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FIX-ALL
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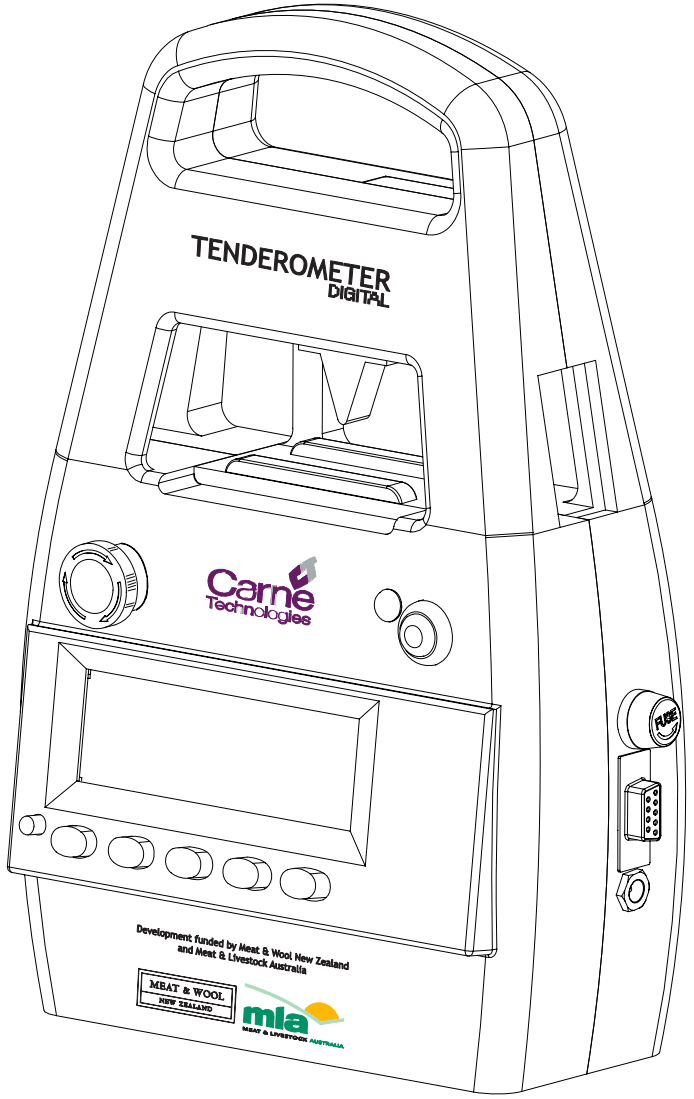
TENDEROMETER
DIGITA



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INSTRUCTION
MANUAL

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AP 2008

Before You Begin

Thank you for your purchase of the Fix-All Services Ltd. tenderness measurement tool the Tenderometer Digital. This guide explains the unit's functions, including normal and standalone operation.

Before use of the Tenderometer Digital for the first time, please read through the *Safety Precautions* and *Quick Start* sections.

▪ Warranty Information

The Tenderometer Digital has a warranty for manufacturing defects; this is valid for one year from the date of purchase. If a problem is encountered, please contact Fix-All Services Ltd. (Contact information is provided on the rear cover of this manual).

▪ Safety Precautions

This instrument has enclosed a powerful electric actuator. This is activated by pressing the start button. When the instrument is in normal operation, operators need to exercise caution to keep body parts clear from the operating window.

In circumstances where the instrument is not actively being used, the emergency stop button should be ensured to be depressed to avoid unwanted operation. This includes when the device is being cleaned.

WARNINGS

- This is a precision instrument. Do not drop it or subject it to physical shock.
- The Tenderometer Digital is also a calibrated instrument, and therefore do not attempt to disassemble or modify the equipment. High-voltage internal parts may cause electrical shock.

This Instrument

Tenderometer Digital is manufactured by Fix-All Services Ltd. The information is provided for your information:

- **Instrument Serial Number**

If the Tenderometer Digital is returned to Fix-All Services Ltd for service etc. please include this instruction manual.

