6$_7$ Series
Spectrophotometers
Operating Manual

670 005/REV C/03-10

IMPORTANT

Please ensure the SD Card is fitted into the socket as detailed in the image below.

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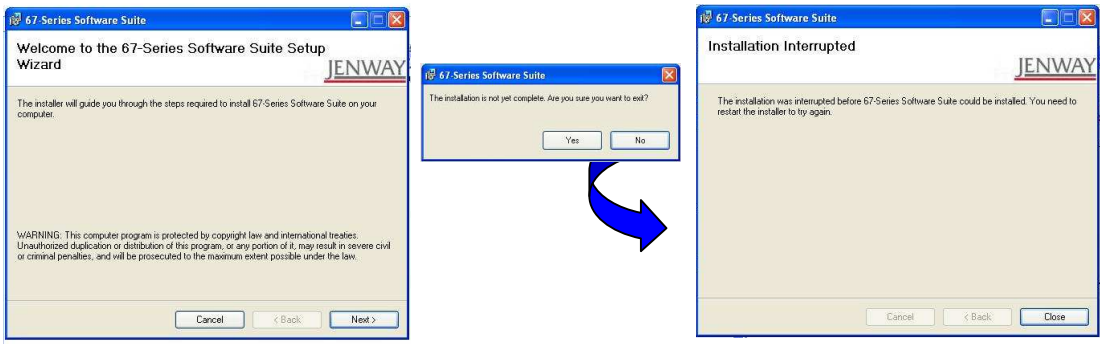
Please ensure the SD Card is fitted into the socket as detailed in the image below.

67 Series Spectrophotometer

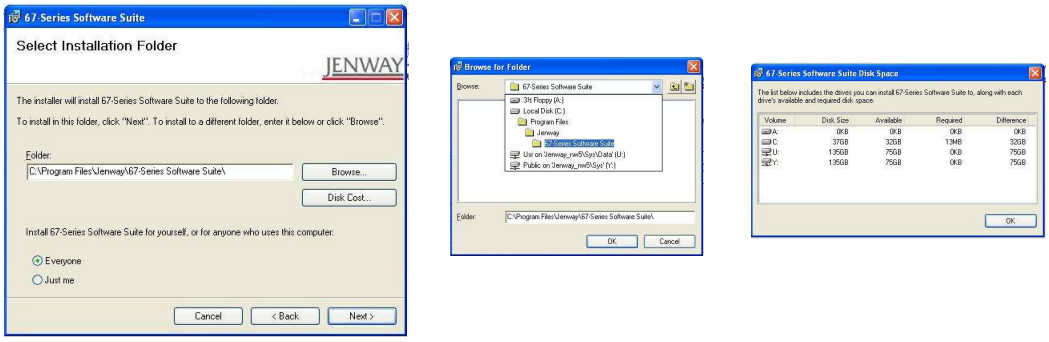
PC Software

Installation

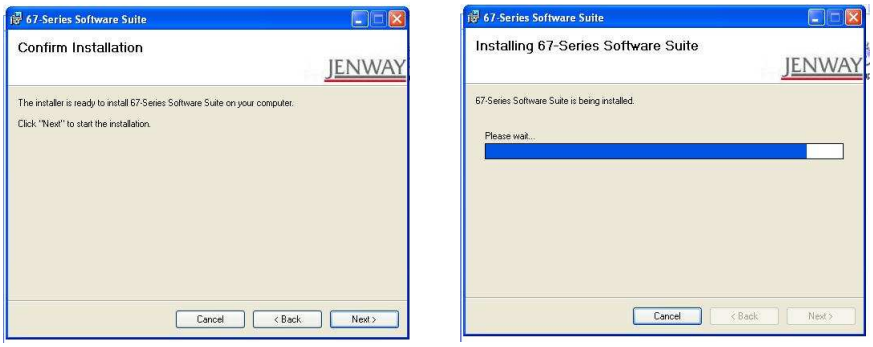
Insert the ***67-Series Software Suite*** installation CD and select the ***67-Series Software Suite*** icon to open the following screen. Selecting ***Next*** commences the installation. The installation can be aborted by selecting ***Cancel***.



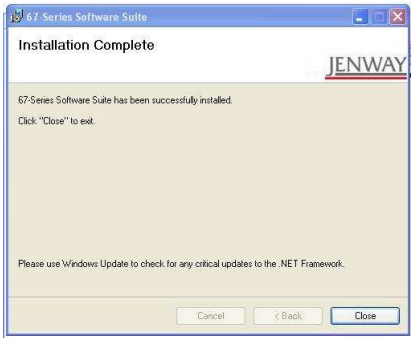
The default installation destination is C:\Program Files\Jenway\67-Series Software Suite\. To select the default destination select ***Next***, to alter the destination select ***Browse***. To review the disk space requirements select ***Disk Cost***. The ***67-Series Software Suite*** can be set up to be used by all users or a single user by checking the appropriate box. To progress the installation select ***Next***, to return to the previous screen select ***Back***, to exit the installation select ***Exit***.



Select ***Next to*** commence the installation. To review or change any of the installation parameters select ***Back***. To exit the installation at this stage select ***Cancel***, the software will not be installed if you choose to exit.



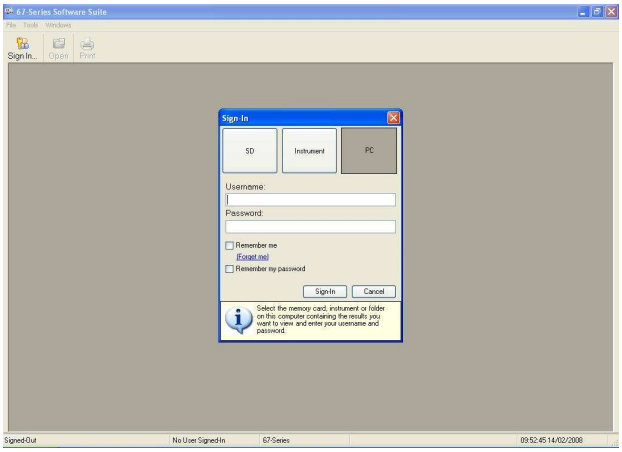
When the installation is complete select ***Close***.



The ***67-Series Software Suite*** icon is displayed on desktop

Getting Started

Ensure the PC and spectrophotometer are connected via the USB cable and select the ***67-Series Software Suite*** desktop icon to open the ***67-Series Software Suite*** main screen.

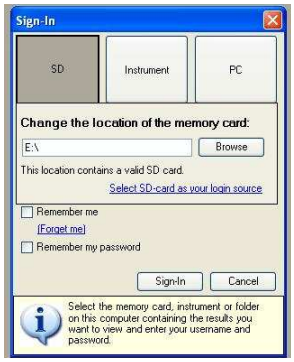


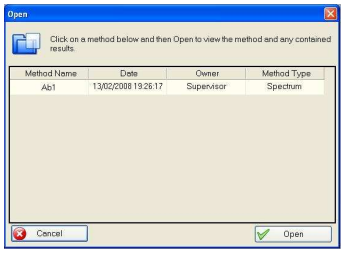
There are three options for accessing saved methods and data: ***SD***, ***Instrument*** and ***PC***.

SD allows the user to access methods and data saved on an SD or SD/USB card inserted in the PC.

Selecting ***SD*** allows the user to browse through the PC directory for the inserted SD or SD/USB card. Select the required folder, ***OK*** and ***Select SD card as your login source***. Entering the ***Username, Password*** and selecting ***Sign-In*** accesses that specific users methods and data (the Username and Password that are required are the same as when logging into the instrument), the user or password can be saved by ticking the appropriate boxes. Highlighting the required method and selecting ***Open*** accesses the saved method.

Data processing for ***SD*** is detailed in the ***Data Processing*** section.



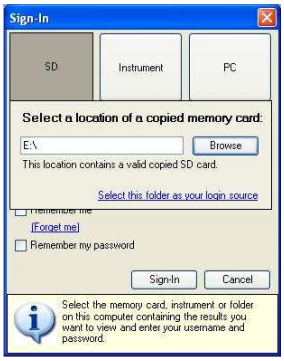


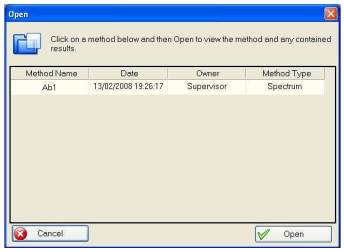
Note: If the selected location does not contain a valid SD card the error message ***This location does not contain a valid SD card*** will be displayed.

PC allows the user to access methods and data saved to a PC.

Selecting ***PC*** allows the user to browse through the PC directory for the desired folder. Select the required folder, ***OK*** and ***Select this folder as your login source***. Entering the ***Username, Password*** and selecting ***Sign-In*** accesses that specific users methods and data (the Username and Password that are required are the same as when logging into the instrument), the user or password can be saved by ticking the appropriate boxes. Highlighting the required method and selecting ***Open*** accesses the saved method.

Data processing for ***PC*** is detailed in the ***Data Processing*** section.



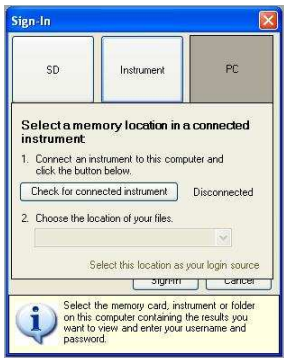


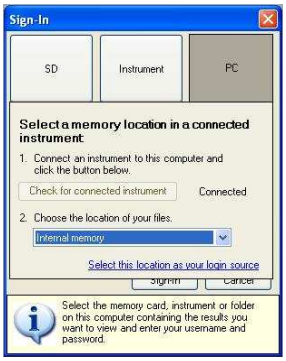
Note: If the selected location does not contain a valid SD card the error message ***This location does not contain a valid copied SD card*** will be displayed.

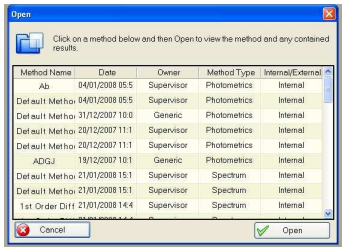
Instrument allows the user to access data saved to either the internal memory of the spectrophotometer or a memory card inserted in the spectrophotometer.

Selecting ***Instrument*** allows the user to browse through data saved to either the internal memory of the spectrophotometer or a memory card inserted in the spectrophotometer. Select the ***Check for connected instrument*** (the default status is ***Disconnected***), whilst searching the ***Check for connected instrument*** button updates to read ***Cancel*** and the status updates to ***Searching…*** when connected the status reads ***Connected***. Choose the desired location of the files from the dropdown bar (the option for ***Inserted Memory Card*** is only available if an SD or SD/USB card is inserted in the spectrophotometer) and ***Select this location as your login source***. Entering the ***Username*** and ***Password*** and ***Sign-In*** accesses that specific users methods and data (the Username and Password that are

required are the same as when logging into the instrument), the user or password can be saved by ticking the appropriate boxes. To access the required method highlight that line and select ***Open***. Data processing for ***Instrument*** is detailed in the ***Data Processing*** section.





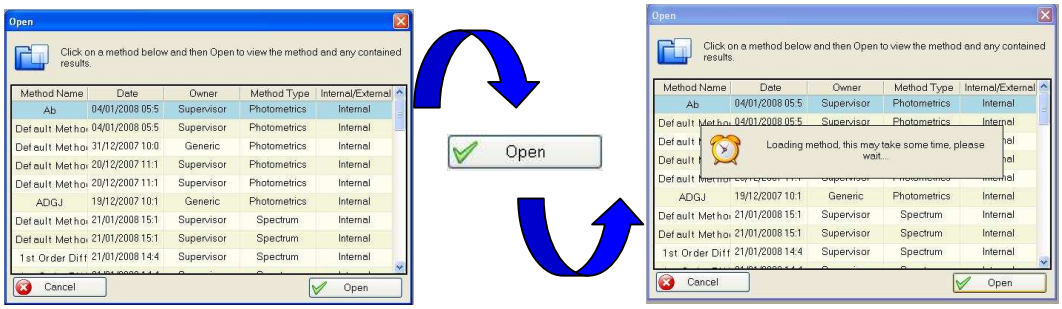


Note: Whenever the PC and spectrophotometer are communicating the spectrophotometer's screen updates to show:

Data Processing

Data processing is the same for the ***SD***, ***PC*** and ***Instrument*** options.

All available methods are displayed in the ***Open*** box. Highlighting the required method and selecting ***Open*** opens the method.



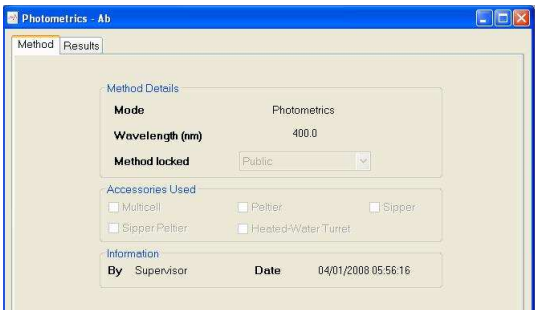
Once a method is opened further methods can be opened by selecting the open icon.

Note: Clicking on the column titles alters the order in which the methods are displayed. ***Method Name*** orders the methods alphabetically, ***Date*** orders the results in date order, ***Owner*** orders the methods by owner type, ***Method Type*** orders the methods alphabetically and ***Internal/Ext*** orders the methods by the order they appear on the spectrophotometer's screen.

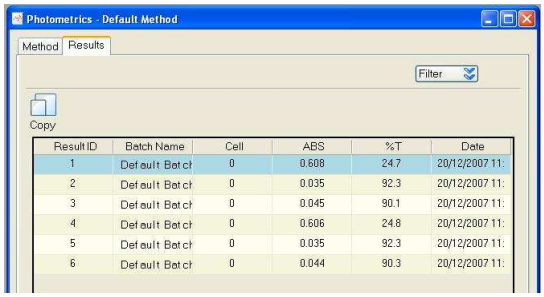
Photometrics

The photometrics screen displays two tabs ***Method*** and ***Results***

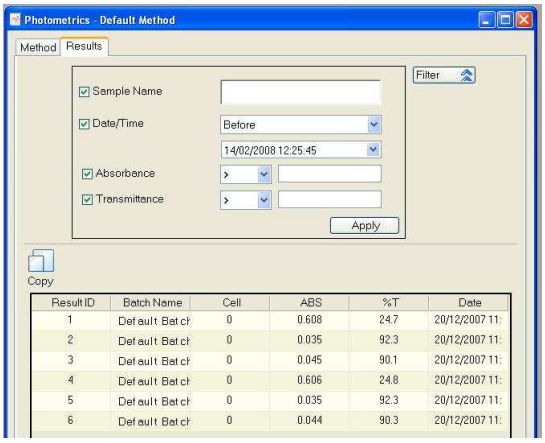
The ***Method*** tab displays the ***Method Details***, ***Accessories Used*** (if any) and ***Information*** of the photometric measurement (this information cannot be edited).



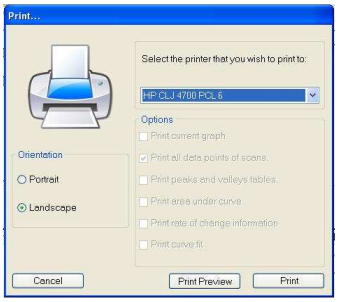
The ***Results*** tab displays a table of the all the results in the chosen method.



Selecting ***Filter*** displays a drop down allowing the results to be filtered by ***Sample Name, Date/Time, Absorbance*** or ***Transmittance*** values. After inputting the required filter parameters select ***Apply*** and the results table will be updated to include the filtered results.



Selecting the print icon opens the ***Print*** box. This allows the user to choose the printer, the orientation of the printout and gives the option of printing directly or viewing a ***Print Preview***.

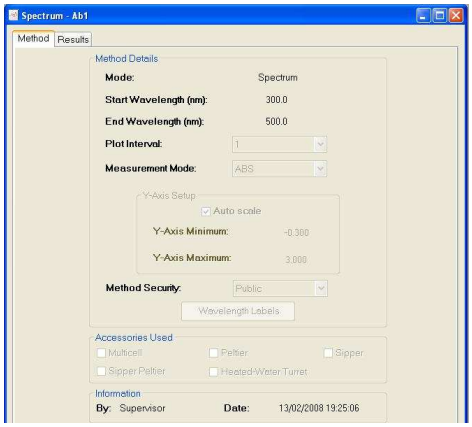


Selecting the copy icon allows the results to be pasted directly into other programmes (*e.g.* a spreadsheet) for further data manipulation or editing.

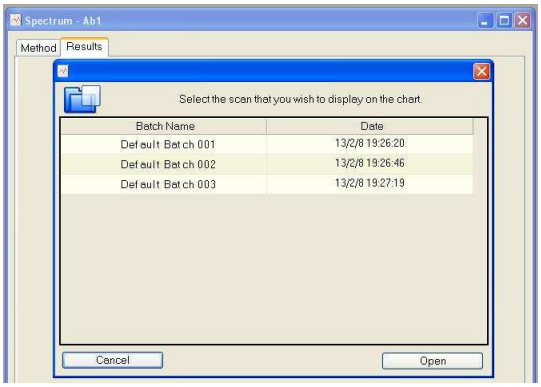
Spectrum Scanning

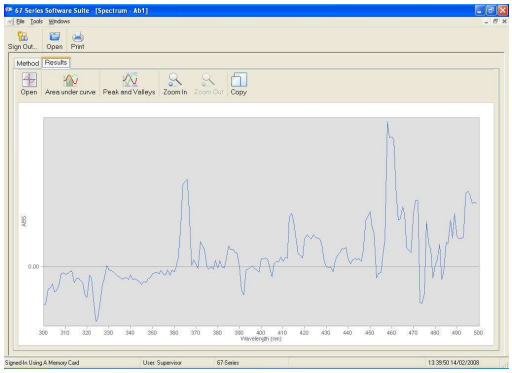
The spectrum screen displays two tabs ***Methods*** and ***Results***.

The ***Method*** tab displays the ***Method Details***, ***Accessories Used*** (if any) and ***Information*** of the spectrum scan (this information cannot be edited).

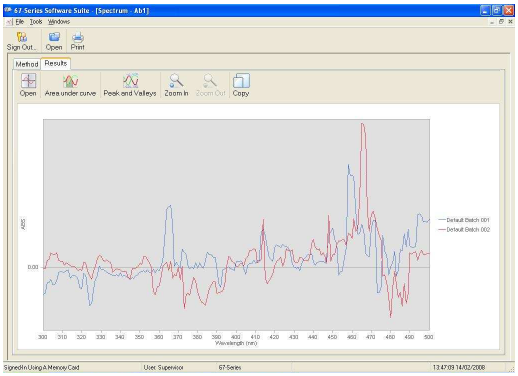


The ***Results*** tab displays a table of the all the results in the chosen method. The desired results can be opened by highlighting the required data line and selecting ***Open***, the chosen spectrum is displayed.





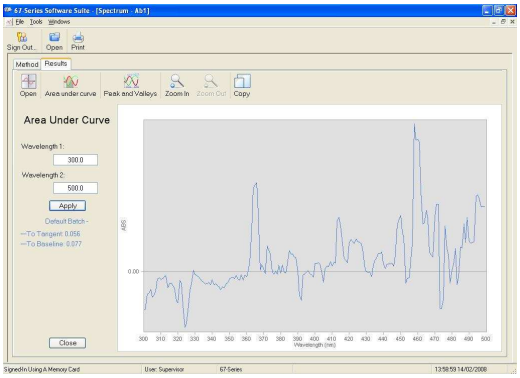
Selecting the open icon displays a table of all of the results. Highlighting the desired result and selecting ***Open*** will overlay the chosen spectrum.



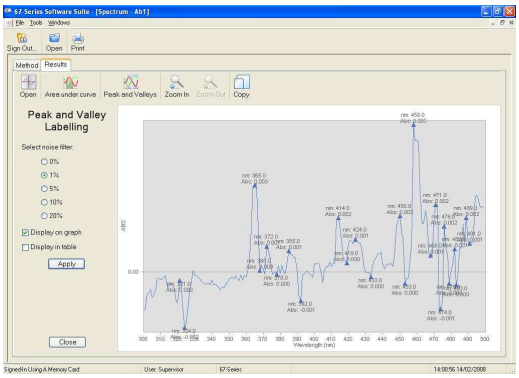
Holding the cursor over the spectrum trace or the data name will highlight the chosen spectrum and fade any other spectra.

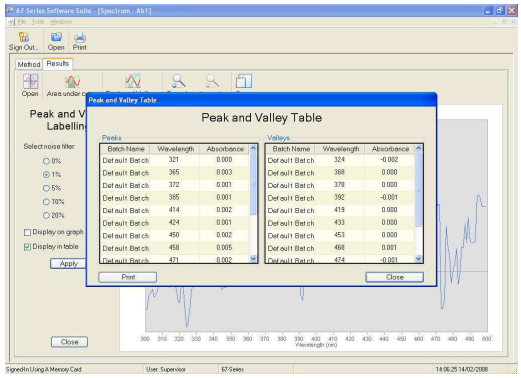
To return to the original spectrum select the open icon and reselect the original data set.

Selecting the area under curve icon displays the following screen. Inputting the required wavelength limits and selecting ***Apply*** will calculate the area under the curve to both the tangent and the baseline.



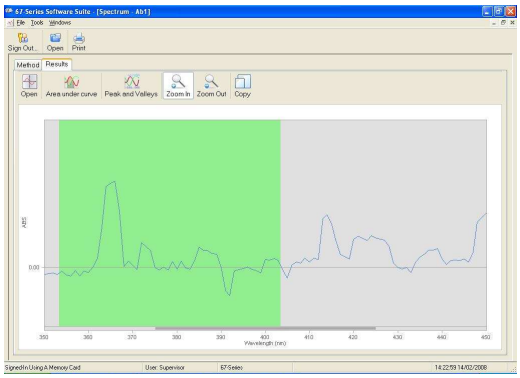
Selecting the peaks and valleys icon displays the following screen. Selecting the required noise filter and ***Apply*** will display the both the wavelength values and the absorbances. These values can be displayed on the spectrum, in a table or both by selecting the appropriate boxes. Alternatively selecting a peak or valley with the cursor will manually label the wavelength and absorbance value.



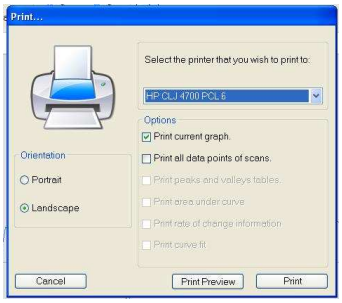


To exit from the Peaks and Valleys screen select ***Close***.

Selecting the zoom in icon displays the green ‘zoom area’ on the spectrum. Placing this over the desired area and clicking the left mouse button will zoom in to the green highlighted area. This process can be repeated up to four times. Once zoomed in it is possible to return to the previous zoom level by selecting the zoom out icon.



Selecting the print icon opens the ***Print*** box. This allows the user to choose the printer, the orientation of the printout, what data is displayed on the printout and gives the option of printing directly or viewing a ***Print Preview***.



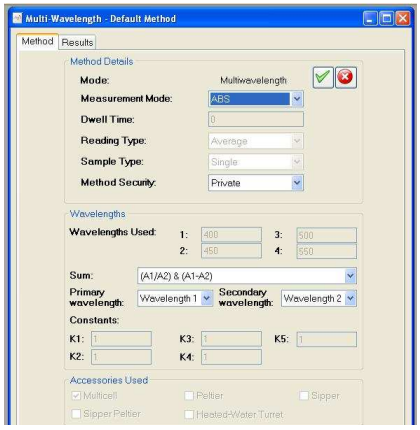
Selecting the copy icon allows the results to be pasted directly into other programmes (*e.g.* a spreadsheet) for further data manipulation or editing.

Multi-Wavelength

The multi-wavelength screen displays two tabs ***Methods*** and ***Results***.

The ***Method*** tab displays the ***Method Details***, ***Wavelengths***, ***Accessories Used*** (if any) and ***Information*** of the multi-wavelength measurement.

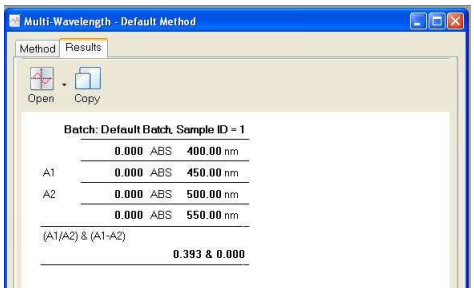
Selecting the edit sum icon allow the ***Measurement Mode***, ***Method Security***, ***Sum***, ***Primary*** and ***Secondary wavelengths*** to be edited.



Measurement Mode can be set as either %T or Absorbance. The ***Method Security*** can be set to ***Private, Public*** or ***Read-Only***. ***Sum*** can be altered to select one of the three available multi-wavelength equations and the ***Primary*** and ***Secondary Wavelengths*** can be altered to any recorded wavelength.

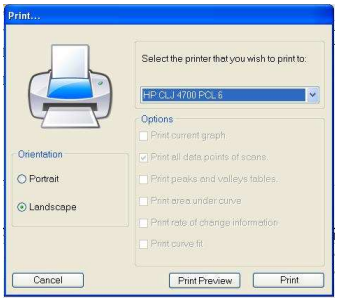
After inputting the required parameters select the tick icon to save the changes or the cross icon to cancel

The ***Results*** tab displays the data of the multi-wavelength measurement alongside the results of the ***Sum*** calculation.



Selecting the open icon allows access to the other results saved in the method.

Selecting the print icon opens the ***Print*** box. This allows the user to choose the printer, the orientation of the printout and gives the option of printing directly or viewing a ***Print Preview***.

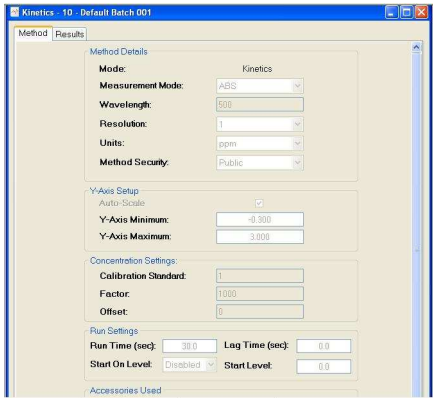


Selecting the copy icon allows the results to be pasted directly into other programmes (*e.g.* a spreadsheet) for further data manipulation or editing.

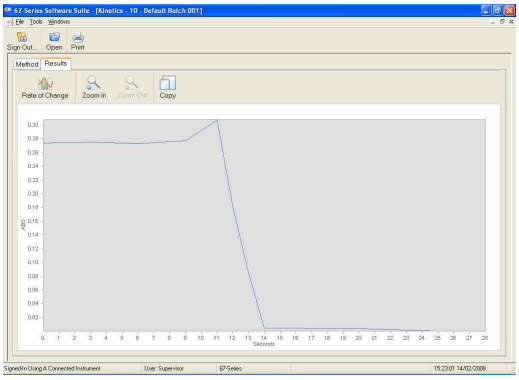
Kinetics

The kinetics screen displays two tabs ***Methods*** and ***Results***.

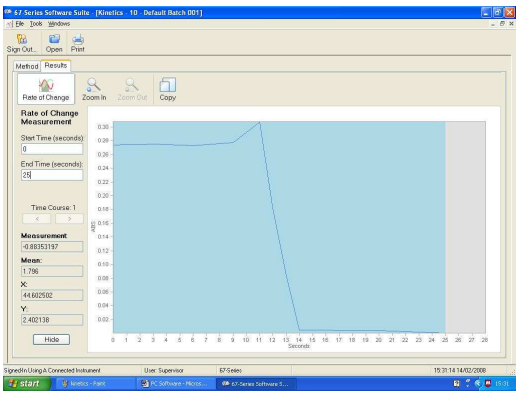
The ***Method*** tab displays the ***Method Details***, ***Y-Axis Set-up***, ***Concentration Settings***, ***Run Settings***, ***Accessories Used*** (if any) and ***Information*** of the kinetics measurement.



The ***Results*** tab displays the chosen result.

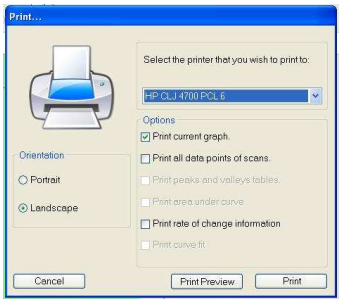


Selecting the rate of change icon displays the following screen. Entering the required ***Start Time*** and ***End Time*** automatically updates the ***Measurement***, ***Mean***, ***X*** and ***Y*** calculations.
Alternatively holding down the left mouse button and dragging over the desired area edits the ***Start Time*** and ***End Time***. To return to the original ***Result*** tab screen select ***Hide***.



Selecting the zoom in icon displays the green ‘zoom area’ on the spectrum. Placing this over the desired area and clicking the left mouse button will zoom in to the green highlighted area. This process can be repeated up to four times. Once zoomed in it is possible to return to the previous zoom level by selecting the zoom out icon.

Selecting the print icon opens the ***Print*** box. This allows the user to choose the printer, the orientation of the printout, what data is displayed on the printout and gives the option of printing directly or viewing a ***Print Preview***.

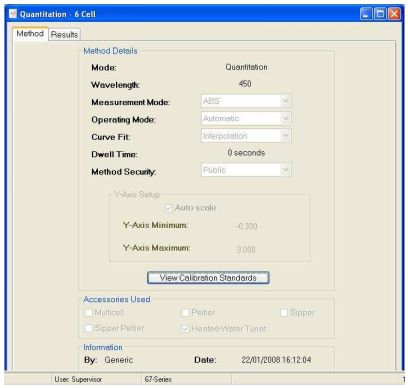


Selecting the copy icon allows the results to be pasted directly into other programmes (*e.g.* a spreadsheet) for further data manipulation or editing.

Quantitation

The quantitation screen displays two tabs ***Methods*** and ***Results***.

