bias value is nonvolatile and will be retained during power-off and battery replacement.

---

**Adding A Sample to the Average (Quick Key)**

To quickly add a sample to the AVERAGE, press the ENTER key after the completion of a moisture reading. The screen will show that the sample was added to the AVERAGE and display the sample number.

Average
Added 12.7%
#3/3
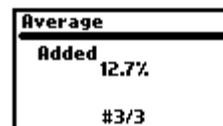
Press the ON/ HOME key to return to the main menu.

>Soybeans
Product
Average
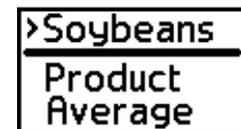
This function is a short-cut method to add to the average. It is provided to make it convenient for quick addition to the average registers. This function can also be accomplished by using the average menu selection.

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## Averaging

**Adding to the Average**

From the main menu, select AVERAGE. Press the ENTER key.

```
 Soybeans
 Product
>Average
```

On the AVERAGE screen, select ADD TO and press the ENTER key. The last sample tested will be added to the average.

```
 Average
>Add to
 Read
```

Reading the Average

From the main menu, select AVERAGE. Press the ENTER key.

```
 Soybeans
 Product
>Average
```

On the AVERAGE screen, select READ and press the ENTER key. The average of all stored samples will be displayed.

Press the UP & DOWN arrow keys to scroll through the samples that were averaged. These are displayed at the bottom of the screen.

```
 Average
 Add to
>Read
```

```
 Average
  15.2%
 #1/3 14.8%
```

Clearing the Average

From the main menu, select AVERAGE. Press the ENTER key.

```
 Soybeans
 Product
>Average
```

On the AVERAGE screen, select CLEAR and press the ENTER key. The Averaged samples will be cleared.

```
 Average
 Read
>Clear
```

The M-3G/M-20P has ten (10) registers for storing ten (10) moisture values to be averaged. Each register is identified with a number - #1, #2, #3, . . . #10. An added value is placed in the next open register. If all registers are full when adding a new value, the value in register #1 is deleted and all values are shifted upward with the new value being placed in register #10.

Clearing the registers makes all ten (10) registers available.

The average calculation is based on only added values where each value can be read.
The average registers do not automatically clear when a different product is selected. It is up to the user to clear the average registers when changing product.
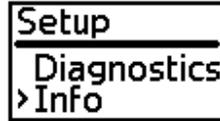
BATTERY INFORMATION

Checking Battery Voltage

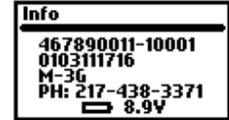From the main menu, select SETUP. Press the ENTER key.

On the SETUP screen, select INFO. Press the ENTER key.

On the INFO screen, the unit will display the part number/ serial number, software version, model name, DICKEY-

john phone number, and Battery Voltage.

```
 Soybeans
 Bias
>Setup
```

```
 Setup
 Diagnostics
>Info
```

```
Info
467890011-10001
0103111716
M-3G
PH: 217-438-3371
         8.9V
```

The unit provides a warning when the battery is low and should be replaced. A battery symbol appears on the display that must be cleared by the user by depressing the ENTER key.

When the battery becomes too low for reliable operation, a battery symbol appears on the display but is not clearable by the user.

Battery Replacement

A high quality 9V alkaline battery is recommended. To replace, unsnap the battery cover panel retention lever and remove the panel. The cover panel has a finger nail grip to aid in removing the panel. Replace the battery and reinstall the cover panel. Press the panel retention lever until it is seated.

Storage Battery

It is recommended that the battery be removed when storing the M-3G/ M-20P (i.e. over the winter). It is also recommended that a new battery be installed at the start of the season.

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ERROR CODES

Error Codes

Error conditions are shown on the display by a "manual" symbol accompanied by an error code number. Some error codes have a symbol to help identify the meaning. The explanation and possible correction are listed:

20 - Moisture is below the lower limit of the calibration table. If you feel the sample should be within the selected range, biasing to the desired moisture can force it into range.	**22 -** Moisture is above the upper limit of the calibration table. If you feel the sample should be within the selected range, biasing to the desired moisture can force it into range.	**24 -** Moisture parameters are out of bounds. This typically happens when a test is performed on an empty cell, or the cell is not empty on power up.	**38, 60, 78, 90, 91, & 92 -** Consult DICKEY-john service.

FILL TECHNIQUE

Scoop or Catching

This unit eliminates sample weighing by utilizing advanced technology to compensate for density including that associated with sample compaction variations in the measurement cell. Some grain calibrations provide excellent compensation while others are slightly affected by sample compaction. Therefore, it is recommended that the standard fill technique be scooping or catching grain from an auger. If pouring is required, pour at a fast rate (dump the grain into the cell). Do not pour slowly. In all cases, be consistent in your method of fill. Biasing can be used to correct for small errors associated with different techniques.