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Quick Start

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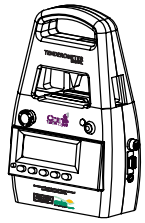
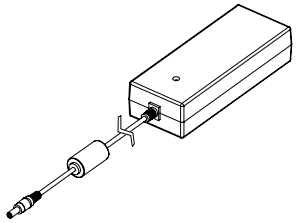
- **Package Contents**

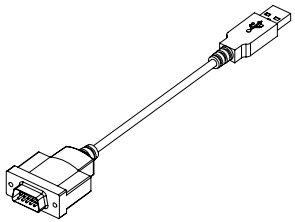
Tenderometer Digital



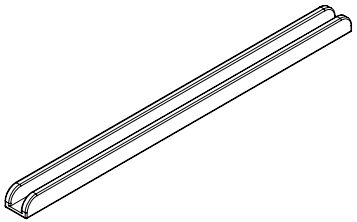
Compact Power Adapter



Serial to USB Adapter



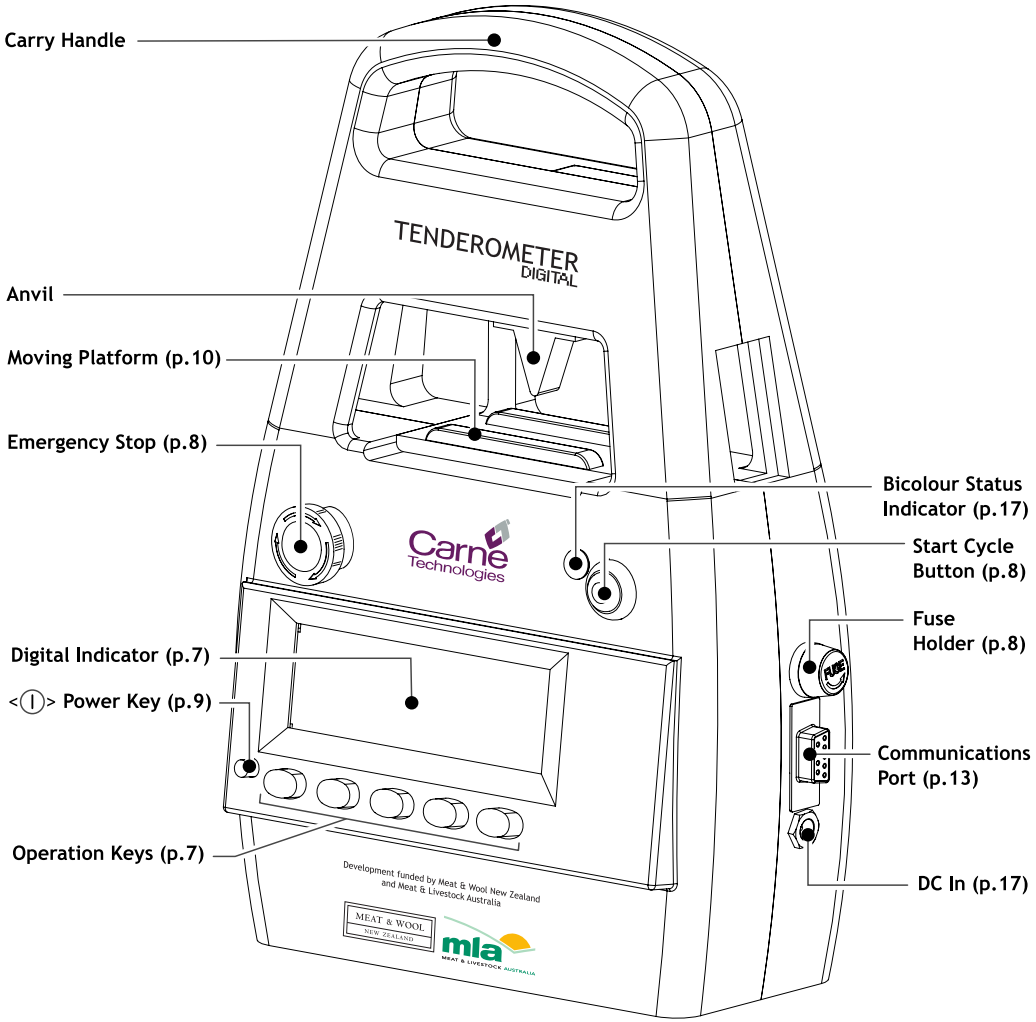
Sample Tray



- Instruction Manual (This Booklet)
- Spare Fuses
- Power Cord*

* The power cord provided is for the AUS/NZ standard plug (AS/NZS 3112:2004). The compact power adapter can accept your country's power cord using the standard IEC, C13 connector (IEC 60320).