The ***Method*** tab displays the ***Method Details***, ***Y-Axis Set-up***, ***Accessories Used*** (if any) and ***Information*** of the kinetics measurement. By clicking on ***View Calibration Standards*** the calibration standards used in the result are displayed.

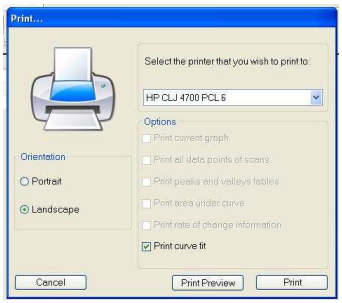


The ***Results*** tab displays the calculated concentrations in a table or displays the curve fit.

Selecting the view table icon displays the calculated concentrations in a table

Selecting the view curve fit icon displays the curve fit.

Selecting the print icon opens the ***Print*** box. This allows the user to choose the printer, the orientation of the printout, what data is displayed on the printout and gives the option of printing directly or viewing a ***Print Preview***.



Selecting the copy icon allows the results to be pasted directly into other programmes (*e.g.* a spreadsheet) for further data manipulation or editing.

Signing Out & Logging In As A Different User

Once all of the required data processing has been completed select the sign out icon to return to the main ***67-Series Software Suite*** screen.

Selecting the sign in icon opens the sign in dialogue box and allows other users to process their data (refer to the ***Getting Started*** section for sign in dialogue box details).

Exiting 67-Series Software Suite

Once all of the data has been processed select ***Exit*** from the ***File*** menu to exit the ***67-Series Software*** **Suite**.

67 Series Spectrophotometers
Models 6700, 6705 & 6715

JENWAY

Operating Manual

Bibby Scientific

670 005/REV C/03-10

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Safety

This is important information; please read carefully before installing or using this instrument.

1. The 67 Series Spectrophotometers are designed for operation by **trained personnel** who are aware of the principles and applications involved. For further help and advice please contact your local distributor, e-mail **sales@jenway.com** or visit **www.jenway.com**

2. The spectrophotometer is a sensitive electronic and optical instrument designed for use in a laboratory environment. Careful adherence to the installation instructions must be observed. If in doubt contact a **relevant and competent authority** for advice before proceeding.

3. In addition to observing the instructions detailed in the Operating Manual and Service Manual for this instrument all installation, operating and service personnel must be aware of, and employ, **a safe system of work**.

4. Voltage levels hazardous to life are present in this instrument, for personal safety only **trained engineers** aware of the risk and avoidance of electric shock should remove protective covers from the instrument.

5. This instrument is designed for minimal maintenance, which must be carried out carefully following the **procedures detailed in this manual**. All safety instructions in these procedures, as well as those defined locally for the **area or environment** where the work is being carried out must be observed.

6. Other than for those items defined in the maintenance procedures herein there are **no user serviceable** items in this instrument. Removal of covers and attempted adjustment or service by unqualified personnel will invalidate any warranty and incur additional charges for repair.

7. Reference should always be made to the **Health and Safety Data** for any chemicals or reagents used. All available information, advice and warnings on the handling, storage, use and disposal of such must be carefully observed. When not available this data must be requested from the supplier before proceeding in any way.

8. It is important that **good laboratory practice** is observed when handling samples, chemicals, reagents and ancillary equipment in order to carry out measurement and analysis with this instrument. Suitable **safety and personal protective equipment** must be used at all times.

9. If it is suspected that safety protection has been impaired in any way, the spectrophotometer must be made **inoperative and secured** against any intended operation. The fault condition must be reported to the **appropriate servicing authority**. In all such reports the **model number and serial number** of the spectrophotometer must be quoted.

Guarantee

Please read this important guarantee information:

Notwithstanding the description and specification(s) of the instruments contained in the Operating Manual, Jenway hereby reserves the right to make changes as it sees fit to the instruments or to any components of the instruments.

This Manual has been prepared solely for the convenience of Jenway customers and nothing in this Manual shall be taken as a warranty, condition or representation concerning the description, merchantability, fitness for purpose, or otherwise of the instruments or components.

The 67 Series spectrophotometers are guaranteed for a period of 3 years from the date of purchase.

Within this period we undertake to supply replacements free of charge for parts that may on examination prove to be defective, provided that the defect is not the result of misuse, accident or negligence.

On all correspondence, please quote the model and serial number in full and/or the sales order number.

Any instrument requiring service under this guarantee should be taken to the supplier through whom it was purchased, or, in the case of difficulty, it should be carefully packed in its original packaging and consigned, carriage paid, to us. Jenway takes no responsibility for returned goods damaged in transit.

Returned goods will not be processed without a Returns Authorisation Number.

Call the Service Administrator +44 (0) 1785 810475 for the relevant documentation.

Please write the Returns Number on the outside of any packaging and ensure that a copy of a Decontamination Certificate is visible.

Please register online **www.jenway.com** or complete and return the Registration Document by fax or mail.

The Guarantee will be rendered invalid if any specified non-serviceable parts within the instrument are tampered with (i.e. the monochromator).

SECTION 1 - Introduction

1.1 INSTRUMENT DESCRIPTION

The 67 Series offer a range of unique features and functions to help in the management of methods and data at both individual and multi-user levels.

These units have a specially designed user interface based on a high quality, colour TFT LCD with touch screen technology and QWheel™ support to provide ease-of-use for all operations from set-up to measurement and data handling.

Five main measuring modes are available: Photometrics, Spectrum, Kinetics, Quantitation and

Multi-Wavelength.

The 67 Series have dual memory options that enable you to store settings and data to either internal memory or on a removable SD/Multi-Media memory card. By saving to the removable SD card all settings, methods and results specific to the user can be retained by the individual, offering additional security and allowing easy transfer of data to a PC for storage, manipulation or off-line review. The SD card can also be used in any similar model, giving complete flexibility to use any available instrument. A simple back-up procedure enables easy transfer of all information from the internal memory to the removable media while quickly enabling a group of instruments to be cloned with identical settings.

It is possible for any user to perform simple measurements (Free Operation) at any time, however, logging-in with your own PIN code will allow you to create methods, change settings or store results. Each method can be designated as ***Public*** (for open user access), ***Read-Only*** (available for all users as read-only information) or ***Personal*** (only accessed through your PIN code).

A number of sampling accessories are available as complete, easily interchangeable modules. These include a Sipper Pump, Sipper/Peltier, Automatic Cell Changer, plus a comprehensive range of passive cuvette and test tube holders, which can be fitted in the single cell holder accessory.

The PC Software supplied enables the transfer of data from the instrument or SD card to the PC with rapid copy and paste into spreadsheets or other computer programmes.

QWheel is a registered trademark of Quantum Research

1.2 INSTRUMENT SPECIFICATIONS

Technical Specification			
	6700	**6705**	**6715**
Light Source	Tungsten Halogen	Xenon	Xenon
Spectral Bandwidth	4nm	4nm	1.5nm
Stray Light	<0.1% at 340nm	<0.05% at 220nm	<0.05% at 220nm
Wavelength Range	320-1100nm	190-1100nm	190-1100nm
Common Specifications			
Optics	Sealed, MgF Coated, Split Beam		
Wavelength Resolution	0.1nm		
Wavelength Accuracy	±1.0nm		
Wavelength Repeatability	±0.2nm		
Photometric Ranges	-0.300 to 3.000A & 0 to 199.9%T		
Photometric Resolution	0.001A & 0.1%T		
Photometric Accuracy	±0.005 at 1A		
Photometric Stability	<0.001A per hour		
Quantitation Range	-99999 to +99999		
Number of Standards	20 with up to 5 replicates of each		
Curve Fit Algorithms	Linear, Quadratic and Cubic Functions		
Multi-wavelength Data Points	Up to 4 wavelengths		
Calculations	Difference and ratio		
Kinetics Time Limits	30 to 9999 seconds		
Kinetics Calibration	Standard or factor		
Scan Speed	1500nm/minute at 0.1nm data steps		
Post Scan Analysis	Peak/Valley pick, Peak Ratios, Area, Zoom, Wavelength Table, Derivatives, Smoothing		
Configuration	Secure Multi-User and Free Access		
Number of Users	10 + Supervisor		
Number of Methods	>1000 (on internal flash memory or removable media)		
Results Storage	>1000 (on internal flash memory or removable media)		
Removable Media	MM/SD Memory Card or SD/USB memory card		
Interface	USB, Centronics, Analogue		
PC Software	Supplied on CD-ROM with USB interface cable		
Mains Supply	100 to 230V ac 50 or 60Hz		
Sample Compartment	150mm (max. height) x 130mm (w) x 210mm (d)		
Size	490x390x220mm		
Weight	7.5Kg		

Environmental Operating Conditions:

The 67 Series is designed to work safely under the following conditions:

Temperature	15 to 40ºC
Humidity	0 to 90%RH

Accessory Specifications

Peltier

Temperature Range:	20 to 50° C or 68 to 122° F
Temperature Resolution:	0.1° C or 1° F
Accuracy:	±0.5° C
Stability:	±0.3° C
Red/Green Window:	±0.5° C

Sipper Pump

Modes:	
Continuous Aspiration	Flow rate dependent on tube ID. (12ml/min with supplied tube)
Timed aspiration	sample/air-gap/wash
sample volumes	75µl min / 9.5ml max.
segment run time	48 secs max.
Memory	Non-volatile

1.3 GOOD PRACTICE GUIDELINES

1. For optimum performance all spectrophotometers should be sited in a clean, dry, dust free atmosphere. When in use ambient temperature and light levels should remain as constant as possible.

2. Adherence to Standard Operating Procedures (SOP) and Good Laboratory Practice (GLP) should be monitored with regular calibration checks and a suitable Quality Control (QC) programme.

3. The sample chamber lid must be fully closed during measurement and before any readings are recorded or printed.

4. The correct selection of sample containers is imperative for accurate and reproducible results:

a) Check that the material of the sample container is compatible with the wavelengths to be used for measurement. In general glass can only be used down to 360nm or 320nm depending on quality. Standard plastic cuvettes can be used down to 320nm. Special UV versions can be used down to 260nm. Below this level quartz cuvettes must be used.

b) Plastic disposable cuvettes should be used ONCE only.

c) Glass cuvettes should be thoroughly cleaned after use. Discard when scratches become evident in optical surfaces.

d) Care should be taken when selecting semi-micro or micro cuvettes. The cuvette window on the inner chamber (the area filled with sample) must be wider than the aperture in the sample holder or light will reach the detector without passing through the sample. In this case, semi-micro or micro cuvettes with self-screening black surrounds must be used or alternative holders for these cuvettes fitted.

e) Glass test tubes and other sample tubes should be used with care. Where possible, matched tubes should be used and any index mark set to the correct position before measurements are made.

f) Ensure any sample containers used are compatible with the constituents of both the samples and standards they are to hold. Plastic cuvettes are not compatible with organic solvents.

g) All sample containers must be handled with care; by the top and non-optical surfaces only. Any finger marks evident must be removed using a suitable cleaning process.

h) Flow-through cuvettes must be selected with care and consideration for the sample type, sample volume, pumping system, rinse, sample and waste handling to be used.

5. Samples and standards should not be stored in open cuvettes or sample containers as evaporation will change the value and lead to staining of the walls which may be irreversible. If stored in stoppered and sealed cuvettes, they should be filled with little or no air space and the values regularly checked against a reference standard or quality control material.

6. Cold samples should be allowed to equilibrate to ambient temperature before measurement (unless a suitable temperature controlled sample holder is in use). Temperature change during measurement may cause air bubbles to form on the walls of the sample holder. This is a common cause of drift during measurement.

7. In the preparation of samples and standards high grade borosilicate glass and AR grade chemicals and reagents must be used. Good quality deionised water or other suitable solvent must be used for dissolving or diluting samples, chemicals and reagents.

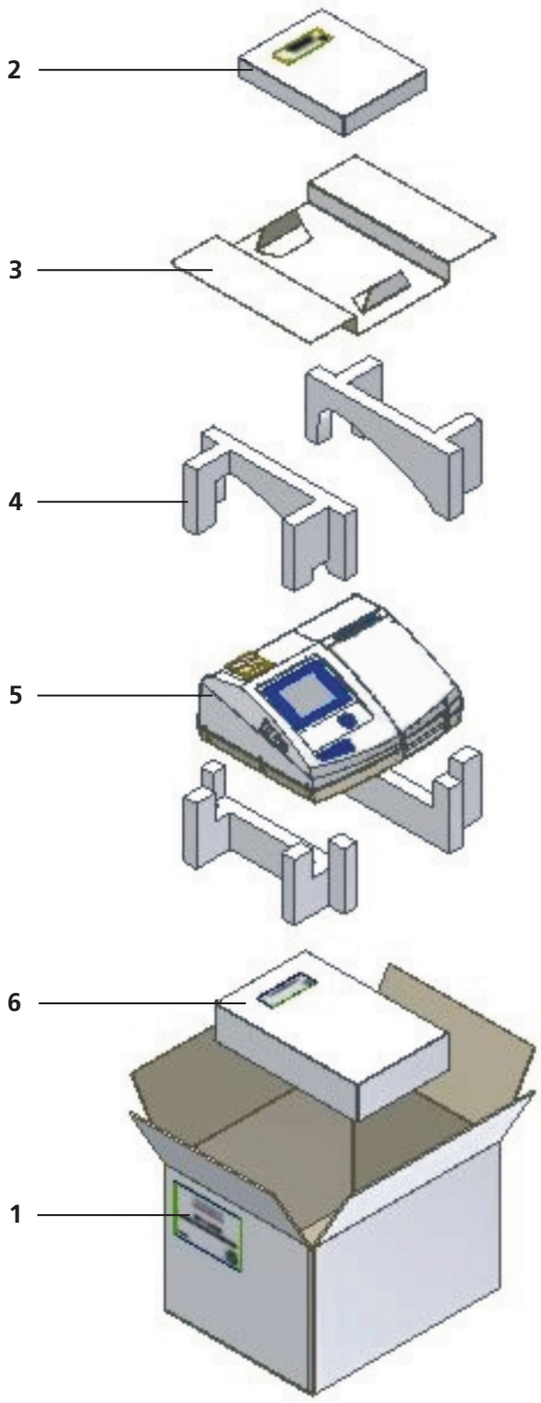
8. All measurements require calibration to a blank, for maximum accuracy this should be prepared with care using the same deionised water or solvent used for dissolving or diluting the sample. Where reagents are added to the sample to produce a colour proportional to its concentration a 'sample based' blank should be used. In this case the blank should consist of the sample plus any reagents or chemicals to be used, ***except*** those that produce the colour to be measured.

9. Deviations from the Beer-Lambert Law may occur at high and low concentrations giving non-linear response during sample concentration measurements. For all new methods a linear range should be defined by the preparation of a calibration curve. The quantitation mode may be used to construct such a curve against which sample results are automatically measured.

10. Cuvettes and sample holders must be filled to a minimum level which covers the light path.

SECTION 2 - Getting Started

2.1 UNPACKING INSTRUCTIONS



• Refer to label **1** on carton exterior and ensure instrument type and options/ accessories supplied are correct. Refer to Distributor in the event of any discrepancy.

• Check each item as it is removed from the packaging to ensure it is correct and undamaged. Refer to Distributor if any item is missing or damaged.

• Remove Documentation carton **2**. Note that this contains the Instruction Manual and other important documents, which **MUST** be retained for future reference. Other small items (CD ROM, SD Card etc) will also be found inside this carton.

• Please take some time to familiarise yourself with the contents of the Instruction Manual before using the instrument for the first time.

• Remove the cardboard packing piece **3** and place to one side.

• Remove the two foam packing pieces **4** and place these to one side.

• Grasp the instrument **5** (which will be sealed in a polythene bag) firmly at each end, and lift out of the carton to place on an adjacent flat, firm and clean surface.

The instrument weighs approximately 10 Kgs.

PLEASE TAKE CARE WHEN LIFTING.

• Remove the Accessory carton **6**. Note that this contains the Power and USB cables together with any sample cells or other items that may have been ordered. Refer to the Instruction Manual to ensure accessories are installed correctly before using the instrument for the first time.

Disposal of Packaging

It is recommended that the Instrument packaging be retained for possible future long-term storage or transportation. Please note that the Manufacturer or Distributor cannot be held responsible for any damage incurred as a result of transportation of an inadequately packed instrument.

If you wish to dispose of the instrument packaging, please do so in an environmentally responsible manner. Please refer to the following guidelines: -

Cardboard packing items are made from paper sourced from recycled fibres or managed forests and can be 100% recycled where appropriate facilities exist. Ensure cartons are crushed or flattened before disposal.

Foam packing pieces are manufactured with a reprocessed polyethylene content and can be easily recycled with other low-density polyethylene (LDPE) materials. Polyethylene foam is manufactured by a CFC and HCFC free process and contains less than 100ppm heavy metal content. The European Union Packaging Directive confirms that recovery by means of waste-to-energy is a sensible waste management alternative. The Polyethylene foam burns cleanly and contributes a high calorific value.

2.2 INSTALLATION

2.2.1 LOCATION

In ideal circumstances the installation environment will be clean, dry and dust free with the instrument protected from extreme variations in ambient lighting and temperature change. Ensure the unit is positioned so that the mains on/off switch is accessible. If a safety problem should be encountered, switch off at the mains socket and remove the plug from the supply.

Where conditions are less than ideal, maintenance and cleaning must be carried out regularly and additional protection offered where possible.

The optional dust cover should be used to protect the instrument when not in use.

2.2.2 SUPPLY VOLTAGE

The 67 series spectrophotometers are powered by a universal switch-mode power supply that operates from a 90-264Vac mains supply. The correct lead for your supply should be selected.

2.2.3 MAINS CONNECTIONS

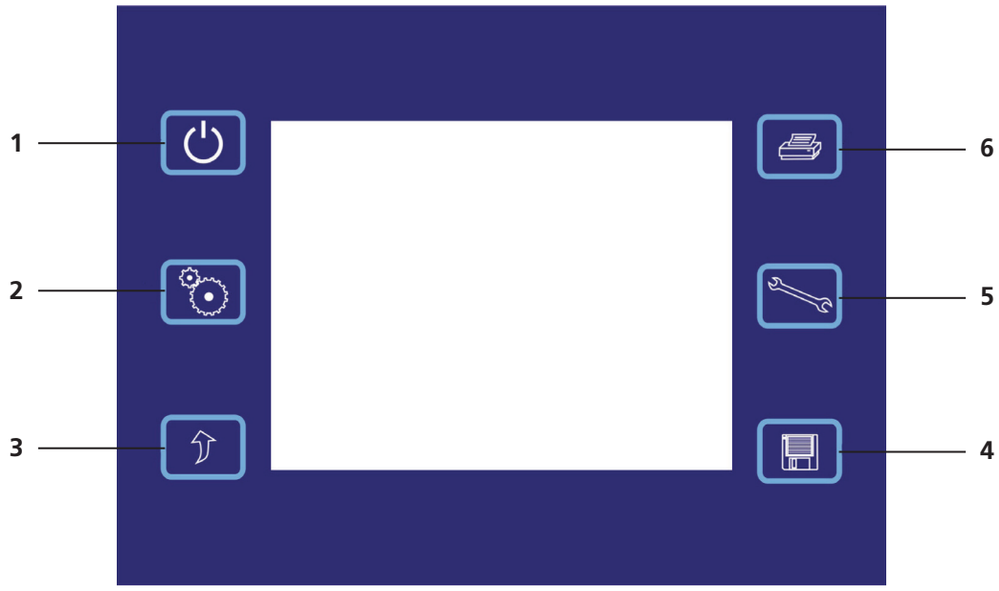
The leads supplied have a moulded on plug. However, if this is removed for any reason the wires in the mains lead are colour coded to conform to the internationally recognised standard such that:

UK CONNECTIONS		US CONNECTIONS	
Brown	**Live**	**Black**	**Live**
Blue	**Neutral**	**White**	**Neutral**
Green/Yellow	**Earth**	**Green**	**Earth**

Safety

When disposing of any removed plug the connectors must be removed or made incapable of insertion into a mains socket.

2.2.4 TOUCH SCREEN FUNCTIONS



1. Standby – this key can be used to enter the standby mode during operation.

2. Instrument Settings – this key can be used to access instrument set up parameters including user creation, PIN codes, language options, date and time settings, administrative functions and instrument identification details.

3. Back key – this is used to return to a previous menu level.

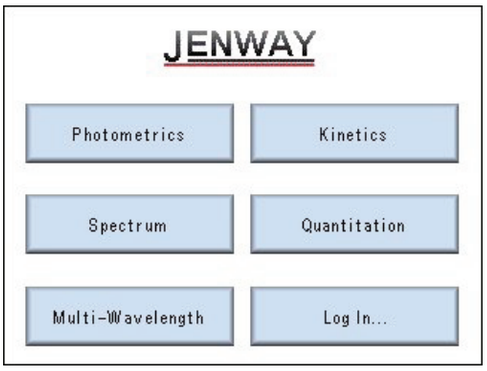
4. Save key – pressing this key saves methods and/or data. If an external card is not fitted then methods/data will automatically be saved to internal memory. If an SD card is inserted or removed during operation relevant messages and options are given to select the desired media.

5. Toolbar key – this key is only functional on the completion of measurements and gives access to the available data manipulation options. The function of this key is context sensitive, enabling different sets of tools depending on the mode of operation in use.

6. Printer key – this key will initiate a print out to either the internal or external printer unit via the selected settings options in each mode of operation.

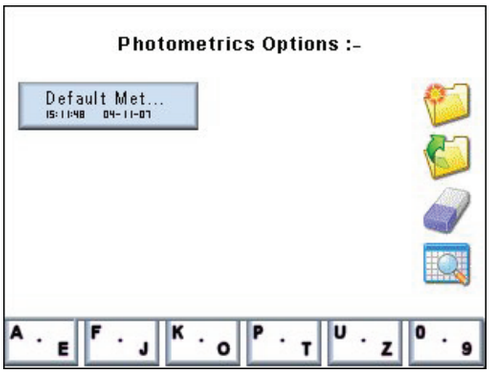
2.2.5 TOOLBAR ICONS

The spectrophotometer can be used for making measurements at any time without the need for logging in; but many benefits will be lost and results cannot be saved, only printed.



The Method Screen options will only be displayed if the user logs in. If the user is not logged in the instrument will automatically display the main measurement screen, with settings at their last used levels.

Method Screens



Methods are stored sequentially by measurement mode. Once the first page is full (8 methods for the selected mode) cursor arrows are displayed enabling the user to browse to subsequent or previous pages of 8 methods.

Alternatively, pressing one of the alphanumeric keys along the bottom of the screen will display all available methods with the initial character that is highlighted.

Note: Repeated pressing of a key sequentially highlights the characters between those displayed.

Create a New Method

For the following functions first touch a method or result to select it.

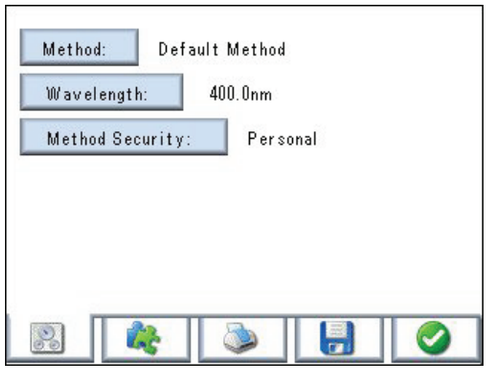
Open the Selected Method

Erase the Selected Method/Result

Browse Results – linked to the selected method

Open specific results in the selected batch

Photometrics Mode



Mode settings – method name, wavelength, method security (if logged in)

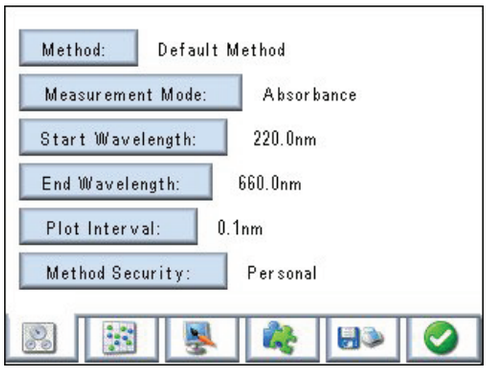
Accessory options – varies with type of accessory module fitted

Allows selection of internal or external printer

Allows set-up of batch ID and the Auto Log options

Press to accept settings entered

Spectrum Mode



Mode settings – method name, measurement mode, wavelength range, plot interval, method security (if logged in)

Analysis Points – up to 30 wavelengths at which absorbance will be reported

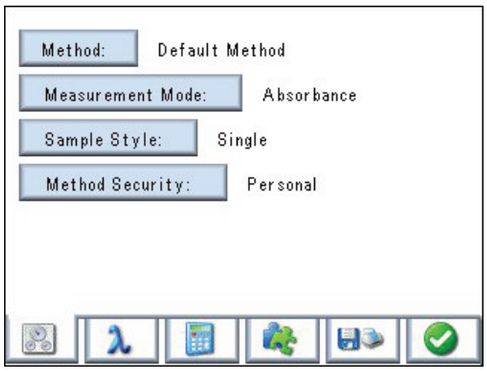
Measurement display – auto scaling, axis setting and colour selection

Accessory options – varies with type of accessory module fitted

Allows selection of internal or external printer, graph details, batch ID and enables or disables the Auto Log feature

Press to accept settings entered

Multi-Wavelength Mode



Mode settings – method name, measurement type, reading type, sample style, method security (if logged in)

Setting wavelengths – allows from 2 to 4 wavelengths to be set

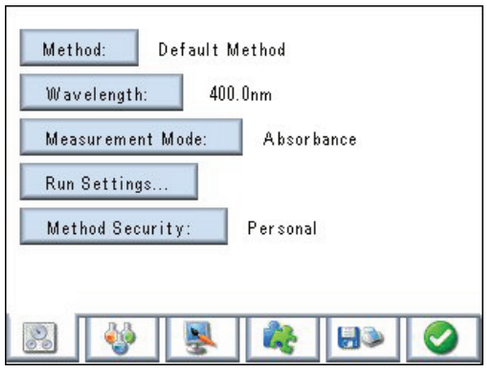
Calculations - allows the selection of calculations and constants

Accessory options – varies with type of accessory module fitted

Allows selection of internal or external printer, graph details, batch ID and the Auto Log options

Press to accept settings entered

Kinetics Mode



Mode settings - method name, wavelength, measurement mode, run settings, method security (if logged in)

Calibration – allows setting of Concentration cal standard, factor, resolution and units of measurement

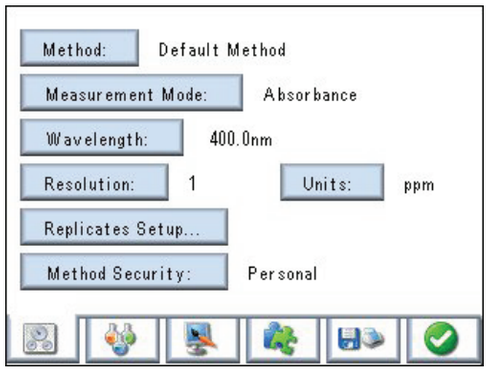
Measurement display – allows auto scaling, axis setting and colour selection

Accessory options – varies with type of accessory module fitted

Allows selection of internal or external printer, graph details, batch ID and the Auto Log options

Press to accept settings entered

Quantitation Mode



Mode settings – method name, measurement mode, wavelength, resolution, units of measurement, replicates set up, method security (if logged in)

Calibration – allows the number and levels of standards to be set

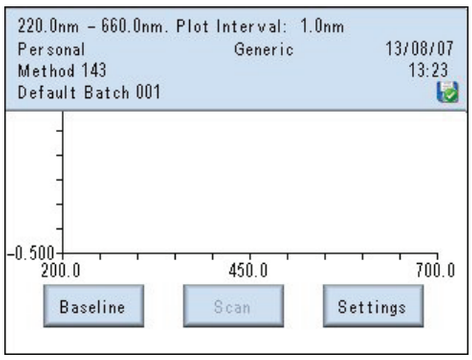
Measurement display – allows selection of type of curve fit, auto scaling, axis setting and colour selection

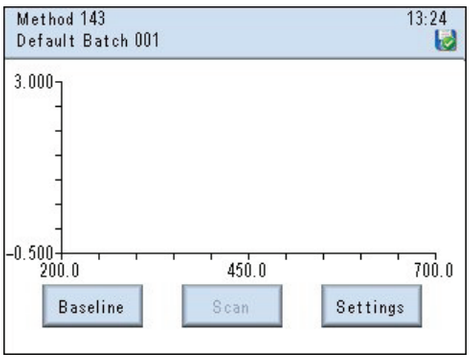
Accessory options – varies with type of accessory module fitted

Allows selection of internal or external printer, graph details, batch ID and the Auto Log options

Press to accept settings entered

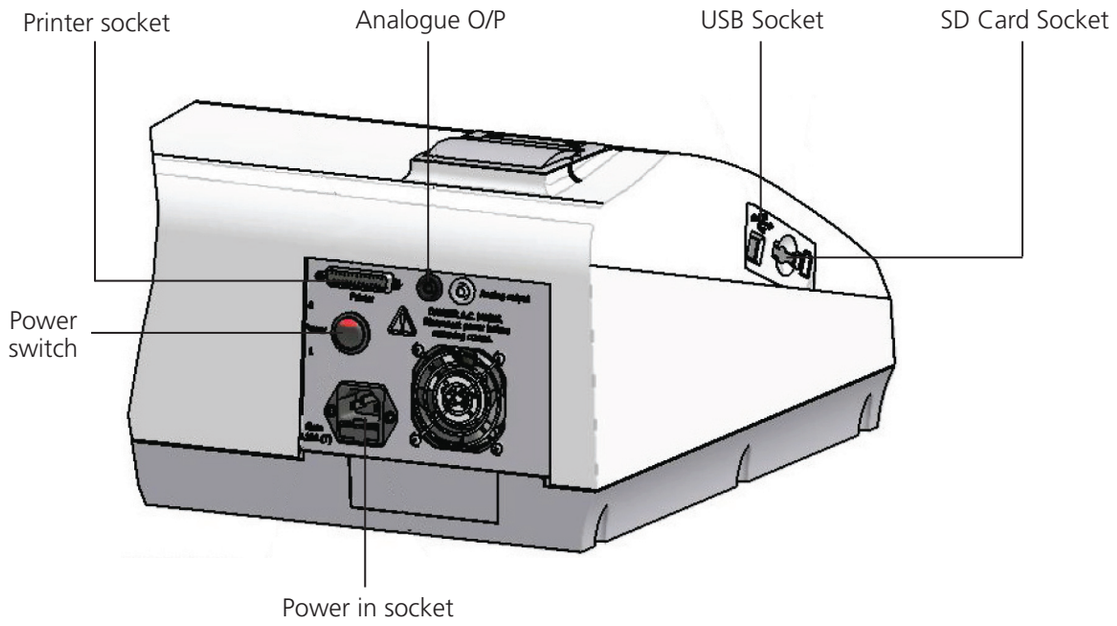
Status Bar





To view the set parameters in any of the measurement modes press the status bar once and a drop down menu will appear. Pressing this bar again will return it to its original status.

