

Symmetry™ PA Series
Precision Analytical Balances
USER MANUAL

(Software Revision: 2.35)

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1.0 INTRODUCTION

Thank you for selecting the Analytical Balance.

This Instruction Manual will familiarise you with the installation, troubleshooting, general maintenance of the balance, etc. and will guide you through the various applications.

Please read this Manual thoroughly before starting the operation. If you need any clarifications, feel free to contact your supplier.

PRODUCT OVERVIEW

This Analytical Balance is ideal for laboratory and general purpose weighing.

FEATURES:

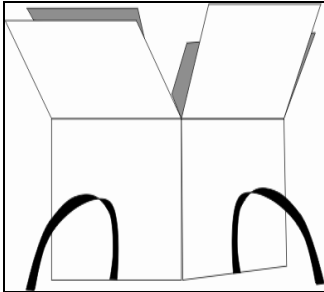
- Large easy to read LCD display with backlight
- Applications include weighing, parts counting and percentage weighing
- Internal Calibration using motorised internal calibration weight or external calibration, if set by the user
- Bi-directional RS-232 interface
- Can be configured to print a GLP Compliant report after each calibration to include the time, date, balance number and a verification of the calibration
- Automatic temperature compensation
- Display in 4 languages- English, French, German and Spanish
- Multiple weighing units
- Date and time
- Easy to use, sealed keypad
- Below balance weighing facility
- Password protection
- Security locking point
- Robust metal casing

2.0 TECHNICAL SPECIFICATIONS

	120g model	220g model
Maximum capacity	120g	220g
Readability	0.0001g	
Tare range	Full	
Typical Repeatability	0.0002g	
Linearity (\pm)	0.0003g	
Units of measure	grams, milligrams, kilograms, carats, pennyweights, grains, troy ounce, ounces	
Interface	RS-232 bi-directional	
Operating temperature	10°C - 40°C	
Power supply	15 VDC, 50/60 Hz, 800 mA	
Calibration	Calibration with internal mass. Alternatively the user can chose to calibrate using an external mass	
Display	Backlit LCD with dual digits (24 mm high)	
Draught shield	Supplied as standard (factory fitted)	
Housing	Die cast aluminium housing With glass draught shield	
Draught shield dimensions	202 x 524 x 275 mm / 7.95" x 20.6" x 10.8"	
Pan size	90 mm / 3.5" \varnothing	
Overall dimensions (w x d x h)	265 x 524 x 275 mm / 10.4" x 20.6" x 10.8"	
Net weight	12 kg / 26.4 lb	
Applications	Weighing, Parts counting, Percentage weighing	

3.0 UNPACKING THE BALANCE

Remove the balance from the packing by carefully lifting it out of the box. Inside the box you will find everything needed to start using the balance-



- ✓ AC adapter
- ✓ Square base plate
- ✓ Locating disc
- ✓ Weighing platform
- ✓ Guard ring
- ✓ Stainless steel top pan
- ✓ This User Manual

4.0 LOCATING THE BALANCE

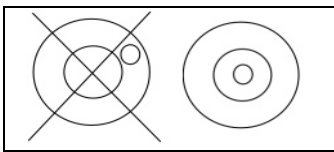
	<ul style="list-style-type: none"> • The balance should not be placed in a location that will reduce the accuracy. • Avoid extremes of temperature. Do not place in direct sunlight or near air conditioning vents.
	<ul style="list-style-type: none"> • Avoid unsuitable tables. The table or floor must be rigid and not vibrate.
	<ul style="list-style-type: none"> • Avoid unstable power sources. Do not use near large users of electricity such as welding equipment or large motors. • Do not place near vibrating machinery.
	<ul style="list-style-type: none"> • Avoid high humidity that might cause condensation. Avoid direct contact with water. Do not spray or immerse the balances in water. • Avoid air movement such as from fans or opening doors. Do not place near open windows or air-conditioning vents. • Keep the balance clean. Do not stack material on the balances when they are not in use.

5.0 SETTING UP THE BALANCE

5.1 ASSEMBLING THE BALANCE

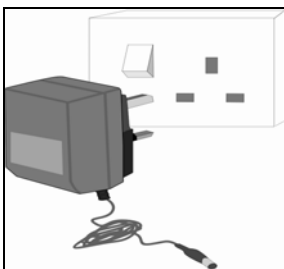
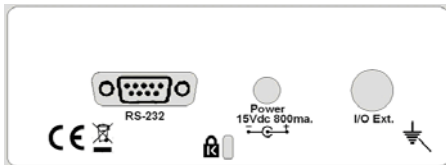
- Locate balance on solid surface, free from vibration
- Open the sliding door and gently place the square base plate, the locating disc, weighing platform, the guard ring and then the stainless steel top
- Level balance using the adjustable feet and spirit level
- Connect the power to the balance
- For best performance, let the balance warm up for 30-60 min. and calibrate before using

5.2 LEVELLING THE BALANCE



After placing the balance in a suitable place, level it by using the spirit level on the rear of the balance. To level the balance turn the two adjustable feet at the rear of the balance until the bubble in the spirit level is centred.