- **Nomenclature**



Main Instrument

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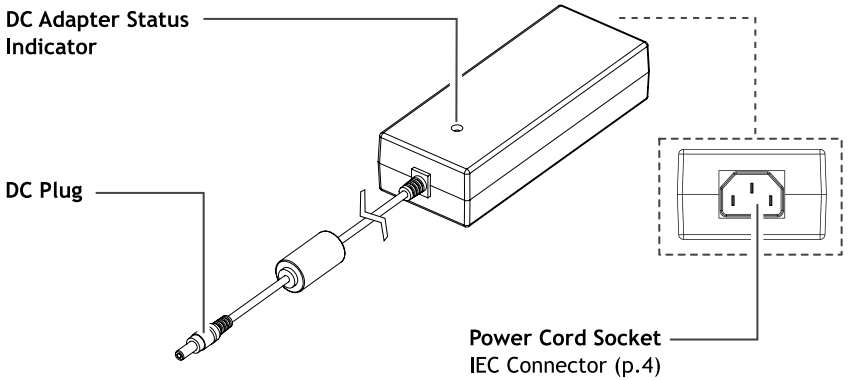
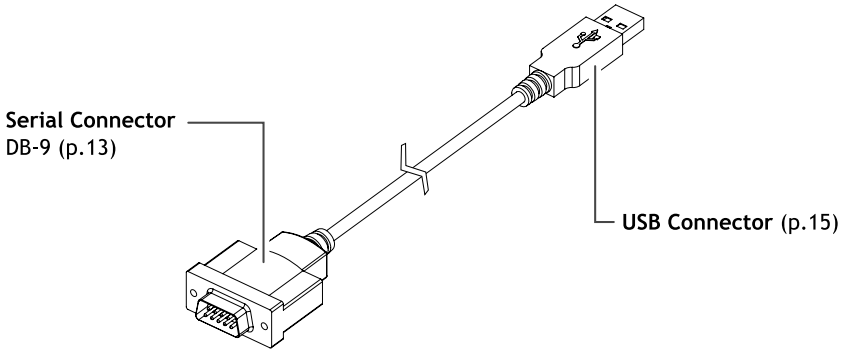
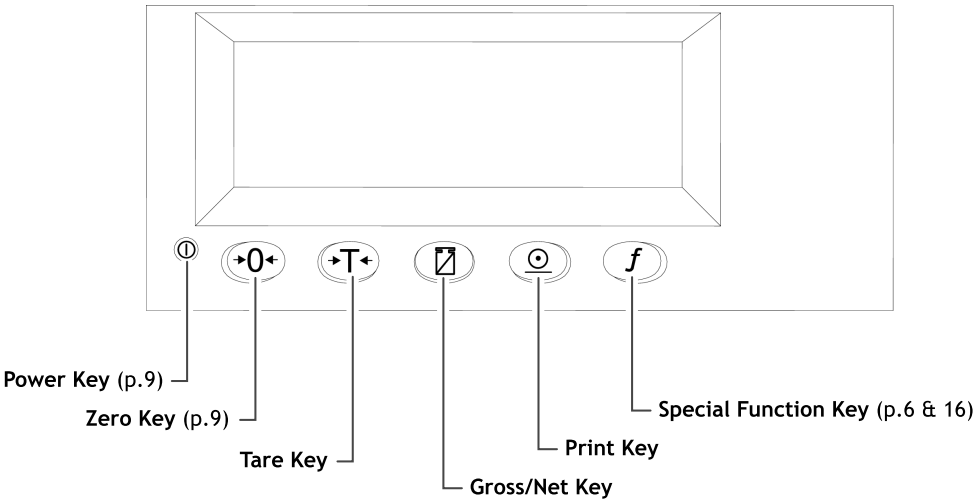


