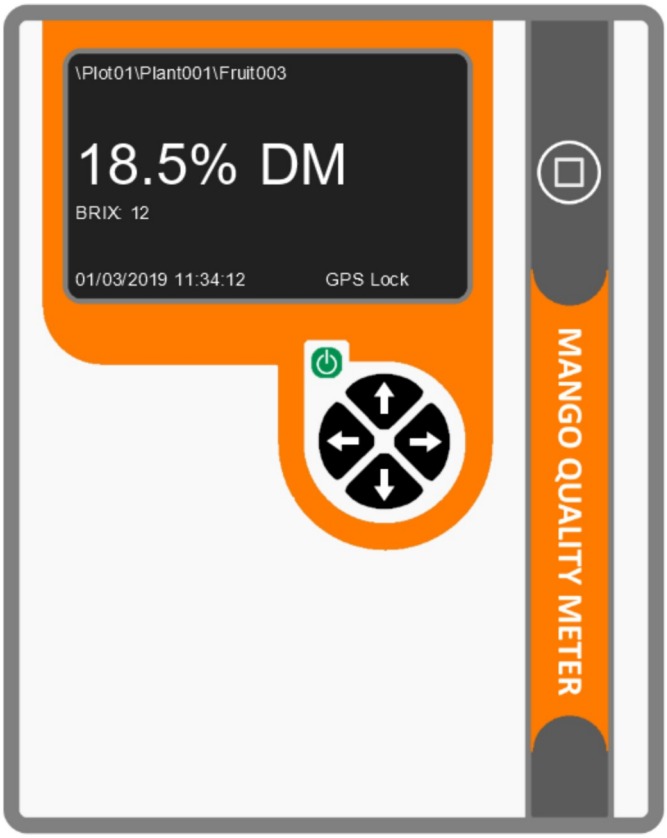
F-751 Mango Quality Meter

MANUAL



Revised 07/1/2019

DECLARATION OF CONFORMITY

Manufacturer:

CID Bio Science, Inc.
Felix Instruments – Applied Food Science
1554 NE 3rd Ave
Camas, WA 98607

Declares that the CE-marked Product:

Product Models (s):

Model F-75x

FCC Compliance Statement:

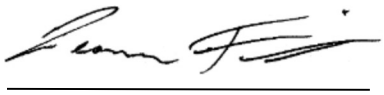
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Complies With:

89/336/EEC Electromagnetic Compatibility Directive
73/23/EEC Low Voltage Directive

Compliance Standards:

EN 55027	RF Emissions Information Technology Equipment
EN 50082-1	EMC Immunity Standard
EN 60950	Safety of Information Technology Equipment Including Electrical Business Equipment



Leonard Felix
President
December 31, 2018

Contents

Overview

Felix Instruments' F-751 Mango Quality Meter is a fast, portable tool for non-destructively measuring mango fruit quality. Combined with **FruitMaps.com**, the F-751 can rapidly take and assess large numbers of scans, giving grove-wide estimations and insights.

The F-751 primarily measures dry matter. Dry matter is the part of the mango which would remain if all its water content was removed. The F-751 measures dry matter with an estimated 5% accuracy, 95% of the time. For more accurate measurements, records can be organized into lots or groups. The average from these lots delivers the most accurate possible result.

The actual dry matter % varies throughout the fruit. See page 8 for instructions on where to scan the mango.

Unpacking & Getting Ready for Use

If you have just received your F-751, the instrument will arrive in a carrying case that includes:

- The F-751 Produce Quality Meter
- SD card
- 2 sets of removeable rechargeable standard-sized batteries (4). Additional button-top 19670, or protected 18650, batteries can be purchased from a preferred battery vendor.
- Battery charger (3)
- Hand strap

Loading the Battery

The F-751 uses 18650 Li-ion 3.7V 3100mAh rechargeable batteries. The batteries must be removed from the F-751 to be charged. To remove the batteries, twist the battery compartment cap, located on the bottom of the device under the rubber bumper. The cap can be twisted with fingers or a screwdriver to tighten or loosen. Use caution when removing batteries, as the cap is spring loaded. Both batteries should be inserted into the unit positive (+) side first (towards lens side).