5.3 WARM-UP TIME



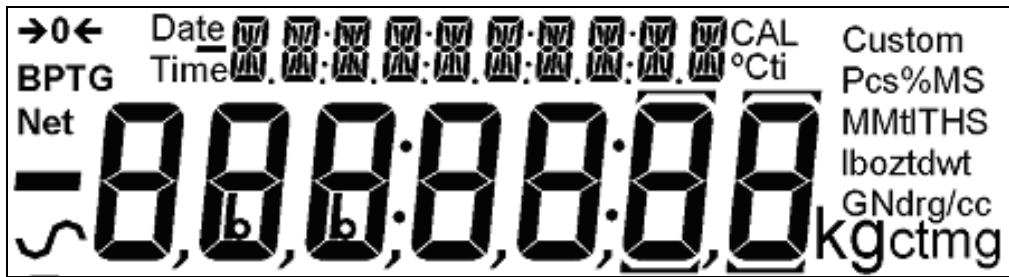
Attach the power supply cable to the connector on the rear of the balance. Plug the power supply module into the mains. The display will indicate the balance serial number (if set) and the software revision number followed by the capacity of the balance. Next the balance will run a self-test by displaying all segments and then will show zeros accompanied by the zero symbol. If the balance serial number is not set, the display will show dashes.

Before you start weighing, you have to wait for the balance to achieve a stable internal temperature. Typical initial warm-up time suggested for a balance already at room temperature is about 1 hour.



A stable sign ~ is shown when the balance is in stable condition. It will turn off if the balance is not stable. Exact zero is shown when the “→0←” symbol is on to the left of the display area.

6.0 DISPLAY



This display includes areas for the weight value (up to 7 digits), symbols for common weighing units, tare, stability, zero and low battery and a text area for menu.

The LCD has 7 x 7-segment digits for the weight and 10 x 14 - segment digits for messages, symbols for weighing units and indicators such as stability etc.

The 14 segment digits area is used to display messages concerning operation or errors.

The 10 digit text area is used to display the current weighing mode or to guide the user through the operation.







SYMBOLS AND INDICATORS

The LCD has unique symbols to indicate the following:

→0←	Zero
⌚	Stable
g, oz, ozt, GN, dwt, ct, Kg, mg, Pcs, %	Text is shown for the weighing units and modes
“CAL”	When calibration is occurring or about to occur
“°C”	When a temperature is shown or a calibration is requested due to change in temperature
“ti”	For a time driven calibration
“Net”	When a net weight is shown

7.0 KEYPAD

The keypad has the following keys to operate the balance.

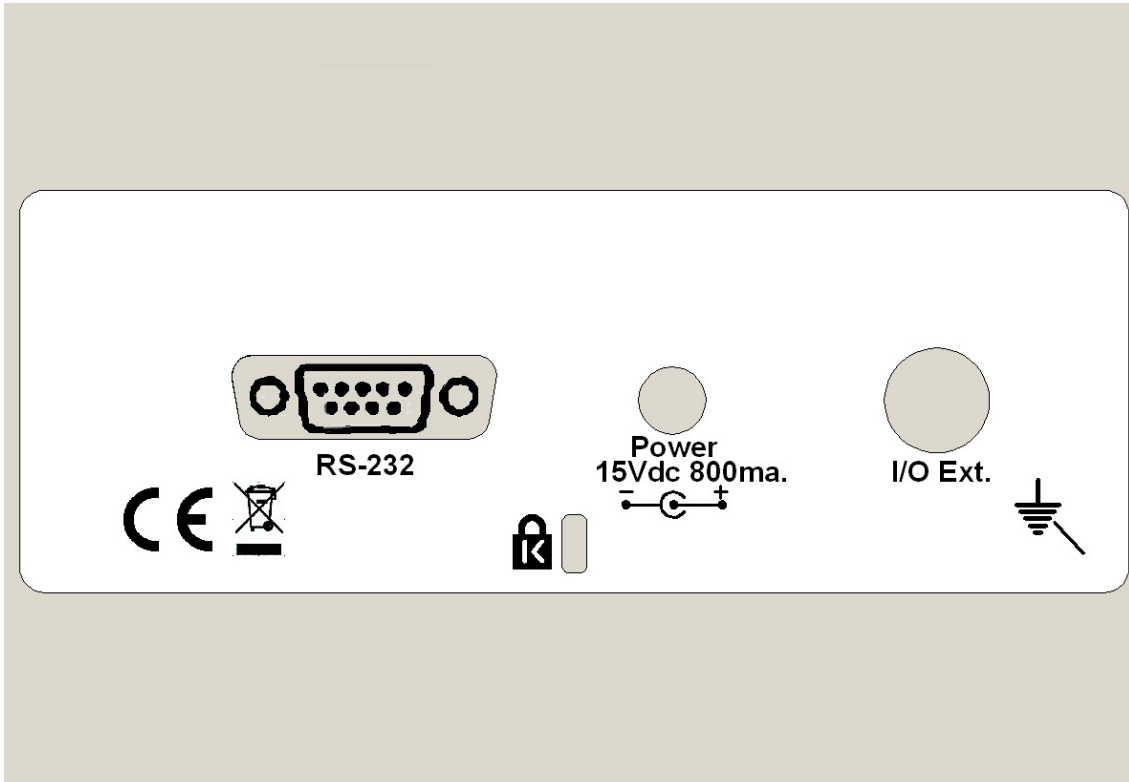
Keys	Primary function	Secondary function
[On/Off]	To turn the balance to ON or OFF	-
[Tare] or [Esc]	A combined zero and tare function	To escape from setup functions and modes
[Cal] /  or [Up]	Starts the calibration function	To increment or change a displayed value or scroll through options forward
[Print] /  or [Back]	Instructs the balance to print data	To advance a flashing digit by one position to the left
[Setup] /  or [Enter]	Enters a function	To save a value during setting up a function such as entering unit weight
[Mode] /  or [Advance]	Selects functions by cycling through a set of enabled functions, for example parts counting or percent weighing	To advance a flashing digit by one position to the right To go back by one step during setup functions
[Units] /  or [Down]	Selects weighing units by cycling through a set of enabled units	To decrement or change a displayed value or scroll through options backwards
[Mode] /  or [Advance]	Selects functions by cycling through a set of enabled functions, for example parts counting and percent weighing	To advance a flashing digit by one position to the right To go back by one step during setup functions