Empty Cell

It is essential that the cell be empty upon power on of the unit. Empty Cell correction takes place immediately after power on and is evidenced by the hour glass on the display.

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SPECIFICATION

Performance Specifications

Operating range (moisture): Grain Dependent

Fill Technique: Scoop or fast fill from auger

Repeatability:+/-.5% Depending on Grain (normal stored grain)

Bias: Operator adjustable for agreement with ref meter

Grain Temp Compensation: Automatic

Resolution: .1% moisture Display: Graphic LCD

Power: One 9V alkaline battery

Warranty: One Year

Weight: 1 lb. 6 oz.

Communications: USB port (type B connector)

Specifications subject to change without notice.

USB CONNECTIVITY

PC Interface

The M-3G/M-20P can be interfaced to a PC (Personal Computer) using a USB cable. Using an executable file provided on the DICKEY-john Web Site, the PC can interrogate the unit and retrieve its calibration files or can send the unit new calibration files. Likewise, language files can be handled in much the same manner, allowing the unit to be configured for different languages. Also, this connectivity provides calibration and diagnostic information which is beyond the scope of this document.

The files associated with this USB connectivity are available on the DICKEY-john Web site.

Web Site Address

www. dickey-john.com

Downloadable Files for M-3G/M-20P

The following files associated with the M-3G/M-20P are downloadable:

      - Operation and File Handling Instructions
          M-3G_M-20P_Operation.pdf

      - PC Communication Program (executable)
          PMTutility.exe

      - Language Files
          English - 111110002_EN.txt (typical)

      - Product Files
          Soybeans - 111120002B_.txt (typical)

M-3G_M-20P_ Operation.PDF

This file provides information on the detailed operation of the unit as well as an explanation of the file downloading process.

PMTUtility.exe

This executable file can be easily downloaded and placed in a convenient subdirectory on a local PC. It requires no installation program but rather is ready for immediate use once downloaded.

English - 111110002_EN.txt (example)

This is a "typical" language file. All such files are .txt files and can be easily read on a text editor if desired. It contains all the required phrases to customize the M-3G/M-20P for that language. The number in the file name is the formal document number used at DICKEY-john to identify the file - 111110001.txt.

Soybeans- 111120002B_EN.txt (example)

This is a "typical" Product file (commonly called calibration files or tables). Like the language files, all such files are .txt files. This file contains all the information required for the indicated product to be used with the M-3G/M-20P. The number in the file name is the formal documentation number used at DICKEY-john to identify this particular file - 111120002B_EN .txt.

Steps in loading a new Product File into the M-3G/M-20P (Language file would be similar)

1. Download the PMTUtility.exe file and store in convenient location on a local PC.

2. Download the Product File of interest and store in convenient location on a local PC.
   (Do not Copy/Paste, since file terminators may be lost).

3. Remove the battery cover panel from the M-3G/M-20P and connect the M-3G/M-20P to a PC using a common peripheral USB cable (type A male to type B male).

4. Initiate the PMTutilty.exe (Double click on file when in Explorer, etc.).

5. Turn the M-3G/M-20P on.
   The sequence of connecting the M-3G/M-20P, initiating PMTUtility.exe, and turning the M-3G/M-20P on is not critical. Once the M-3G/M-20P is turned on, the power time out feature is overridden preventing the unit from automatically powering down.

6. Using the PC, determine how many Product Files are currently in the M-3G/M-20P. If all four Product File allocations are being used on the M-3G or all twenty allocations on the M-20P, one must be deleted if a new one is to be added. Such deletion must be done prior to sending a new Product File to the unit.

7. Open the new Product File using "File" or the "File Open" button. Its contents will appear in the File Viewer window. Select "Send File". The new selected Product File will be sent to the M-3G/M-20P.

8. Power down (Hold the ON/HOME key) and disconnect the USB cable. Power back up and verify that the new product is available for selection.

   Other File Transfers beyond the scope of this document:

   Calibration File Transfers allow the M-3G/M-20P to collect calibration data and transfer the data to a PC for calibration development.

Normalization files are used to calibrate the unit at the factory or Service Center.

A Diagnostic file can be used to convey information to the PC regarding the last test run on the M-3G/M-20P. To develop this file in the M-3G/M-20P, the Diagnostic mode must be enabled on the unit (Menu selection under the SETUP Screen). This is typically used for troubleshooting.

REGULATORY REQUIREMENTS

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Consult the dealer or and experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved by DICKEY-john could void the user's authority to operate the equipment.

Canadian ICES-003 Statement

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

CE

This device complies with the EMC Directives 89 / 336 / EEC; EN61326-1: 1997 including Amendment A1: 1998; ICES-003; and EN55011.

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