Warning: Do not drop batteries, this may cause them to crack and rupture.

Protecting Your Device

Ensure that the rubber bumpers on the top and bottom of the F-751 are always installed when using the instrument, as they protect it from water damage.

The hand strap should be tightened so that the device has a snug and secure fit around the hand.

If the lens becomes dirty, it can be cleaned with a soft cloth. The lens is made of extremely durable Gorilla Glass and should not become scratched with normal use.

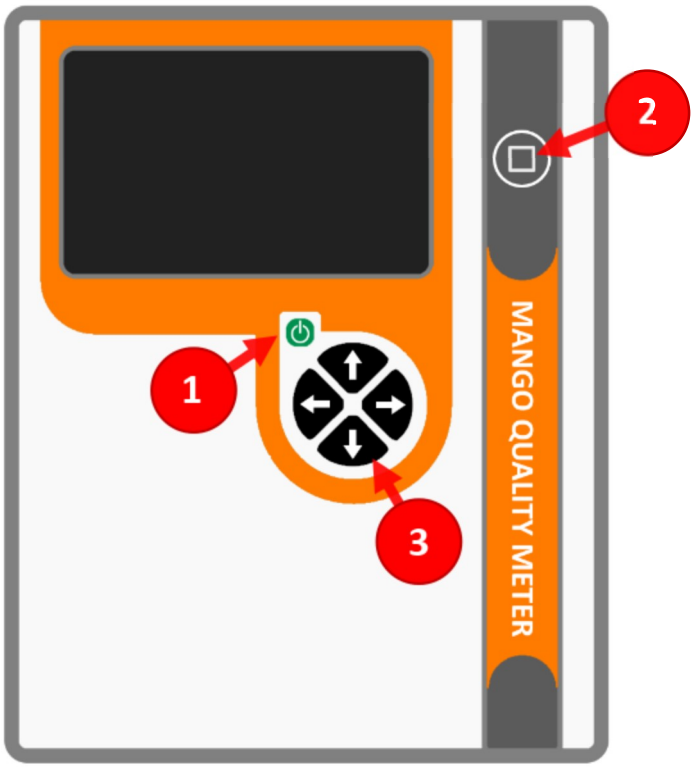
Turning the Instrument On

1. Press the **Power On/Off Button**, the instrument will turn on.

This process takes a few moments and the display will display ***Ready*** *when the instrument is prepared to measure mangos.*

Instrument Interface

1. **Power On/Off** Button
2. **Measure** Button
3. **Navigation** Buttons (referred to as **Up\Down\Left\Right**)



Instrument Interface (Continued…)

Navigating Menus

The instrument's interface is composed primarily of menus that are operated using the navigation buttons.

Up/Down navigates between menu item.

Left navigates back to the previous menu.

Right navigates into the selected menu item.

Entering Text/Numbers

When prompted, text/numbers can be entered using the device using the navigation buttons.

Up/Down navigates between letters/numbers for the current cursor position.

Left navigates the cursor in text that has already been entered. Navigating past the beginning of the text aborts and returns to the previous menu.

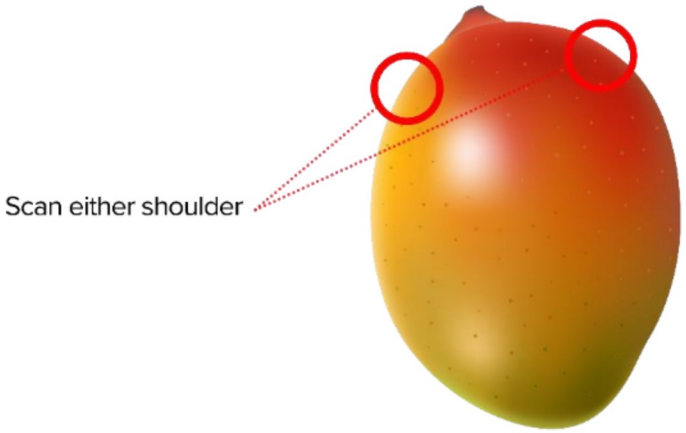
Right navigates the cursor in text that has already been entered. Navigating past the end of the text saves your entry and continues.

