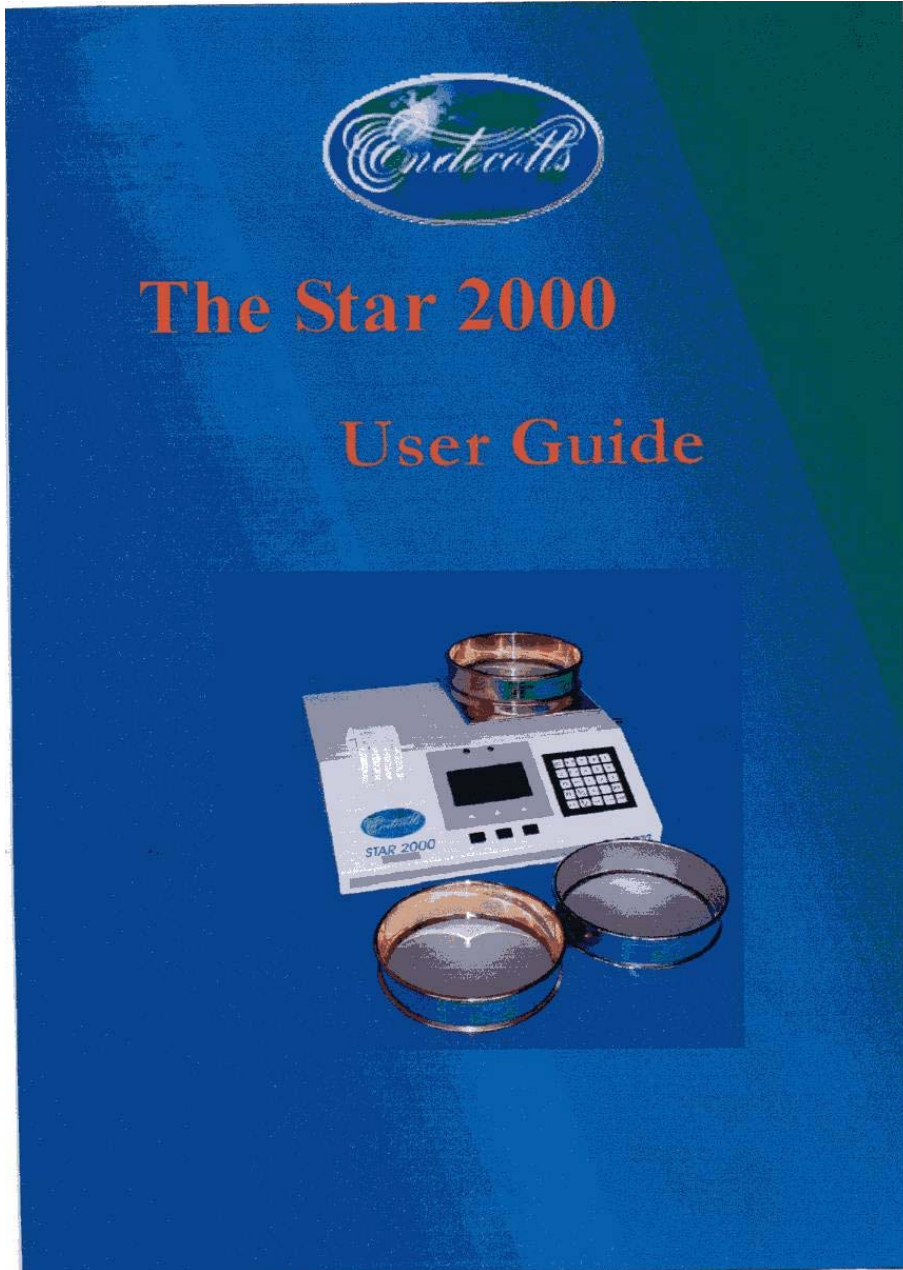




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# The STAR      User Guide

## Sieve Test Analyser & Recorder

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## Description

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The Endecotts Star 2000 is a dedicated Sieve Test Analyser, Recorder and stand alone balance. The combination of a sensitive balance, a sophisticated microcontroller, a back lit liquid crystal display and printer in one compact unit makes an accurate and reliable device for sieve test analysis. It is a fast and efficient method of producing and storing sieve test results.