7.1 NUMERIC ENTRY METHOD

To set a value when required, use the keys as given below-

- [Up] and [Down] keys to increase or decrease the flashing digit,
- [Advance] and [Back] keys to advance or move back the digit and
- [Enter] key to accept the value

8.0 INPUT/OUTPUT

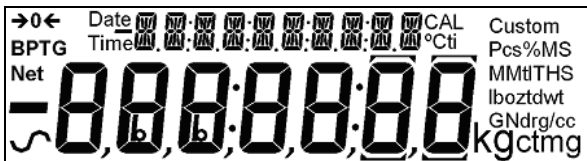


The rear panel has connectors for RS-232 serial and buffered I²C-bus interfaces and a power input socket. Required power input is a low-voltage external supply, 15VDC @ 800mA.

Various communication options, e.g. USB, LAN, Wireless, will be implemented in the future via add-on “black-boxes” which will convert the RS-232 serial output or I²C to the desired protocol. The basic unit includes RS-232 serial communications only.

9.0 OPERATIONS

9.1 INITIALISATION



When the balance is first switched on, it will display the balance serial number (if set), software revision, model capacity and then all segments on the display will be shown. Overall the time taken is usually 5 -10 seconds.

If a passcode has been set, the display will show "PASSCODE" and the main display will show a zero. In this case you must enter the passcode to continue using the numeric entry method (see section 7.1). A different passcode may be set for a Supervisor to weigh or to have access to the selected User menus. If the passcode has not been set the balance will continue as below.



The display will show zero reading along with the zero symbol "→0←" and the weighing unit last used. If automatic time calibration is enabled the balance will calibrate after power up and again after the pre-set time interval.

9.2 PASSCODES

If a passcode has been set to limit access to the weighing functions of the balance the display will show "PASSCODES" with the main digit set to zero. The display will change to show 7 digits set to zero with the rightmost digit flashing. Use the numeric entry method (see section 7.1) to enter the code. It will be necessary to enter the correct passcode to continue. See the Section 13.6 for details.

9.3 WEIGHING

- Press **[Tare]** to zero the balance, if required
- “→0←” will be displayed
- Place a mass on the pan and the weight will be displayed
- If a container is used press **[Tare]** to tare the balance when the stable symbol “~” is on. “Net” will be displayed to indicate that the balance is tared
- When the display shows zero, place the item to be weighed. Only the net weight will be displayed
- At any time the **[Units]** key can be pressed to select another unit. Use the **[Up]** or **[Down]** key to scroll through the units and select the desired unit by pressing **[Enter]**, the display will change to show the weight in the selected weighing unit. The available weighing units can be enabled or disabled by the user (see section 13.1). Only weighing units that have been enabled will be cycled through when **[Units]** is pressed

9.3.1 Weighing Units

You can select alternative weighing units to display the weight by pressing the **[Units]** key. The common weighing units are:

	Unit	Symbol	Models	Conversion Factor 1g =	Conversion Factor 1 unit = grams
1.	Grams	g	All	1	1.0
2.	Milligrams	mg	not 0.01g units	1000	0.001
3.	Kilograms	kg	All	0.001	1000
4.	Carats	ct	All	5	0.2000
5.	Pennyweights	dwt	All	0.643014865	1.555174
6.	Grains	GN	All	15.43236	0.0647989
7.	Troy ounces	ozt	All	0.032150747	31.103476
8.	Ounces	oz	All	0.035273962	28.349523

It is possible to set the balance to display only grams. Grams will always be one of the units enabled, by default.

