Digital Fruit Hardness Tester 4 in 1
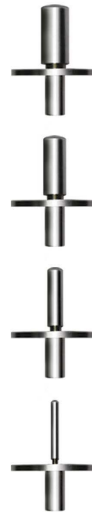
FRUIT HARDNESS TESTER

19.99

FAST/SLOW   ZERO   ☀

DISPLAY REVERSE

TENSION & COMPRESSION

Kg   N   lb

O   Peak H.

POWER

20 Kgx 0.01 Kg
196 N x 0.05N
44 lb x 0.01lb   CE

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1 FEATURES

* The tester is used to measure the hardness of most kind
  fruits such as apple, pear, strawberry, grape, large/hard
  fruits, small/soft fruits. It is suitable for the fruit
  scientific research department, fruit company, fruit farm,
  agriculture colleges and universities to improve the fruit
  quality, the harvest storage, the product transportation etc.
  by the fruits' hardness. The useful tester to judge fruit's
  mature degree.
* Max. capacity : 20 Kgf x 0.01 Kgf (10 gf).
* Unit : Kg/LB/Newton.
* Use load cell sensor, high precision.
* Digital display with Peak hold function, easy
  measurement.
* Tension or Compression, Zero.
* Positive/ Reverse display.
* Large LCD display with back light.
* Tip size : 3 mm, 5 mm, 8 mm, 11 mm.
* RS-232/USB computer interface.
* Complete set with hard carrying case and 4 kind tips
  (3 mm, 5 mm, 8 mm, 11 mm).
* Test stand optional.
* USB cable and the data acquisition are optional.
* Peak hold (Max. load) can be held in display during
  make the measurement.
* Zero button can operate both for normal measuring
  & the " peak hold " operation.
* Full capacity zero (tare) control capability.
* Fast/Slow response time push button.
* Hand held & stand mounted gauges are available.
* Low power consumption gives long battery life.
* Microprocessor circuit & exclusive load cell transducer.
* Over load protection.
* Built-in DC 9V power adapter input socket.

2. SPECIFICATIONS

Principal	The hardness of Fruit can express by the unit area (S) could undertake the pressure of dynamometer (N) , their specific value is just as the hardness (P). $P = N / S$ *P = Hardness value of fruit (Kg/cm²)* *N = Pressure of dynamometer (N, Kg, LB)* *S = Area of pressure (m², cm²)*
Display	LCD (Liquid crystal display). 5 digits, 16 mm (0.63") digit size. Back light.
Display Direction	Positive or Reverse direction, select by the push button on the front panel.
Function	Tension & Compression (Push & Pull). Normal force, Peak hold (Max. load).
Peak hold	Will freeze the display value of the Peak load (Max. load).
Zero	Zero button can be operated both for "normal force" or "peak hold" operation
Unit select	Kg/Newton/LB.
Measure Capacity	20.00 Kg/44.10 LB/196.10 Newton.
Resolution	0.01 Kg/0.01 LB/0.05Newton.
Min. Display	0.02 Kg/0.07 LB/0.3 Newton,
Accuracy	$\pm$ (0.5 % + 2 digits), within 23$\pm$ 5℃. ** Under the test weight on 10 Kg & 20 Kg.*
Update time	Fast Approx. 0.2 second. Slow Approx. 0.6 second.
Over range Indicator	Display show " - - - - " when in over range status.
Data output	RS-232 serial computer interface.

Overload Capacity	Max. 30 kg.
Full Scale Deflection	Approx. 0.4 mm max.
Zero/tare Control	Max. full capacity.
Circuit	Exclusive microprocessor LSI-circuit.
Power Supply	6 x 1.5 V AA size battery or DC 9V adapter (not included).
Power Consumption	Approx. DC 28 mA
Transducer	Exclusive load cell.
Operating Temperature	0℃ to 50℃ (32℉ to 122℉).
Operating Humidity	Less than 80% RH.
Dimension	215 x 90 x 45 mm (8.5 x 3.5 x 1.8 inch).
Weight	650 g (1.43 LB) / with batteries.
Data output	RS-232 serial computer interface
Mounting Holes	Main instrument with mounting holes are provided on the back case, easy stand mounting.
Accessories Included	Operating manual ....1 PC. 11 mm Penetrometer Tip.......................1 PC. 8 mm Penetrometer Tip........................ 1 PC. 5 mm Penetrometer Tip........................ 1 PC. 3 mm Penetrometer Tip........................ 1 PC. Carrying case .... 1 PC.
Optional Accessories	* Test stand * RS232 cable * USB cable * SD card data recorder * Software for data logging & data recorder

