

User's Guide

EXTECH[®]
INSTRUMENTS

A FLIR COMPANY

Fruit Hardness Tester

Model FHT200



Introduction

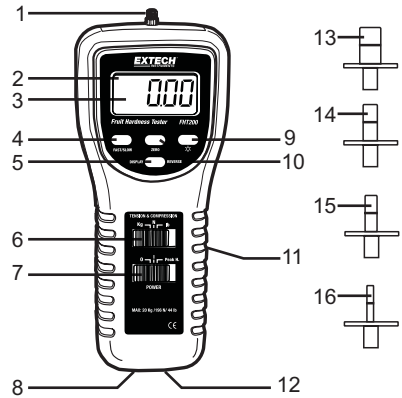
Congratulations on your purchase of Extech's Fruit Hardness Tester Model FHT200. The tester is used to measure the hardness (ripeness) of fruits such as apples, pears, strawberries and grapes. Users include fruit science research departments, fruit producers, fruit farms and agricultural colleges and universities to improve the fruit quality, harvest, storage, and product transportations. The tester helps to judge the fruit's degree of maturity. This professional meter, with proper care, will provide years of safe reliable service.

Features

- Maximum capacity: 20.00Kg / 44.10lb / 196.10 Newton.
- Units: Kg/lb/Newton
- Includes a high precision load cell sensor
- Digital display with Peak hold function for easy measurement
- Tension or Compression
- Positive/ Reverse display
- Large backlight LCD display
- RS-232/USB computer interface
- Complete set with hard carrying case and 4 tips (3 mm, 6 mm, 8 mm, 11 mm)
- Optional USB cable and data acquisition software
- Peak hold (Max. load) can be held in display during the measurement
- Zero button can operate both for normal mode and "peak hold" mode
- Full capacity zero (tare) control capability
- Fast/Slow response time
- Low power consumption for long battery life
- Microprocessor circuit & exclusive load cell transducer
- Overload protection
- DC 9V power adapter input socket

Meter Description

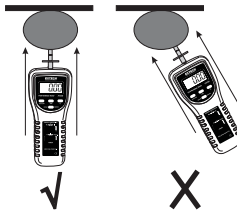
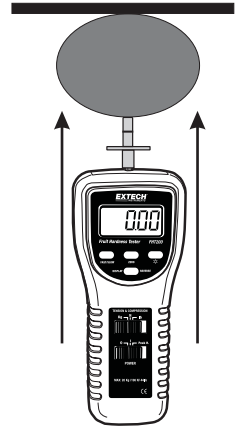
1. Measurement Tip mounting screw
2. Fast selection indicator
3. LCD display
4. FAST/SLOW button
5. LCD Reverse Display button
6. Kg/Newton/LB unit switch
7. OFF/ON/PEAK HOLD switch
8. RS-232 output terminal
9. LCD Back Light button
10. Zero button
11. Battery Compartment (rear)
12. DC 9V Power Adapter input socket
13. 11mm Tip
14. 8mm Tip
15. 6mm Tip
16. 3mm Tip



Operation

Preparation for Measurement

1. Select and install the tip most suitable for the fruit to be tested.
2. Slide the Power switch to the "I" position to turn the meter on.
3. If the meter display remains blank or the "Lo" low battery indicator appears in the display, replace the batteries.
4. Fruit hardness tests utilize the compression function of the meter. The Tension (pull) function is displayed with a "-" symbol and is not normally used for fruit hardness tests.
5. For the most repeatable results, place the fruit against a firm surface when making measurements.
6. Press the measurement tip perpendicular against the fruit surface. Do not measure at an angle.



Tip Selection

There are four diameter tips: 3mm, 6mm, 8mm and 11mm. Which tip should be used is based on the user's experience, type of fruit or vegetable, location the fruit was grown and ripeness of the fruit. Always log tip used with measurement results to establish optimum testing results and insure repeatability of the measurement.

General recommendations are:

3mm	Small fruits, berries
6mm	Hard fruits, grapes
8mm	Firm fruits, pears
11mm	Apples

Fruit Preparation

For most measurements, skin removal is recommended.

Peak Measurement

The Peak mode is the most commonly used mode for fruit harness testing.

1. Install a tip.
2. Slide the POWER switch to the "Peak H" position.
3. Select units of measure (grams/kilograms, ounces/pounds, or newtons) using the units select switch.
4. Press the ZERO button to zero the display.
5. Select FAST or SLOW response. FAST is the preferred speed for fruit harness testing.
6. Properly align the tip and the fruit and then slowly increase the applied pressure against the fruit..
7. When the tip breaks the surface, the force will release and the peak value, which is the highest reading encountered, will remain "held" in the display.
8. Press the ZERO button to clear the display for the next measurement.

Normal Measurement Mode

1. Install a tip.
2. Slide the POWER switch to the "I" position.
3. Select units of measure (grams/kilograms, ounces/pounds, or newtons) using the units select switch.
4. Press the ZERO button to zero the display.
5. Select FAST or SLOW response. FAST is the preferred speed for fruit harness testing.
6. Properly align the tip and the fruit and then slowly increase the applied pressure against the fruit.
7. Observe the display to monitor the applied force.

LCD Backlight

The backlight feature provides display illumination when the meter is used at night or in dimly lighted areas. Press and hold (> 2 seconds) the ***** button until LCD backlight is turns ON. The backlight will automatically turn off after approximately 6 seconds

Reverse Display

The Reverse Display feature flips the display upside-down to permit easy reading of the results regardless of the direction the meter is held during measurement.

Fast-Slow

The Fast-Slow feature selects the meter's response time. Slow response will average the reading over a longer time period and Fast response will display more rapid changes.

"FAST" appears in the display when it is selected, no display indication appears for slow.

RS232 PC/USB Interface

Optional software is available to log, graph and save measured data.

Maintenance

Battery Replacement

The low battery indication appears on the LCD as "Lo". Replace the batteries when this symbol appears.

1. Remove the two screws securing the battery compartment cover.
2. Lift off the battery cover.
3. Replace with 6x 1.5V AA (UM-3) batteries. Observe polarity.
4. Replace compartment cover and screws.



All EU users are legally bound by the battery ordinance to return all used batteries to collection points in your community or wherever batteries / accumulators are sold! Disposal in the household garbage is prohibited!

Specifications

Display	5 digits LCD with backlight.
Transducer	Load cell.
Units	Kg/Newton/LB.
Measure Capacity	20.00Kg / 44.10LB / 196.10 Newton.
Resolution	0.01Kg / 0.01LB / 0.05 Newton.
Min. Display	0.02Kg / 0.07LB / 0.3 Newton,
Accuracy	± (0.5 % + 2 digits), within 23± 5°C, and @ 10 Kg & 20 Kg.
Update time	Fast: Approx. 0.2 second, Slow: Approx. 0.6 second.
Over range Indicator	" - - - - " is displayed
Data output	RS-232 serial computer interface.
Overload Capacity	Max. 30kg.
Full Scale Deflection	Approx. 0.4mm max.
Data output	RS-232 serial computer interface
Mounting Holes	Located on rear (thread size: M5 x 0.8mm ISO); mounting screws included
Power Supply	6 x 1.5 V AA (UM-3) batteries or 9VDCadapter (not included).
Power Consumption	Approx. DC 28 mA
Operating Temperature	0°C to 50°C (32°F to 122°F).
Operating Humidity	Less than 80% RH.
Dimension	215 x 90 x 45 mm (8.5 x 3.5 x 1.8 inch).
Weight	650g (1.43lb)/with batteries.

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