Measuring Mangos

1. Position a mango over the lens of the instrument…

Measuring Mangos (Continued…)

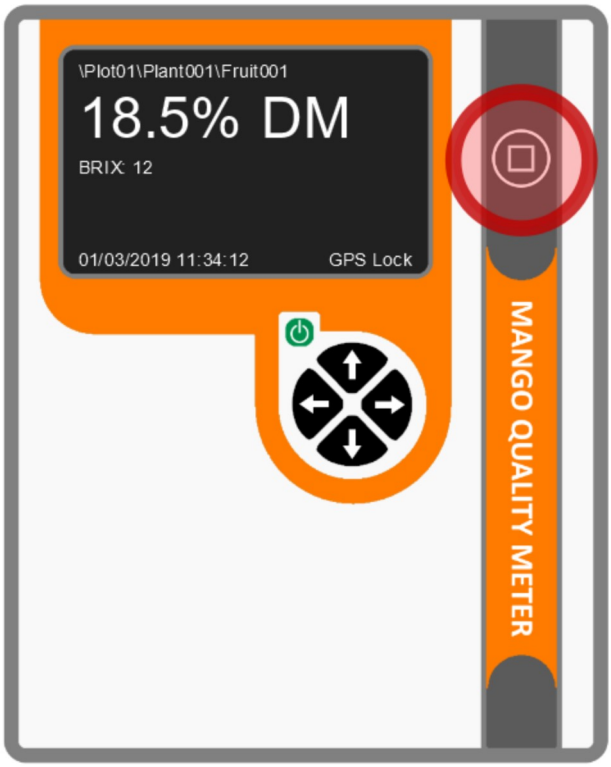
We suggest taking scans from either shoulder of the fruit to reduce any potential interference from the seed. There is noted variance in dry matter between the “blush” and “non-blush” sides of the fruit, therefore it is imperative that the user is consistent in which shoulder they take scans from. If the fruit is large enough, you may take multiple scans of one shoulder to increase confidence in your result.



Measuring Mangos (Continued…)

2. Press the **Measure Button** to record a new measurement.

*This process takes a few moments. The display will display **Measuring** while reading the fruit, then **Processing** while calculating the results. When completed, your measurement results will be displayed.*



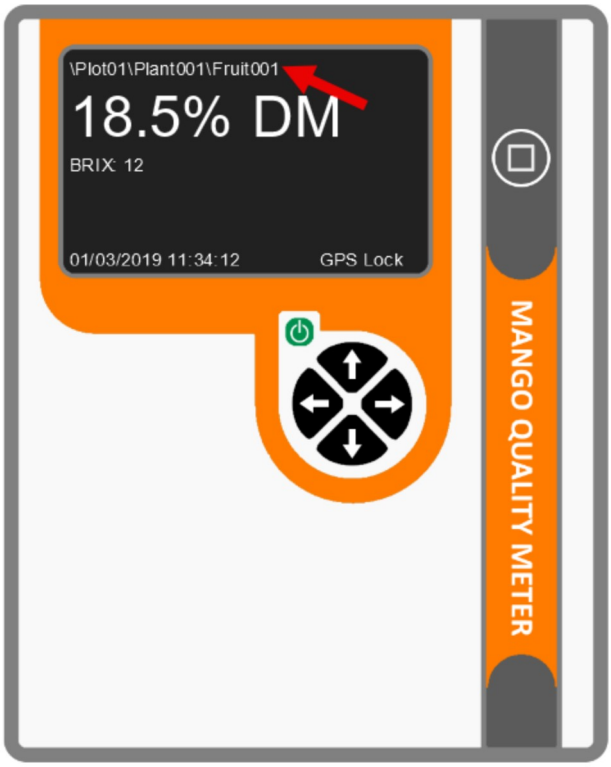
Organizing Measurements

Overview of Lots Used to Group Records

Measurements can be grouped using “Lots”. While browsing measurements, each lot displays the number of records, along with the average and standard deviation of the Dry Matter values.

