

System Requiries

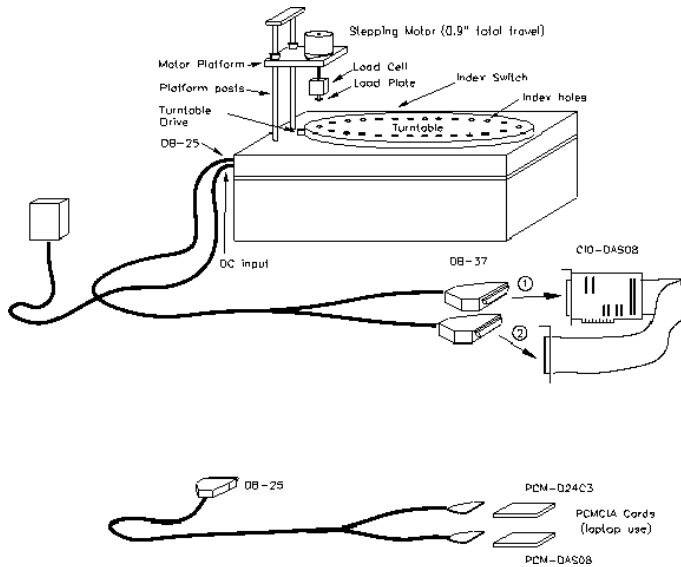
Firmtech System 1, PC Version

Min. Pentium2, 133 Mhz
Min. 32 MB RAM
Win95/98/NT
One free ISA Slot

Firmtech System 2, labtop

Min. Pentium2, 133 Mhz
Min. 32 MB RAM
Win95/98/NT
Two PCMCIA Slots

Firmtech System 3, labtop + PC



Technical information:

Size: 360 x 400 x 360 mm (WxLxH)
Weight: 5 kg
Power supply: 15V, 2.5 A (power unit included)
Port connections: analog input and digital I/O via ISA cards
Step resolution: stepping motor 1/1000 inch/step
Measuring range: maximum 1500 g pressure from load cell
0.5 g resolution
Velocity: about 50 fruits in 2 minutes
Data format: ASCII datafiles or automatic input in database

Firmtech Systems are supplied with

Firmtech basic hardware including Control-Soft and one turntable with 25 indentures suitable for cherries or blueberries, flat probe (about 15mm diameter), connection cable for PC or labtop, main power cable (220V/110V, 2.5 A), calibration weight (250g), ISA card or PCMCIA, spanner to change plates and probes

Additional parts

We deliver special forms and sizes of turntable, so that oval objects like plums will keep their correct positions. The form of the probe can be adapted to your aim of measurement. The Database Fruit-Soft gives you a strong tool to handle your experiences over years. The Database can be adapted to your special application. For larger fruits like tomatoes, oranges or kiwis we supply a similar hardware setup with one bigger step motor (elongation) and no turntable to keep the hardware small enough to fit on standard laboratory desks.

For further information please contact:

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Feel the difference with Firmtech



Check the firmness of soft-fruit with Firmtech:

- quick test
- non-destructive
- easy to use



Firmtech – principles

The Firmtech has been developed as a tool for the rapid evaluation of firmness of soft fruit. The idea is as good as it is simple – fruit are tested similarly to how a consumer might test fruit with his fingers before buying them in the supermarket. The Firmtech gently squeezes the fruit to determine firmness.

Using a turntable, suitable for sampling 25 fruit, a test series can easily and quickly be done (about 50 fruits in 2 min). Fruit are placed into indentures on the turntable which help



Control-Soft – Controlling the Firmtech instrument

Fruits are automatically tested using a Windows 95/98/NT custom program. Depending on your aim of the test you can choose between four different procedures and set up suitable parameters like maximum force on the fruit and velocity of the probe and turntable.



■ Compression Proc. (Force thresholds)

This procedure uses a maximum force threshold. The Firmtech squeezes the fruit to a specified force and determines firmness.

■ Compression Proc. (Defl. thresholds)

This procedure uses a maximum deflection threshold. The Firmtech squeezes the fruit to a specified deflection and determines firmness.

Firmtech can be used with a variety of different fruits

Although the Firmtech has been developed for cherries, it is suitable for a large number of other things. The standard setup can be used for a number of soft objects which yield to a measurable amount of deformation when compressed with a maximum force of 1500g. The size should be smaller than 30 mm. The Firmtech can be used for non-destructive testing of:

- cherries
- blueberries
- radish
- plums
- cherry-tomatoes ...