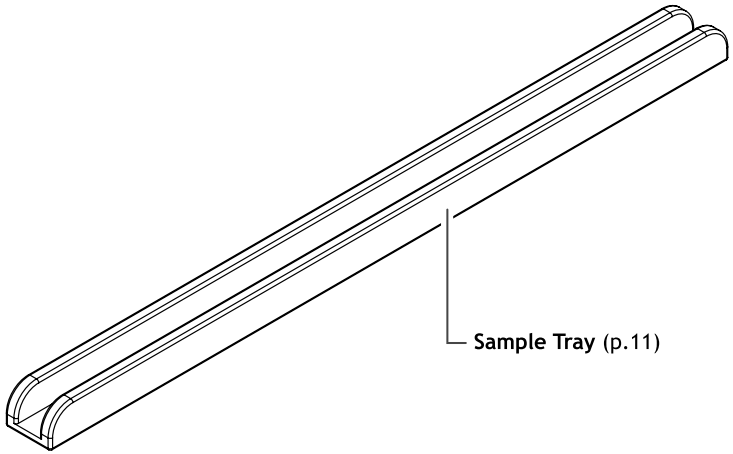


Compact AC Adapter

and

Serial to USB Adapter





Digital Indicator and Sample Tray

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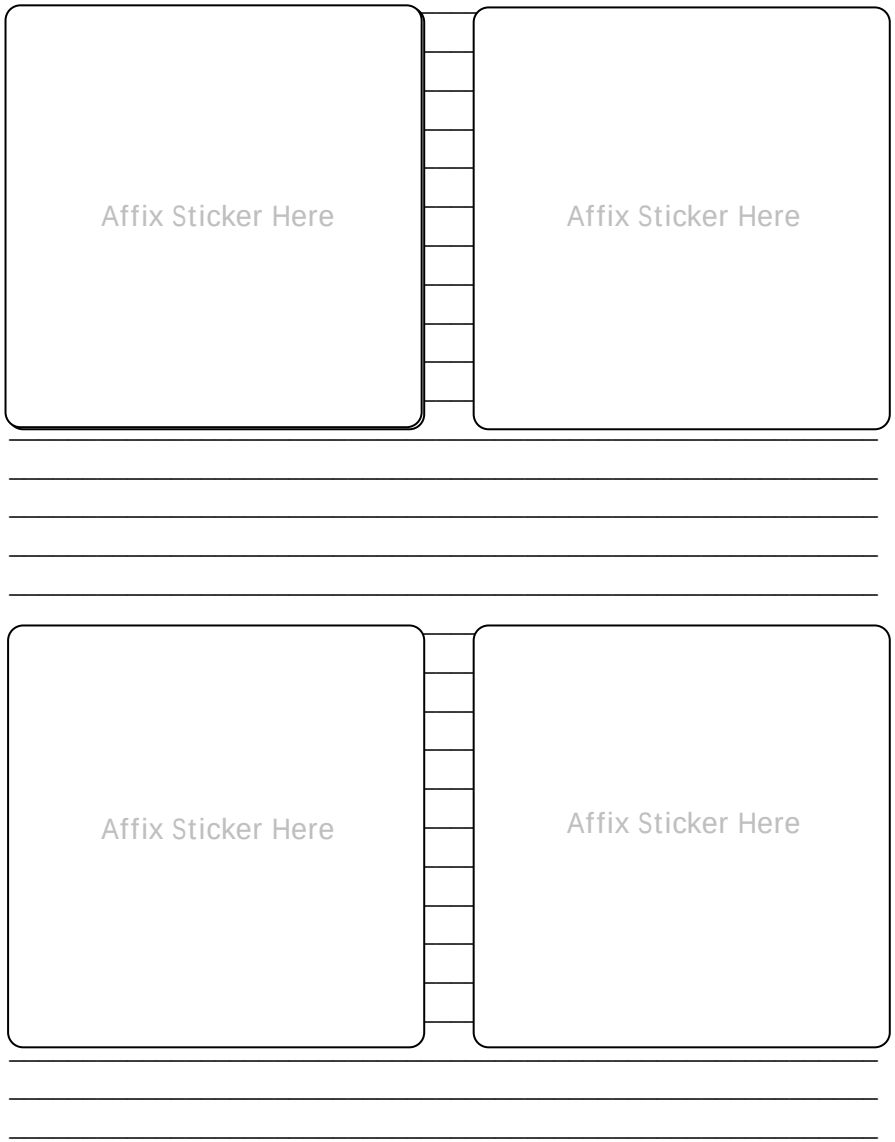
Calibration Data



First Use

The following steps will help you get your Tenderometer Digital up and running smoothly.

When the instrument is removed from its package, you will find that the fuse holder and fuse is removed. This is to ensure that the unit is kept in the OFF position during delivery.