9.4 FUNCTIONS

When weighing, the user can access the applications that have been enabled (see section 13.2).

The following applications are available in this version (2.35):

- Parts counting
- Percent weighing

The functions can be enabled or disabled using a similar method to the Units above by turning the functions to on or off.

9.4.1 Parts Counting

A known quantity of sample is first weighed to compute an average unit weight and then an unknown quantity of the sample is weighed. The net weight of this unknown sample is divided by the average unit weight to display the quantity. The result is always a whole number.

The balance will have a preset number of parts to be used as a sample. These values are 10, 25, 50 or 100 items.

- Press **[Mode]** to show parts counting, "PARTS" will be displayed
- Enter parts counting by pressing **[Enter]**
- Press the **[Up]** or **[Down]** key to select the sample size, "REF QTY", 10, 25, 50, 100, etc., then press **[Enter]** to confirm
- When "LOAD XX Pcs" is shown place XX number of items on the pan and press **[Enter]** to compute the average piece weight
- Remove the sample when display shows "XX Pcs" and then place an unknown quantity on the pan. The balance will then compute the number of parts based upon the average piece weight. The display will show the result in Pcs
- To count another item press **[Mode]** and continue as before
- Checks will be made to determine that the weight of the reference parts is large enough for reasonably accurate counting (weight of each piece should be > 1d)
- To return to normal weighing, press **[Mode]** to show "REF QTY" then press **[Esc]**

9.4.2 Percent Weighing

Percent weighing is carried out by defining a sample weight as 100%. The sample weight can either be entered by the user or taken from a sample.

- Press **[Mode]** and then the **[Up]** or **[Down]** key to select Percent weighing, "PERCENT" will be displayed
- Press **[Enter]** to enter the function
- Display will show, "PERCENT SAMPLE"
- Press **[Enter]** to select the sample method
- When "LOAD 100 %" is shown, add the sample
- Press **[Enter]** to set this weight to be 100%. When ready the display will show "100%"
- Remove the sample and place an unknown sample to display the percentage weight
- To set another weight as 100%, press **[Mode]** and continue as before
- To manually enter a value to be set as 100%, press **[Up]** or **[Down]** key when "PERCENT SAMPLE" is shown to select "PERCENT Ent Wt"
- Press **[Enter]** to select the manually entered weight method
- Enter the weight using the numeric entry method (see section 7.1)
- Place unknown sample to display the percentage weight
- To perform percent weighing with another sample press **[Mode]** and continue as before
- To return to normal weighing, press **[Esc]**

Note: Percentage will be displayed to the maximum number of decimal places based on the resolution of the balance. To increase or decrease by one decimal place, press the **[Up]** or **[Down]** key respectively.

10.0 CALIBRATION

The balance can be calibrated using either an internal mass (default method) or an external mass (if setup by the user to do this). See the User Parameters section.

10.1 MANUAL CALIBRATION

Pressing the **[Cal]** key will start calibration. Calibration can also be initiated by a change in internal temperature or a set time period as determined by the user (see section 13.5).

10.1.1 Calibration using Internal Calibration mass

- Pressing **[Esc]** will abort the calibration at any time
- Check the display is at zero. Tare if necessary
- Calibration will begin automatically. When calibration is complete the balance will return to weighing.

10.1.2 Calibration using External Calibration mass

- Pressing **[Esc]** will abort the calibration at any time
- Check the display is at zero. Tare if necessary
- Press the **[Cal]** key
- The display will show "LOAD 0" to set a new Zero condition. Ensure the pan is empty then press the **[Enter]** key
- The display will then show the value of the calibration mass required, i.e. "LOAD 100 g"
- Put the mass on the balance. Press **[Enter]** to continue
- After calibration is complete, the balance will return to normal weighing

Note: The suggested external calibration weight for all analytical balances is 100g.

10.2 AUTOMATIC CALIBRATION

The balance will have the ability to calibrate (or ask for calibration) when the balance has automatic calibration enabled and the conditions of the automatic calibration have been met.

Conditions that will cause an automatic calibration are:

1. Internal temperature change greater than a preset amount, typically 0.5°C for the analytical balances.
2. Time since last calibration exceeds a preset time, typically 4 hours or 15 minutes after power is applied.

On the balances with internal calibration the calibration will be done automatically when the balance is at a stable zero. The user knows a calibration is asked for by the flashing of the “CAL” symbol on the display. The display will show a 5 second countdown when calibration will start. If the user presses the **[Esc]** key the calibration will be delayed by one minute to allow time for a process to be finished.