2.2.6 REAR PANEL LAYOUT



Power Switch	On/Off switch for the unit.
Power In Socket	IEC type connection socket for the mains supply cable.
Printer Socket	25 way Centronics parallel output socket compatible with Postscript printers.
Analogue Output	2 x 4mm pin sockets for analogue devices.
USB Socket	type B connector for communication to PC.
SD Card Socket	will accept 128MB to 2GB SD or Multi-media memory cards.

2.2.7 POWER ON AND SELF-TESTS

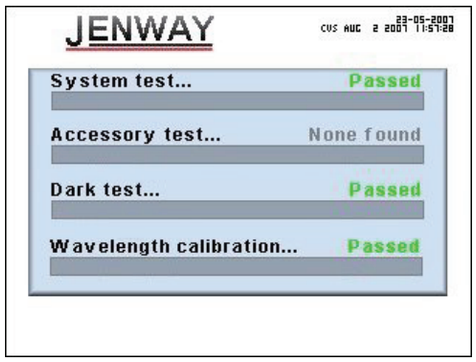
Note: For the Model 6700 allow 30 minutes warm up prior to use.

Connect the mains supply cable to the rear panel mains input socket and plug the other end into a suitable mains supply socket.

Lift the sample chamber lid on the instrument and ensure that there is no sample or other item present in the sample holder, close the lid.

Switch on the supply socket, then the instrument, using the Power switch located on the rear panel.

The instrument will then perform the power on self-test protocol. The power on and self-test screens will be shown:



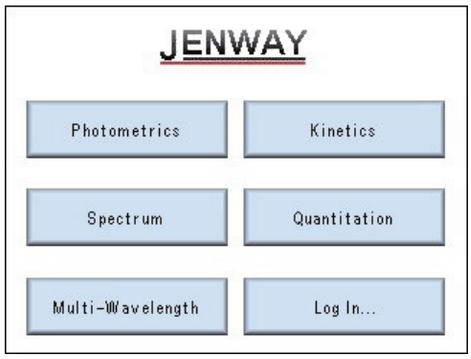
System test… Checks internal connections / Checks internal and external memory status

Accessory test… Checks for fitted 'active' accessories / Verifies communication and response

Dark test… Checks detector and light seal on sample chamber

Wavelength calibration… Performs a wavelength calibration

followed by the ***Main Menu*** Screen:



This screen gives you access to the five operating modes that can be used directly for making measurements without logging in. It should be noted that if the user is not logged in results can only be viewed and printed but not stored. In addition, methods cannot be created or retrieved.

SECTION 3 - Systems of Operation

3.1 MULTI-USER AND FREE OPERATION

The 67 Series spectrophotometers focus on secure, multi-user operation. But to ensure that anyone can acquire quality results in an emergency or when otherwise required (stat or free operation), they may also be used without the operator having to log in. Such free operation is restricted to making measurements with no access to methods while results will only be displayed or printed.

Secure, multi-user operation requires each designated user to enter a PIN code to access methods and results. When creating methods a user can opt to share them with other users, as ***Public*** (can be modified) or ***Read-Only*** (can be used but not modified), or to keep them ***Personal***. Up to 10 users and a Supervisor with administrative rights can be set up on each instrument but by using the removable media (see below) an almost infinite number of users can be securely accommodated.

3.2 MEMORY STRUCTURE

The 67 Series spectrophotometers have a dual memory structure based on removable media and fixed internal memory. The capacity of the internal memory can be selected when an instrument is purchased; further up-grade to this internal memory is only possible by a trained and qualified Service Engineer. The removable media is based on SD or Multi-Media memory cards with a wide range of capacities available.

For both internal memory and removable media the following table of memory capacity and data storage can be used as a guide to the files that can be stored:

Memory Size	Methods	Results	Total Files
256 MB	1000	1000	2000
512 MB	2000	2000	4000
1 GB	4000	4000	8000
2 GB	8000	8000	16000

The following table gives details of the removable media available (subject to change by manufacturers range consolidation):

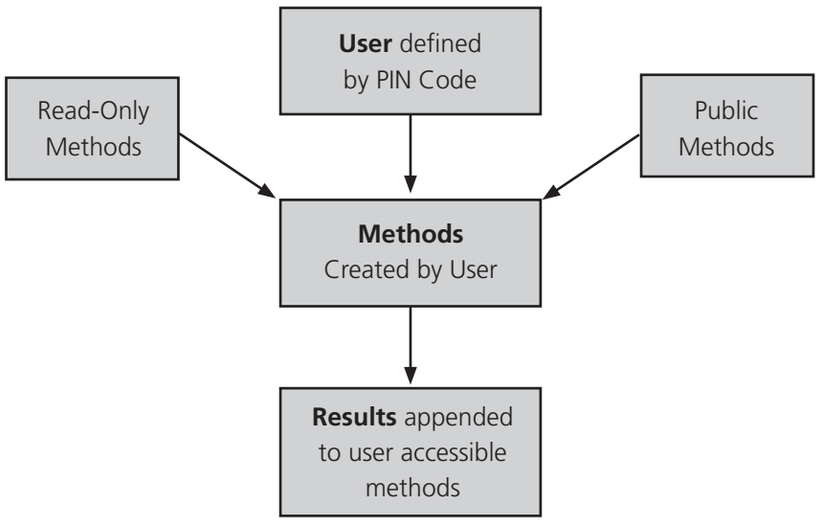
Card Capacity	SD Card Part Number
256 MB	019 130
512 MB	019 131
1 GB	019 132
2 GB	019 133

3.2.1 MEMORY SELECTION

When the power is turned on the internal memory is selected as the default memory location, even if a removable memory card is fitted in the instrument. If the user inserts a removable media memory card during use a message will be displayed giving the user the option to switch the default memory location to the removable media memory card so that any methods and results that are saved are sent to this card. Should the card be removed during use a warning message will be displayed and the internal memory will then be set as the default location.

3.2.2 MEMORY HIERARCHY

The top level of the memory hierarchy is the user, defined by a user name and recognised by their unique PIN code. In general it is considered that this will be an individual but in practice this can be made more flexible by considering the user as a group sharing the same PIN code. For instance different departments or shifts could be identified by their own PIN codes.



Different types of tests could also be separated by PIN codes with only users trained in carrying out specific tests given the relevant PIN codes to access the tests for which they have been trained. In education a PIN code for each semester or part of the curriculum would restrict students or year groups access to only the current work, protecting that to be used in the future. The implementation and benefits of this function are only limited by the imagination.

Below the user level are the Methods created by that user or for that group, and those with ***Public*** or ***Read-Only*** status that all users can access, below each method are the results stored by the user for THAT METHOD.

3.3 CREATING METHODS

The ability to create and re-call methods is only available to logged in users.

To log in touch the ***Log In…*** key on the bottom right-hand side of the ***Main Menu*** screen that is displayed after completion of the start-up tests.

A table of users is then displayed, touching your name (department, user group or other identifier) then brings up a numeric entry screen for inputting the four digits of the relevant PIN code.

For first time use the only user in the table will be the Supervisor with a default PIN Code of 1234 (once logged in this can subsequently be changed to a number combination of the Supervisor's choice).

By pressing the ***Settings*** key on the display surround and selecting the ***Administrative Functions*** option the Supervisor can create new users. On creation a new user has a default PIN Code of 0000 that, like the Supervisor's, can be changed by selecting User Preferences, then Adjust PIN Code.

NOTE: Once the Supervisor's PIN CODE is changed it must be kept safe as there is no other way of accessing this function – however the Supervisor does have the right to re-set other users' PIN Codes back to the default.

For further information on these functions see the Section on ***Instrument Settings*** and ***Administrative Functions***.

When successfully logged in the user is returned to the main menu screen from which the required mode of measurement can be selected.

The Browse screen is then displayed from which an existing method can be re-called using the alphanumeric search keys along the bottom menu bar. If insufficient methods have been created to fill the first page all available methods will be shown.

3.4 FILE & DATA MANAGEMENT

Saving Methods

Having entered all your required settings on the tabbed pages the method can be saved by simply pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result.

If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options. Alternatively, when the ***Auto Log*** option is set to ***On*** or ***Timed*** and the destination option is ***Memory*** all results will be saved automatically.

Sharing Methods

Methods can be shared with other users by setting the security level at either ***Read-Only*** where other users can use but not modify the method or, ***Public*** where they can use and modify the method. Other users must then ensure that under ***Method View Settings*** (Settings/User Preferences/Method View Settings) they have enabled ***Public*** and/or ***Read-Only*** methods or turned ***All Methods*** on.

Recalling Methods

Following selection of the operating mode from the main menu the method browse screen is displayed. This will show all methods that the current user has access to, based on their selections in the ***Method View Settings*** (refer to Sharing Methods). If the first page is full, cursor arrows will be displayed to enable navigation to and from additional pages.

Alternatively, selection may be made using the alphanumeric menu bar at the bottom of the screen.

Repeated pressing of each character set will display the full alphanumeric range and the screen will show all methods starting with the highlighted character.

Touch the required method when it is displayed on the screen to highlight it, touch the ***Open File*** icon to display the main measurement screen for that method.

Editing Methods

Use the Recalling Methods procedure to recall the required method. With the measurement screen displayed touch the ***Settings*** option. Adjust the settings as required and touch the ***Enter*** icon on completion. The modified method can then be saved by pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result. If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options.

Note: If the Method name was not changed during editing it will be saved with the same name but with a new date and time to ensure traceability. If the old method is no longer required it should be deleted as detailed in Deleting Methods.

Deleting Methods

To delete methods highlight the required method in the Browse screen as described in Recalling Methods and then touch the ***Erase*** icon.

A warning message will be displayed to ensure this action is required. On confirmation the selected file will be deleted.

If the current user does not have the required privileges to delete the selected method then an information message will be displayed advising that the method cannot be deleted.

Privileges required for deleting designated methods:

Public Methods – only the Supervisor and Originator can delete these.

Read-Only Methods – only the Supervisor and Originator can delete these.

Personal Methods – Only the Originator can delete these methods. (The Supervisor can delete these by re-setting the Originator's PIN code and then logging in as the Originator).

Saving Results

After completion of a measurement the result can be saved by simply pressing the ***Save*** key on the display surround. The result is saved under the method that created it, with the entered Batch ID and an incremental number along with the time and date of the measurement. Results can also be saved as part of the ***Auto Log*** function by selecting ***Memory*** under the ***Auto Log*** option, which will vary depending on the type of sampling accessory fitted.

Printing Results

After completion of a measurement the result can be printed, by simply pressing the ***Print*** key on the display surround. The result will be printed to either the internal or external printer, as selected by the user in the ***Printer Settings*** option.

The first result of any new batch is preceded by a print header, which gives details of the method settings and Batch ID. Results can also be printed as part of the ***Auto Log*** function, which will vary depending on the type of sampling accessory fitted.

Recalling Results

Stored results are always directly linked to the method that created them. To access results first recall the method as described in ***Recalling Methods***. With the method highlighted touch the ***Search Results*** icon. This will open a screen detailing all results available to the current user. Touch the required result or batch (depending on the mode) and then the ***Open Specific Result*** icon. This will display the results on the screen. The ***Tools*** option can then be used to work on these results (depending on mode). It is also possible to print the result by simply pressing the ***Print*** key on the display surround. Options to print to the Internal or External printer or to the CSV file will be displayed. Printing to the CSV (Comma Separated Values) file will save the data in CSV format on the external data card. (If a card is not fitted the instrument will display a prompt). This is in text format and can be viewed and printed in Excel®.

In ***Kinetics*** mode an additional option is available (Analogue Mode). This allows results to be output via the rear panel analogue sockets to a chart recorder or similar device.

Sharing Results

Results attached to ***Personal Methods*** cannot be accessed by any other user.

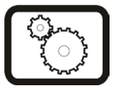
Results attached to ***Read-Only*** and ***Public Methods*** can be accessed by all users, based on their current ***Method View Settings***.

SECTION 4 - Instrument Settings

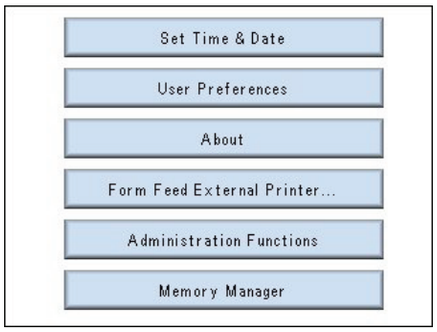
4.1 MENU OPTIONS

A number of settings can be stored for each signed in user including language, method view settings, display brightness and time/date display choices so that these do not have to be reset each time a new user logs in. These can be found under ***User Preferences***.

Note: ***Administration Functions*** and ***Memory Manager*** options will be greyed out and unavailable unless the Supervisor has logged in.

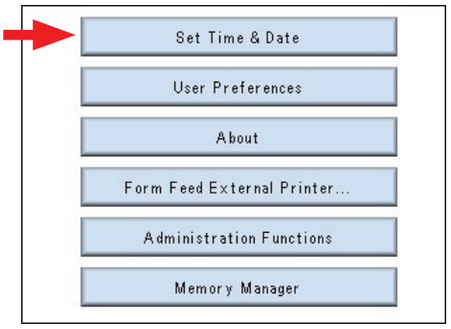


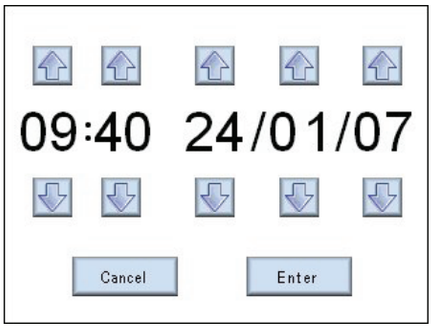
– When switching on the product for the first time, or if the previously entered settings need to be checked, this key should be selected to give access to the following display:



4.2 SET TIME & DATE

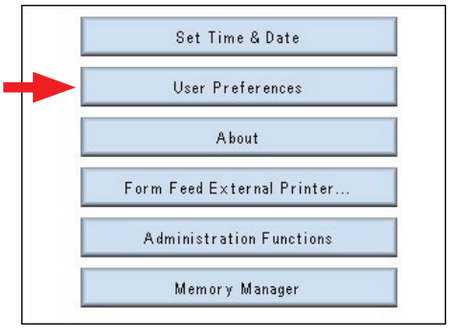
To set the correct date and time select the ***Set Time & Date*** key. The time and date can be reset using the up and down arrows. To accept the new settings select the ***Enter*** key. Touching the ***Cancel*** key will return you to the main menu without accepting any alterations to the current settings.

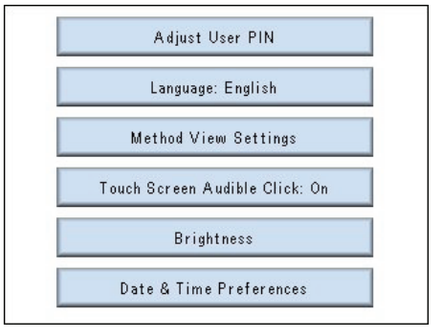




4.3 USER PREFERENCES

Selecting ***User Preferences*** gives access to the following options:



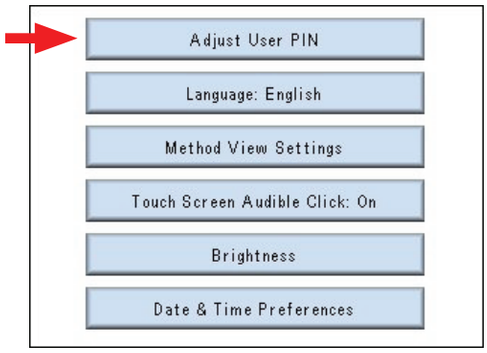


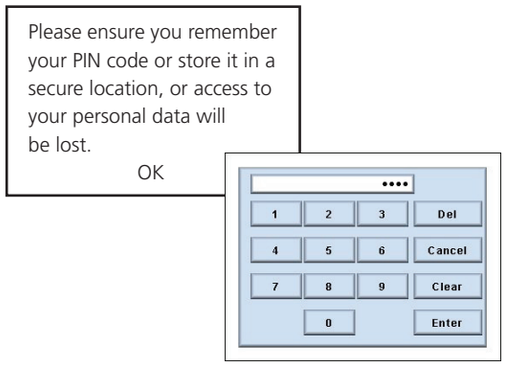
These settings are saved for each user and the individual's selections are retained when that user logs in. ***Adjust User PIN*** and ***Method View Settings*** options are only available to the Supervisor.

Note: Adjust User PIN and **Method View Settings** will only be available to the Supervisor.

4.3.1 ADJUST USER PIN – available to logged in users only

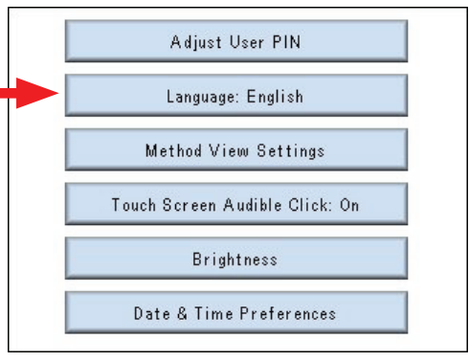
To alter your User PIN select the ***Adjust User PIN*** key. A warning message will be shown prior to the numeric keypad. Enter your new 4 digit code using the numeric keypad as shown below. The ***Del*** key allows individual digits to be changed. The ***Cancel*** key will return you to the previous menu without altering the original PIN code. The ***Clear*** key will clear all digits entered from the screen. The ***Enter*** key accepts the new code and returns you to the previous menu.





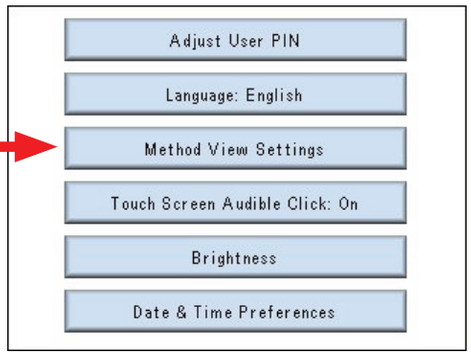
4.3.2 LANGUAGE

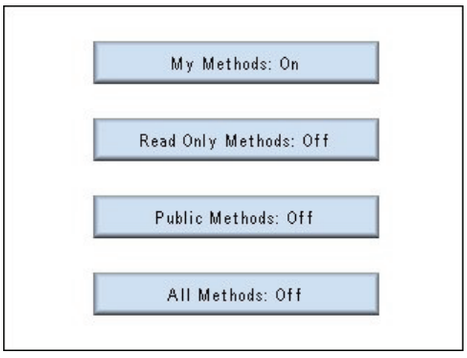
The preferred language can be selected using the ***Language*** key. Select the preferred language from the options available and press the ***OK*** key and the will update to show all screens in English, French, German, Italian or Spanish.



4.3.3 METHOD VIEW SETTINGS – available to logged in users only

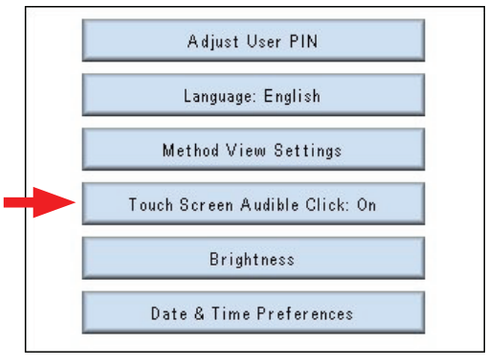
To simplify operation it is possible to restrict the methods displayed by their allocated category. Selecting ***Method View Settings*** enables ***My Methods*** (Personal) to be hidden (Off) or displayed (On). Similarly, ***Read Only Methods*** and ***Public Methods*** can be hidden or displayed. To simply display all method categories toggle ***All Methods*** to the On status.





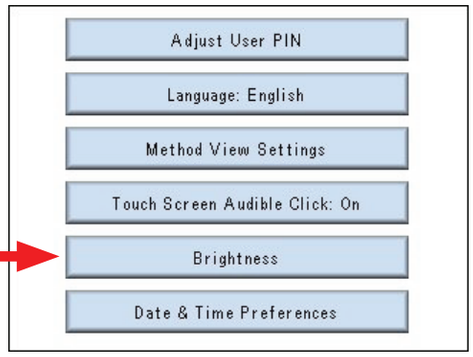
4.3.4 TOUCH SCREEN CLICK

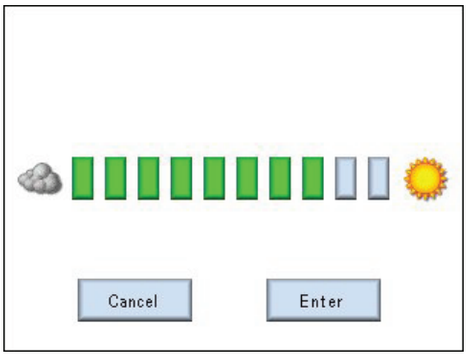
The touch screen can be operated with or without an audible click each time a key is touched. The click can be toggled on or off via the ***Touch Screen Audible Click: Off*** key.



4.3.5 BRIGHTNESS

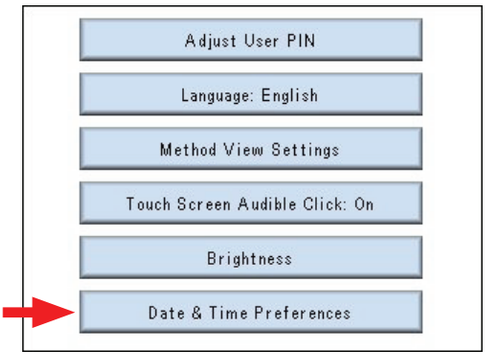
Selecting the ***Brightness*** key and then using the left and right arrows on the display shown below can adjust the brightness of the display. Selecting the ***Enter*** key will update the display setting and return the instrument to the previous display.

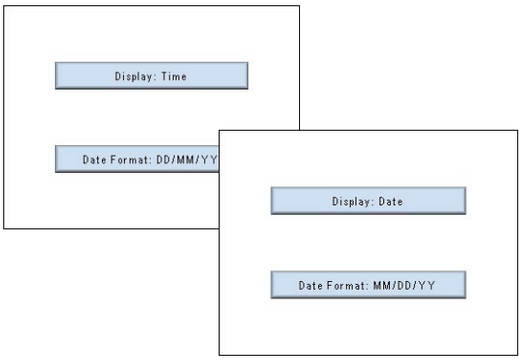




4.3.6 ADJUST DATE & TIME

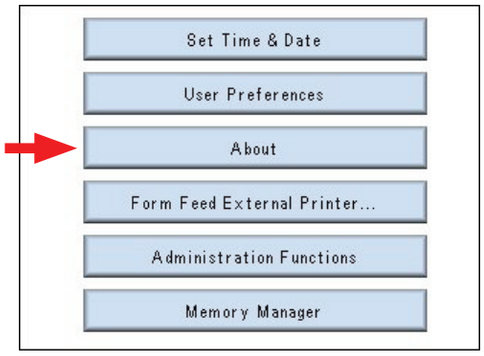
Selecting the ***Date & Time Preferences*** key allows the user to display either the time or date. In addition the date format can be set to either DD/MM/YY or MM/DD/YY. Once the preferred option is selected, pressing the ***Back*** key on the display surround once will return you to the previous menu. Pressing the ***Back*** key twice returns the instrument to the ***Main Menu***.





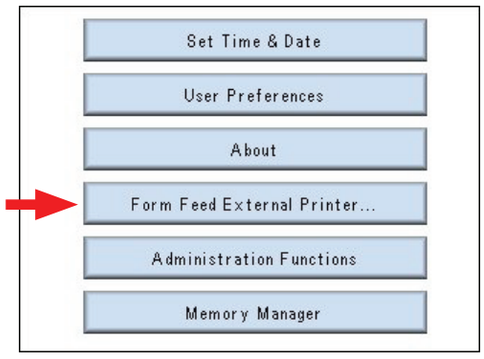
4.4 ABOUT

Selecting the ***About*** key provides information relating to instrument ID and signed in user details. Selecting the ***OK*** key returns the instrument to the previous menu.



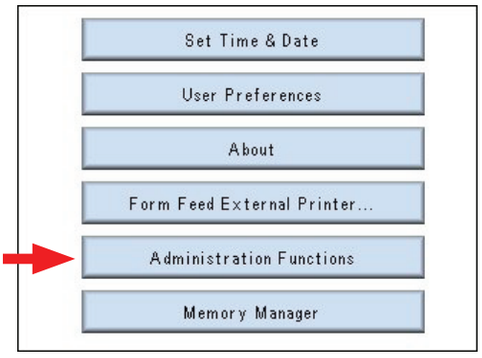
4.5 FORM FEED

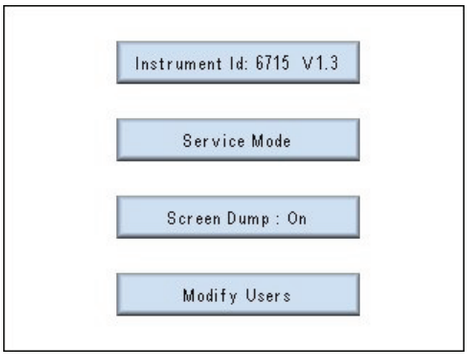
Selecting the ***Form Feed*** key will feed additional paper through the mechanism of the connected printer to separate results or enable a clean area for tearing off.



4.6 ADMINISTRATION FUNCTIONS

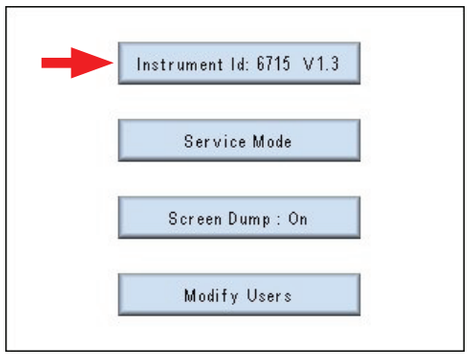
This function is only available to the Supervisor. It gives access to all user related information. It gives access to ***Instrument ID***, screen dump control and ***Modify Users*** sub-menu.

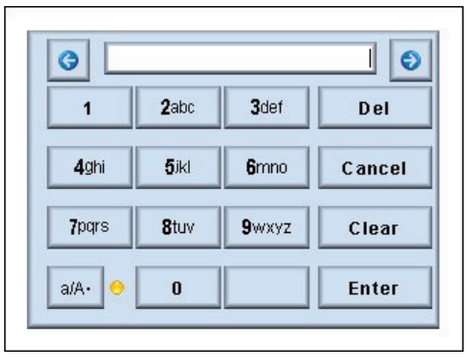




4.6.1 INSTRUMENT ID

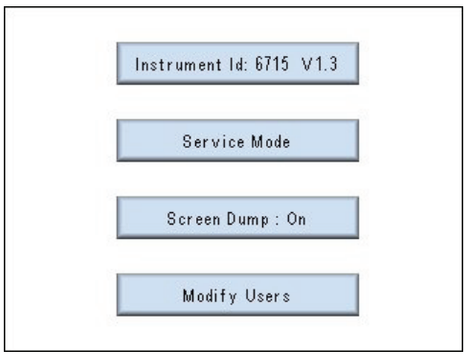
Selecting the ***Instrument Id: 67XXCVS*** key allows the supervisor to alter the instrument identification code. This is entered by use of the alphanumeric keypad. The ***Cancel*** key will return you to the previous menu without altering the original ID. The ***Del*** key allows individual letters or digits to be removed. The ***Clear*** key will clear all digits entered from the screen. The ***Enter*** key accepts the new ID and returns you to the previous menu. For laboratories with more than one 67 series spectrophotometer it is useful to change this ID to the serial number, department or other unique identifier for easy recognition of different instruments.





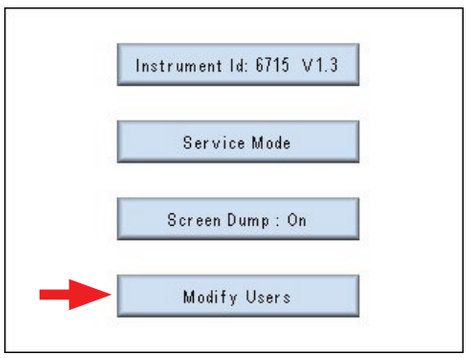
4.6.2 SCREEN DUMP

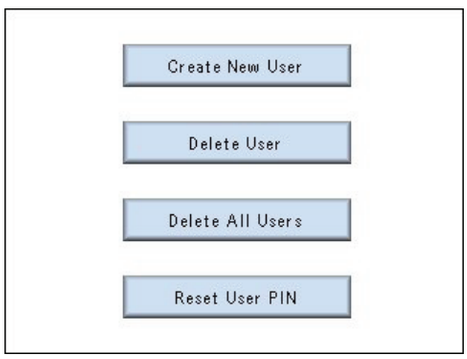
The screen dump function can be enabled or disabled.