Before replacing the fuse, understand that the emergency stop button is used as the main on/off switch. When inserting the fuse, ensure that the emergency stop button is depressed.

At any stage in the operation of this instrument, pressing the emergency stop disconnects power to the internal electronics and electric actuator from both the internal battery pack and external AC adapter.

1. Push Emergency Stop, then insert Fuse

Ensure that the fuse is rated for **3.0 A**

2. Connect AC Adapter

The Tenderometer Digital has an internal NiMH battery pack. As the instrument has been factory calibrated, the internal battery pack will have some remaining charge, but it is recommended that the unit is connected to its AC adapter for the first use procedure.

3. Turn On

Firstly, ensure that there are no obstructions to the moving platform. To turn on, rotate the emergency stop button clockwise and it will release. The Tenderometer Digital is now on, and you should see the bicolour status indicator lit, and the digital indicator also should be on.

The digital indicator may not be on. The indicator has a memory of the last power status when the power was interrupted. This can be turned on by pressing and holding in the power key until the display lights up.

4. First Cycle

To perform a cycle, press the ‘start cycle’ button. This results in the moving platform raising, and then lowering.

5. Set Zero

The digital indicator zero should be set when there is an empty scale. This is done by pressing the zero key. The zero symbol is displayed < ► **0** ◄ > on the indicator.

6. Use in Standalone Mode

The Tenderometer has the ability to be used in a standalone mode. This feature enables a special function of the digital indicator to retain the peak reading on the display. To enter this mode, press the special function key. The display now shows an < H > symbol, and displays the last peak reading.

The previous peak reading is cleared by pressing in the special function key until two audible beeps are heard.

A sample can be placed in the sample tray, and the sample inserted into the instrument. The sample should be put in a situation where the anvil will strike **only** the sample. This is done by allowing the sample tray to sit flat on the moving platform and to be located by the guide rails. The magnet will assist you.

Specifications

- **Tenderometer Digital**

Weight	**Approx. 4.6 Kg**
Dimensions	186.5 x 275 x 86.7 mm
Humidity	<90%
Temperature	0 to 40 °C (Ambient)
Power Source	DC 36V 3.33A (120W)
Interface	RS232 (DB-9 Connector)
Fuse	3A MAX

- **Digital Indicator**

The digital indicator used in the Tenderometer Digital is manufactured by Rinstrum Pty.

- **AC Adapter**

The AC adapter can be supplied with voltages between AC 100-240 at either 50/60 Hz.

Care for your Battery

Inside your Tenderometer Digital is a NiMH battery pack. These batteries provide the power to the electronics and the electric actuator. To charge these batteries, included inside the unit is a NiMH battery fast charge controller. The external energy source for the battery charger is the AC adapter.

The fast charge controller uses several techniques to manage the state of the batteries including voltage slope, temperature and time.

▪ Bicolour Status Indicator

On the front of the Tenderometer Digital is a bicolour status indicator. This gives you information of the current level of the battery. When the light is **green**, the voltage level of the battery is within an acceptable level.

When the indicator is **red** this indicates that it is time to charge the battery. The AC adapter should be connected as soon as practical.

You will find that the indicator will flicker between red and green when the actuator is in operation. When the actuator operates and the indicator is red for the duration of the cycle, please charge the battery.

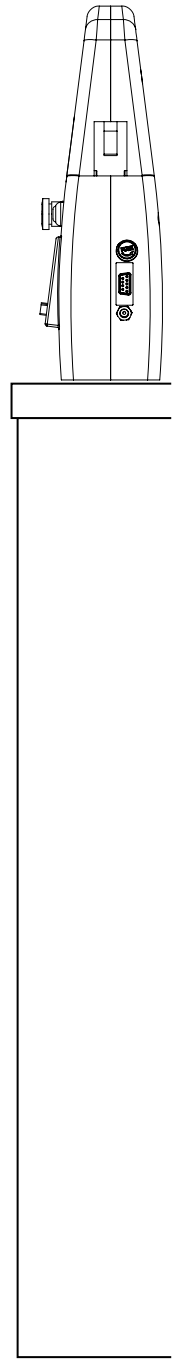
▪ Useful Info

New NiMH batteries ordinarily last from 500 to 1000 charges.

Regular use of the device is good for the batteries.