If external calibration has been enabled, the balance will call for a calibration by flashing the “CAL” symbol on the display. As soon as the balance is calibrated the symbol will be turned off.

The Auto calibration feature can be enabled, disabled or changed within the user options to meet the requirements of the users.

Calibration Errors

Occasionally during calibration an error will be detected. These errors can be caused by unstable readings, improper weights being used, large shifts of zero from the factory settings, etc. When an error is found a message will be shown and the calibration must be done again.

11.0 RS-232 INTERFACE

The balances have the ability to send data to the serial interface.

The weighing data can be sent over the interface either automatically or when the user presses the **[Print]** key.

The user has control over what data is to be printed.

The following gives a description of the RS-232 interface.

HARDWARE

The RS-232 interface is a simple 3 wire connection. The input and output connections are:

Connector: 9 pin D-sub miniature socket
 Pin 2 input to balance RXD
 Pin 3 output from balance TXD
 Pin 5 Signal ground GND

Handshaking is not applied.

Baud rate: 4800, **9600**, 19200, 38400

Parity: NONE (=8N1), EVEN (=7E1) or ODD (=7 O 1)

All lines are terminated with carriage return and line feed (<CR><LF>).

In continuous output mode, or if single-line output on demand is selected, the serial output format will be a single line in the form "1234.567 g<CR><LF>".

The format of the single-line output will change depending on the mode in which the balance is operating, as described below.

If output on demand is selected, the user may optionally configure the serial output as a choice of 3 styles of form, either in a default format or in one of two custom formats. Each of the custom formats can be configured to output up to 15 lines of data. The data types that can be printed are:

NAME	TEXT PRINTED
ID number	ID no.: xxxxxxxxxxxxxx
Serial number	Serial no. xxxxxxxxxxxxxx
Date	DATE dd/mm/yyyy
Time	TIME hh:mm:ss
Net weight	Net: xxx.xxx g
Gross weight	Gross: xxx.xxx g
Tare weight	Tare: xxx.xxx g
Unit weight	Unit wt: xxx.xxx g
Count	Count: xxxx pcs
Reference weight	Ref. wt: xxx.xxx g
Percent	Percent: xx.xxx %
A blank line printed	<CR><LF> only.

Any of these can be printed on any of the 15 lines available. Not all items need to be used and any one can be used more than once (see section 13.3).

The data for each form will be preceded by a start-of-header <SOH> character (01) and terminated with an end-of-transmission <EOT> character (04). These characters will be ignored by a serial printer but will allow a computer program which reads the data to distinguish between this block report format and the single-line output format described above.

STANDARD FORMAT

The balance will print the following data as the standard form. The standard form cannot be changed. The format of the custom forms #1 and #2 will be the same as the standard form until modified by the user.

Line 1	Date
Line 2	Time
Line 3	Blank line
Line 4	ID number
Line 5	Blank line
Line 6	Result
Line 7	Blank line
Line 8	Blank line

This will result in a printout that looks like:

Date:	23/09/04
Time:	15:45
ID No:	123456
Net:	123.456 g

***NOTE:** The format of the results line will change depending on the mode in which the balance is operating, e.g.

- Normal weighing: "123.456 g"
- Parts counting: "1234 pcs"
- Percent weighing: "12.345 %"

INPUT COMMANDS USING REMOTE KEYS

The balance can be controlled with the following commands sent using remote keys such as from a PC. The commands must be sent in upper case letters, i.e. “KT” not “kt”. Press the Enter key of the PC after each command (the action of Carriage Return is denoted as <CR> as shown below).

Basic Input Commands:

!KT<CR>	Tares the balance to display the net weight. This is the same as pressing the [Zero / Tare] key when the balance is in the normal weighing mode.
!KS<CR>	Enters the Setup section. This is the same as pressing the [Setup] key when the balance is in the normal weighing mode. Once entered the Setup section, the balance can be controlled remotely using the Input Commands (as mentioned in this table) which will perform the same key functions as described in section 13.0.
!KP<CR>	Transmits data over RS-232 interface. This is the same as pressing the [Print] key when the balance is in the normal weighing mode.
!KM<CR>	Enters the Modes section. This is the same as pressing the [Mode] key when the balance is in the normal weighing mode.
!KC<CR>	Enters the Calibration section. This is the same as pressing the [Cal] key when the balance is in the normal weighing mode.
!KU<CR>	Enters the Unit selection section. This is the same as pressing the [Units] key when the balance is in the normal weighing mode.