4.6.3 MODIFY USERS

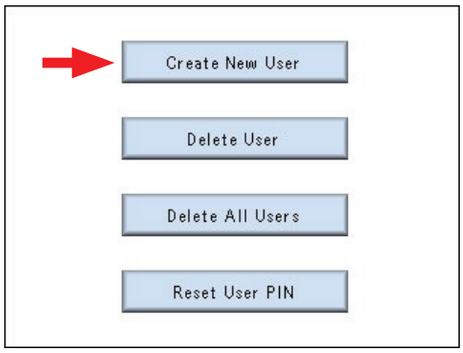
This gives access to the sub-menu which allows the supervisor to modify user parameters.

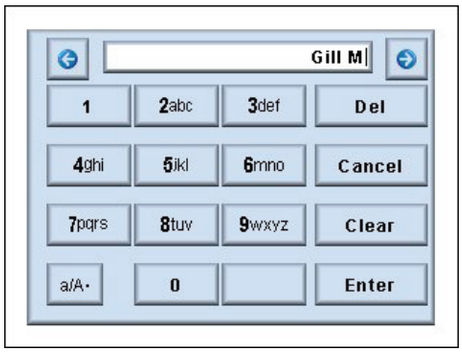




4.6.3.1 CREATE NEW USER

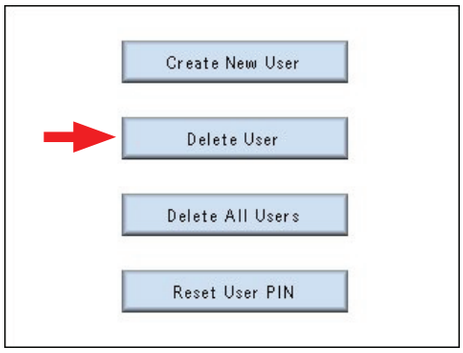
Selecting the ***Create New User*** key allows the supervisor to enter an additional user on to the instrument using the alphanumeric keypad as shown. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu without adding a new user. The ***Enter*** key accepts the new ID and returns you to the previous menu.

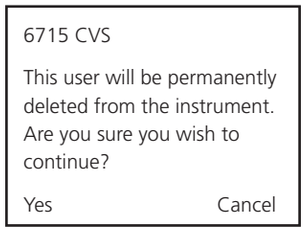




4.6.3.2 DELETE USER

Selecting the ***Delete User*** option allows the supervisor to delete a specific user from the instrument. When the user name is selected from the list the following warning message is displayed:



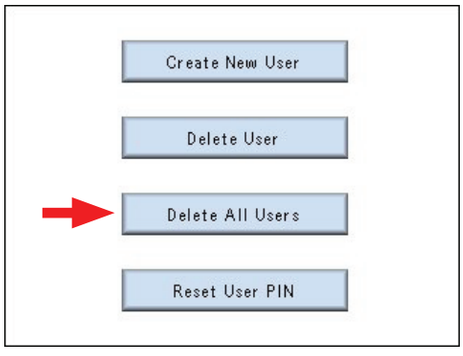


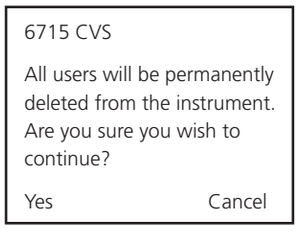
If ***Yes*** is selected the instrument will update and the user will be removed from the instrument.

If ***Cancel*** is selected the user will not be deleted from the instrument.

4.6.3.3 DELETE ALL USERS

Selecting this option allows the supervisor to delete all current users (except the supervisor) from the instrument. The following warning message is displayed:



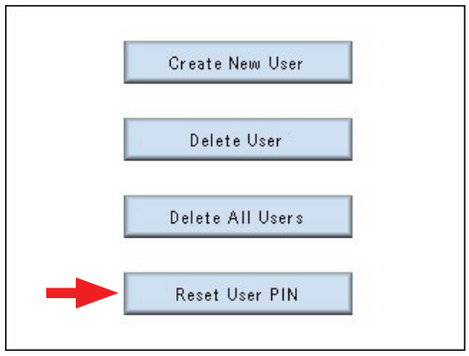


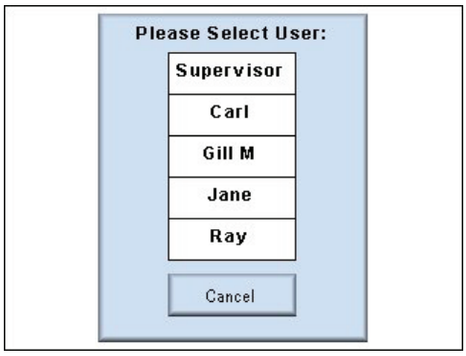
If ***Yes*** is selected the instrument will update and all users will be removed from the instrument.
If ***Cancel*** is selected all users will remain on the instrument.

4.6.3.4 RESET USER PIN

This option allows the supervisor to reset an individual users PIN code.

Select the ***Reset User PIN*** option from the screen. The list of current users will then be displayed on screen. Select the user. The warning message: '***Are you sure you wish to continue***' will be displayed with the options to accept or cancel.



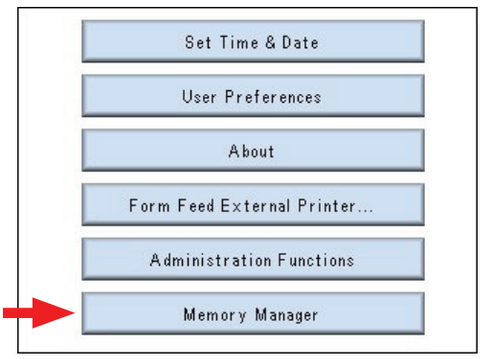


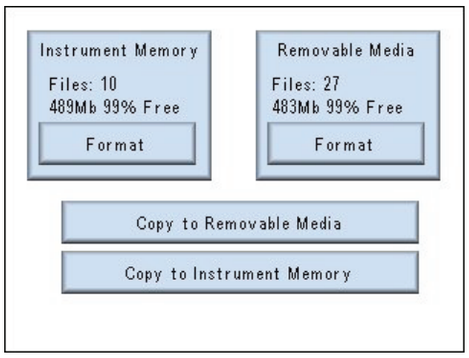
If ***Yes*** is selected the user PIN will be reset to the default value and the supervisor has access to all information relating to that user.

If ***Cancel*** is selected no changes will be made to the user codes and the instrument will return to the ***Select User*** Menu.

4.7 MEMORY MANAGER

This option is available only to the Supervisor and allows transfer of data, methods and user preferences to and from the instrument memory. This enables backup of information stored in the instrument memory and on any removable media used. Both memory locations can also be formatted. **WARNING – this will permanently delete all information stored in the location being formatted.**



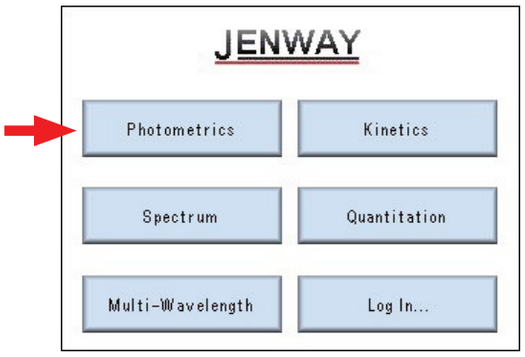


SECTION 5 - Photometrics Mode

5.1 PRINCIPLES OF MEASUREMENT

The simplest mode of the spectrophotometer is Photometrics. A measurement is made of either the absorbance or transmittance of a sample. The measurement is at a single wavelength, at one point in time, with no additional calculations.

Select ***Photometrics*** from the ***Main Menu***:

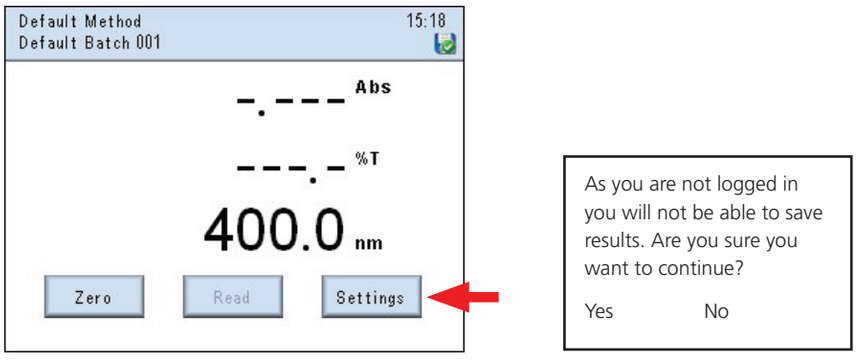


If the user is not logged in (Free Operation) the main measurement screen will be displayed (refer Section 5.2).

5.2 FREE OPERATION

Settings

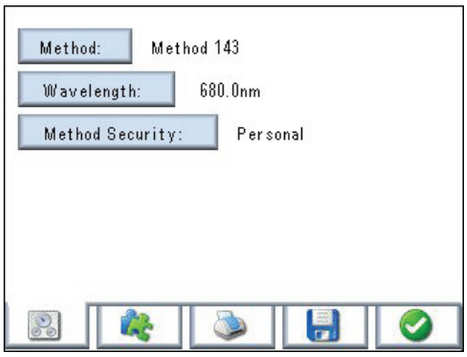
If the user is not logged in then the screen will show the following message when the ***Photometrics*** Mode key is selected from the ***Main Menu***:



If ***Yes*** is selected the instrument will go to the main measurement screen.

If ***No*** is selected the instrument will return to the main menu where the user has the option to Log In.

To enter the appropriate parameters for the sample(s) to be tested select the ***Settings*** key and the instrument will display the following screen:



Mode settings - method ID, wavelength, method security (if logged in)

Accessory options - varies with type of accessory module fitted

Allows selection of internal or external printers

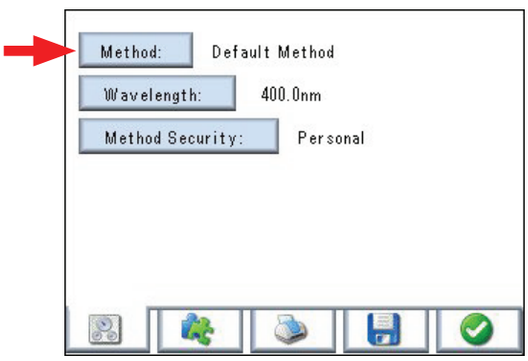
Allows set-up of batch ID and enables or disables or disables the Auto Save feature

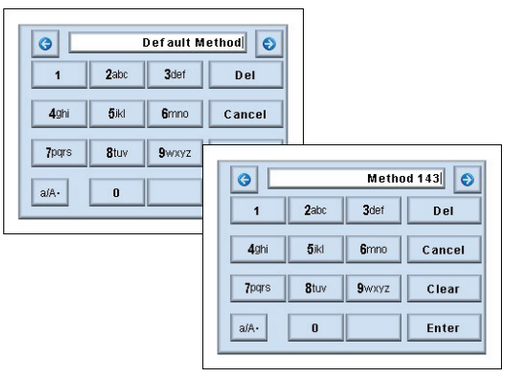
Press to accept settings entered

Setting Method ID

To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.

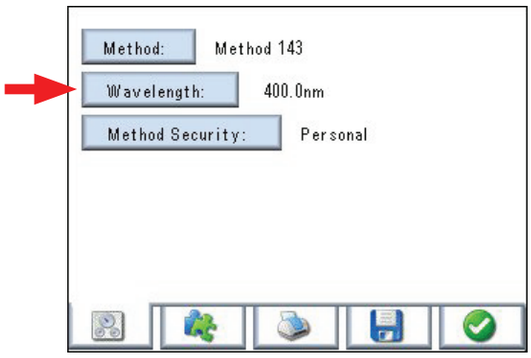
Note: The new Method ID can only be used to identify the method on a printout to the internal or external printer module. The generic user has no additional facility to store or recall results or methods.

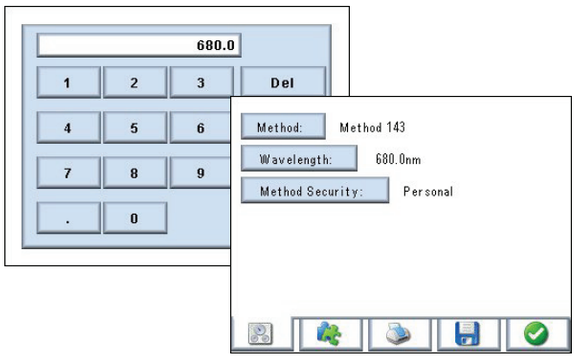




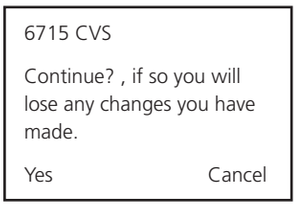
Setting Wavelength

Select the ***Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out). Select the ***Enter*** key to confirm and the display will update to show the new wavelength.





Using the ***Back*** key to escape settings will display:



If ***Yes*** is selected all set information will be lost and the instrument will return to the main measurement screen.

If ***No*** is selected the instrument returns the ***Settings*** screen as shown.

To accept all entered information touch the ***Enter*** key to confirm. The instrument will show the main measurement screen with the updated information.

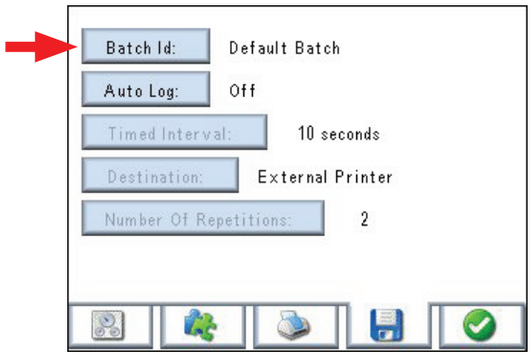
Setting Method Security

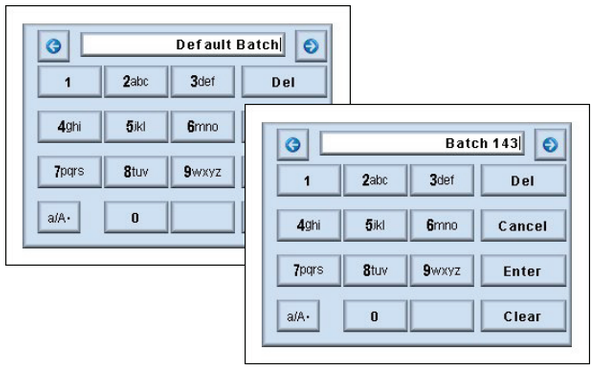
This option is only applicable to logged in users.

Batch ID and ***Auto Logging*** can be entered via the ***Save*** icon.

Setting Batch ID

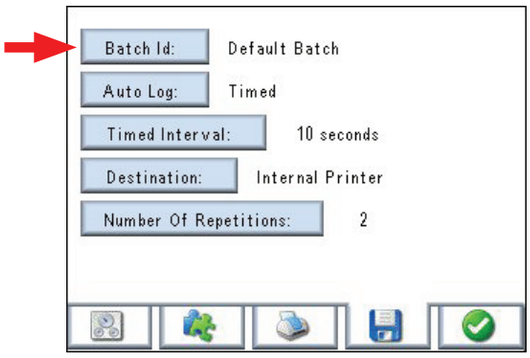
Select the ***Batch ID*** key and enter the Batch code using the alphanumeric keypad. Select the ***Enter*** key to accept or ***Cancel*** to remain as a default.

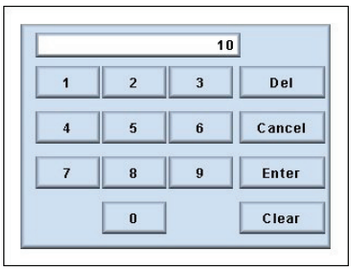




Auto Log Settings...

Selecting **Auto Log Settings...** opens a dedicated sub-menu.





This option can be toggled between ***On, Off*** or ***Timed***.

Auto Log Settings

This option can be toggled between **Off/On/Timed.** When **Auto Log** option is selected to **On** the user can set:

the destination, (toggles between internal or external printer and memory).

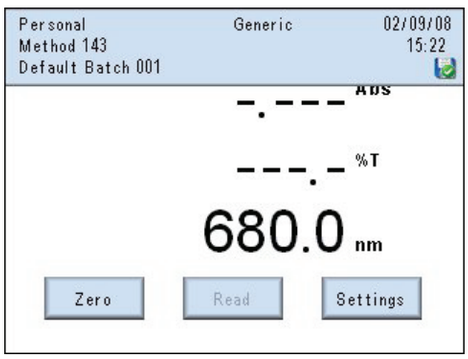
When the **Auto Log** option is set to **Timed** the user can set:

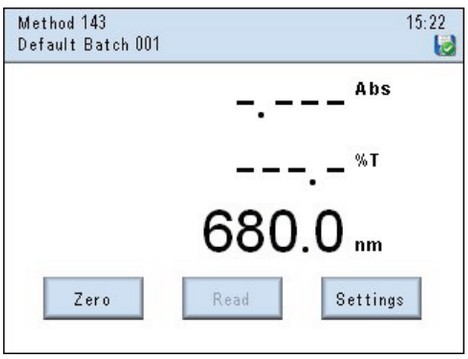
the timed interval between 3 and 9999 seconds using the numeric keypad;

the destination (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear giving this detail. Touching the bar again will return it to its original position.





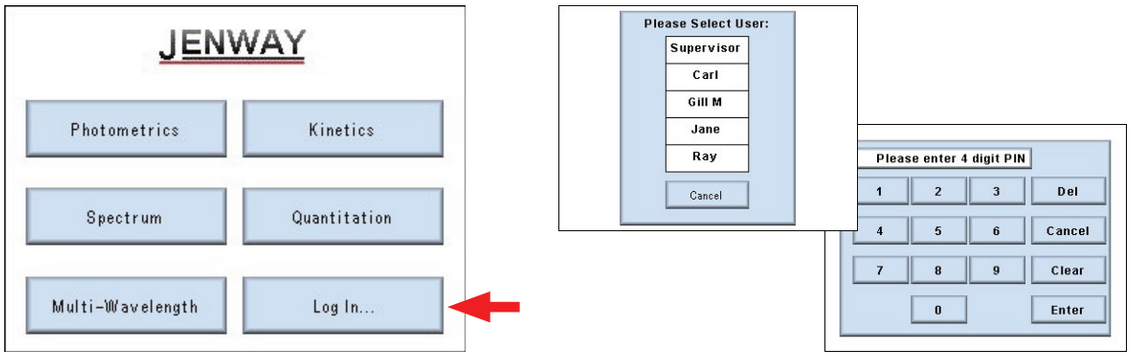
Note: If the ***Auto Log Timed*** option is selected the ***Read*** key will be replaced with ***Start/Stop*** keys.

5.3 LOGGED IN MEASUREMENT

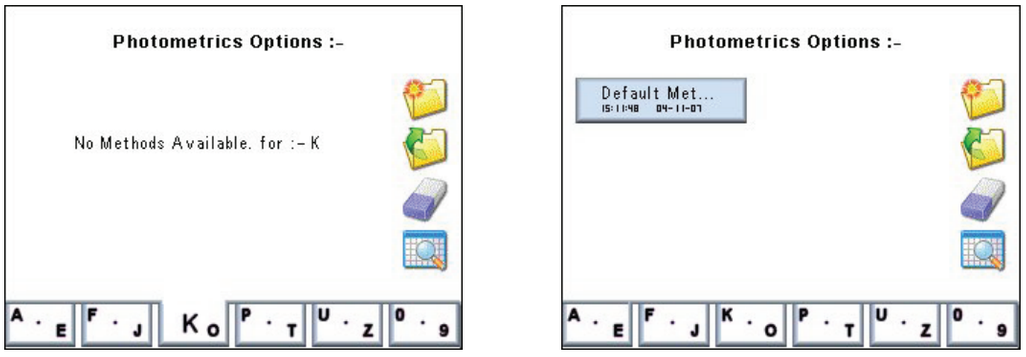
PIN Codes – each user is allocated a 4 digit PIN code that is required when logging in.

Select ***Log In...*** from the ***Main Menu*** and a list of users will be shown. Select the appropriate user name and a numeric keypad will be displayed.

Enter your 4 digit PIN code and touch the ***Enter*** key to confirm.



Once logged in method screen options will be displayed:



Methods are stored sequentially by measurement mode. Once the first page is full (8 methods for the selected mode) cursor arrows are displayed in the top corners enabling the user to browse to subsequent or previous pages of 8 methods.

Alternatively, pressing one of the alphanumeric keys along the bottom of the screen will display all available methods with the initial character that is highlighted.

Note: Repeated pressing of a key sequentially highlights the characters between those displayed.

Create a New Method

For the following functions first touch a method or result to select it.

Open the Selected Method

Erase the Selected Method

Browse Results – linked to the selected method

Open specific results in the selected batch

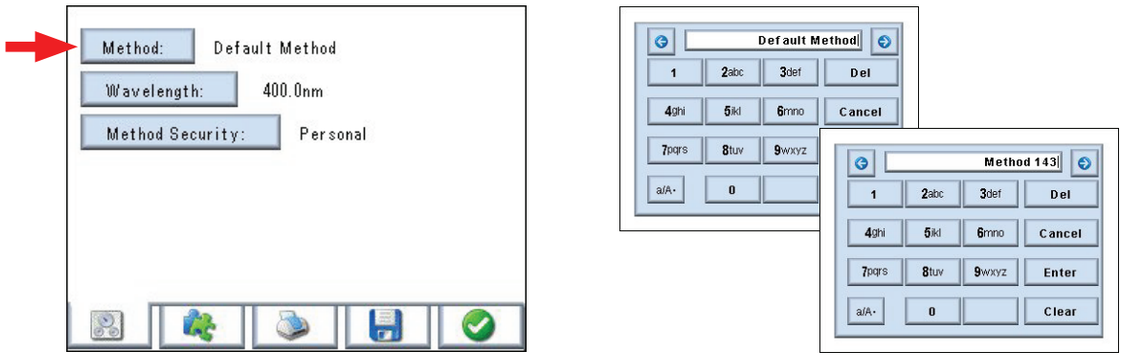
Creating a New Method

Settings

To enter the Method ID, appropriate wavelength for the sample(s) to be tested and the level of Method Security required for the method being created select the ***New File*** icon

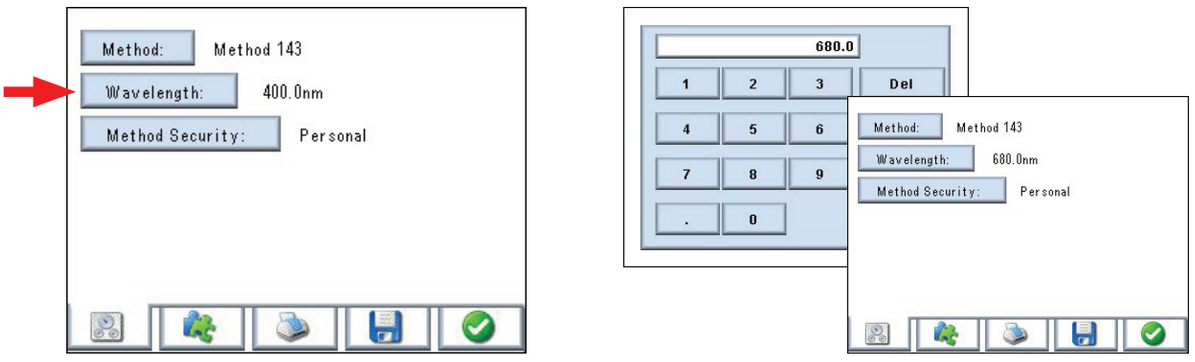
Setting Method ID

To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.



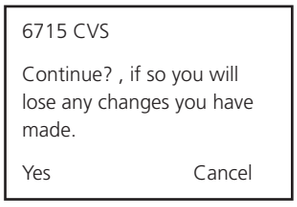
Setting Wavelength

Select the ***Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out). Select the ***Enter*** key to confirm and the display will update to show the new wavelength.



Using the ***Back*** key to escape settings will display:

If ***Yes*** is selected all set information will be lost and the instrument will return to the main measurement screen. If ***No*** is selected the instrument returns the ***Settings*** screen as shown.



Setting Method Security

The 67 Series spectrophotometers can support up to 10 individual users plus one Supervisor who has full administrative rights.

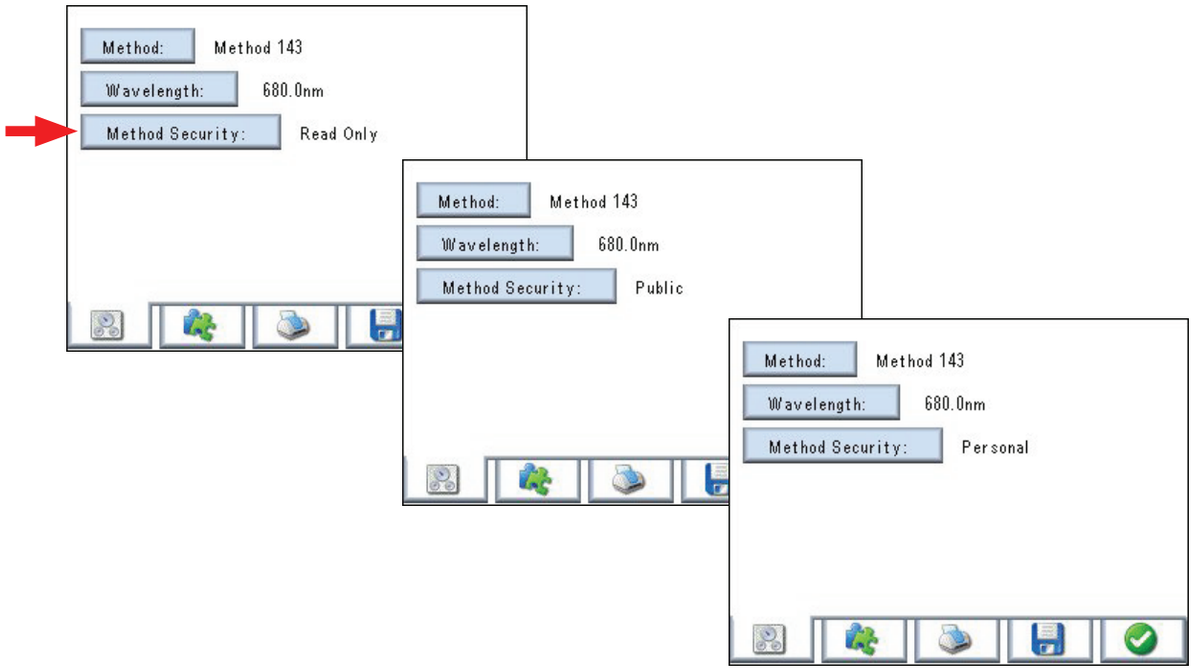
Logged in users can create methods with three levels of security options:

Personal – these methods are only accessible by the originator.

Public – these methods are available for use and modification by any logged in user.

Read-Only – these methods can be accessed by all logged in users, but can only be modified by the originator.

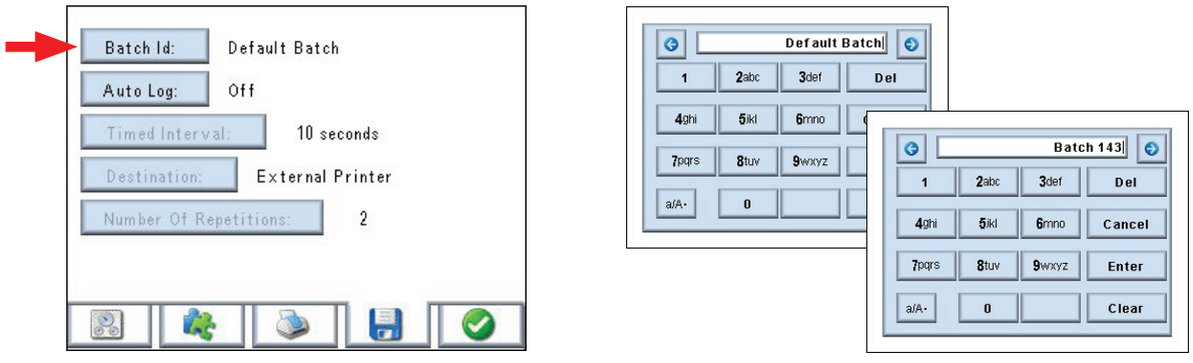
The preferred level of protection can be achieved by selecting the ***Method Security*** key that toggles between ***Personal***, ***Public*** and ***Read-Only*** options.



To accept the selected options touch the ***Enter*** key to confirm. The instrument will show the main measurement screen with the updated information.

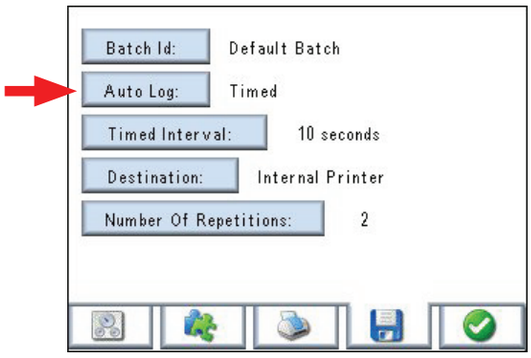
Setting Batch ID

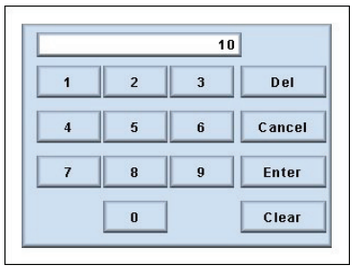
Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Select ***Enter*** to accept or ***Cancel*** to remain as a default.



Auto Log Settings...

Selecting **Auto Log Settings...** opens a dedicated sub-menu.





This option can be toggled between ***On, Off*** or ***Timed***.

Auto Log Settings

This option can be toggled between **Off/On/Timed.** When **Auto Log** option is selected to **On** the user can set:

the destination, (toggles between internal or external printer and memory).