Keep in mind that at room temperatures, NiMH batteries generally lose 1% of their charge per day. So if you are not using the instrument charge the batteries at least every **sixty** days.

Normal Operation



The Tenderometer Digital is intended to measure the tenderness of samples. The operator is given an indication of this on the digital indicator. The displayed result is an indication of force, displayed in Kilogram units.

The flow of operation for the instrument is that samples are placed in a sample tray. The tray is then placed in the Tenderometer Digital and a cycle is completed on each sample in the tray. Data is obtained from each sample through the serial communications port. (Refer Serial Communications.)

The Tenderometer Digital is designed for use in a normal working environment, where it can be placed on a standard bench or desk top depending on the working position.

Standard care and handling precautions are taken for this precision instrument. The Tenderometer Digital should not be subjected to physical abuse or harsh environmental factors like extreme temperatures or humidity. (Refer Specifications.)

Operator safety is important. This instrument contains an electric actuator to control the moving platform. All objects are required to be kept clear from the operating window when the instrument is in operation. If you have any concern, the emergency stop can be pressed at any time. The unit will turn off instantly.

If the Tenderometer is to be cleaned or serviced, then the emergency stop should be pressed and the instrument isolated by removing the fuse.

- **Operating Sequence**

1. Work Area

The Tenderometer Digital should be placed on a stable, flat and clean work area. When the AC adapter is used, a suitable mains power source should be provided, and it is intended to sit flat on the surface also.

Cables connecting to the instrument need to be placed where they will not place any stress on the Tenderometer Digital or cause it to fall over.

2. Sample Preparation

Samples for measurement in the Tenderometer Digital are required to be able to be deformed. Placing a rigid body in the sample tray and operating the instrument will change the instrument's accuracy, and may permanently damage the load cell. The samples should be prepared according to standard practice.

3. Saving the Data

Data from the Tenderometer Digital can saved using serial communications. The serial port needs to be connected to a computer with that capability and also has the necessary software.

To setup this operation refer to the Serial Communications section for details.

4. Testing Samples

The prepared samples are placed into the sample tray and then inserted into the Tenderometer Digital. Measurements are taken for each sample by pressing the start cycle button when the sample is placed directly under the anvil. For accurate readings and to care for your Tenderometer Digital, ensure that the measurement is taken of the sample only and not of any rigid body.

Standalone Operation

The Tenderometer Digital can always be used on its own, i.e. without a computer. The difference is that only the digital indicator reading is used, and this should be manually written down. Also, the information obtained is only the peak value.

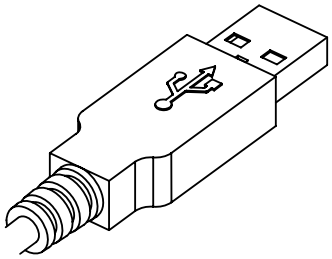
A similar outline for standalone mode is given in the *Quick Start* section. To use the standalone mode, firstly, the instrument should be zeroed. A zero set is done by pressing the zero key. The zero symbol is displayed < ► **0** ◄ > on the indicator.

Now the digital indicator is put in peak hold mode. For convenience, the peak hold function has been set on the special function key. To enter the peak hold mode, press the special function key. The display shows an < H > symbol, and displays the last peak reading. The indicator will now only display

The previous peak reading is cleared by pressing in the special function key until two audible beeps are heard.

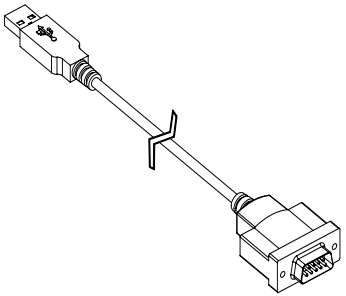
Samples can now be measured in a similar method to normal operation.

Serial to USB Adapter



Most computers rarely use the serial communications port and as such, most notebook computers now no longer have serial ports. Therefore a Serial to USB adapter must be used.

Included with the Tenderometer Digital is a third-party Serial to USB adapter.



This can be used to create a serial port on a computer which does not have a physical DB-9 connector.

Inside the package of the Serial to USB adapter will be a cable (like the one shown) and a driver disc if this is required.

- **Tips:**

- We have found that which port the USB connector is plugged into each time can make a difference (on the same computer). In some situations, the driver for the adapter associates itself with a particular USB port. If you encounter difficulty for the adapter to be recognized in Windows on a computer where it worked before, try another USB port to find where it was originally setup.