The results are displayed in a clear visual manner in a tabular form. The balance can be used as a stand alone weighing instrument within the specified range to the same accuracy and readability.



# Sieve analyser features

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## ***Sieve memory***

You can store and recall up to 10 stacks each containing up to 16 sieves and a receiver plus the empty sieves weight.

## ***Edit a stack***

This allows you to change any sieve within the working stack.

## ***Results print out***

After the completion of a test the results are displayed on the screen (sieve aperture, weight retained, weight percentage retained and total sample weight) you then have the option of printing the results or sending them to a PC as a delimited file (data separated by a comma and carriage return/line feed) this format allows you to import the data into a spreadsheet or database. (see page 17)

## ***Error checking***

During a test the sieve analyser continually checks to ensure each sieve is weighed correctly before it is accepted.

## ***Clock/calendar***

The sieve analyser has a clock and calendar function after a test the time and date is either printed or sent to the PC along with the results.

## ***Stack and test reference***

A numeric stack and test reference can be attached to each of the stacks.

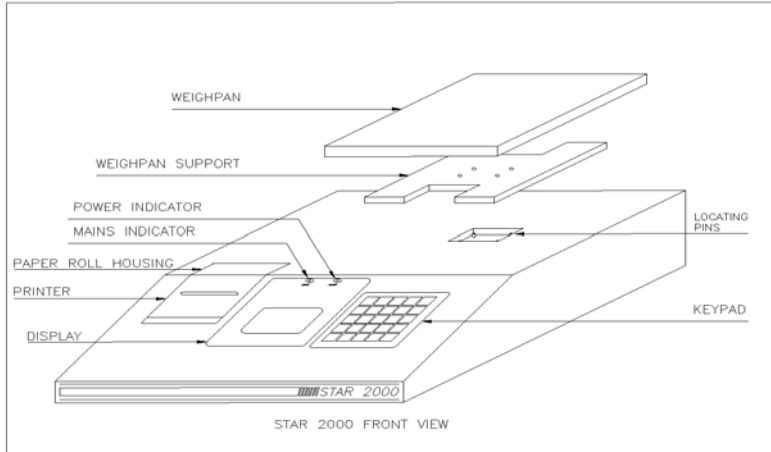
The sieve analyzer can be plugged into any mains voltage in the range of 100-240 volts AC.

# Sieve analyser set up

## **Installation**

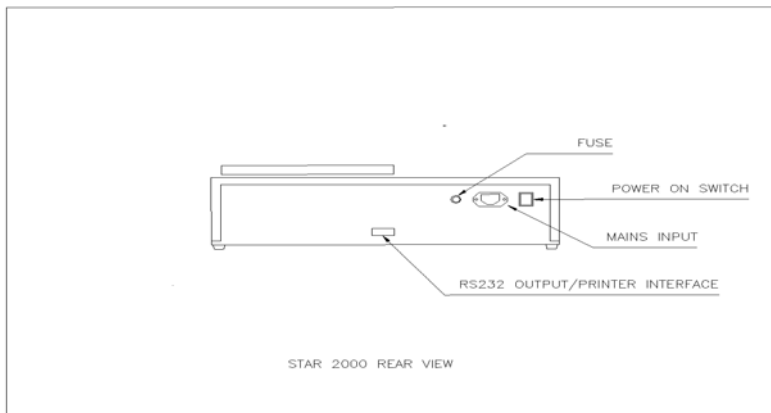
Ensure the instrument is on a stable vibration and draft free platform.

Place the weighpan on the support.



## **Connection**

The moulded power cord supplied with the unit is suitable for connecting between the IEC socket at the rear of the instrument, and a local power outlet.