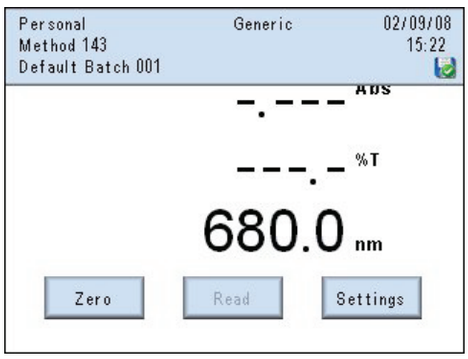
When the **Auto Log** option is set to **Timed** the user can set:

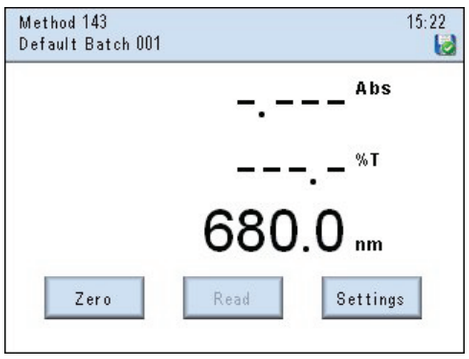
the timed interval between 3 and 9999 seconds using the numeric keypad;

the destination (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear giving this detail. Touching the bar again will return it to its original position.





Note: If the ***Auto Log Timed*** option is selected the ***Read*** key will be replaced with ***Start/Stop*** keys.

File & Data Management

Save

Tools

Print

Settings

Erase

Search Results

Open Results

Save

Saving Methods

Having entered all your required settings on the tabbed pages the method can be saved by simply pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result.

If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options. Alternatively, when the ***Auto Log*** option is set to ***On*** or ***Timed*** and the destination option is ***Memory***, all results will be saved automatically.

Sharing Methods

Methods can be shared with other users by setting the security level at either ***Read-Only*** where other users can use but not modify the method or, ***Public*** where they can use and modify the method. Other users must then ensure that under ***Method View Settings*** (Settings/User Preferences/Method View Settings) they have enabled ***Public*** and/or ***Read-Only*** methods or turned ***All Methods*** on.

Recalling Methods

Following selection of the operating mode from the main menu the method browse screen is displayed. This will show all methods that the current user has access to, based on their selections in the ***Method View Settings*** (refer to Sharing Methods). If the first page is full, cursor arrows will be displayed to enable navigation to and from additional pages. Alternatively, selection may be made using the alphanumeric menu bar at the bottom of the screen.

Repeated pressing of each character set will display the full alphanumeric range and the screen will show all methods starting with the highlighted character.

Touch the required method when it is displayed on the screen to highlight it, touch the ***Open File*** icon to display the main measurement screen for that method.

Editing Methods

Use the Recalling Methods procedure to recall the required method. With the measurement screen displayed touch the ***Settings*** option. Adjust the settings as required and touch the ***Enter*** icon on completion. The modified method can then be saved by pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result. If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options.

Note: If the Method name was not changed during editing it will be saved with the same name but with a new date and time to ensure traceability. If the old method is no longer required it should be deleted as detailed in Deleting Methods.

Deleting Methods

To delete methods highlight the required method in the Browse screen as described in Recalling Methods and then touch the ***Erase*** icon. A warning message will be displayed to ensure this action is required. On confirmation the selected file will be deleted.

If the current user does not have the required privileges to delete the selected method then an information message will be displayed advising that the method cannot be deleted.

Privileges required for deleting designated methods:

Public Methods – only the Supervisor and Originator can delete these.

Read-Only Methods – only the Supervisor and Originator can delete these.

Personal Methods – Only the Originator can delete these methods. (The Supervisor can delete these by re-setting the Originator's PIN code and then logging in as the Originator).

Saving Results

After completion of a measurement the result can be saved by simply pressing the ***Save*** key on the display surround. The result is saved under the method that created it, with the entered Batch ID and an incremental number along with the time and date of the measurement. Results can also be saved as part of the ***Auto Log*** function by selecting ***Memory*** under the ***Auto Log*** option, which will vary depending on the type of sampling accessory fitted.

Printing Results

After completion of a measurement the result can be printed, by simply pressing the ***Print*** key on the display surround. The result will be printed to either the internal or external printer, as selected by the user in the ***Printer Settings*** option.

The first result of any new batch is preceded by a print header, which gives details of the method settings and Batch ID. Results can also be printed as part of the ***Auto Log*** function, which will vary depending on the type of sampling accessory fitted.

Recalling Results

Stored results are always directly linked to the method that created them. To access results first recall the method as described in ***Recalling Methods***. With the method highlighted touch the ***Search Results*** icon. This will open a screen detailing all results available to the current user. Touch the required result or batch (depending on the mode) and then the ***Open Specific Result*** icon. This will display the results on the screen. The ***Tools*** option can then be used to work on these results (depending on mode). It is also possible to print the result by simply pressing the ***Print*** key on the display surround. Options to print to the Internal or External printer or to the CSV file will be displayed. Printing to the CSV (Comma Separated Values) file will save the data in CSV format on the external data card. (If a card is not fitted the instrument will display a prompt). This is in text format and can be viewed and printed in Excel®.

In ***Kinetics*** mode an additional option is available (Analogue Mode). This allows results to be output via the rear panel analogue sockets to a chart recorder or similar device.

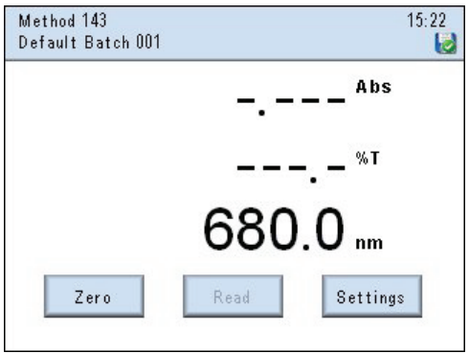
Sharing Results

Results attached to ***Personal Methods*** cannot be accessed by any other user.

Results attached to ***Read-Only*** and ***Public Methods*** can be accessed by all users, based on their current ***Method View Settings***.

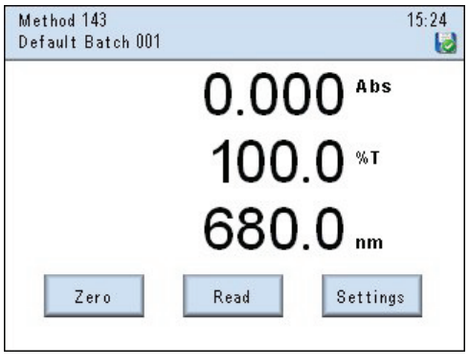
5.4 PERFORMING MEASUREMENTS – all users

Once the required settings have been confirmed the main ***Photometrics*** measurement screen will be shown. This screen shows the absorbance value, followed by the Transmittance value and then the selected wavelength. At the top of the screen Method ID and Batch number, time or date is displayed.



Zeroing the Instrument

Insert a cuvette containing a blank solution into the sample holder and close the sample chamber lid. (Test tubes or other sample containers may be used depending on the sample holder accessory fitted). Select the ***Zero*** key. The messages ***Calibrating Dark Level... and Calibrating Light Level...***' are displayed momentarily. Once the measurement is completed the screen will update to show:

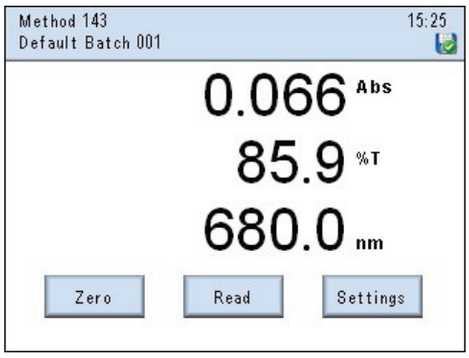


Note: In general the blank solution should contain everything that is in the sample except the colour-producing component. For specific information reference should be made to the procedure or application being followed. For enhanced reproducibility matched cuvettes should be used.

Measuring the Sample

Remove the cuvette containing the blank solution and insert the first sample into the sample holder and close the sample chamber lid. Select the ***Read*** key.

The screen will momentarily display '***Taking reading. Please wait...***' Once the measurement is completed the screen will update to show the measured value.



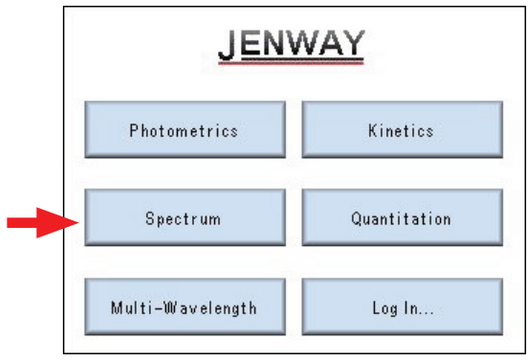
Additional individual samples can be measured by inserting them in the single sample holder and selecting ***Read***. Alternatively, multiple samples can be measured with the optional 8 or 6 cell changers or sequentially with the sipper pump accessory.

Section 6 - Spectrum Mode

6.1 PRINCIPLES OF MEASUREMENT

By examining the absorbance or transmittance of the sample over a wavelength range we can partially characterise the sample. Readings of the sample over a range of wavelengths are made and a graph is plotted of the absorbance or transmittance at each wavelength. As well as observing good practice (see Good Practice Guidelines) it must be ensured that the sample is stable for the period of the scan (maximum 70 seconds).

Select the ***Spectrum*** Mode from the ***Main Menu*** options.

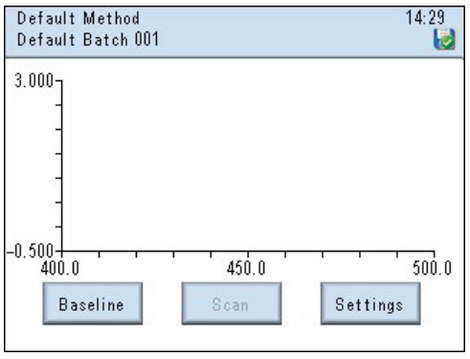


The method screen options will only be displayed if the user logs in. If the user is not logged in the instrument will automatically display the main instrument screen, with settings at their last used levels.

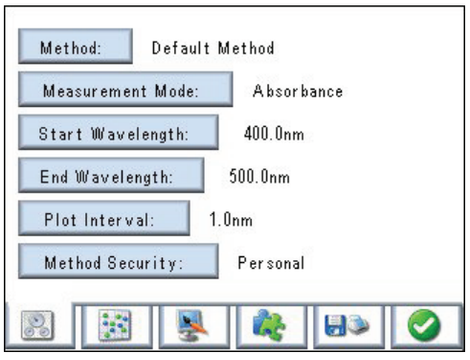
6.2 FREE OPERATION

Settings

If the user is not logged in then the main measurement screen will automatically be displayed when the ***Spectrum*** mode is selected from the **Main Menu**:



To enter the required parameters for the sample(s) under test, select the ***Settings*** key and the instrument will display the following screen:



Mode settings – method name, measurement mode, wavelength range, plot interval, method security (if logged in)

Analysis Points – up to 30 wavelengths at which absorbance will be reported

Measurement display – auto scaling, axis setting, colour selection

Accessory options – varies with type of accessory module fitted

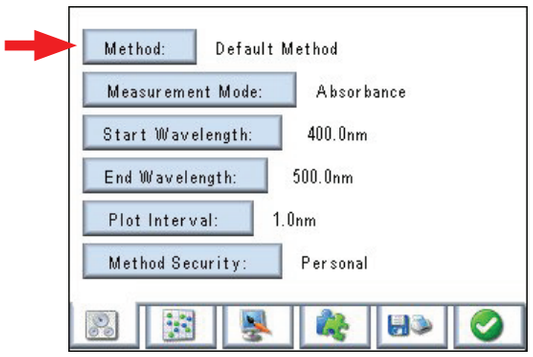
Allows selection of internal or external printer, graph details, batch ID and enables or disables the Auto Log feature

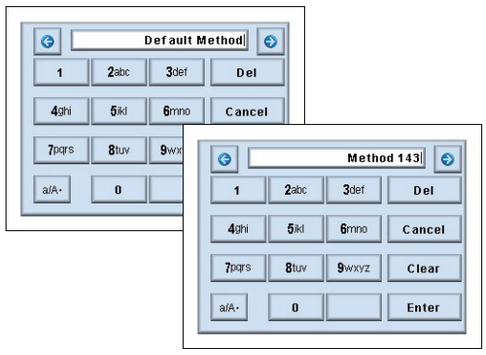
Press to accept settings entered

Setting Method ID

To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.

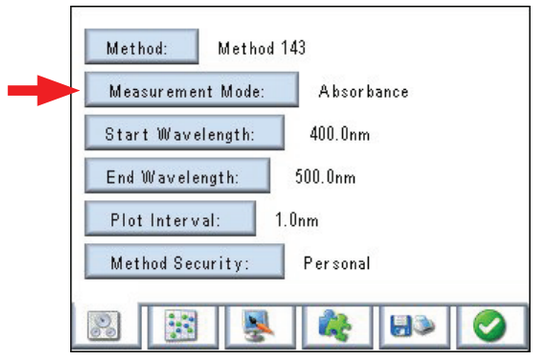
Note: The new Method ID can only be used to identify the method on a printout to the internal or external printer module. The generic user has no additional facility to store or recall results or methods.

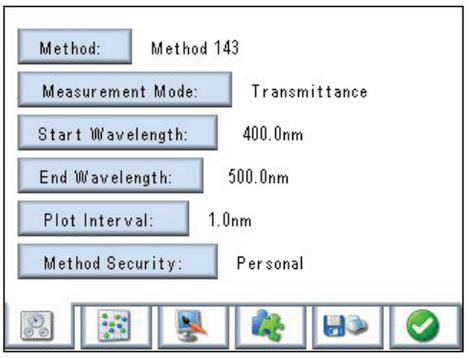




Selecting Measurement Mode

The ***Measurement Mode*** key toggles between Absorbance and Transmittance.



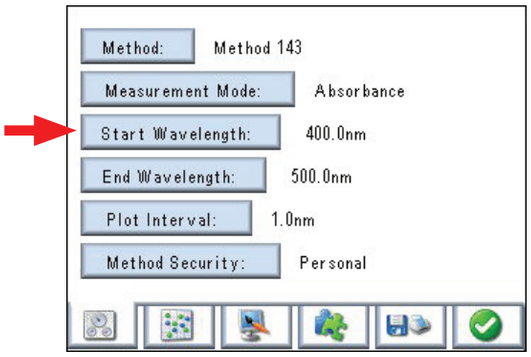


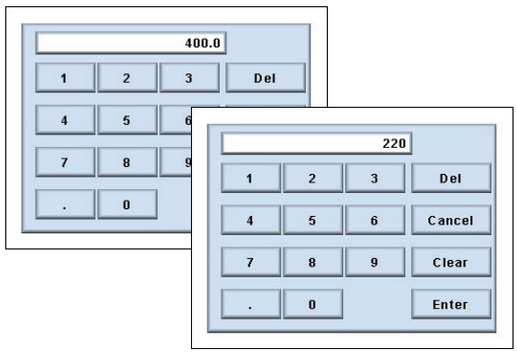
Setting Wavelengths

Note: If the start or end wavelength is adjusted so that they are closer than twice the plot interval then the previously set wavelength will be automatically adjusted to ensure a minimum of two measurement points.

Setting Start Wavelength

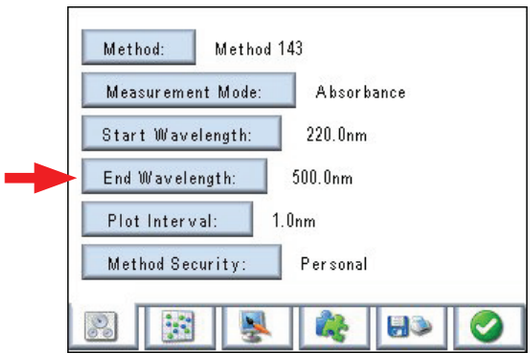
Select the ***Start Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out). Select the ***Enter*** key to confirm. The display will show the entered wavelength.

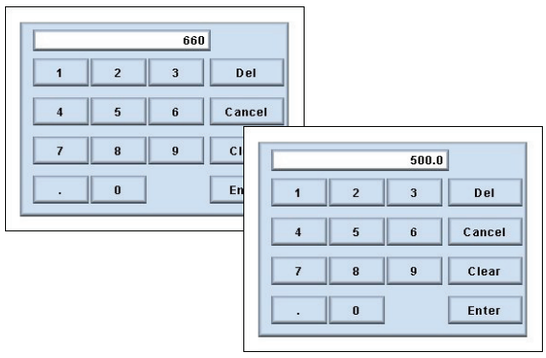




Setting End Wavelength

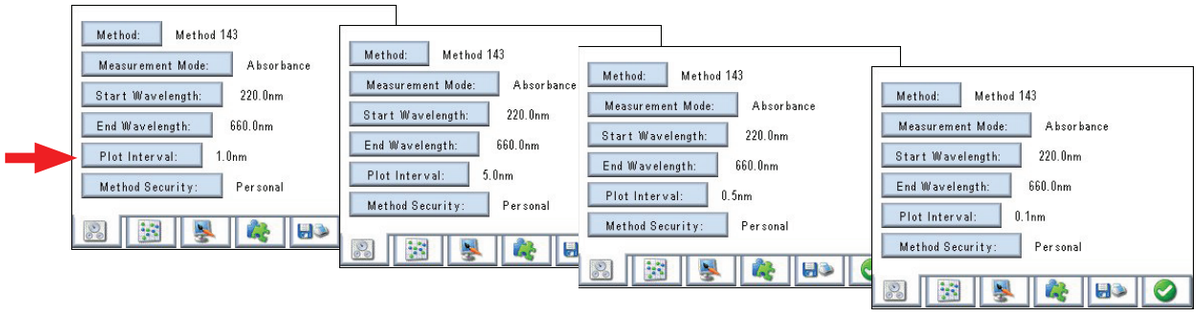
Select the ***End Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out). Select the ***Enter*** key to confirm. The display will show the entered wavelength.



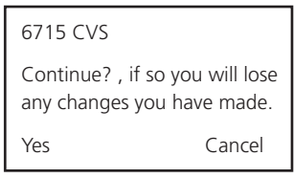


Selecting Plot Interval

Selecting the ***Plot Interval*** key allows the user to toggle between 1.0nm, 5.0nm, 0.1nm and 0.5nm.



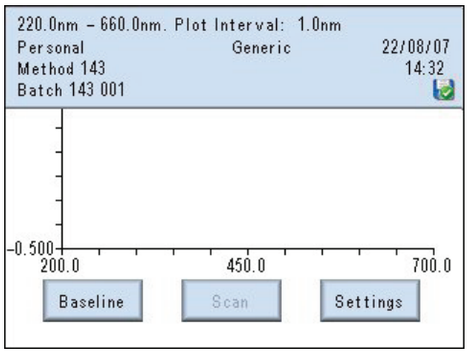
Using the ***Back*** key to escape settings will display:

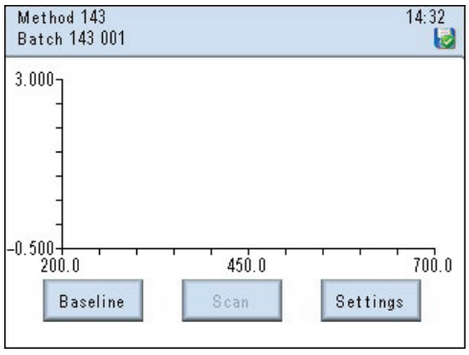


If ***Yes*** is selected all set information will be lost and the instrument will return to the main measurement screen. If ***No*** is selected the instrument returns the ***Settings*** screen as shown.

To accept the entered information at any time, select the ***Enter*** key to confirm. The instrument will show the main measurement screen with the updated information.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.





Setting Method Security

This option is only applicable to logged in users.

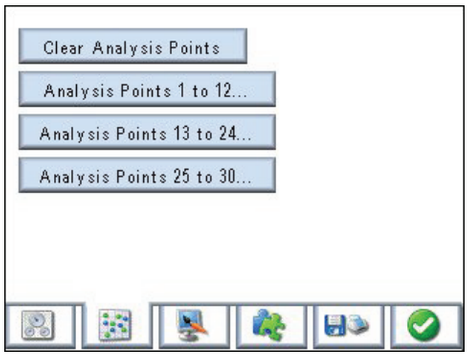
Setting Additional Set-up Parameters using the Toolbar Icons

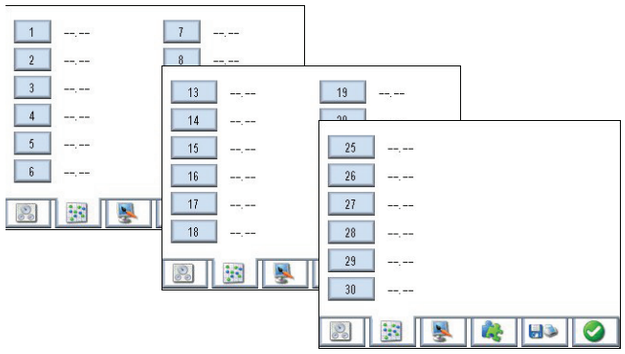
Setting Analysis Points

Up to 30 analysis points can be set be selecting the ***Analysis Points*** keys and entering the required wavelength value via the numeric keypad.

It should be noted that a warning message will be displayed if the analysis point(s) set are outside the spectrum scan range and a warning symbol will be shown next to the entered value.

The ***Clear Analysis Points*** option will clear all previously set analysis points.

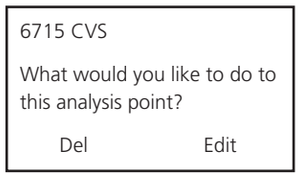


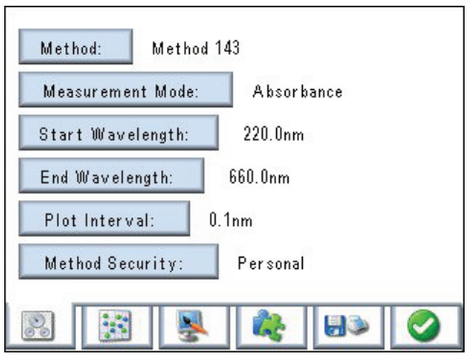


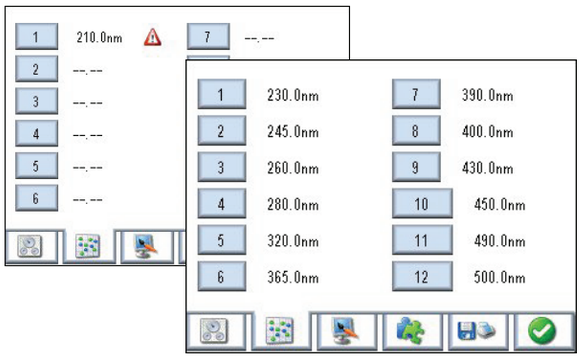
To delete or edit individual analysis points select the required analysis point to display:

If ***Del*** is selected the analysis point is deleted.

If ***Edit*** is selected a new value can be entered via the numeric keypad.







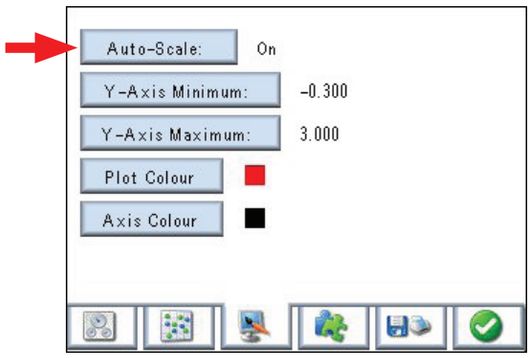
If an attempt is made to set an analysis point outside the start and end wavelength values the error message **'Wavelength for analysis out of spectrum scan range'** will be displayed momentarily and a triangular symbol will be shown to the side of the incorrect value. This value can be deleted or edited by selecting the analysis point (in this example 1) and entering a new value within the specified limits.

The analysis points will appear on tags at the relevant point on the spectrum display. They will also be printed with any printout to the internal or external printer if the ***Print Data Points*** option has been selected.

Setting Auto-Scale

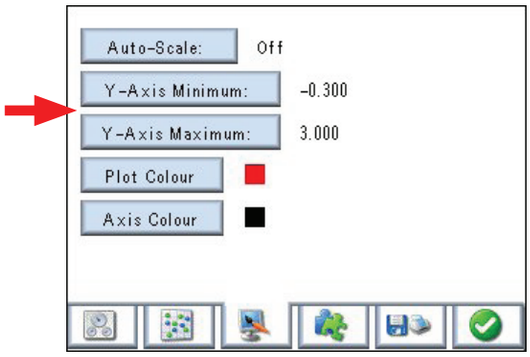
The ***Auto-Scale*** key toggles between ***On*** and ***Off***. With the ***Auto-Scale*** function ***On*** the instrument will automatically set the Y-axis maxima to a level that will fit the largest peak and lowest valley in the display area. This is the best option to choose if the user is uncertain of the limits of the scan.

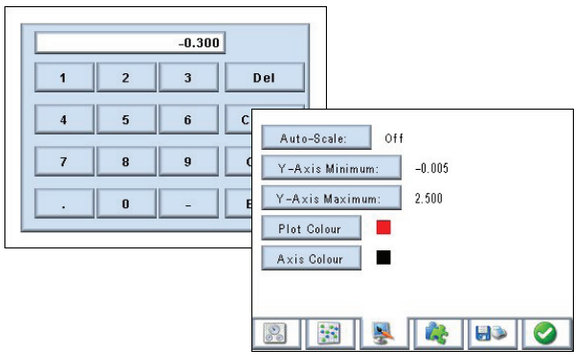
When set to ***On*** the manual settings for Y-axis maximum and minimum are non-functional. These settings can be changed with ***Post Scan*** analysis tools to enable alternative views and printouts after the scan has been completed.



With the ***Auto-Scale*** function set to ***Off*** the ***Y-Axis Minimum*** enables the lowest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Minimum*** key and a numeric keypad will be displayed for entry of this value. This value can be between –0.301 and 2.999.

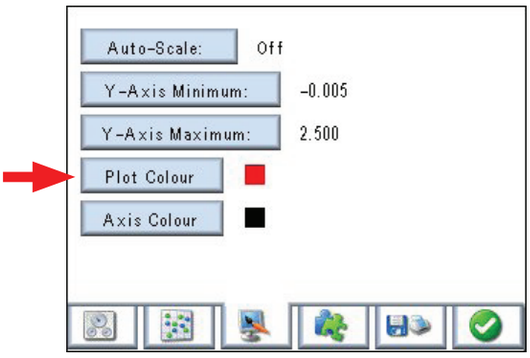
The ***Y-Axis Maximum*** enables the highest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Maximum*** key and a numeric keypad will be displayed for entry of this value. This value can be between 3.000 and –0.300.

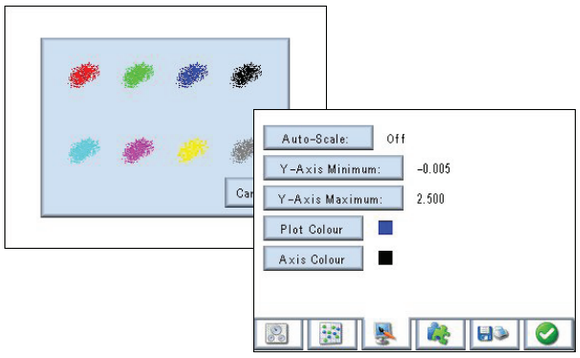




Selecting Plot Colour

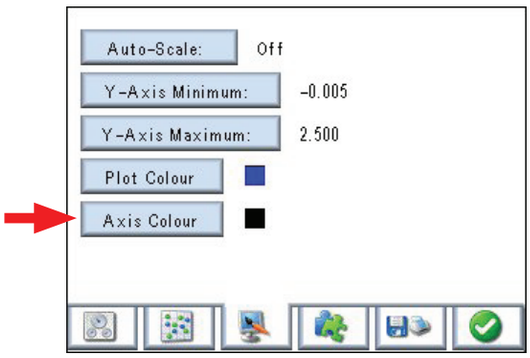
Selecting the ***Plot Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred plot colour. Once selected, the screen will update to show the selected colour.

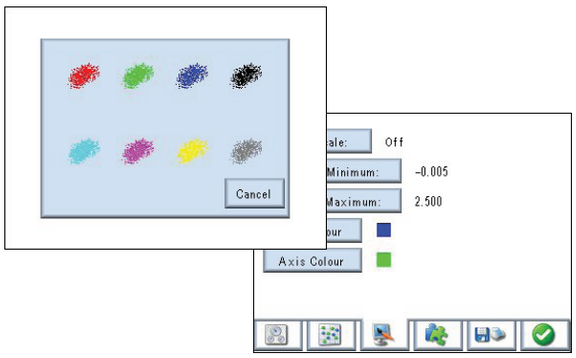




Selecting Axis Colour

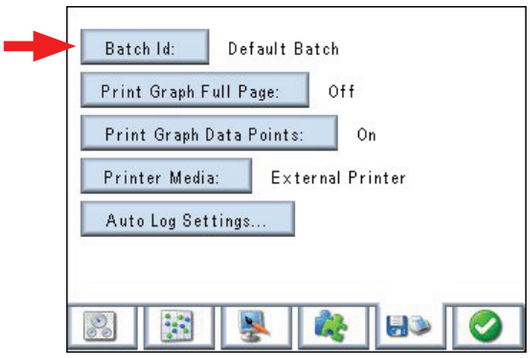
Selecting the ***Axis Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred colour. Once selected, the screen will update to show the selected colour.

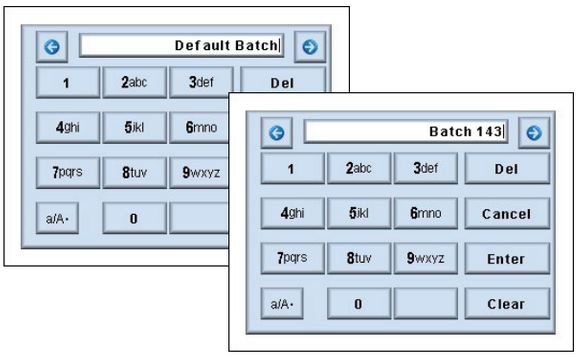




Setting Batch ID

Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Select ***Enter*** to accept or ***Cancel*** to remain as a default.