3. FRONT PANEL DESCRIPTION
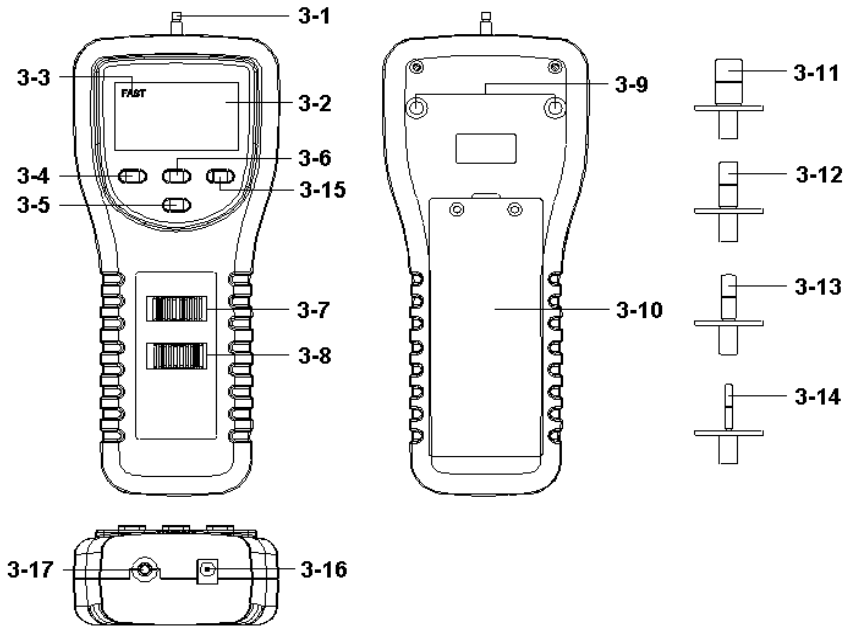
3-1 Universal Sensing
    Head

3-2 LCD-Display

3-3 Fast Indicator

3-4 FAST/SLOW Button

3-5 LCD Reverse Display
    Button

3-6 Zero Button

3-7 Kg/Newton/LB Unit
    Switch

3-8 Power Off/On/Peak Hold
    0 = Off, 1 = On

3-9 Mounting Holes/fixing
    Screws

3-10 Battery Cover/Compartment

3-11 11 mm Penetrometer Tip

3-12 8 mm Penetrometer Tip

3-13 5 mm Penetrometer Tip

3-14 3 mm Penetrometer Tip

3-15 LCD Back Light Button

3-16 DC 9V Power Adapter
     Input Socket
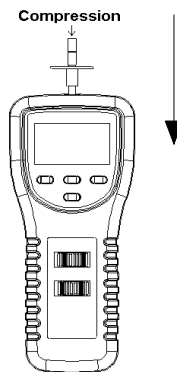
3-17 RS-232 output terminal

4. MEASURING PROCEDURE

4-1 Pay attentions for the measurement

1) When make the fruit hardness testing, it always use compression function, the display will show the '" - " mark automatically.

   Remark :
   The meter can use the " Tension " measurement, however for the fruit hardness measurement is not use this function typically.

2) Pressure head and fruits should be vertical surface. When make the measurement, the Sensing Head along the tip should be on a line with measuring fruits (ref. Fig. 2)
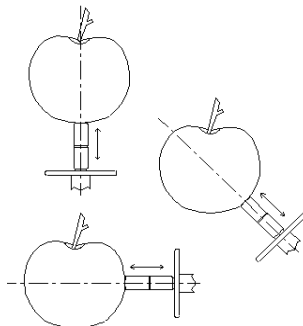

Fig. 2

3) Rotate the Sensing Head is prohibited. Some certain angles between Sensing Head & measuring object are not allowed (ref. Fig. 3).
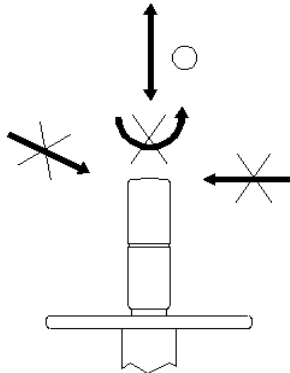

Fig. 3

4-2 Normal Measurement

1) Slide the "Power Off/On/Peak Hold Switch" (3-8, Fig. 1) to the "On" position.

