PENETROMETER

Fruit Measurement System V3.0

USER GUIDE

WEL

WEL Electronic Penetrometer (V3.0) User Guide

Foreword:

The WEL Electronic Penetrometer V3.0 has been engineered for reliability, accuracy and minimum maintenance.
This instruction document presumes that the user has adequate knowledge of Windows™ operating system to install software and configure communications ports.

Contents

Safety:

1. This unit is powered from the AC Mains supply. It is imperative that the power lead and adaptor are kept away from water. Failure to do so could cause electrocution.
2. The Penetrometer is a mechanical instrument that has the ability to inflict minor injury if fingers or hands are in the path of the tip during a test cycle. Please ensure that your hands are clear of the penetration point while testing.

System Requirements:

This software is compatible with Windows 7, Windows 8.1 and Windows 10.

Software Compatibility:

The .NET DLL software interface is used to configure the penetrometer. This software can also be used for inserting measurements into any program which takes text input. E.g. Excel.

Installation:

The Penetrometer is supplied with the following items:
1x Penetrometer Unit
1x 8mm tip
1x 11mm tip
2x 25mm Shafts
1x Plastic splash plate
1x power supply
1x foot pedal
1x data lead
1x USB Flash Drive containing .NET DLL Interface Software
1x USB to Serial Adapter Cable
1x calibration test weight and hook
1x packing box

Unpack the Penetrometer, set up the stand in the work environment at a comfortable height for operation. (Keep the packing box as it will be useful for future calibration certification tests!)

Installing Software

WEL Software

Follow the **WEL Penetrometer Quick Start Guide** on how to install **Setup WEL Penetrometer Software** which is on the USB flash drive provided.

Open the .NET DLL Interface Software, configure the "Com Port" you intend to use. (e.g. COM1.)
(Coms menu on top tool bar)
Once the software port has been selected, close the coms menu. (The software baud rate is fixed at 57600 and is not user adjustable.)

Setting up the Penetrometer

Connect all leads into the back of the Penetrometer stand. (NOTE: All leads have a unique connector so that they cannot be incorrectly inserted into the sockets on the rear of the stand.)
Connect the USB to Serial Adapter Cable to computer then connect the penetrometer data lead to the USB to Serial Adapter Cable or COM Port if the PC has one. If you are using a USB Port, you will also need to install the USB to Serial adaptor provided.
You MUST install the driver supplied with the adaptor for correct operation.

Connect the power adaptor plug to the mains power outlet.
The Green LED on the front of the stand should blink several times as the stand powers on and then become a solid green glow.

After connecting to the penetrometer via the .NET DLL Interface Software the serial number, multiplier and stand calibration date will be display in the designated fields.

For software which is written to use the .NET DLL, the stand will now be linked to your application and your software will now be able to capture the data from the Penetrometer.

Measurement depth and speed can be set in the .NET DLL control panel screen.

Operation of Software:

.NET DLL Interface Software

To use the penetrometer to input into a spreadsheet. Follow the steps in the **WEL Penetrometer Quick Start Guide**.

Refer to the software guide supplied by the software writers for any specific requirements. (E.g. inserting calibration multiplier)

Operation of the Penetrometer

Select the tip size required and extension shaft if required. Screw together with the splash plate between the tip and extension, then screw the assembly on to the load cell. Ensure that these are **FIRMLY** screwed together as a loose fitting will introduce measurement errors in depth measurement and pressure readings and could result in shaft damage.

Place the sample to be measured on the measuring block. (It is imperative that the measuring surface is absolutely rigid as any compression or flex will introduce a depth error.)
Operate the pedal to commence the test. Once the pedal has been depressed for 1 second, the test is commenced and will complete a measurement cycle regardless of whether the operator has the pedal operated or released. When the programmed depth is reached, the Penetrometer will automatically return to the home position.

Routine Maintenance

Disconnect the power adapter before doing the following.

Penetrometer Stand	Clean stand, tips, extension shaft and splash plate. Use a soft damp cloth with soap.
Pedal	Wipe pedal to clean dirt build up. Check for loose screws, fittings. Check lead for damage.
Leads / Accessories	Wipe gently with damp soapy cloth to remove any build up dirt / foreign material.

Before use make sure to dry stand and tip assembly, replace onto the load cell. Ensure that these are firmly secured. Ensure that the work area is left clean and free of hazards.

Calibration Check

The Penetrometer can be checked regularly if required (Using the .NET DLL Interface Software). The procedure to **Calibrating WEL Penetrometer** can be found **WEL Penetrometer Quick Start Guide** on the USB Flash drive provided.

Faults / Troubleshooting

Fault	**Check**
Stand does not work. No Green Light.	a) Check PSU Unit is plugged in. b) Check power socket is working. c) Check for lead damage on power supply.
Stand does not work. Green light is off and no actuator movement.	a) Check pedal is plugged in. b) Check pedal is operating correctly by substitution. c) Motor has an electrical fault. Return for repair.
Penetrometer actuator goes down and stops down.	a) Faulty Actuator – Return for service.
Penetrometer operates. No data out.	a) Check data lead and power adapter is connected to the stand. b) Check COM port selected in the software is correct. c) Substitute USB adapter and check for data. d) Check data is getting to PC via SerialCom on the USB provided. (57600 baud, No parity, Byte size is 8, 1 stop bit)
Erratic Readings	Check Actuator for mechanical Problem a) Mechanical noise from actuator. b) Radio interference in the immediate area of the stand. c) Loose connector on load cell.
Down and ZigZag modes don't work in .NET DLL Interface Software.	a) Set "After pressing Enter, move selection Direction" to "Down" in Spreadsheet program.

Specifications

Power Input: AC 90-265 volts
Power consumption: 40 watts
Stand input Voltage: 24 volts DC
Stand input Current: 1.5 amps
Measurement Range: 30- 15000 gm
Measurement Speed: 8 – 25 mm/second
Force resolution: 5grams
Depth resolution: 0.1mm
Overload protection: 20000gm cut-off with 150% load cell overload capability.

Warranty Statement and Terms and Conditions of Sale

Willowbank Electronics warrantees this product against manufacturing, electronic and electrical defect for a period of 12 months.
Any warranty claim is on a “return to base” basis, freight paid by the customer.
Any accepted claim will be repaired/ replaced at the discretion of Willowbank Electronics Ltd or its authorized agent, providing that the equipment is being used in the manner for which it was intended.
Willowbank Electronics Ltd accepts no direct or consequential liability for any damage or losses arising from the use of this instrument.
In the event of any proven loss, liability shall not exceed the purchase value or upgrade value of the device.
This unit is sold under the terms and conditions of New Zealand Law.

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