# Sieve analyser set up

---

## *Connection cont/...*

The power switch is situated next to the IEC socket at the rear of the unit. The fuse holder is also adjacent to the IEC socket. Always use a fuse of the same type and size as the original, this should be a 1¼" long, quick acting fuse. The maximum current rating should be 2A.

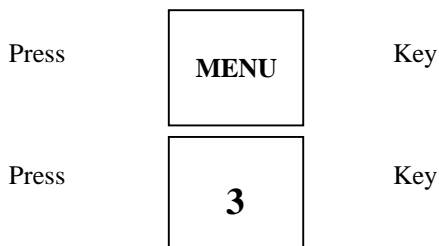
## *Powering Up*

On connecting the power cord to the rear of the instrument and local power outlet, the 'Mains' indicator will be energized, even though the main switch is not activated. This is an indication, from a safety point, that live power is connected to the instrument. When the main switch is activated, by depressing the side of the switch marked 'I', the Power indicator, will be energized, indicating that the instrument is activated. The display will also become active at this point and the instrument will go into the initialisation routine. Allow the unit to warm up for a period of twenty minutes.

## *Printer/ PC Connection*

Connect attached interface plug (RS232) at the rear to use the printer/ or connect the sieve analyser to a PC via the same socket. Before the initial test is run the destination for the results must be set for, either the printer or PC.

To set the destination



Press 1 to send the results to the printer.

Press 2 to send the results to a PC.

The destination remains set once selected, to change repeat procedure. No further adjustment is necessary and no user serviceable controls are available internally.

## Sieve analyser set up

---

### **Connection cont/...**

#### **Balance**

The Balance works in a stand alone mode or dedicated mode for sieve test analysis and recording.

#### **Stand Alone Balance**

The analyzer can be used as a stand alone balance for live weighing purposes upto a maximum of 10,000g with an accuracy and readability as quoted in the specifications. When the system is powered up, and allowed to warm up after initialization the display will show the weight as samples are placed on the weigh pan and the balance has stabilized. This is indicated by the display of 'g' after the weight on the display.

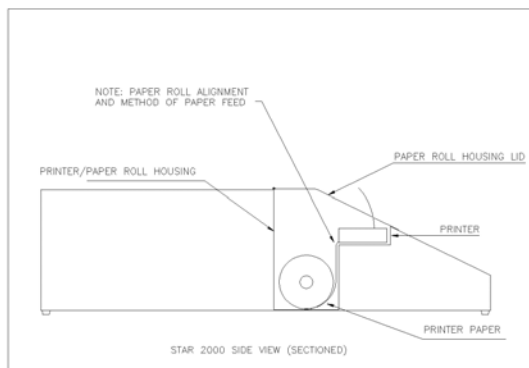
#### **Printer**

Do not exceed 10,000g or the balance may be damaged

The printer is a 7 x 5 dot matrix, impact printer, the printing is clear and crisp.

#### **Loading Paper Roll**

Paper is loaded from the top of the machine, through the lid to the printer/paper roll housing. The paper roll must be placed inside the housing such that the paper comes off from the underside (see diagram below). Pull about six inches of paper off the roll. The paper roll is placed inside the housing, to rest on the bottom, using the thumb and forefinger holding the ends of the roll. Do not contaminate the paper with grease, water, heat or any type of solvent. Always clean and dry your hands before loading the paper roll.



# Sieve analyzer - function of controls

## ***Paper Feed***

Ensure that the end of the paper is cut square and clean, feed this end into the slot at the bottom of the printer mechanism until it registers against the pinch rollers. Press the paper feed (P/F) key on the keypad to feed the paper through the printer. The paper should be square and will emerge from the top. The paper can then be pulled through until clean unmarked paper is seen. Reposition the paper so that the edges are central, if necessary. Feed the paper through the paper cutter in the lid as it is closed. Tear off any excess paper by pulling down against the paper cutter. The printer is now ready for printing. Towards the end of the paper roll a red line appears at the edge, or on the back, to warn you to change the roll.

## ***Display & Key Pad***

### ***Display***

The backlit liquid crystal displays characters are 3mm and 9mm high and the viewing area is 110mm by 60mm.