Setting Graph Data Points

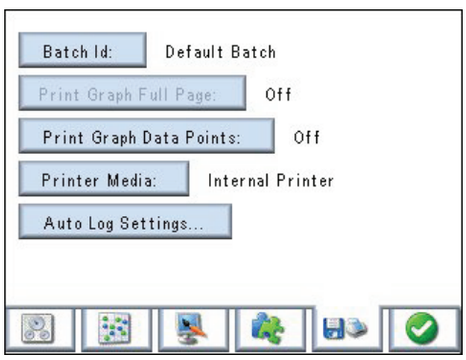
The option to print graphs on a full page is only available if the ***External*** printer is selected. If available and set to ***On*** the scan will be printed on one page (typically A4 landscape format) with the data on following pages.

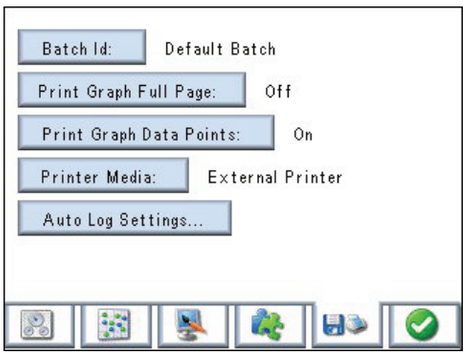
If available and set to ***Off*** the scan will be printed with the data below it (typically top half A4 portrait).

The ***Print Graph Data Points*** key toggles between ***On*** and ***Off***.

With this key set to ***On*** all the data points that make up the graph will be printed in a table following the scan.

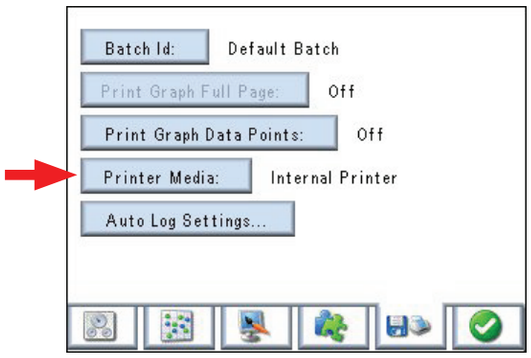
Note: For a long scan at 0.1nm resolution this can result in many pages of data. It is recommended that careful consideration should be given to this and that this feature should be set to the ***Off*** position in this instance.

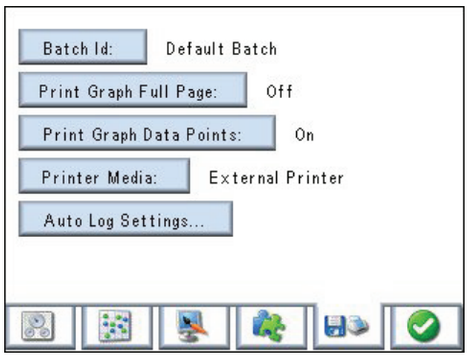




Selecting Printer Media

The ***Printer Media*** options toggle between Internal and External Printers.





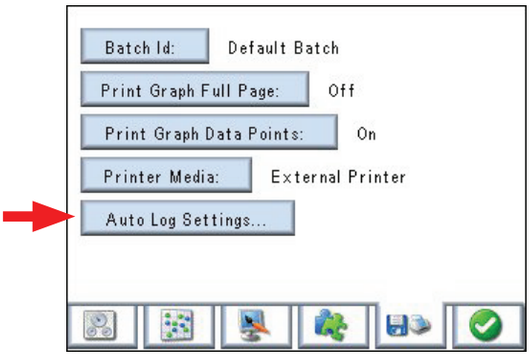
Auto Log Settings...

Selecting ***Auto Log Settings...*** opens a dedicated sub-menu.

This option can be toggled between ***Off***, ***On*** and ***Timed***.

When the ***Auto Log*** option is selected to ***On*** the user can set:

the destination, (toggles between internal or external printer and memory).



When the ***Auto Log*** option is set to ***Timed*** the user can set:

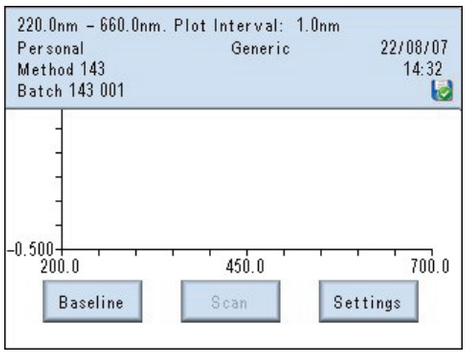
the timed interval between 3 and 9999 seconds using the numeric keypad;

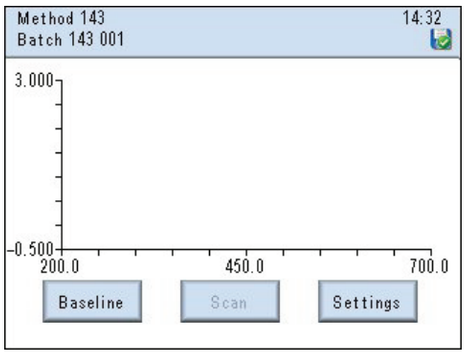
the destination, (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

Selecting the ***Enter*** key accepts the entered information and returns the instrument to the main measurement screen.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.



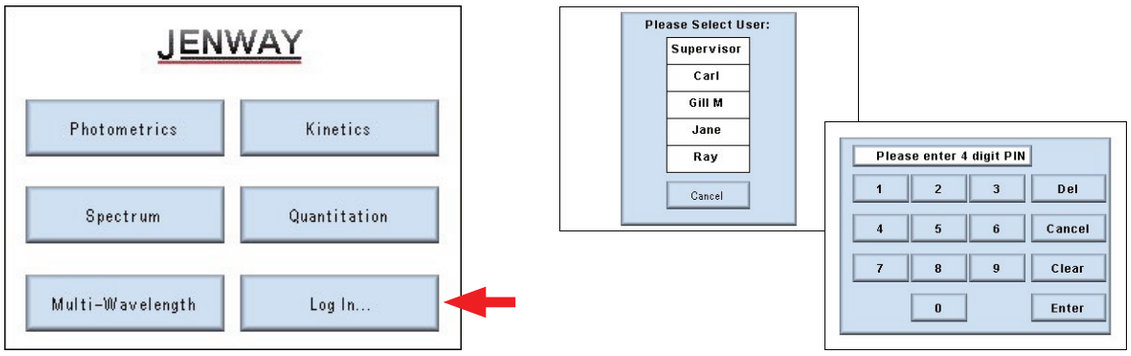


6.3 LOGGED IN MEASUREMENT

PIN Codes – each user is allocated a 4 digit PIN code that is required when logging in.

Select Log ***In...*** from the ***Main Menu*** and a list of users will be shown. Select the appropriate user name and a numeric keypad will be displayed.

Enter your 4 digit PIN code and touch the ***Enter*** key to confirm.



Once signed in method screen options will be displayed:

Methods are stored sequentially by measurement mode. Once the first page is full (8 methods for the selected mode) cursor arrows are displayed in the top corners enabling the user to browse to subsequent or previous pages of 8 methods.

Alternatively, pressing one of the alphanumeric keys along the bottom of the screen will display all available methods with the initial character that is highlighted.

Note: Repeated pressing of a key sequentially highlights the characters between those displayed.

Create a New Method

For the following functions first touch a method or result to select it.

Open the Selected Method

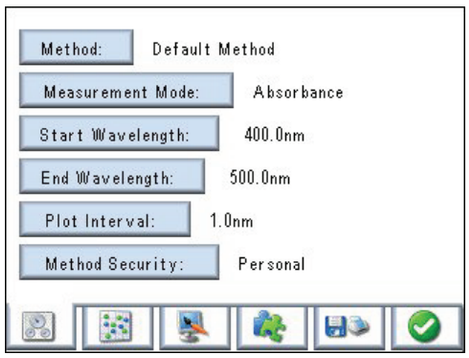
Erase the Selected Method

Browse Results – linked to the selected method

Open specific results in the selected batch

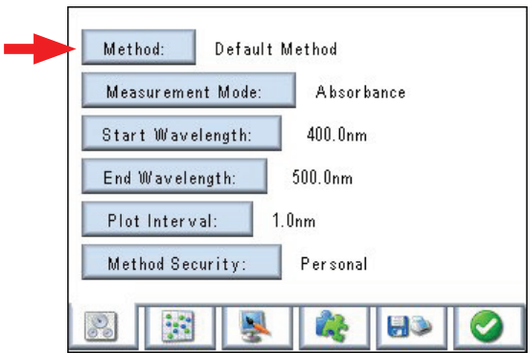
Creating a New Method

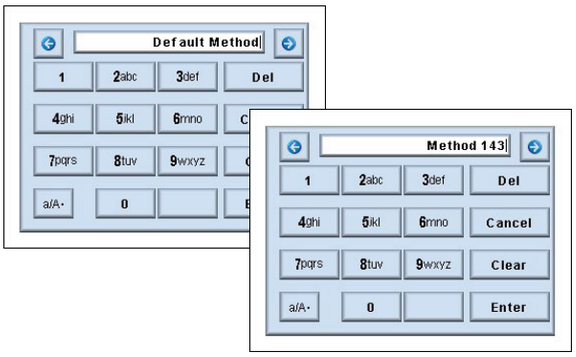
To enter the Method ID, appropriate measurement parameters and the level of Method Security required for the method being created select the ***New File*** icon.



Setting Method ID

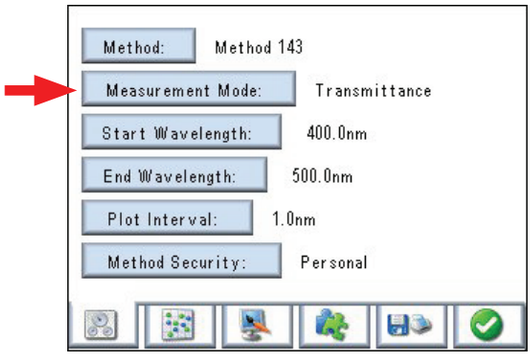
To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.

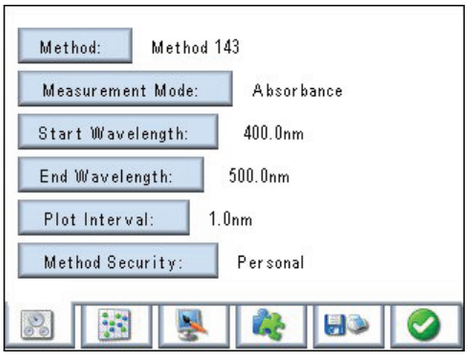




Selecting Measurement Mode

The ***Measurement Mode*** key toggles between Absorbance and Transmittance.



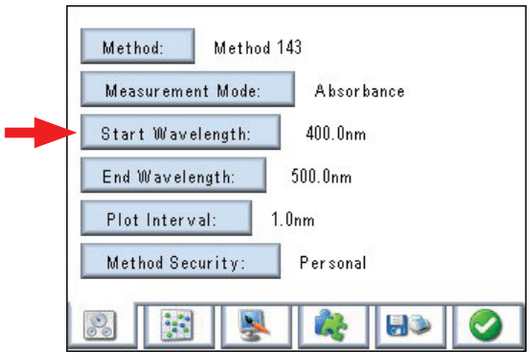


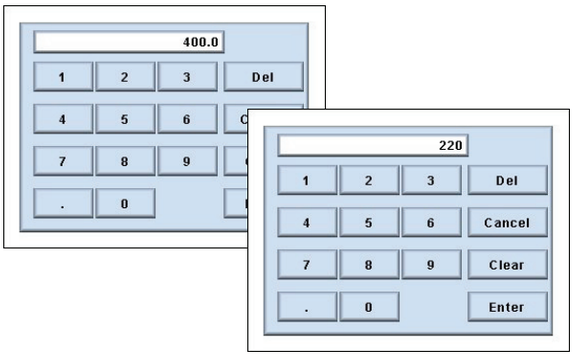
Setting Wavelengths

Note: If the start or end wavelength is adjusted so that they are closer than twice the plot interval then the previously set wavelength will be automatically adjusted to give a minimum of two measurement points.

Setting Start Wavelength

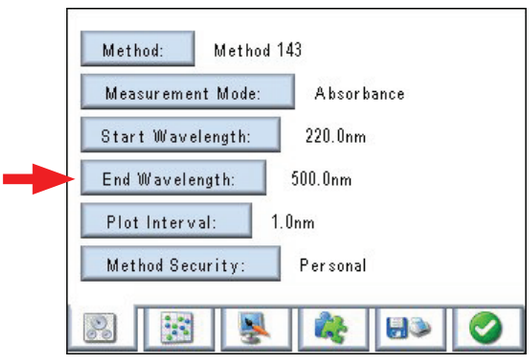
Select the ***Start Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out). Select the ***Enter*** key to confirm. The display will show the entered wavelength.

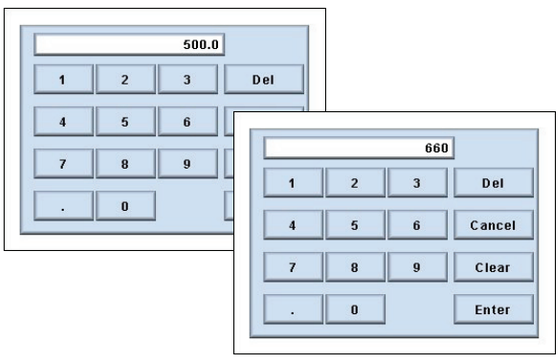




Setting End Wavelength

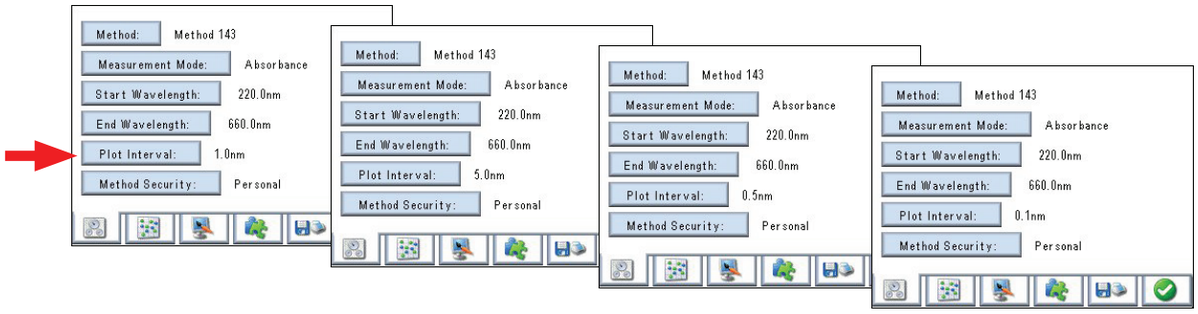
Select the ***End Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out). Select the ***Enter*** key to confirm. The display will show the entered wavelength.





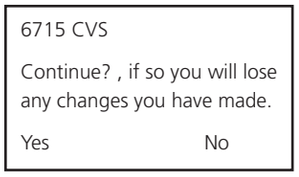
Selecting Plot Interval

Selecting the ***Plot Interval*** key allows the user to toggle between 1.0nm, 5.0nm, 0.1nm and 0.5nm.



Using the ***Back*** key to escape settings will display:

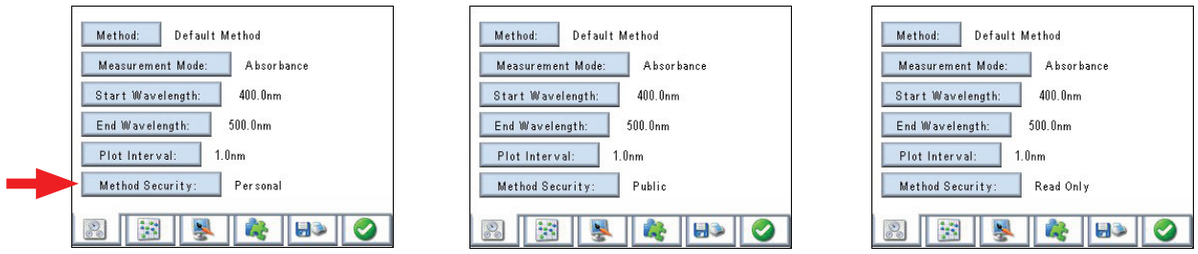
If ***Yes*** is selected all set information will be lost and the instrument will return to the main measurement screen. If ***No*** is selected the instrument returns to the ***Settings*** screen as shown.



Setting Method Security

The 67 Series spectrophotometers can support up to 10 individual users plus one Supervisor who has full administrative rights.

Logged in users can create methods with three levels of security options:



Personal – these methods are only accessible by the originator.

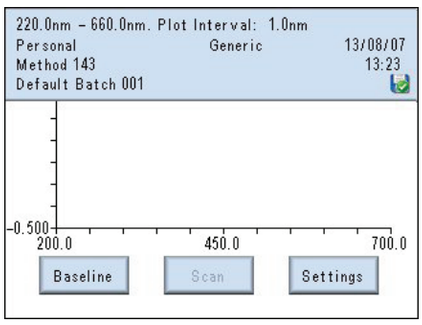
Public – these methods are available for use and modification by any logged in user.

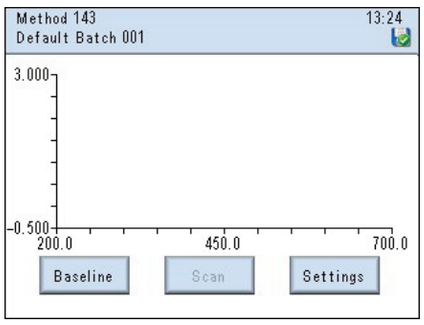
Read-Only – these methods can be accessed by all logged in users, but can only be modified by the originator.

The preferred level of protection can be achieved by selecting the ***Method Security*** key that toggles between ***Personal***, ***Public*** and ***Read-Only*** options.

To accept the selected options touch the ***Enter*** key to confirm. The instrument will show the main measurement screen with the updated information.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.



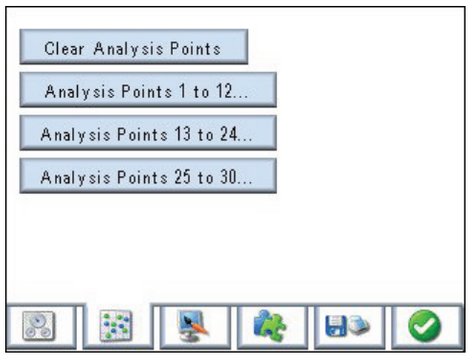


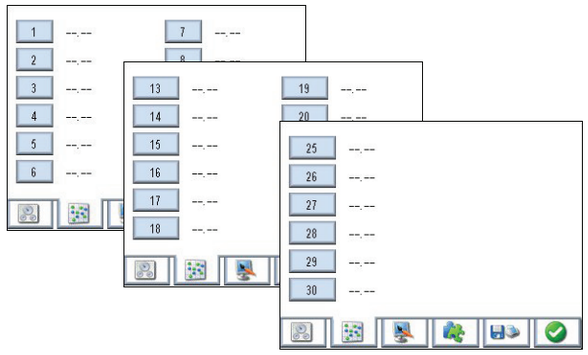
Setting Additional Set-up Parameters using the Toolbar Icons

Setting Analysis Points

Up to 30 analysis points can be set be selecting the ***Analysis Points*** keys and entering the required wavelength value via the numeric keypad.

The ***Clear Analysis Points*** option will clear all previously set analysis points.

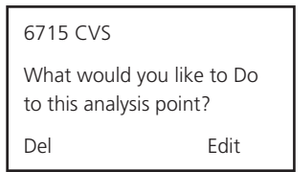


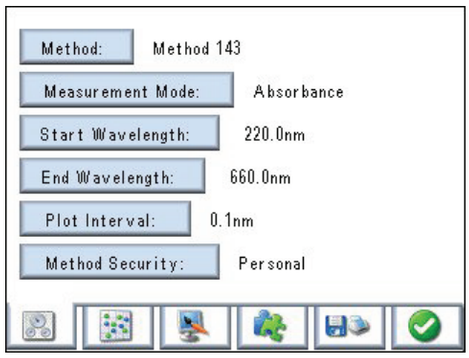


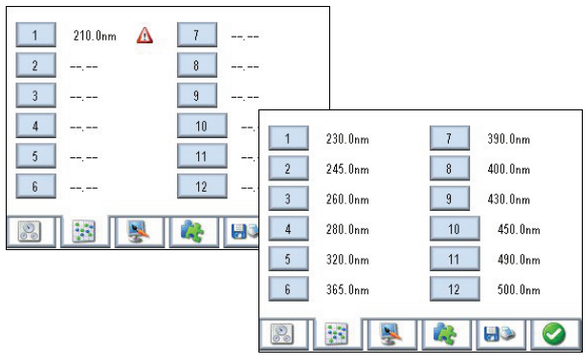
To delete or edit individual analysis points select the required analysis point to display:

If ***Del*** is selected the analysis point is deleted.

If ***Edit*** is selected a new value can be entered via the numeric keypad.







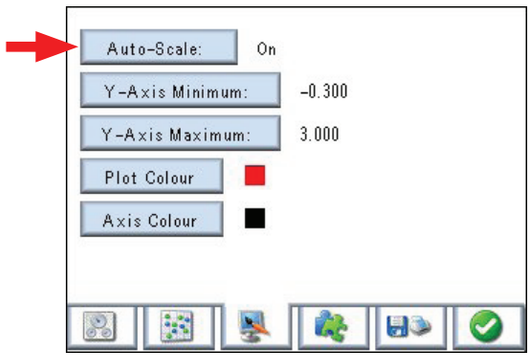
If an attempt is made to set an analysis point outside the start and end wavelength values the error message **'Wavelength for analysis out of spectrum scan range'** will be displayed momentarily and a triangular symbol will be shown to the side of the incorrect value. This value can be deleted or edited by selecting the analysis point (in this example 1) and entering a new value within the specified limits.

The analysis points will appear on tags at the relevant point on the spectrum display. They will also be printed with any printout to the internal or external printer if the ***Print Data Points*** option has been selected.

Setting Auto-Scale

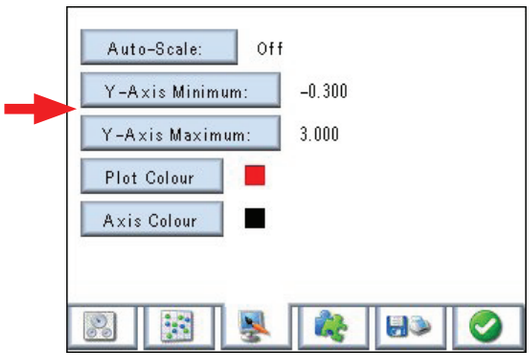
The ***Auto-Scale*** key toggles between ***On*** and ***Off***. With the ***Auto-Scale*** function ***On*** the instrument will automatically set the Y-axis maxima to a level that will fit the largest peak and lowest valley in the display area. This is the best option to choose if the user is uncertain of the limits of the scan.

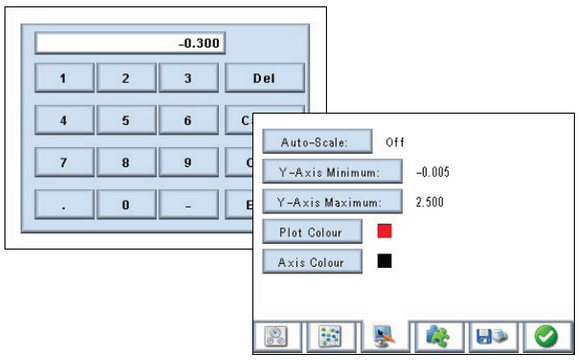
When set to ***On*** the manual settings for Y-axis maximum and minimum are non-functional. These settings can be changed with ***Post Scan*** analysis tools to enable alternative views and printouts after the scan has been completed.



With the ***Auto-Scale*** function set to ***Off*** the ***Y-Axis Minimum*** enables the lowest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Minimum*** key and a numeric keypad will be displayed for entry of this value. This value can be set between –0.301 and 2.999.

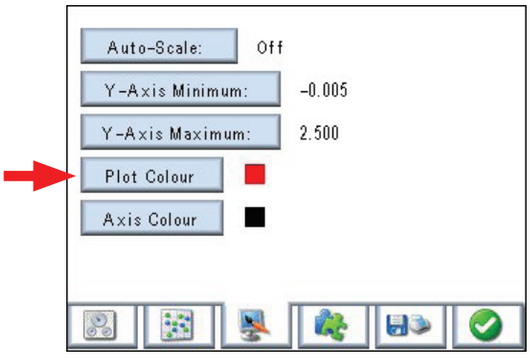
The ***Y-Axis Maximum*** enables the highest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Maximum*** key and a numeric keypad will be displayed for entry of this value. This value can be set between 3.000 and –0.300.

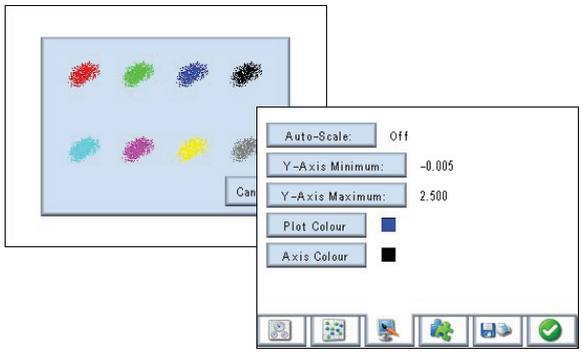




Selecting Plot Colour

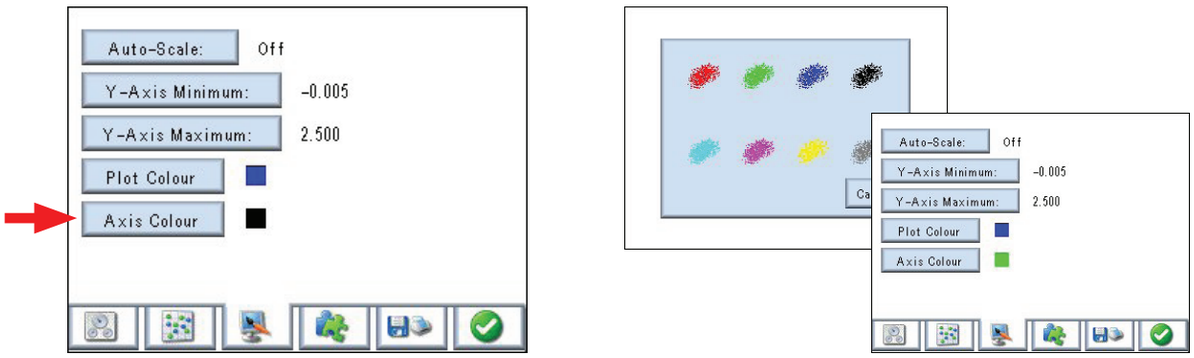
Selecting the ***Plot Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred plot colour. Once selected, the screen will update to show the selected colour.





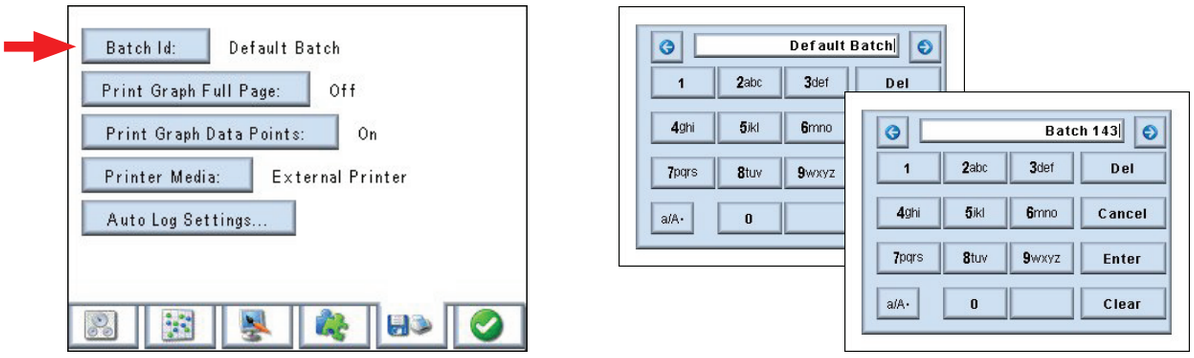
Selecting Axis Colour

Selecting the ***Axis Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred colour. Once selected, the screen will update to show the selected colour.



Setting Batch ID

Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Select ***Enter*** to accept or ***Cancel*** to remain as a default.



Setting Graph Data Points

The option to print graphs on a full page is only available if the ***External*** printer is selected. If available and set to ***On*** the scan will be printed on one page (typically A4 landscape format) with the data on the following pages.

If available and set to ***Off*** the scan will be printed with the data below it (typically top half A4 portrait).

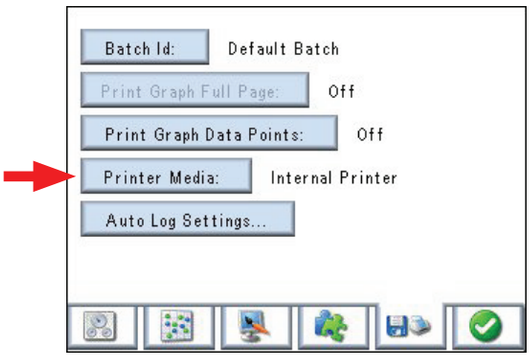
The ***Print Graph Data Points*** key toggles between ***On*** and ***Off***.

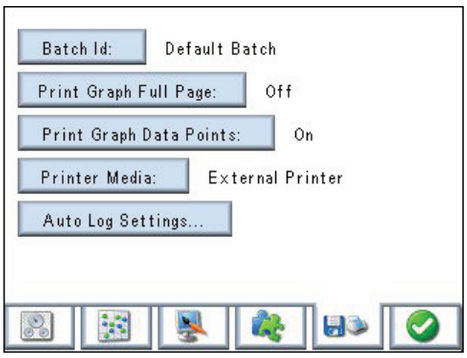
With this key set to ***On*** all the data points that make up the graph will be printed in a table following the scan.