Invalid Input Command:

If an invalid command is received, then the command is returned as follows-

Invalid Command	Message returned	Remarks
!NT<CR>	!EU<CR>	Command character is not 'K'
!KK<CR>	!EK<CR>	Key character is not 'T', 'S', 'P', 'M', 'C' or 'U'
!KT-<CR>	!EF<CR>	Command format error, <CR> is not the fourth character
KT<CR> or !KT -	No reply	Either '!' or <CR> is missing in the command string

12.0 ERROR CHECKING

During weighing the balance is constantly checking to see if the balance is operating within the limited parameters. The errors likely to occur are:

- A/D counts below lowest allowed value
- A/D counts above highest allowed value
- A/D not operating
- Maximum capacity exceeded

Other errors may be detected during special functions or operations. These will be described in the section that applies.

Error messages and the reasons are:

Concerning A/D counts	
ERROR ADc UL	A/D counts below a limit
ERROR ADc OL	A/D counts above a preset limit
Concerning calibration	
ERROR St	Calibration could not be completed because the results were not stable
ERROR LO or ERROR HI	Calibration constant not within 20% of old calibration constant
Concerning weighing	
ERROR LO	Weight display is below zero by >4%max
ERROR HI	Weight is above maximum plus 90d

13.0 SUPERVISOR MENUS

Pressing the **[Setup]** key while in normal weighing gives access to the Supervisor menus.

- When **[Setup]** is pressed and passcodes are not enabled, the display will show the message “SUPERVISOR”. If passcodes are enabled, the balance will ask for it by displaying “PASSCODE 0”
- If a wrong code is entered an “ERROR CODE” message will flash and the balance will return to weighing mode
- If the passcode has been enabled and entered, the balance will allow the operator to access the Supervisor’s menus
- When the display shows “SUPERVISOR”, press **[Enter]** to view the parameters that can be modified
- From this menu the user can enable/disable weighing units or modes, set balance parameters for the conditions, set time and date, set parameters for the RS-232 interface, calibration parameters and security parameters
- The **[Up]** and **[Down]** keys will cycle through the main parameters, pressing the **[Enter]** key will enter the parameters and sub-parameters or options can be set. Press **[Mode]** to come out of a sub-parameter or press **[Esc]** to return to normal weighing from any parameter

13.1 ENABLE WEIGHING UNITS

- When “UNITS” is displayed, press **[Enter]**. The display will show the symbol for the first unit, e.g. carats, ct, together with its enable state “OFF” or “On”. The user can then enable or disable the carats unit by using **[Up]** or **[Down]**. Pressing **[Enter]** will confirm the setting and will advance to the next weighing unit. Repeat for each weighing unit in turn. Gram is always set to “On”
- Press **[Mode]** to advance to setting of the next menu or press **[Esc]** to return to normal weighing

13.2 ENABLE WEIGHING MODES

Same steps are followed to enable or disable the weighing modes.

- Press **[Enter]** when “MODES” is displayed. The display will show the first mode i.e., Parts Counting (“PARTS”) together with its enabled state “OFF” or “On”. The user can enable or disable the parts counting mode by using **[Up]** or **[Down]**. Pressing **[Enter]** will confirm the setting and will advance to the next weighing mode. Repeat for each mode in turn
- Press **[Mode]** to advance to setting of the next menu or press **[Esc]** to return to normal weighing

13.3 ENABLE SERIAL INTERFACE PARAMETERS

The parameters affecting the serial setup are set in a similar manner to the other parameters.

Press **[Enter]** when “SERIAL” is displayed to enter the sub-menu.

The parameters that can be set are:

ENABLE	The serial port can be set to On or OFF
BAUD RATE	Set the Baud Rate to 4800, 9600, 19200 or 38400
PARITY	Set the Parity to NONE, EVEN or ODD
STABLE	To print when stable (On) or regardless of stability (OFF)
CONTINUOUS	Set the RS-232 to send data continuously to On or OFF
PERIODIC	Set the RS-232 to send data periodically (set in seconds) to On or OFF. If On is selected, the value can be changed between 1 and 999 seconds, using [Up] and [Down]
FORMAT	To send data as a single line of data, using the standard format or using a customer designed format (FORM 1 or FORM 2).

Format of custom forms #1 and #2

If FORM1 or FORM2 is selected, it can be changed by the user using a selection of available data. By default the 2 forms are the same as the standard form unless changed by the user as below.

When FORM 1 or FORM 2 is selected the user can set the information to be printed on each line of the form. Pressing the [Up] or [Down] keys will cycle through the options available. The options are:	
INST ID	Instrument ID number
SER No	Serial Number
TIME	Time
DATE	Date
NET	Net Weight (Gross weight – Tare Weight)
GROSS	Gross Weight
TARE	Tare Weight
UNIT	Unit weight in parts counting mode
COUNT	Number of items in parts counting mode
REF	100% weight in percent weighing mode
PERCENT	Percentage of reference weight in percent weighing
Cr Lf	Inserts a blank line
END	Signifies the end of the report When END is entered the display returns to the RS-232 Sub-menu

Enter the data to be printed on the first line by pressing the **[Up]** or **[Down]** key to cycle through the options. If the current information is OK then press the **[Setup]/Enter** key to move to the next line.

e.g. “LINE No1” “DATE” - prints date

Select a code for one of the preset data formats as detailed above.