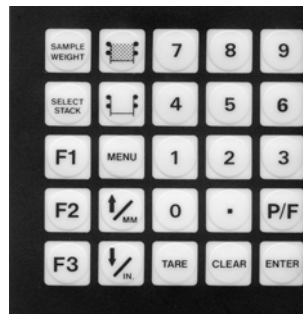
### ***Keypad***

The keypad is made up of 25 keys in a 5 x 5 matrix. (see diagram below). The keys consist of numerical keys and some dedicated function keys. Each time a key is pressed an audible “bleep” will be heard indicating that the keystroke has been accepted. The keys are raised, tactile feel keys and need to be depressed fully to make contact.

When a selection is made from the menu the display changes to each appropriate part of the function.

### ***Numerical Keys & Decimal Point***

These keys are used to enter numerical data for various elements such as stack reference, aperture size, time and date, stack numbers and numbered menu functions and options.



## Sieve analyzer - function of controls

---

### ***Keypad cont/...***

#### ***Paper Feed***

The key feeds paper through the printer one line at a time as long as the key is held down.

#### ***Up/Down***

Either key – back to initializing screen from Menu

When the Menu key is pressed the display changes from the weighing mode. Pressing the Menu key again changes the display back to the weighing mode. When the display is in a menu mode there are a number of menu options as follows:-

1. Set the time and date.
2. Reprint results.
3. Printer on/off.
4. Span calibration.

#### ***Select Stack***

This key selects the stack menu and there are a number of menu options as follows:-

1. Save stack
2. Recall stack
3. Edit stack
4. Enter new stack

#### ***Tare***

This key is used when the instrument is required to be tared before weighing commences when in the free standing balance mode. In the automatic sieve test mode taring can only be carried out at the beginning of the test. An autotare function is carried out when automatic sieve tests are done.

#### ***Clear***

The clear key is used to delete any data that is entered via the numeric keys.

# Sieve analyzer - function of controls

---

## *Keypad cont/...*

### *Enter*

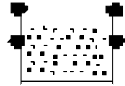
The enter key is used to input numeric data or to make selections from menus.

### *Empty Sieves*



The empty sieves key is to the right of the Select Stack key and is a legend showing two sieves stacked with no sample. This key is pressed when the weights for empty sieves of the working stack require to be re-taken and stored.

### *Full Sieves*



The full sieves key is a legend showing two sieves stacked with sample included. This key is pressed when the weights for retained sample in the working stack are to be taken and stored.

### *Function Keys*

F1, F2, F3 and 'SAMPLE WEIGHT' are special function keys that are not operational and reserved for future use.

## Sieve analyser start up

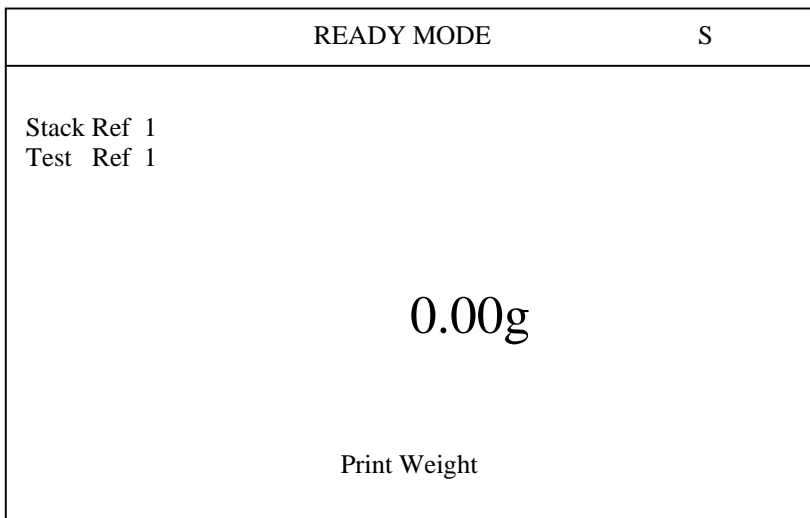
After applying power the display will show the initialising screen, this screen is

After applying power the display will show the initialising screen, this screen is displayed for approximately 40 seconds while the instrument initialises and carries out a self check, if there are any problems this will be indicated in the display.