Note: For a long scan at 0.1nm resolution this can result in many pages of data. It is recommended that careful consideration should be given to this and that this feature should be set to the ***Off*** position in this instance.

Selecting Printer Media

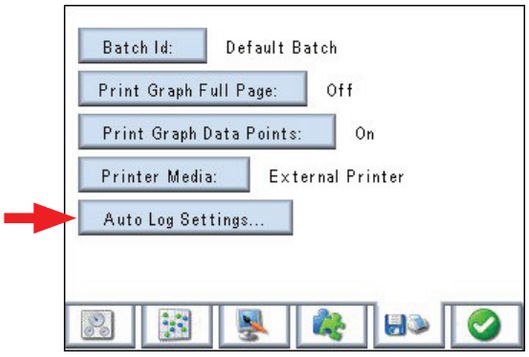
The ***Printer Media*** options toggle between Internal and External Printers.





Auto Log Settings...

Selecting ***Auto Log Settings...*** opens a dedicated sub-menu. This option can be toggled between ***Off***, ***On*** and ***Timed***.



When the ***Auto Log*** option is selected to ***On*** the user can set the destination, (toggles between internal or external printer and memory).

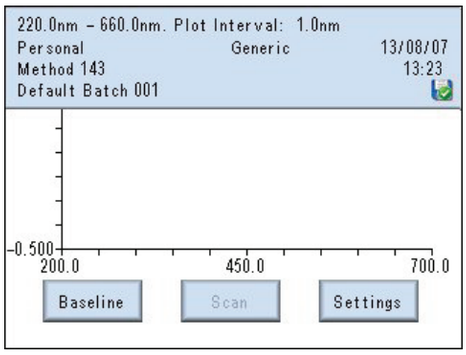
When the ***Auto Log*** option is selected to ***Timed*** the user can set:

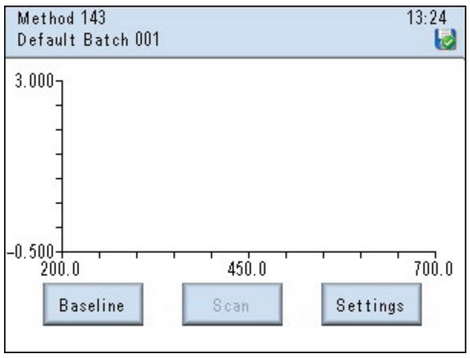
the timed interval between 3 and 9999 seconds using the numeric keypad;

the destination (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.





File & Data Management

Save

Tools

Print

Settings

Erase

Search Results

Open Results

Save

Saving Methods

Having entered all your required settings on the tabbed pages the method can be saved by simply pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result.

If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options. Alternatively, when the ***Auto Log*** option is set to ***On*** or ***Timed*** and the destination option is ***Memory*** all results will be saved automatically.

Sharing Methods

Methods can be shared with other users by setting the security level at either ***Read-Only*** where other users can use but not modify the method or, ***Public*** where they can use and modify the method. Other users must then ensure that under ***Method View Settings*** (Settings/User Preferences/Method View Settings) they have enabled ***Public*** and/or ***Read-Only*** methods or turned ***All Methods*** on.

Recalling Methods

Following selection of the operating mode from the main menu the method browse screen is displayed. This will show all methods that the current user has access to, based on their selections in the ***Method View Settings*** (refer to Sharing Methods). If the first page is full, cursor arrows will be displayed to enable navigation to and from additional pages.

Alternatively, selection may be made using the alphanumeric menu bar at the bottom of the screen.

Repeated pressing of each character set will display the full alphanumeric range and the screen will show all methods starting with the highlighted character.

Touch the required method when it is displayed on the screen to highlight it, touch the ***Open File*** icon to display the main measurement screen for that method.

Editing Methods

Use the Recalling Methods procedure to recall the required method. With the measurement screen displayed touch the ***Settings*** option. Adjust the settings as required and touch the ***Enter*** icon on completion. The modified method can then be saved by pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result. If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options.

Note: If the Method name was not changed during editing it will be saved with the same name but with a new date and time to ensure traceability. If the old method is no longer required it should be deleted as detailed in Deleting Methods.

Deleting Methods

To delete methods highlight the required method in the Browse screen as described in Recalling Methods and then touch the ***Erase*** icon.

A warning message will be displayed to ensure this action is required. On confirmation the selected file will be deleted.

If the current user does not have the required privileges to delete the selected method then an information message will be displayed advising that the method cannot be deleted.

Privileges required for deleting designated methods:

Public Methods – only the Supervisor and Originator can delete these.

Read-Only Methods – only the Supervisor and Originator can delete these.

Personal Methods – Only the Originator can delete these methods. (The Supervisor can delete these by re-setting the Originator's PIN code and then logging in as the Originator).

Saving Results

After completion of a measurement the result can be saved by simply pressing the ***Save*** key on the display surround. The result is saved under the method that created it, with the entered Batch ID and an incremental number along with the time and date of the measurement. Results can also be saved as part of the ***Auto Log*** function by selecting ***Memory*** under the ***Auto Log*** option, which will vary depending on the type of sampling accessory fitted.

Printing Results

After completion of a measurement the result can be printed, by simply pressing the ***Print*** key on the display surround. The result will be printed to either the internal or external printer, as selected by the user in the ***Printer Settings*** option.

The first result of any new batch is preceded by a print header, which gives details of the method settings and Batch ID. Results can also be printed as part of the ***Auto Log*** function, which will vary depending on the type of sampling accessory fitted.

Recalling Results

Stored results are always directly linked to the method that created them. To access results first recall the method as described in ***Recalling Methods***. With the method highlighted touch the ***Search Results*** icon. This will open a screen detailing all results available to the current user. Touch the required result or batch (depending on the mode) and then the ***Open Specific Result*** icon. This will display the results on the screen. The ***Tools*** option can then be used to work on these results (depending on mode). It is also possible to print the result by simply pressing the ***Print*** key on the display surround. Options to print to the Internal or External printer or to the CSV file will be displayed. Printing to the CSV (Comma Separated Values) file will save the data in CSV format on the external data card. (If a card is not fitted the instrument will display a prompt). This is in text format and can be viewed and printed in Excel®.

In ***Kinetics*** mode an additional option is available (Analogue Mode). This allows results to be output via the rear panel analogue sockets to a chart recorder or similar device.

Sharing Results

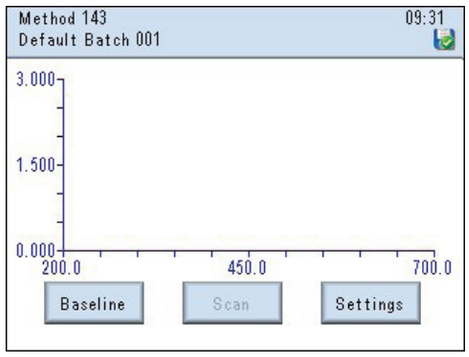
Results attached to ***Personal Methods*** cannot be accessed by any other user.

Results attached to ***Read-Only*** and ***Public Methods*** can be accessed by all users, based on their current ***Method View Settings***.

6.4 PERFORMING MEASUREMENTS – all users

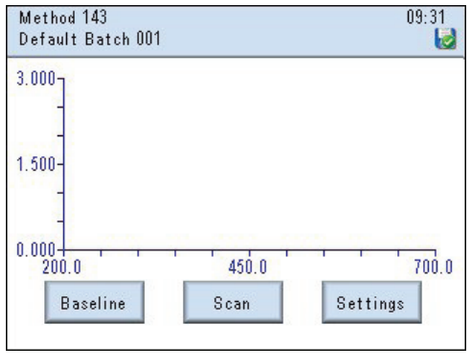
Performing a Scan

Once the required settings have been confirmed the main ***Spectrum*** measurement screen will be shown with the ***Scan*** key inactive (blanked out):



Performing a Baseline

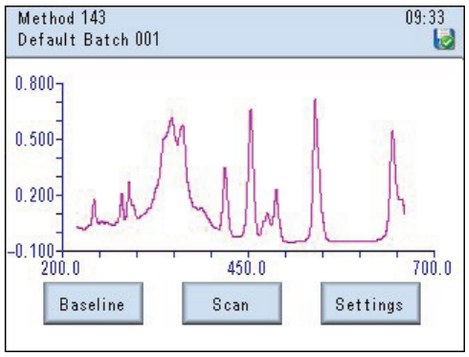
Insert a cuvette containing a blank solution into the sample holder and close the sample chamber lid. (Test tubes or other sample containers may be used depending on the sample holder accessory fitted). Select the ***Baseline*** key. The messages '***Performing baseline scan. Please wait...***' are displayed momentarily. Once the baseline measurement and storage is completed the screen will update to show:



Note: In general the blank solution should contain everything that is in the sample except the colour-producing component. For specific information reference should be made to the procedure or application being followed. For enhanced reproducibility matched cuvettes should be used.

Scanning the Sample

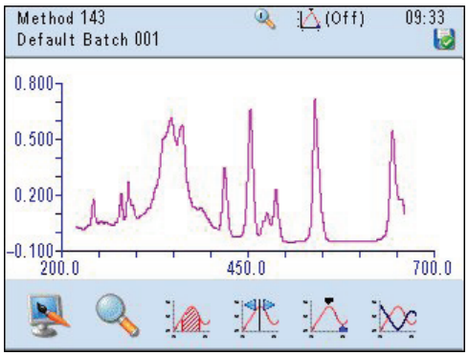
Once the baseline has been performed the ***Scan*** key will be active. Remove the cuvette containing the blank solution and insert the sample into the sample holder and close the sample chamber lid. Select the ***Scan*** key, if **Auto Scale** has been selected once the scan is completed, the screen will blank and the scan will be re-drawn to the optimum scaling.



Additional individual samples can be measured by inserting them in the single sample holder and touching ***Scan***. Alternatively, multiple samples can be measured with the optional 8 or 6 cell changers or sequentially with the sipper pump accessory.

Analysing the Scan

Selecting the icon gives access to post scan analysis options, as detailed below:



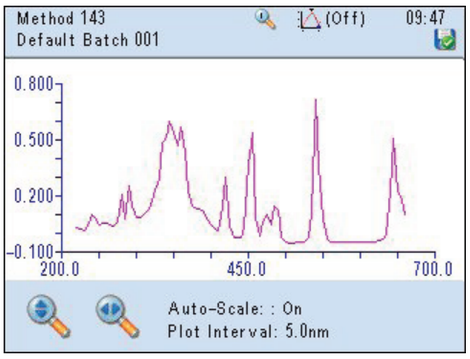
Note: All tools functions are available for use on recalled results in exactly the same manner as described hereafter.

Toolbar Icons

Display Settings

Toggles ***Auto Scale*** (Y Axis) ***On*** or ***Off***. If ***Off*** Y axis defaults to manual settings entered in the method.

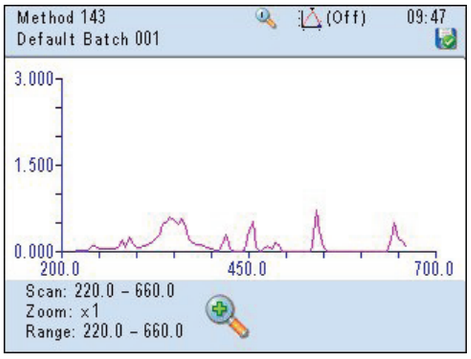
Cycles round ***Plot Interval*** settings of 0.1, 0.5, 1.0 and 5.0nm



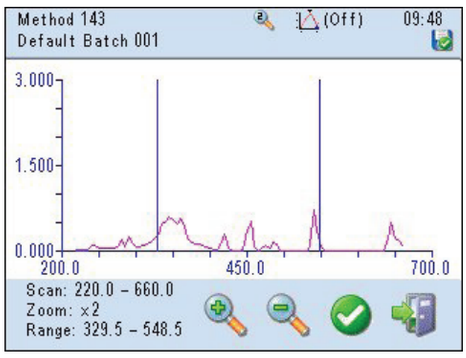
Zoom

Activates the zoom area select cursors that can be positioned using the QWheel™ over the area required. Repeated presses increase the zoom up to 5 times.

Returns the zoom to the next lower level. At x1 this icon is disabled.



Accepts and re-scales the selected area to the current zoom setting. Selecting the ***Back*** key or the ***Exit Door*** once maintains the zoom display and gives access to the tools for manipulation and analysis of the zoomed portion. A further press of the ***Back*** key returns the original scan.



Area Under Curve

Toolbar Icons

Area Under Curve

Cursor Select

Calculator

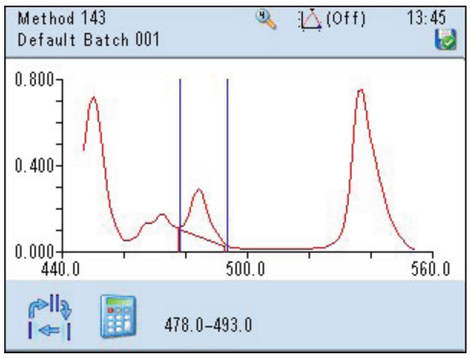
Selecting the ***Area Under Curve*** icon displays the area select cursors. This can be carried out on zoomed or recalled spectra as well as the current result. Initially both cursors are active.

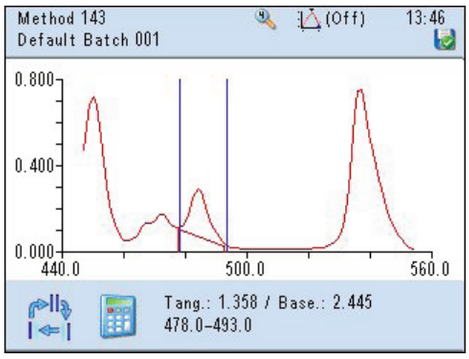
Use the QWheel™ to position the right hand cursor at the right hand side of the curve to be analysed.

Press the ***Cursor Select*** icon to fix this position, enabling the QWheel™ to move the left hand cursor to the other side of the required curve.

A further press of the ***Cursor Select*** icon fixes this position but frees the right hand cursor for further fine adjustment. (A further press enables both cursors again and so on round the cycle).

When the required area has been defined selecting the ***Calculator*** icon displays the area under the curve, both as the displayed tangent (***Tang***.) to the valleys, and as a continuum to the X-axis (***Base***). The wavelengths at the start and end of the curve are also displayed.





Co-ordinate Tagging

Toolbar Icons

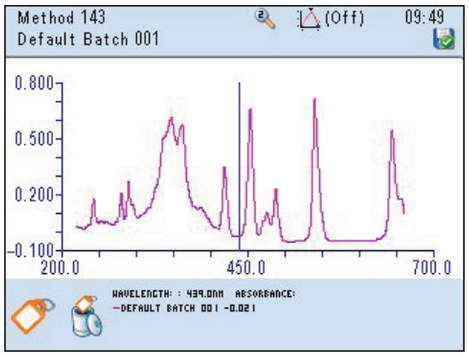
Co-ordinate

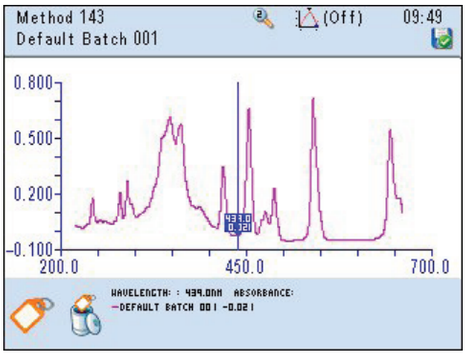
Tagging Tag

Delete Tag

Peaks, valleys or any other points of interest can be selected (on the current, zoomed or recalled spectra) and have a co-ordinate tag added for future reference.

Selecting the ***Co-ordinate Tag*** icon enables the QWheel™ to control the displayed cursor. With the cursor on the required point pressing the ***Tag*** icon will add a tag at this point. All tags can be removed by selecting the ***Delete Tag*** icon.





Auto Peak & Valley Tagging

Toolbar Icons

Peak & Valley Tagging

Calculate

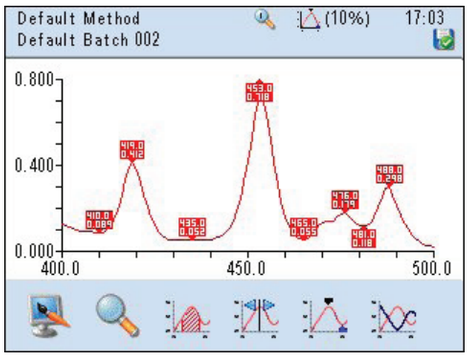
Find Peaks & Valleys Table

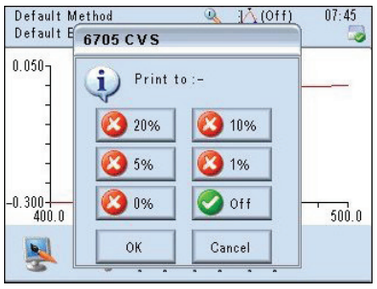
Display spectrum with Peaks & Valleys

Scroll Up

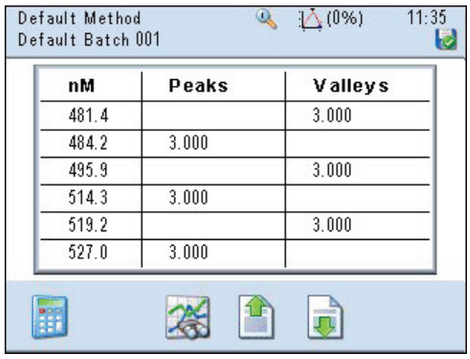
Scroll Down

Peaks and valleys can be automatically identified on current, zoomed or recalled spectra. Selecting the ***Peak and Valley*** icon will cause the scan to be re-drawn with all peaks and valleys identified with co-ordinate tags. The initial display is with a setting of 20% (defined as any turning point where the maximum or minimum value reached is 20% greater or less than the previous turning point). The sensitivity can be adjusted by selecting the ***Calculate*** icon and choosing the required sensitivity.





Selecting the ***Find Peaks & Valleys Table*** icon displays the peaks and valleys in a table.



nM	Peaks	Valleys
481.4		3.000
484.2	3.000	
495.9		3.000
514.3	3.000	
519.2		3.000
527.0	3.000	

Scrolling through the table can be carried out using the ***Scroll Down*** and ***Scroll Up*** icons.

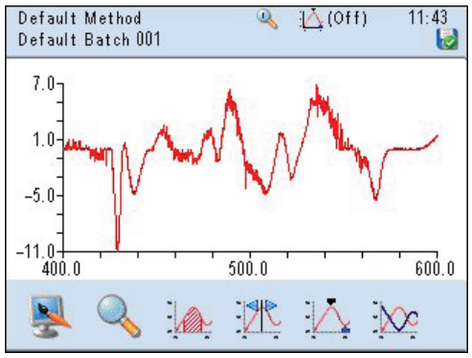
Selecting the ***Display Spectrum with Peaks and Valleys*** icon at any time returns to the spectrum display.

Obtaining Derivative Spectra

Toolbar Icon

Select Derivative

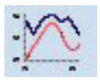
To obtain a derivative spectra select the ***Select Derivative*** icon and choose which derivative is required (the range is from None to 4th Derivative). The spectrum derivative display is updated to show the spectrum.



Selecting the ***Back*** key returns to the original spectrum.

Overlaying Scans

Toolbar Icon



Spectral Overlay

Add Scans To Overlay

Information

Display More Icons

Display Original Icons

Note: Scans can only be overlaid on Recalled Methods and the user has logged in, as access to stored data is required.

To overlay scans first measure and store the scans for each sample required in the overlay, to a maximum of 8 scans.

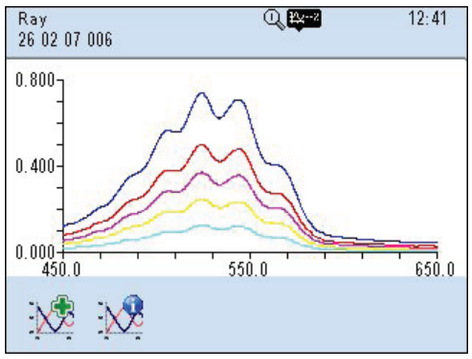
Selecting the ***Spectral Overlay*** icon displays the overlay screen with the chosen recalled method displayed (the ***Spectral Overlay*** icon is displayed by selecting the ***Display More Icons*** icon from the ***Toolbar***).

Selecting the ***Add Scans To Overlay*** icon opens a window detailing all available scans in the current batch.

Selecting the key detailing the required scan will re-draw the screen with the two scans overlaid. Further scans from the batch can be added in a similar way.

Selecting the ***Information*** icon opens a window enabling the colours of each displayed scan to be changed; by touching the colour swatch next to the details of each scan it will cycle through the 8 available alternatives. Similarly, any overlaid scan can be removed by touching the ***Delete*** icon alongside it.

Select the ***Back*** key to exit from either screen.



Adding or Subtracting Spectra

Toolbar Icon

Add/Subtract Scans

Display More Icons

Display Original Icons

Add Scans

Delete Scans

Return to Original Scan

Note: Scans can only be added or subtracted on ***Recalled Methods*** and the user has logged in, as access to stored data is required.

To add or subtract scans, first measure and store the scans for each sample required.

Selecting the ***Add /Subtract*** icon displays the chosen recalled method displayed (the ***Add/Subtract*** icon is displayed by selecting the ***Display More Icons*** icon from the ***Toolbar***).

Selecting either the ***Add Scans*** or ***Subtract Scans*** icon opens a window detailing all available scans in the current batch.

Selecting the key detailing the required scan will re-draw the screen with the two scans added or subtracted.

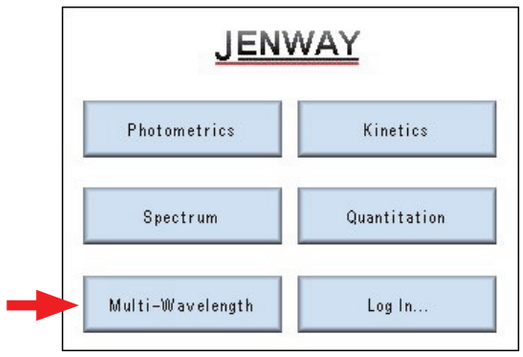
Selecting the ***Return to Original Scan*** icon updates the display to show the original method.

SECTION 7 - Multi-Wavelength Mode

7.1 PRINCIPLES OF MEASUREMENT

The multi-wavelength mode is used to measure absorbance or transmittance at up to four distinct wavelengths. There are two ways in which this mode can then be used, one sample at four wavelengths or four samples each at a different wavelength when the eight position cell holder is fitted. This mode is used for specific tests when one sample is examined and a ratio of absorbance values (or difference between absorbance values) at different wavelengths can reveal the purity or the composition of the sample. The ratio or difference calculations are automatically made by the spectrophotometer. The measurements are made almost simultaneously so the sample must be stable. Easily constructed methods for DNA or RNA purity/concentration can be implemented, with options for automatic or manual calibration and measurement.

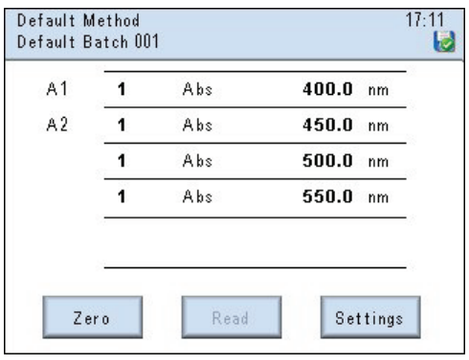
Select the ***Multi-Wavelength*** Mode from the ***Main Menu*** options.



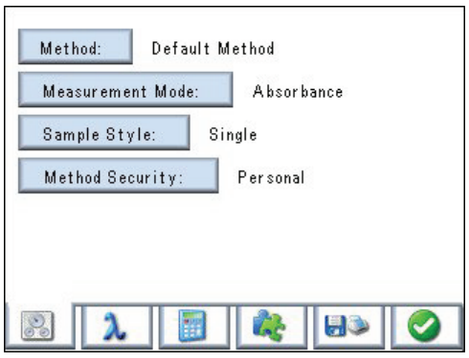
7.2 FREE OPERATION

Settings

If the user is not logged in then the main measurement screen will automatically be displayed when the ***Multi-Wavelength*** mode is selected from the ***Main Menu***:



To enter the required parameters for the sample(s) under test, select the ***Settings*** key and the instrument will display the following screen:



Mode settings – method name, measurement mode, sample style, method security (if logged in)

Setting wavelengths – allows 2 to 4 wavelengths to be set

Calculations - allows the selection of calculations and constants

Accessory options – varies with type of accessory module fitted

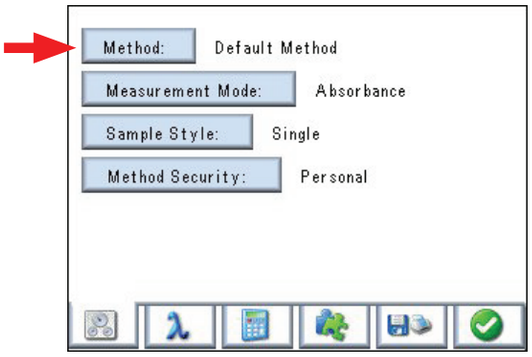
Allows selection of internal or external printer, batch ID and the Auto Log options

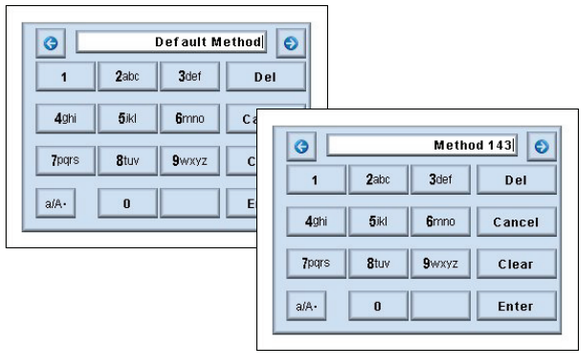
Press to accept settings entered

Setting Method ID

To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.

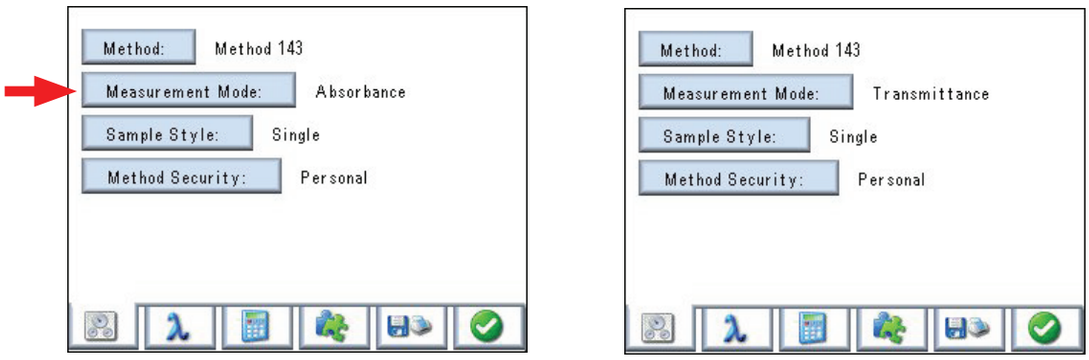
Note: The new Method ID can only be used to identify the sample or batch on a printout to the internal or external printer module as a single reading or a set of multiples if the Auto Log facility is used. The generic user has no additional facility to store or recall these results or the method settings.





Selecting Measurement Mode

The ***Measurement Mode*** key toggles between Absorbance and Transmittance.

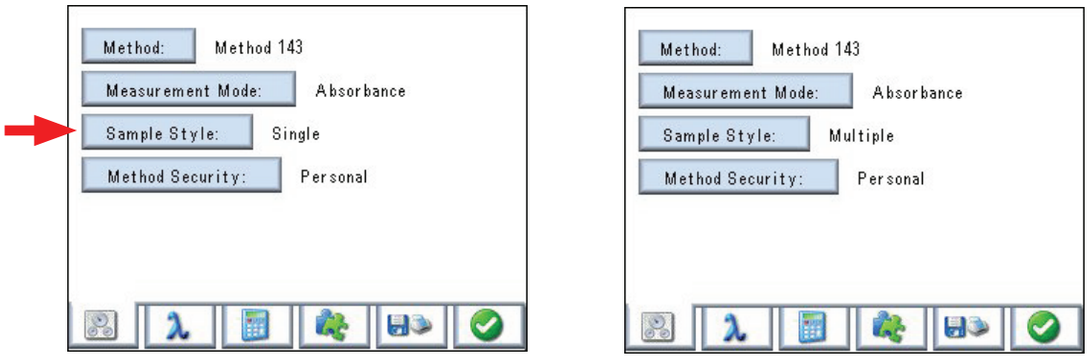


Selecting Sample Style

This option allows the user to select to measure one sample at up to four wavelengths, or to measure up to four samples at different wavelengths when the 8-position cell holder is fitted.

Single – allows a single sample to be measured at up to 4 wavelengths.

Multiple – allows up to 4 samples to be measured at single different wavelengths.



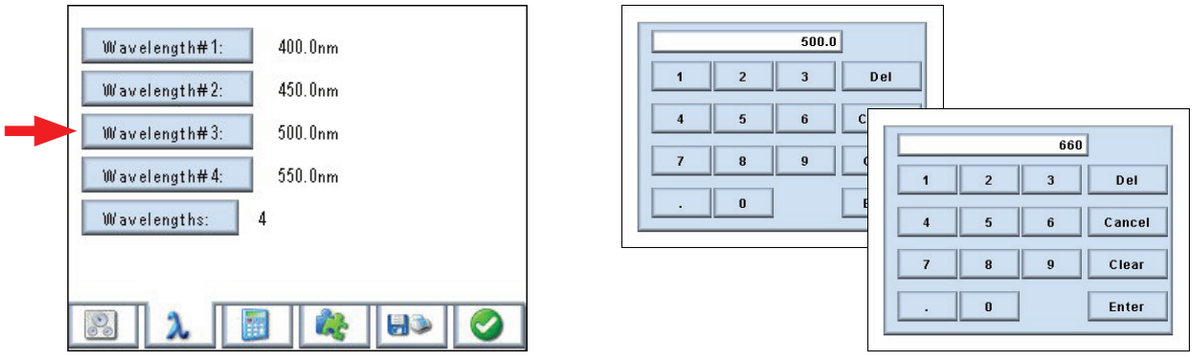
This parameter is used in conjunction with setting wavelengths; i.e. in multiple option Sample 1 = Wavelength 1, Sample 2 = Wavelength 2, etc, with Position 0 reserved for a common blank.