         0 = Off, 1 = On

2) Determine display unit of g, oz or Newton by selecting "Kg/Newton/LB Unit Switch" (3-7, Fig. 1).

3) Connect " Sensing Head " (3-1, Fig. 1) with proper "Adapter" (3-11 to 3-14, Fig. 1) and the "Measuring Object" should be in straight line. Don't give any force in standby mode.

4) "Zero Adjust" by pushing "Zero Button" (3-6, Fig. 1) before every measurement.

5) Start measurement by giving force (push or pull), then the LCD will display the Average reading value.

   During the measurement, if intend to change the display direction, just push the "Reverse Button" (3-5, Fig. 1) once.

* There are two kind sampling time of display, FAST and SLOW. Push the "FAST/SLOW Button" once (3-4, Fig. 1), if the upper left corner of LCD show " FAST " (Fast Indicator, 3-3, Fig. 1), then the display reading is under the operation of fast sampling time.
* If the upper left corner of LCD not show the " Fast Indicator " (3-3, Fig. 1), the display reading is under the slow sampling time.
* Over range display of tension function, LCD will show " ‒ ‒ ‒ ‒ ‒ "
* Over range display of compression function, LCD will show " _ _ _ _ _ "

4-3 Peak Hold Measurement

The meter can measure the peak value of force both of tension & compression operation. The operation procedures of Peak Hold Measurement are same as above "4-2 Normal Measurement" but should slide the "Power Off/On/Peak Hold Switch" (3-8, Fig. 1) to the "PEAK H." position.

Slide the "Power Off/On/Peak Hold Switch" (3-8, Fig. 1) to the "On" position will cancel the peak hold function.

4-4 LCD Back Light On/Off

During the measurement, press and hold (> 2 seconds) the " ✳ Button " (3-15, Fig. 1) until LCD Back Light is ON, then it will be off after a period time.

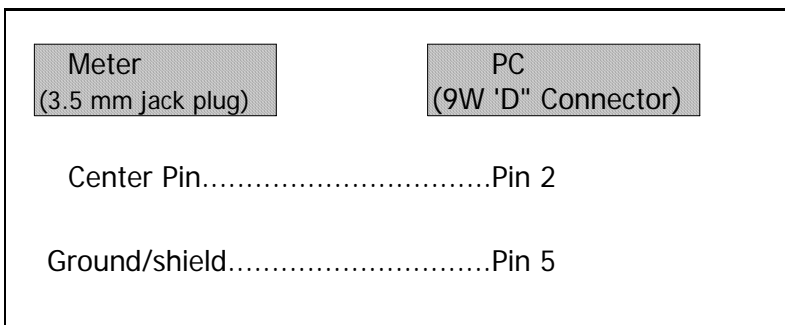several seconds then off automatically

5. BATTERY REPLACEMENT

1) When the LCD shows " Lo ", it is necessary to replace
   the batteries. However, in-spec. measurement may
   still be made for several hours after low battery
   indicator appears before the instrument become
   inaccurate.
2) Take out the battery cover (3-10, Fig. 1) away from the
   instrument and remove the batteries.
3) Install the batteries (6 x 1.5 V AA) correctly
   into the battery case.

6. RS232 PC SERIAL INTERFACE

The instrument features an RS232 output via 3.5 mm
Terminal (3-17, Fig. 1).
The connector output is a 16 digit data stream which can
be utilized to the user's specific application.
An RS232 lead with the following connection will be
required to link the instrument with the PC serial input.

Meter (3.5 mm jack plug)	PC (9W 'D" Connector)
Center Pin...............................Pin 2	
Ground/shield.............................Pin 5	

The 16 digit data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicate the following status :

D0	End Word
D1 & D8	Display reading, D1 = LSD, D8 = MSD *For example :* *If the display reading is 1234, then D8 to D1 is : 1234*
D9	Decimal Point(DP), positision fron right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP
D10	Polarity 0 = Positive 1 = Negative
D11 & D12	Anunuciator for Display
	g = 57 | Newton = 59 | oz =58
	Kg = 55 | LB = 56 |
D13	1
D14	4
D15	Start Word

RS232 setting

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

7. MOUNTING HOLES & OPTIONAL

TEST STAND

Fruit hardness tester is a precise instrument, best results are obtained when the gauge is fitted to a test stand. Mounting holes (3-9, Fig. 1) are provided on the back of the gauge for easy stand mounting.

Optional Test Stand & accessory :

 * TEST STAND
   Size: 630 x 250 x 230 mm.
   Weight: 7.02 Kg (15.4 LB).