If initialisation is successful the sieve analyser will display the Ready Mode screen.

Sieve analyser  
Mode indicator

Balance stability  
indicator



Press the Button below the arrow symbol under the display to print the screen weight



Make sure the balance stability indicator is stable, if it is flashing this indicates the instrument is either not on a stable platform or in a draft.

## Entering a Sieve stack

---

### *Preparing the stack*

Before you start to enter the stack into the sieve analyser make sure each of the sieves are clean, you will be asked to enter each sieve aperture then weighing the empty sieve, largest first ending with the receiver.

### *Entering a stack.*

Press 

SELECT STACK
-----------------

 Key

Press 

4
---

 Key

You are now ready to start entering your stack.

First enter a numeric stack reference, this number will be displayed in the top left hand corner of the display in all modes and printed with the test results.

If you make a mistake press the

<b>CLEAR</b>
--------------

key.

The next screen is going to ask you to enter the sieve aperture then weigh the empty sieve.

PROGRAM A NEW STACK	STACK SIZE = 1	
ENTER SIEVE SIZE:	<input type="checkbox"/>	
0.00g		
EXIT	RECEIVER	Esc

## Entering a Sieve stack

---

Type in the sieve aperture then press the



Key

If you make a mistake press the



key and re-enter.

You will now be asked to weigh the empty sieve, place the sieve on the weigh pan then wait until you hear two beeps and the screen asks you to remove the sieve.

The screen will now ask you for the next sieve, continue entering the sieve apertures then weigh the empty sieves until all the sieves are entered.

Remember to start with the largest aperture first ending with the smallest apertures.

After you have entered and weighed the last sieve press the button under the displayed 'RECEVER'

You will now be asked to weigh the empty receiver, place the receiver on the weigh pan then wait until you hear two beeps and the screen asks you to remove the receiver.

If at any time after you enter a sieve and you have made a mistake just press the button under the displayed 'Esc', this will erase the last sieve entered so you can re-enter to correct the mistake.

You have now successfully entered your stack. The display will go back to the stack menu, you can select an option or press the key under the displayed 'Esc', this will return you to the ready mode screen button.

**The stack you have just entered is your working stack if you wish to enter another stack you must first save the stack you just entered. See saving a stack to memory.**

## Saving a stack to memory

---

Press 

SELECT STACK
-----------------

 Key

Press 

SPACE <b>1</b>
-------------------

 Key

The screen will display

ENTER MEMORY 1-10 TO STORE STACK <input type="checkbox"/>	
STACK REF	STACK REF
1: EMPTY	6: EMPTY
2: EMPTY	7: EMPTY
3: EMPTY	8: EMPTY
4: EMPTY	9: EMPTY
5: EMPTY	10: EMPTY
	Esc

Pressing the button under the displayed <b>Esc</b> , will return you to the select stack menu.
--

Enter a number (1-10) to store your working stack, (when you return to this menu the word EMPTY will be replaced with the stack reference number.) The display will now go back to the select stack menu, you can now select an option or press the button under the displayed 'Esc', this will return you to the ready mode screen.

## Recalling a stack from memory

Press 

SELECT STACK
-----------------

 Key

Press 

2
---

 Key

The screen will display

ENTER MEMORY 1-10 TO RECALL STACK □	
STACK REF	STACK REF
1: 123	6: EMPTY
2: 456	7: EMPTY
3: EMPTY	8: EMPTY
4: EMPTY	9: EMPTY
5: EMPTY	10: EMPTY
	Esc

Pressing the button under the displayed 'Esc' will return you to the select stack menu.

Enter a number (1-10) to recall a working stack, The display will now go back to the select stack menu, you can now select an option or press the button under the displayed 'Esc', this will return you to the ready mode screen.