The next line shows: “LINE NO 2” “TIME” - prints time
Only one item can be entered per line.

Continue until the formatting of the form is complete. There are 15 lines of possible data. After the 15th line has been set or “END” has been selected, the balance will return to the RS-232 Sub-menu.

Press **[Mode]** to advance to setting of the next menu or press **[Esc]** to return to normal weighing.

13.4 SETUP PARAMETERS

The user parameters that control the balance are shown under the SETUP. When "SETUP" is displayed, press the **[Setup]/Enter** key. The options for each parameter can be scrolled through by using the **[Up]** or **[Down]** key.

LANGUAGE	English French German Spanish
TIME	Set Time using the numeric entry method (see section 7.1)
DATE DATE FORM EUROPE (dd/mm/yy) USA (mm/dd/yy)	Set Date using the numeric entry method (see section 7.1)
INST ID	Enter a user number to identify this balance
BUZZER	On= Enable OFF= Disable
BACKLIGHT	On OFF AUTO
POWER DOWN	Set the time after which the unit will go into Stand-by power settings, On=Enable, OFF=Disable, If set to On- the options are 1 to 9 minutes
FILTER	Set a value for the amount of filtering to be done, set a value of 5, 10, 20, 30, 40 or 50. A larger number is more filtering and a slower response. Default is 20
STABILITY	Set a value to be used to determine balance stability, set a value of 1, 2, 5 or 10d. A larger number corresponds to a larger stable zone. Default is 5
AUTO ZERO	Can be set to On or OFF to enable the auto-zero function. If set to On- select from 1, 2 or 5d

The sub-menu is entered by pressing **[Enter]** –

- Use the **[Up]** and **[Down]** keys to increase or decrease the value for setting. Press **[Enter]** to accept the setting and advance to the next item in the menu
- Press **[Mode]** to advance to setting of the next menu or **[Esc]** to return to normal weighing

13.5 CALIBRATION SETUP

This menu allows the user to set the calibration parameters.

- Press **[Enter]** when “CAL SETUP” is displayed to select the calibration parameters
- The options for each parameter can be scrolled through by using the **[Up]** or **[Down]** key

ENABLE	NO =operator calibration is disabled YES=operator calibration is enabled
CAL REPORT	On = Enabled. Prints out Calibration report after successful calibration OFF = Disabled
TIME CAL	On = Enabled. Select time from 1 to 24 hours. Default setting is 4 hours OFF = Disabled
TEMP CAL	On = Enabled. If set to On, set the temperature variation from 0.2 to 4°C OFF = Disabled

Press **[Mode]** to advance to setting of the next menu which is “PASSCODES” or **[Esc]** to return to normal weighing.

13.6 PASSCODES

To enable the security features in this balance it is necessary to set passcodes. There are 2 passcodes called Operator Passcode and Supervisor Passcode. The Operator Passcode allows an authorised user to operate the basic weighing functions of the balance but will not allow access to the Supervisor Menu if the Supervisor Passcode has been set.

To change or disable a Passcode it will be necessary to enter the current passcode.

Press **[Enter]** when "PASSCODES" is displayed to enter this section.

OPERATOR	Enter the current passcode (OLD) first then enter a new passcode if desired. A passcode set to zero will disable the security feature and allow unlimited access.
SUPERVISOR	Enter the current passcode (OLD) first then enter a new passcode if desired. A passcode set to zero will disable the security feature and allow unlimited access.

13.6.1 Forgotten Passcodes

Keep a record of the passcode to ensure you can access this section again. If however you have forgotten your passcode you can still gain access by entering a universal code.

If you have forgotten the current passcode a code of "15" will always allow you to enter the Supervisor area.

Using the Supervisor menus go to the PASSCODE section and reset the operator or Supervisor passcode using the "15" code as the old number when asked.

14.0 SAFETY AND MAINTENANCE

CAUTION

Use the AC adapter designed by the manufacturer for the balance. Other adapters may cause damage to the balance.

Avoid overloading or dropping material onto the platform which could damage the balance.

Do not spill liquids on the balance as it is not water-resistant. Liquids may damage the case and if it gets inside the balance it may cause damage to the electronics.

Material that has a static electric charge could influence the weighing. Discharge the static electricity of the samples, if possible. Another solution to the problem is to wipe both sides of the pan and the top of the case with an anti-static agent.

15.0 TROUBLE-SHOOTING

Service of this balance will generally be necessary when the balance does not perform as expected. The balances are not user-serviceable. For Service Information, see section 18.0 and contact your supplier.