Since there is no protecting skin, it can be used as a destructive system for:

- strawberries,
- raspberries
- blackberries ...

Or you can think of really other objects – Limited only by your imagination, many other items have potential for testing:

- mushrooms,
- rubber balls,
- jelly babies,
- olives...

Depending on the application, the turntable and the probe can be made suitable for many different types of fruit or specimens. For plums we use a turntable with 12 oval shaped indentures and for strawberries we supply a round probe.



■ Puncture

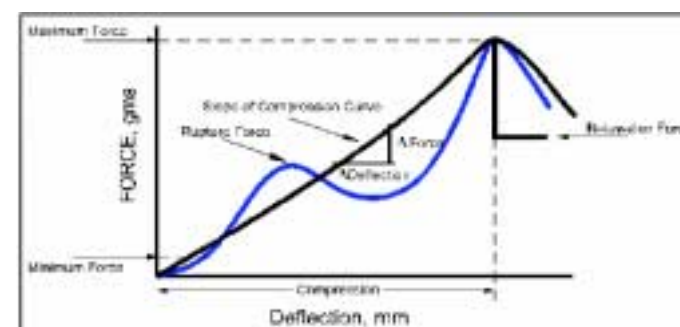
Firmtech detects the pressure of destroying the skin. You should use special probe suitable for your object.

■ Relaxation Procedure

Fruit are compressed according to the max. force procedure. The probe keeps this position for a certain time (maximum 1 sec), resulting in an inelastic remodelling of the fruit. This gives a force drop and is detected by the Firmtech.

■ Size measurement (optional)

Size measurement can be done at the same time as measuring firmness and will be prepared for the next systems, resulting in a useful tool for quality control and saving your time.

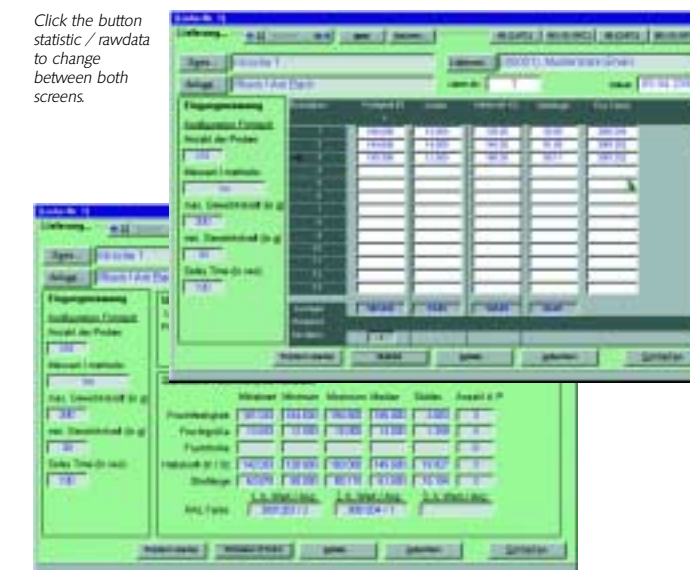


As fruit are squeezed by the instrument load cell, the force increases. The rate at which the force (grams) increases per unit of deformation (mm) is defined as firmness (grams/mm). A firmness measurement of 200 would mean that if a force of 200 grams were placed on the fruit, it would deflect 1 mm.

Fruit-Soft Your useful database for post harvest control

Fruit-Soft manages all information you may add to your firmness test in an easy-to-use database and defines unequivocal datasets, characterized by sort/variety – supplier/farmer – plant – orchard – delivery-no. – picking date.

Click the button statistic / rawdata to change between both screens



The last results from firmtech instruments can be entered in the database with a single key stroke.

Additional to the firmness data you can enter the following data via keyboard to your dataset:

- Colour measurements
- Size, Height
- Holding-Force between cherry and stem
- Acid, Sugar
- Store temperature and storeroom

This list can be adapted to your special task.

An automatic statistic function calculates mean, minimum, maximum, standard deviation and median from all data series. The colour values will be sorted according the most frequently value.

Each dataset can be completed with a detail form, where you can enter physical properties and diseases, taste characters and other particular information. Free space is provided for the harvest consultant to enter his evaluation.

Finally all important data of one measurement series are printed out on a control form (certificate) with only one click on the screen. We can easily adapt the layout from your companies standard formular.

The data can be exported with a clear data selection query window (e.g. all data from one orchard measured in the last years), thus keeping your experiences useful for yourself and for others.

The software is available in german and english.