**The stack you have just recalled is now your working stack.**

## Editing the working stack

---

This function allows you to change any sieve in the working stack and store its empty weight.

Press 

SELECT STACK
-----------------

 Key

Press 

<b>3</b>
----------

 Key

The screen will display

ENTER SIEVE NUMBER TO BE EDITED <input type="checkbox"/>	
TEST REF 1	STACK REF 1
APERTURE	
1: 50.000	
2: 40.000	
3: 30.00	
R:	
RECEVER	Esc

To change a sieve enter the sieve number, the display will now ask you to enter the new sieve size, if you have selected the wrong sieve press the button under the displayed 'Esc', this will return you to the ENTER SIEVE NUMBER TO BE EDITED screen.

After you have entered the new sieve size the screen will ask you to weigh the new sieve empty.

Place the sieve on the weigh pan then wait until you hear two beeps and the screen asks you to remove the sieve.

## Editing the working stack

---

After this the sieve analyser will return to the ENTER SIEVE NUMBER TO BE EDITED screen.

Press the button under the displayed 'RECEVER' to re-weigh the receiver.

At this point you can edit another sieve or press the button under the displayed 'Esc' to return to the select stack menu.

**Tip:**

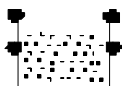
This function is also useful if you need to re-weigh some of the sieves in the stack to update their empty weight, it saves having to re-weigh the complete stack using the empty sieve function.

## Running a sieve test

---

When you run a sieve test all you will have to do is to place each sieve in turn on the weigh pan starting with the largest, ending with the smallest aperture and finally weighing the receiver, the screen will tell you which sieve to place on the pan.

To start the sieve test:

Press  Key

The screen will ask you to enter a numeric test reference or you can skip this by

pressing the  Key

**If you do not enter a test reference its value will be incremented by one.**

The screen will now display

W.F.S WEIGH FULL SIEVES	S
Stack Ref 1 Test Ref 1	
WEIGH SIEVE 50.00	0.00g
EXIT	Esc

## Running a sieve test

Place the sieve on the weigh pan then wait until you hear two beeps and the screen asks you to remove the sieve.

The screen will now ask you for the next sieve, continue placing each of the sieves on the weigh pan as prompted by the screen.

The test will be completed after the receiver has been weighed.

The sieve analyser will now display the results.

Sieve Aperture	Wt Retained (g)	Wt
Retained %		
50.000	17.76	19.87
40.000	26.86	30.05
30.000	35.76	40.01
Receiver	9.00	10.07
Total Weigh 89.38		
Print	Next/Previous	Esc



This button is only active if you have selected the printer option, see sieve analyser set up. Press this button to print your results



This button is only active if you have more than 8 sieves in your stack, pressing this button allows you to scroll through the rest of the sieves in the stack



Press this key to return to the Ready Mode screen

## Running a sieve test

---

When you are weighing the sieves you can at any time press the button under the displayed 'EXIT' to abort the test and return to the Ready Mode screen.

If at any time after you have weighed a sieve and you have made a mistake just press the button under the displayed 'Esc', this will erase the last sieve weighed so you can re-weigh to correct the mistake.

If the sieve you are about to weigh is empty you can press the CLEAR key to skip to the next sieve.

## Weighing empty sieves

---

At some point the weight of the empty sieves in your stack will change, to maintain accuracy it is a good idea to re-weigh the sieves in the working stack on a regular basis.

To re-weigh the sieves in the working stack.

Press  Key

The screen will now display

W.E.S WEIGH EMPTY SIEVES	S
Stack Ref 1	
WEIGH SIEVE 50.00	
	0.00g
EXIT	Esc

All you will have to do is to place each sieve in turn on the weigh pan starting with the largest, ending with the smallest aperture and finally weighing the receiver, the screen will tell you which sieve to place on the pan.

Place the sieve on the weigh pan then wait until you hear two beeps and the screen asks you to remove the sieve.

The screen will now ask you for the next sieve, continue placing each of the sieves on the weigh pan as prompted by the screen.