Problems usually fall into one of the following categories:

User Problems:

The user is asking the balance for something it cannot do or is confused by the modes and functions of a balance. It is also possible the user has set a parameter that has affected the balance operation. Resetting the parameter to a normal value will restore operation.

Mechanical Problems

The balances consist of complicated and fragile mechanical devices. They can be damaged by placing a weight on it which is too high for the balance or by dropping the balance or occasionally shipping it without taking care. The most fragile parts are the flexures. Dust, dirt, spills and other foreign objects in the balance can also cause problems.

Electronic Problems:

These are the rarest of the problems affecting balances. If an electronic problem is suspected make sure the mechanical problems that can cause similar symptoms have been eliminated before attempting electronic repairs. With the exception of cables most electronic repairs are solved by board replacement.

The table that follows is a guide of common problems and their solutions. Note that many problems may have multiple solutions and there may be problems found that are not listed in the table. For Service Information, contact your supplier.

BALANCE DOES NOT FUNCTION		
The balance is dead when power is applied	Power supply failure	Check adapter is working Check adapter is correct for the balance Normal adapter is 15VDC, 800mA. Power supply circuit board failure Short circuit on any circuit board
The display does not turn on but the calibration motor moves when power is applied	Power is getting to balance, display is not working	Check display cables Replace display module
The display stays on the initial test screen when power is applied. Calibration weight motor is on.	Unstable balance Balance not working correct Power supply	Check if balance is stable by using service menu and view A/D values Put breeze shield over pan Check power supplies
BALANCE WORKS BUT IS NOT STABLE		
Balance is unstable by a few divisions	Noise or vibration from environment Friction in mechanics	Check the balance is positioned correctly to avoid vibration, wind or air movement, it is on a solid table, it is not near sources of heat or cool air, Check balance with weights if problem occurs when sample is used. Static electricity on the samples can cause drifting and instability. Check the area around the weighing pan for hair, dust, obstructions under the pan, A complete inspection of the mechanics to look for sources of friction.

Balance is very unstable and does not weigh correctly	<p>Mechanical problems</p> <p>Balance programming</p> <p>Electronic problems</p>	<p>A complete inspection of the mechanics to look for sources of friction.</p> <p>Verify the A/D is also unstable. If the A/D is OK then suspect the programming of the balance. Reset parameters, check temperature compensation, and redo the calibration.</p> <p>Some electronic problems can also cause this. But all mechanical problems must be resolved first.</p>
BALANCE IS NOT ACCURATE		
<p>You must have accurate and trusted weights to test a balance. If you suspect that the balance is not accurate then you must know your weights are accurate. A balance calibrated using a bag of flour is not accurate even if it works OK otherwise.</p>		
Balance is not accurate	<p>Repeatability</p> <p>Eccentric loading</p> <p>Linearity</p>	<p>Verify the balance shows the same value when the same mass is placed on the centre of the pan for a few tests.</p> <p>Verify the balance shows the same reading (within a tolerance depending upon the model) when a mass is placed at positions around the pan.</p> <p>Verify the balance is acceptable throughout the weighing range. The balance must give acceptable readings from low weights up to the capacity.</p>
Poor Repeatability	Usually a mechanical problem.	<p>Inspect the area around the pan for hair, dust or other obstructions,</p> <p>Inspect the mechanics for any possible problems.</p>
Poor Eccentric loading	A mechanical problem	<p>Inspect the area around the pan for hair, dust or other obstructions,</p> <p>Inspect the mechanics for any possible problems</p> <p>Readjust the Eccentric loading</p>

Poor Linearity	Usually a mechanical problem Electronic Problems	Re-check repeatability Inspect the flexures for damage or loose hardware Use the Linearity Function in the service menu to reset linearity A problem in the analogue circuit board or power supplies can cause poor linearity. Make sure all mechanical problems have been eliminated first
OTHER PROBLEMS:		
Cannot calibrate	Zero shifted more than allowed Calibration timeout	Check all flexures for damage Reset factory calibration Verify linearity and repeatability The balance may be unstable. Verify stability as above. Try using a more aggressive filter
Calibration weight motor does not stop		Check the cables to the motor, try plugging the balance into the power again Look for friction in the calibration weight movement Check the flags that control motor position are correct
RS-232 not working	Doesn't print	Check parameters match the device connected Verify cable is correct RS-232 circuits damaged
Display dark, keys beep	Display contrast poor Cable unplugged or damaged	Check the cables to the display Replace the display which could be damaged



Manufacturer's Declaration of Conformity

This product has been manufactured in accordance with the harmonised European standards, following the provisions of the below stated directives:

Electro Magnetic Compatibility Directive 89/336/EEC

Low Voltage Directive 73/23/EEC

FCC COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded interconnect cables must be employed with this equipment to insure compliance with the pertinent RF emission limits governing this device.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

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The manufacturer reserves the right to make changes to the technology, features, specifications and design of the equipment without notice.

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