Organizing an Existing Measurement

While recording a measurement, or while browsing measurements, the Lot is displayed in the upper-left corner of the display. In the example below, the lot is \Plot01\Plant001\Fruit001.



Organizing an Existing Measurement (Continued…)

After recording a measurement, the Lot this record is assigned to can be changed. To do this, while viewing the record, press the **Right** button

Organizing an Existing Measurement (Continued…)

After pressing the **Right** button, the following menu will be displayed. Use the **Up\Down** buttons to select the desired action, then press the **Right** button.

Organizing an Existing Measurement (Continued…)

If you selected **Enter Lot Manually**, the instrument will prompt you to enter a new lot. Follow the on-screen directions to enter the text for the lot.

Separating text with a \ (backslash) allows you to have sub-lots within lots.

Organizing an Existing Measurement (Continued…)

If you selected **Select Recently Used Lots**, the instrument will display a list of the most recently used lots. Navigate these lots using the **Up\Down** buttons, then press the **Right** button to select the desired lot. Alternatively, press **Left** button to return to the previous menu.

Organizing an Existing Measurement (Continued…)

If you selected **Select Lots from List**, the instrument will display a list of the lots pre-loaded on the instrument (see *page 21* for instructions on updating this list). Navigate these lots using the **Up\Down** buttons, then press the **Right** button to select the desired lot. Alternatively, press **Left** button to return to the previous menu.

Organizing New Measurements

1. Press the **Left** button until you have returned to the main menu.

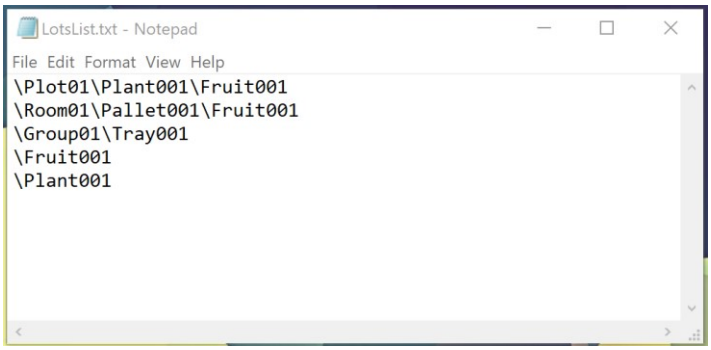
2. Then use the **Up\Down** buttons to navigate to **Default Lot for New Measurements** and press the **Right** button to select that action.

Organizing New Measurements (Continued…)

The menu displayed is identical to the menu displayed for organizing existing measurements (pages 13-19). The difference is that the lot chosen here (from a list or by entering it manually) will be used for all new measurements.

Updating Lots from Your PC

1. Turn off the device.
2. Remove the SD Card from the device.
3. Insert the SD Card into your PC.
4. Launch the Notepad app.
5. Open the file LotsList.txt under the root of the SD Card.



6. Each line entered here will display on the device as a lot.

Assessing Your Results

Users have 3 methods to view and assess measurements –

1. Online with FruitMaps.com
2. Offline on your PC using the SD Card
3. Using on the instrument

Overview of FruitMaps.com

FruitMaps.com, produced in-house by Felix Instruments, is a proprietary application that enables mango growers to better visualize their crop data and convert their gathered measurements into actionable harvest insights.

The following pages will guide you first, through connecting the F-751 to a wireless network, then uploading your data to FruitMaps.

Connecting to a Wireless Network

1. Press the **Left** button until you have returned to the main menu.

2. Then use the **Up\Down** buttons to navigate to **Setup Instrument**.

Connecting to a Wireless Network (Continued…)

3. Use the **Up\Down** buttons to navigate to **Wireless Network**, then press the **Right** button to select that menu item.