## Weighing empty sieves cont/...

---

When you are weighing the sieves you can at any time press the button under the displayed 'EXIT' to abort the test and return to the Ready Mode screen.


If at any time after you have weighed a sieve and you have made a mistake just press the button under the displayed 'Esc', this will erase the last sieve weighed so you can re-weigh to correct the mistake.

## Other functions

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### *Clock \ Calendar*

Press  Key

Press  Key

Follow the on screen prompts to enter the data and time. The date and time will be printed or sent to the PC depending on the settings (see sieve analyser set up) at the end of a sieve test

### *Reprint results*

You can display the results of the last sieve test, this is useful if you need to look at the results again, print another copy or send the results to the PC again.

Press  Key

Press  Key

The screen will now display the results as they were at the end of the last test.

# Maintenance

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## *Calibration and Service*

The Star 2000 has been fully calibrated at the factory prior to packing and shipping. Servicing and calibration depends on the frequency of use. It is recommended that the instrument is serviced at least every 12 months.

## *Calibrating the balance*

To maintain optimum performance you should regularly calibrate the instrument. For this you will need a known standard 5000g weight.

Press



Key

Press



Key

Follow the on screen instructions to calibrate the sieve analyser

**Do not exceed 10,000 or the balance will be damaged**

# Maintenance

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## *Cleaning and General Care*

The instrument should be cleaned regularly with a soft cloth and must first be powered down and disconnected from the mains supply. Cleaning must take place in the normal operating position without tipping or lifting the instrument.

Stubborn dirt may be removed with a damp cloth, and if necessary, a mild detergent diluted in water and applied sparingly.

Do not use strong cleaning agents, solvents, thinners etc., as these could damage the analyser.

Do not apply pressure to the display window.

Keep the weigh pan and the surrounding area free from spillage and any extraneous particles.

When changing paper rolls avoid contaminating the paper with damp or greasy hands, or any types of solvent. If paper is contaminated, remove the contaminated portion by feeding through and tearing off, or replace the roll completely if badly contaminated.

## Specification

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### **General**

Maximum Sieve Diameter:	8 inch or 200mm
Maximum No. of Sieves: (Excluding Receiver per Stack)	16
Maximum No. of Sieve Stacks Stored:	10
Voltage Supply (Preset):	100 /240 volts
Voltage Tolerance:	+/- 15%
Frequency:	50/60 Hz
Power Consumption:	20 W
Size:	440 W x 415 D x 120mm
Net Weight:	11.5 kg
Operating Temperature:	5 to 35° C
Operating Humidity: (Non Condensing)	35 to 90 % RH
Storage Temperature:	0 to 40° C
Storage Humidity:	35 to 90 % RH

### **Balance**

Maximum Weighing Capacity:	10,000g
Readability:	0.02g
Hysteresis:	< +/- 0.01g
Creep:	< +/- 0.01g
Accuracy:	+/- 0.01g
Reproducibility:	+/- 0.01g
Linearity:	+/- 0.01g

## Specification

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### ***Balance cont/...***

Response Time:	0.2 secs
Overload:	Positive overload stop to prevent damage.

### ***Printer***

Paper Width:	57mm
Printing System:	Impact
Character Height:	2mm
Character Format:	Dot Matrix 7 x 5
Printing Speed:	16 cps
No: of characters per line:	40

### ***Display***

Display Type:	LCD
Display Format:	16 Rows x 40 Characters
Character Height:	3 / 9mm
Viewing Area:	110 x 60mm
Backlighting:	LED

# Specification

---

## *Features*

Stand Alone Balance

Automatic Weighing of Sieves and Analysis of Tests

Operation by Single Person

Last test stored in active memory.

Data stored in non-volatile memory

Tests are printed out with time and date reference

Up to 10 sieve stack details can be recalled from memory

Tests show retained weights and percentage of total sample size

Tests show total weight

Option to interface to personal computer

Operates on any single phase electrical supply.

Endecotts policy is one of continuous development and we  
reserve the right to modify future models

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