- To check which COM port the adapter is set to, you can check this in control panel's 'Device Manager' and look under ports.

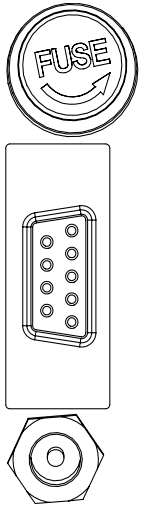
To assist you, a magnet is present on the moving platform. This helps with ensuring that the sample tray is in the correct position.

5. Clean Up

When measurements are finished, then the Tenderometer Digital should be cleaned. Before cleaning, press the emergency stop button, remove cable connections and isolate machine by removing the fuse.

The main instrument is coated for ease of cleaning, and can be cleaned using a mild detergent solution and rubbing with a cloth. Cleaning of the sample tray can be done separately in a tub. A scouring pad can be used on the sample tray if needed.

Serial Communications



The Tenderometer Digital is designed to be used in conjunction with a computer. Data can be acquired from the digital indicator using the RS232 Serial communications port. There is a DB-9 port located on the right-hand side of the instrument.

By Default, the serial communications port functions by streaming live data from the load cell at a frequency of 10Hz (0.1s). This data is in a standard text string (ASCII) format.

With a standard terminal (e.g. HyperTerminal, Windows), correct operation of the serial communications can be identified. The terminal should be set to the appropriate COM port[1], and these are the factory default settings:

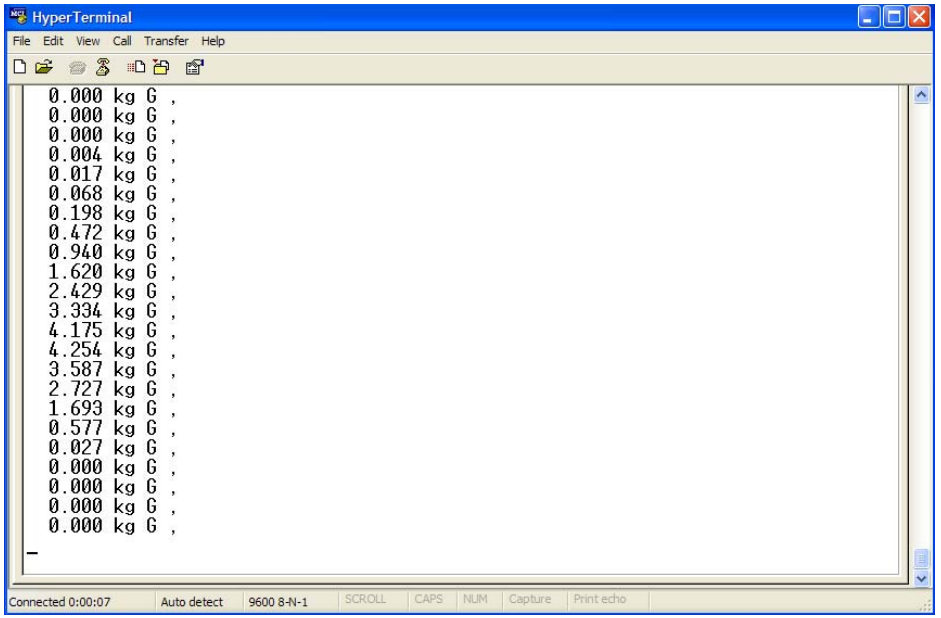
Setting:	
Bits per Second	9600
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	Hardware

[1] Read through the USB section if you are using the Serial to USB adapter.

▪ Simple Use (HyperTerminal, Windows)

With the terminal set to the correct COM port and the serial communications set to the default settings, a connection can be established.

When you have the terminal setup correctly, you should see the following output in the terminal window:



Using the ‘Transfer’ > ‘Capture Text’ function, the data can be saved as a text file. The data is streamed as a string in the format:

String = “ <leading spaces> <value> <unit> <status> ‘,’ ”

The *comma delimited* text file can then be imported into a program (such as Excel) to process the data. To extract the numbers only from the data, a useful formula for Excel is: (<COLUMN> where data is stored)

= VALUE(LEFT(<COLUMN>,FIND(".",<COLUMN>) + 2))