4. Use the **Up\Down** buttons to navigate to **Networks**, then press the **Right** button to select that menu item. Select your network and enter the passcode as directed on-screen.

Uploading Records to FruitMaps

1. Before uploading measurements, login to FruitMaps.com and register this device using the serial number. The instrument's serial number can be found on the **Ready** screen.

2. Connect to your wireless network (see page 23).

Uploading Records to FruitMaps (Continued...)

3. Press the **Left** button until you have returned to the main menu.

4. Use the **Up\Down** buttons to navigate to **Upload to FruitMaps.com**, then press the **Right** button to select that menu item.

Downloading Measurements to Your PC

1. Turn off the device.

2. Remove the SD Card from the device.

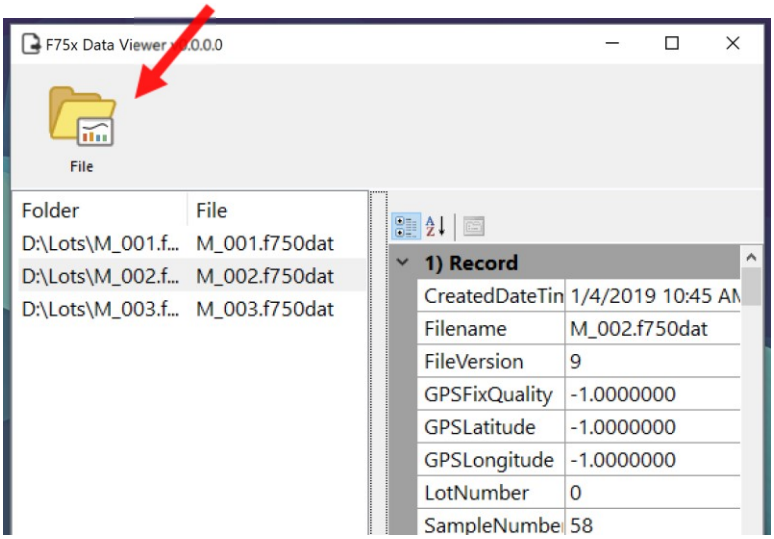
3. Insert the SD Card into your PC.

4. If you have never used Data Viewer…

    4.A. Browse to the **Software** folder on the SD Card.
    4.B. Run **Setup.exe** and follow the prompts to install Data Viewer.

5. Launch Data Viewer (from the Window's Start Menu)

6. Click the **File** icon or press Alt+F, then select **Open**

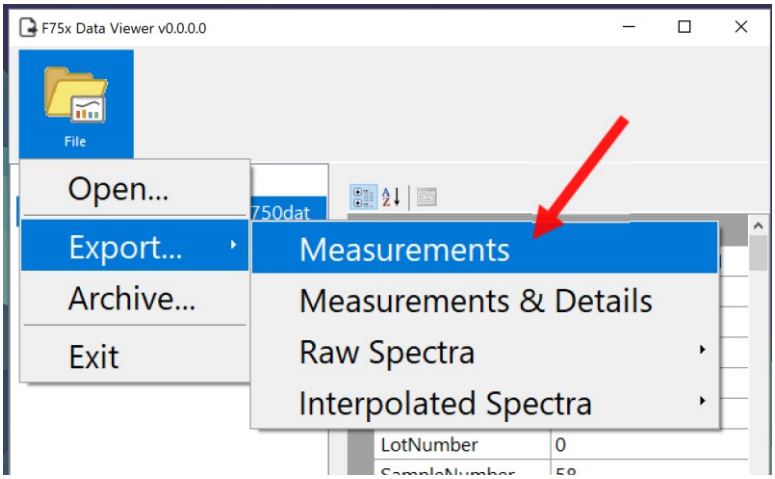


7. Browse to the Lots folder on the SD Card and select the data files to view.

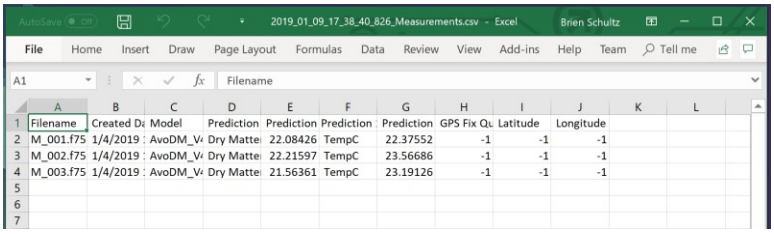
8. Click the **File** icon or press Alt+F

9. Select **Export...**

10. Select **Measurements**



This will export the data to a CSV file that can be opened with Excel or another similar application...



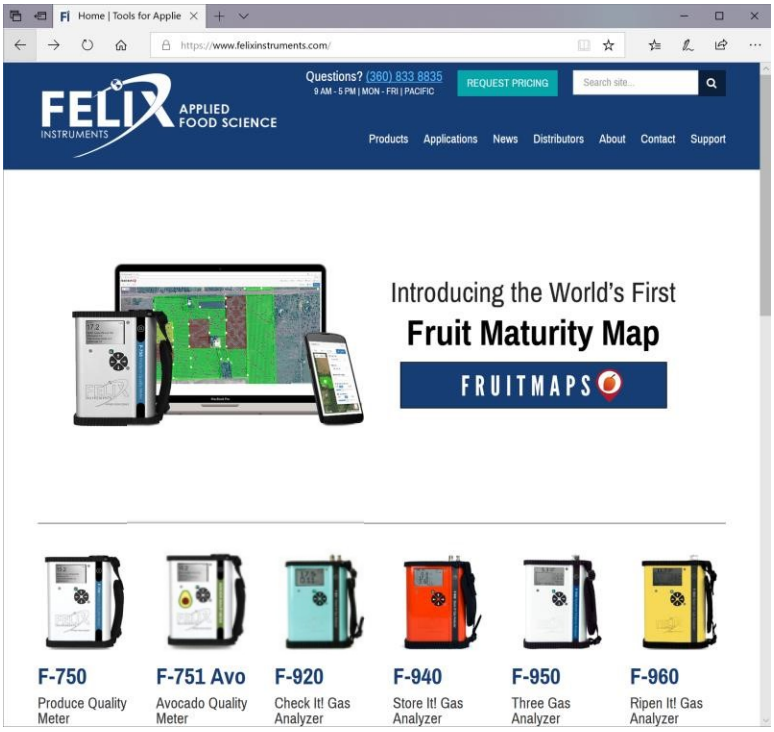
Troubleshooting

If something goes wrong, the device can always be reset by pressing and holding the Power On/Off button for 20 seconds, waiting for two seconds, then pressing the Power On/Off button again.

Troubleshooting (Continued…)

Visit the Felix Instruments website for advanced troubleshooting, frequently asked questions, or to report a problem.

www.felixinstruments.com



Technical Support

If you have questions, online support is available at the following address…

http://www.felixinstruments.com/support

Felix Instruments is committed to provide customers with high quality, timely technical support.

Felix Instruments' contact information:

Mailing Address
Felix Instruments
1554 NE 3rd Ave
Camas, WA 98607
USA

Phone
800-767-0119 (U.S. and Canada)
360-833-8835 (Other countries)

Fax:
360-833-1914

F-751 Production Test Check Sheet

Date: _____

Technician Initials: _____

Serial #: _____

Spectrometer #: _____

Firmware Version: _____

Spectrometer Pixel Coefficients

C0:

C1:

C2:

C3:

C4:

C5:

Spectrometer DAC Offset:

Reference Voltage:

Specific technology in this device was developed with the generous help and technical guidance of PROCINORTE, a network of national agricultural research bodies in the three countries of North America: Canada, USA and Mexico https://www.procinorte.net/.

Technology was also developed and licensed from Central Queensland University, Rockhampton, Australia https://www.cqu.edu.au/