Setting Method Security

This option is only applicable to logged in users.

Setting Wavelengths

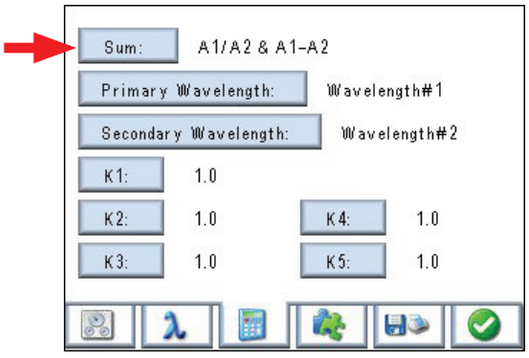
Up to four wavelengths can be set for each measurement parameter. The number of wavelengths to be measured can be set at 2, 3 or 4 by successive presses of the wavelength key. Values can be set by selecting the appropriate wavelength (#1-4) and entering the new value via the numeric keypad.



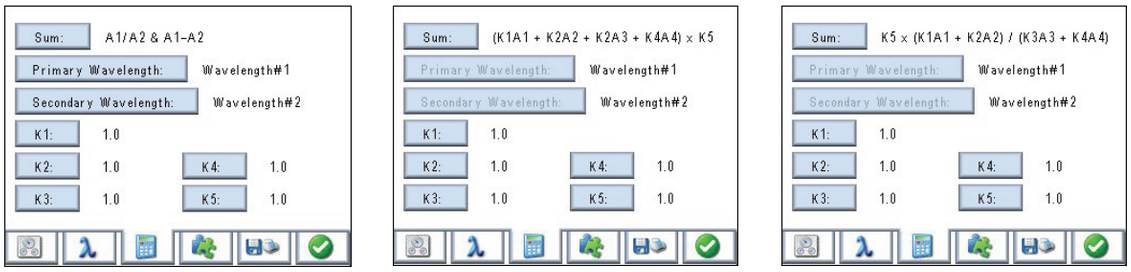
Note: The primary and secondary wavelengths can be selected using any combination e.g. Wavelength #1 as the primary and Wavelength #3 as the secondary.

Calculations

The calculations option allows the user to specify which calculations they would like to see performed with the readings taken at selected wavelengths and with specific samples.



Sum allows the user to specify which of the following sums is performed:



A1/A2 & A1-A2 ratio and difference will allow the user to see the ratio between any two readings – in this case the primary value divided by the secondary value, and the difference between two readings – the primary value minus the secondary value.

(K1A1 + K2A2 + K3A3 + K4A4) x K5

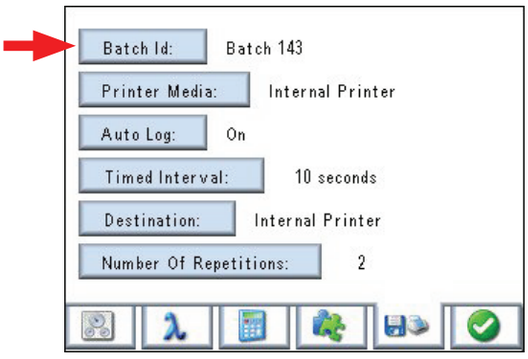
K5 x (K1A1 + K2A2) / (K3A3 + K4A4)

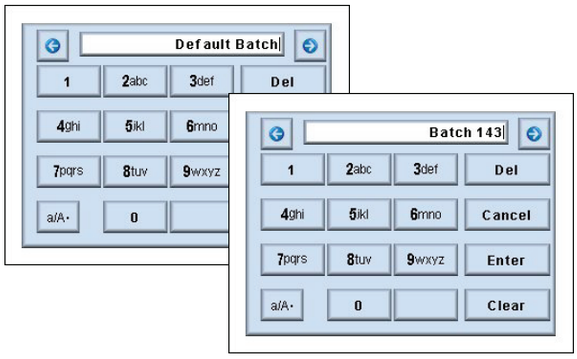
Primary Wavelength allows the user to select which of the (up to) four wavelengths selected is used as the primary wavelength in the Ratio and Difference calculation.

Secondary Wavelength allows the user to select which of the (up to) four wavelengths selected is used as the secondary wavelength in the Ratio and Difference calculation. It is not possible to set the primary and secondary wavelengths to the same value.

K1 to K5 allow the user to set the required constants for the calculations.

Setting Batch ID

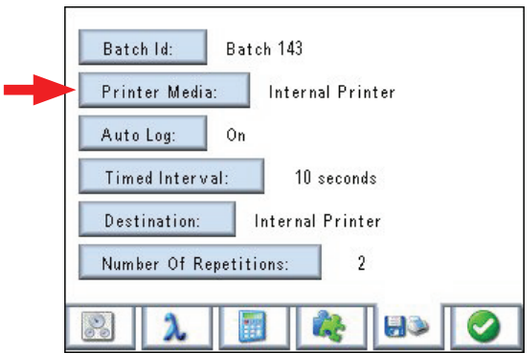




Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Select ***Enter*** to accept or ***Cancel*** to remain as a default.

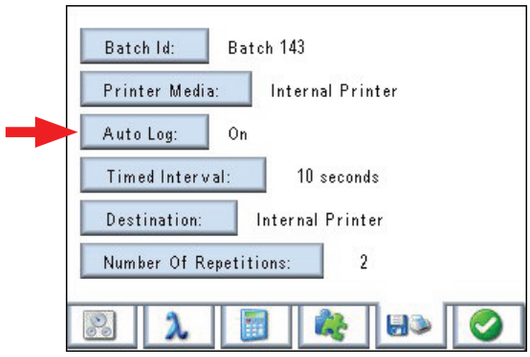
Selecting Printer Media

The ***Printer Media*** key toggles between Internal and External Printer options.



Auto Log Setting...

Selecting the ***Auto Log Settings...*** opens a dedicated sub-menu.



This option can be toggled between ***Off***, ***On*** and ***Timed***. When the ***Auto Log*** option is selected to ***On*** the user can set the destination (toggles between internal or external printer and memory);

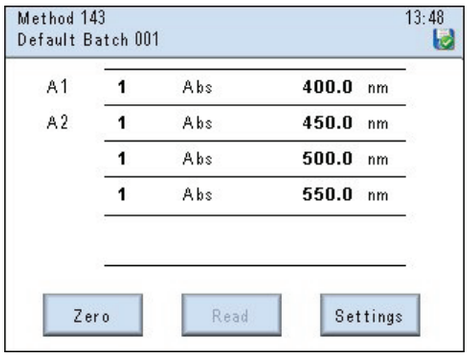
When the ***Auto Log*** option is set to ***Timed*** the user can set:

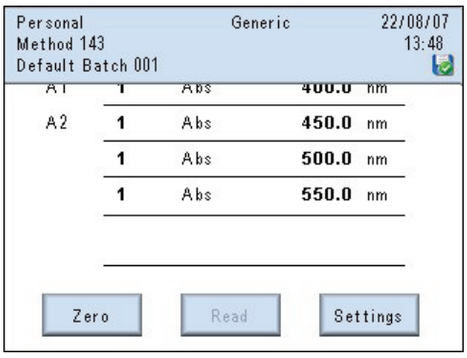
the timed interval between 3 and 9999 seconds using the numeric keypad;

the destination (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.



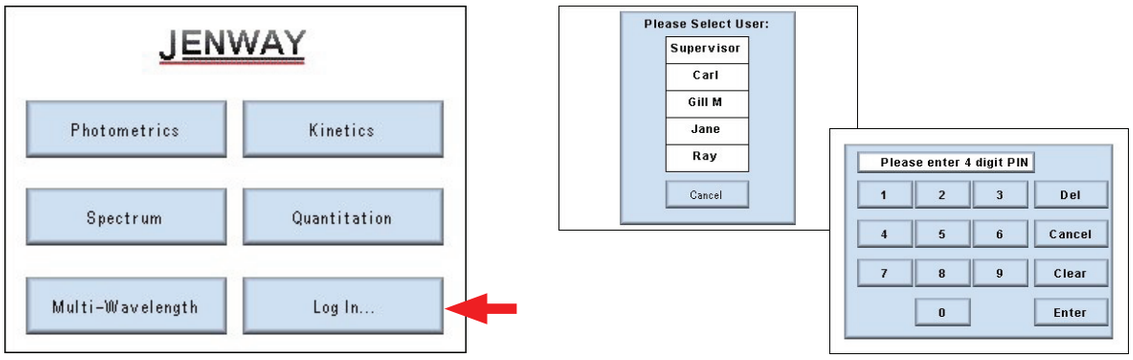


7.3 LOGGED IN MEASUREMENT

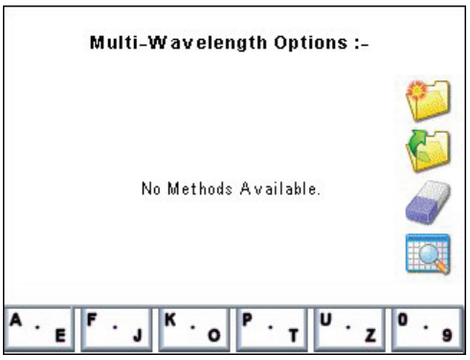
PIN Codes – each user is allocated a 4 digit PIN code that is required when logging in.

Select ***Log In...*** from the ***Main Menu*** and a list of users will be shown. Select the appropriate user name and a numeric keypad will be displayed.

Enter your 4 digit PIN code and touch the ***Enter*** key to confirm.



Once logged in method screen options will be displayed:



Methods are stored sequentially by measurement mode. Once the first page is full (8 methods for the selected mode) cursor arrows are displayed enabling the user to browse to subsequent or previous pages of 8 methods.

Alternatively, pressing one of the alphanumeric keys along the bottom of the screen will display all available methods with the initial character that is highlighted.

Note: Repeated pressing of a key sequentially highlights the characters between those displayed.

Create a New Method

For the following functions first touch a method or result to select it.

Open the Selected Method

Erase the Selected Method

Browse Results – linked to the selected method

Open specific results in the selected batch

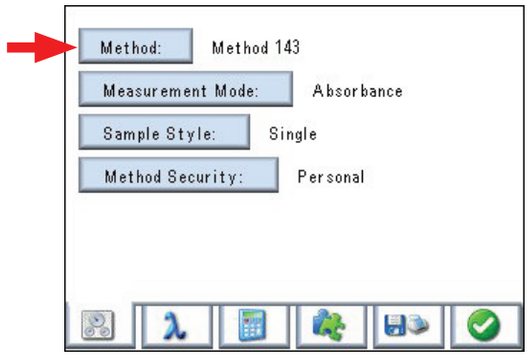
Creating a New Method

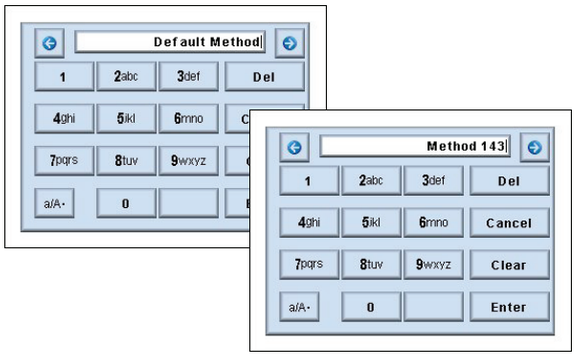
Settings

To enter the Method ID, appropriate wavelength for the sample(s) to be tested and the level of Method Security required for the method being created select the ***New File*** icon

Setting Method ID

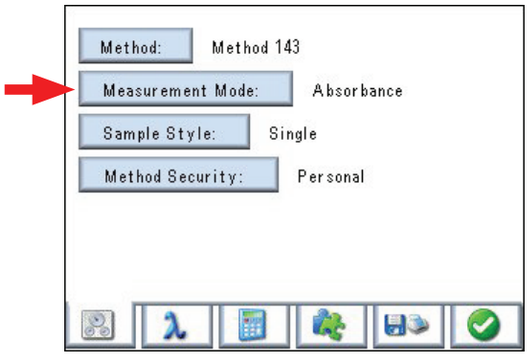
To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.

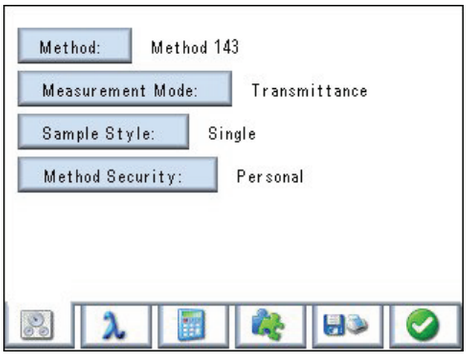




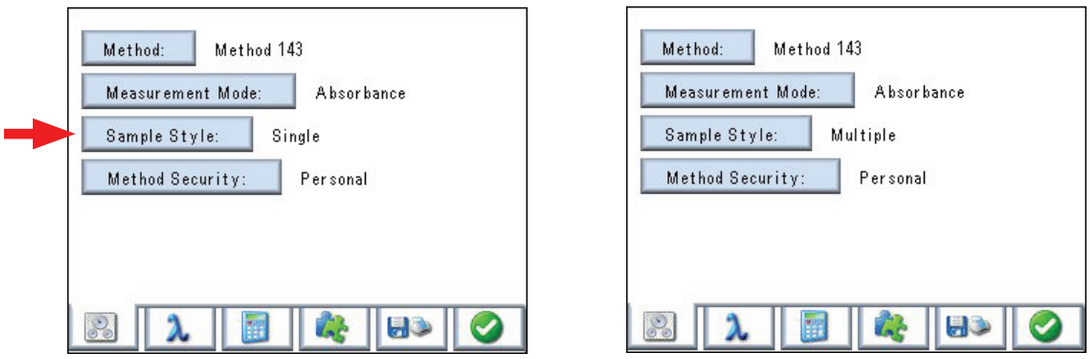
Selecting Measurement Mode

The ***Measurement Mode*** key toggles between Absorbance and Transmittance.





Selecting Sample Style



This option allows the user to select to measure one sample at up to four wavelengths, or to measure up to four samples at different wavelengths when the 8-position cell holder is fitted. This parameter is used in conjunction with setting wavelengths; i.e. in multiple option Sample 1 = Wavelength 1, Sample 2 = Wavelength 2, etc, with position 0 reserved for a common blank.

Single – allows a single sample to be measured at up to 4 wavelengths.

Multiple – allows up to 4 samples to be measured at single different wavelengths.

Method Security

The 67 Series spectrophotometers can support up to 10 individual users plus one Supervisor who has full administrative rights.

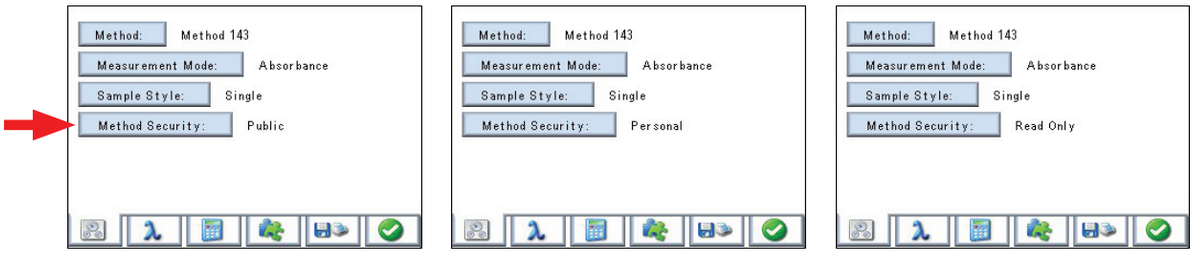
Logged in users can create methods with three levels of security options:

Personal – these methods are only accessible by the originator.

Public – these methods are available for use and modification by any logged in user.

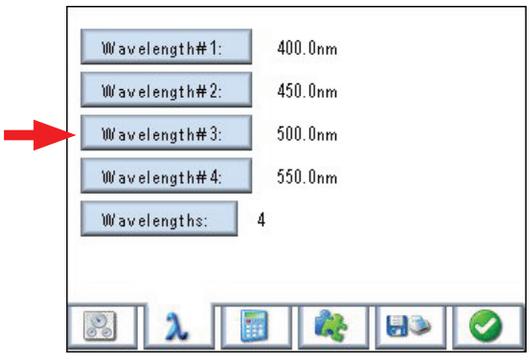
Read-Only – these methods can be accessed by all logged in users, but can only be modified by the originator.

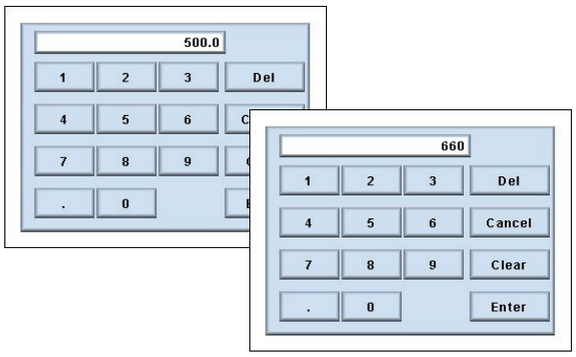
The preferred level of protection can be achieved by selecting the ***Method Security*** key that toggles between ***Personal***, ***Public*** and ***Read-Only*** options.



Setting Wavelengths

Up to four wavelengths can be set for each measurement parameter. The number of wavelengths to be measured can be set at 2, 3 or 4 by successive presses of the wavelength key. Values can be set by selecting the appropriate wavelength (#1-4) and entering the new value via the numeric keypad.

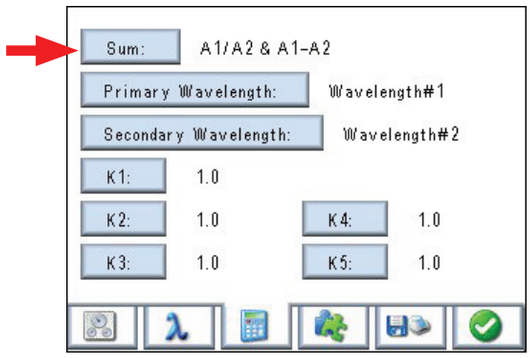




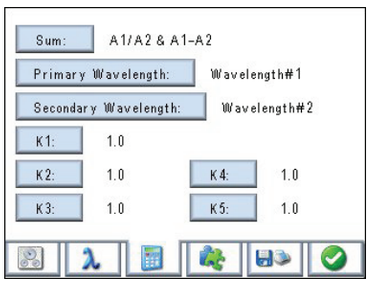
Note: The primary and secondary wavelengths can be selected using any combination e.g. Wavelength #1 as the primary and Wavelength #3 as the secondary.

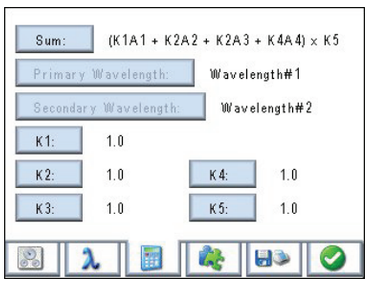
Calculations

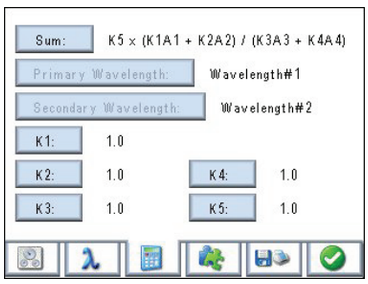
The calculations option allows the user to specify which calculations they would like to see performed with the readings taken at selected wavelengths and with specific samples.



Sum allows the user to specify which of the following sums is performed:







A1/A2 & A1-A2 ratio and difference will allow the user to see the ratio between any two readings – in this case the primary value divided by the secondary value, and the difference between two readings – the primary value minus the secondary value.

(K1A1 + K2A2 + K3A3 + K4A4) x K5

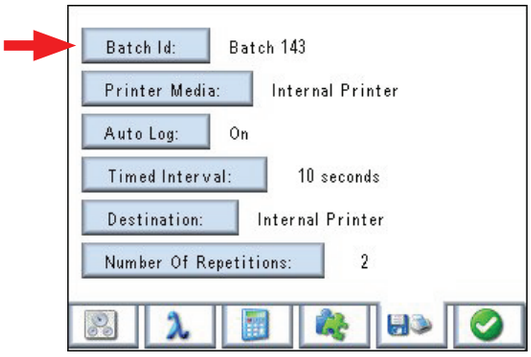
K5 x (K1A1 + K2A2) / (K3A3 + K4A4)

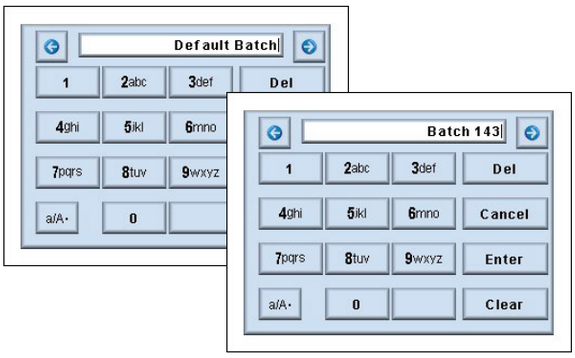
Primary Wavelength allows the user to select which of the (up to) four wavelengths selected is to be used as the primary wavelength in the Ratio and Difference calculation.

Secondary Wavelength allows the user to select which of the (up to) four wavelengths selected is to be used as the secondary wavelength in the Ratio and Difference calculation. It is not possible to set the primary and secondary wavelengths to the same value.

K1 to K5 allow the user to set the required constants for the calculations.

Setting Batch ID

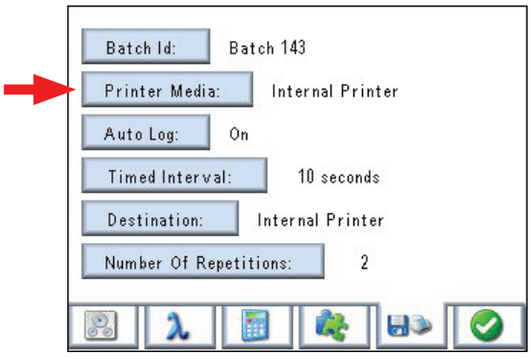




Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Touch ***Enter*** to accept or ***Cancel*** to remain as a Default.

Selecting Printer Media

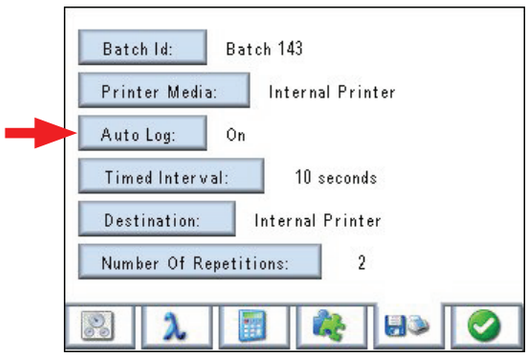
The ***Printer Media*** key toggles between Internal and External Printer options.



Auto Log Settings...

Selecting the ***Auto Log Settings...*** opens a dedicated sub-menu.

This option can be toggled between ***Off, On*** and ***Timed*** .



When the ***Auto Log*** option is selected to ***On*** the user can set the destination (toggles between internal or external printer and memory);

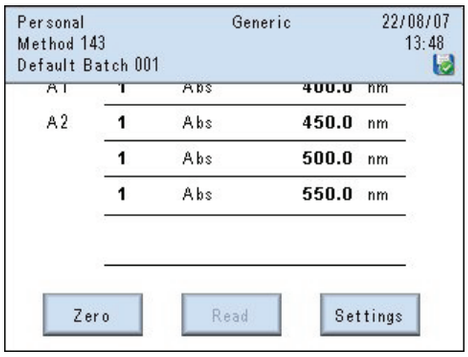
When the ***Auto Log*** option is set to ***Timed*** the user can set:

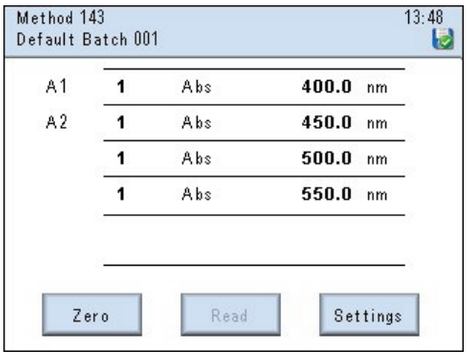
the timed interval between 3 and 9999 seconds using the numeric keypad;

the destination (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.





File & Data Management

Save

Tools

Print

Settings

Erase

Search Results

Open Results

Save

Saving Methods

Having entered all your required settings on the tabbed pages the method can be saved by simply pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result.

If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options. Alternatively, when the ***Auto Log*** option is set to ***On*** or ***Timed*** and the destination option is ***Memory*** all results will be saved automatically.

Sharing Methods

Methods can be shared with other users by setting the security level at either ***Read-Only*** where other users can use but not modify the method or, ***Public*** where they can use and modify the method. Other users must then ensure that under ***Method View Settings*** (Settings/User Preferences/Method View Settings) they have enabled ***Public*** and/or ***Read-Only*** methods or turned ***All Methods*** on.

Recalling Methods

Following selection of the operating mode from the main menu the method browse screen is displayed. This will show all methods that the current user has access to, based on their selections in the ***Method View Settings*** (refer to Sharing Methods). If the first page is full, cursor arrows will be displayed to enable navigation to and from additional pages.

Alternatively, selection may be made using the alphanumeric menu bar at the bottom of the screen.

Repeated pressing of each character set will display the full alphanumeric range and the screen will show all methods starting with the highlighted character.

Touch the required method when it is displayed on the screen to highlight it, touch the ***Open File*** icon to display the main measurement screen for that method.

Editing Methods

Use the Recalling Methods procedure to recall the required method. With the measurement screen displayed touch the ***Settings*** option. Adjust the settings as required and touch the ***Enter*** icon on completion. The modified method can then be saved by pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result. If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options.

Note: If the Method name was not changed during editing it will be saved with the same name but with a new date and time to ensure traceability. If the old method is no longer required it should be deleted as detailed in Deleting Methods.

Deleting Methods

To delete methods highlight the required method in the Browse screen as described in Recalling Methods and then touch the ***Erase*** icon.

A warning message will be displayed to ensure this action is required. On confirmation the selected file will be deleted.

If the current user does not have the required privileges to delete the selected method then an information message will be displayed advising that the method cannot be deleted.

Privileges required for deleting designated methods:

Public Methods – only the Supervisor and Originator can delete these.

Read-Only Methods – only the Supervisor and Originator can delete these.

Personal Methods – Only the Originator can delete these methods. (The Supervisor can delete these by re-setting the Originator's PIN code and then logging in as the Originator).

Saving Results

After completion of a measurement the result can be saved by simply pressing the ***Save*** key on the display surround. The result is saved under the method that created it, with the entered Batch ID and an incremental number along with the time and date of the measurement. Results can also be saved as part of the ***Auto Log*** function by selecting ***Memory*** under ***Auto Log*** options, which will vary depending on the type of sampling accessory fitted.

Printing Results

After completion of a measurement the result can be printed, by simply pressing the ***Print*** key on the display surround. The result will be printed to either the internal or external printer, as selected by the user in the ***Printer Settings*** option.

The first result of any new batch is preceded by a print header, which gives details of the method settings and Batch ID. Results can also be printed as part of the ***Auto Log*** function, which will vary depending on the type of sampling accessory fitted.

Recalling Results

Stored results are always directly linked to the method that created them. To access results first recall the method as described in ***Recalling Methods***. With the method highlighted touch the ***Search Results*** icon. This will open a screen detailing all results available to the current user. Touch the required result or batch (depending on the mode) and then the ***Open Specific Result*** icon. This will display the results on the screen. The ***Tools*** option can then be used to work on these results (depending on mode). It is also possible to print the result by simply pressing the ***Print*** key on the display surround. Options to print to the Internal or External printer or to the CSV file will be displayed. Printing to the CSV (Comma Separated Values) file will save the data in CSV format on the external data card. (If a card is not fitted the instrument will display a prompt). This is in text format and can be viewed and printed in Excel®.

In ***Kinetics*** mode an additional option is available (Analogue Mode). This allows results to be output via the rear panel analogue sockets to a chart recorder or similar device.

Sharing Results

Results attached to ***Personal Methods*** cannot be accessed by any other user.

Results attached to ***Read-Only*** and ***Public Methods*** can be accessed by all users, based on their current ***Method View Settings***.

7.4 PERFORMING MEASUREMENTS – all users

Place the zero solution in the sample chamber and close the lid.

Selecting the ***Zero*** key will start the cycle, setting zero at each wavelength in turn. A series of information boxes will advise of the progress.

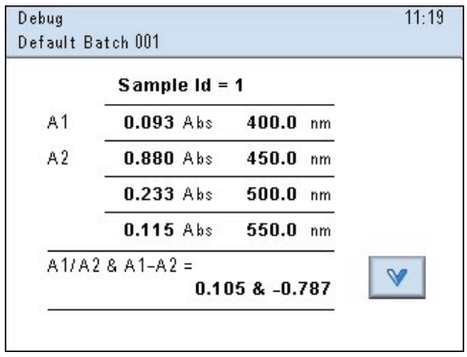
When completed all displayed absorbance values will be set to zero (or 100% Transmittance).

Replace the zero solution with the sample to be measured and close the sample chamber lid.

Selecting the ***Read*** key will start the measure cycle, measuring at each wavelength in turn. A series of information boxes will advise of the progress.

When completed the measured absorbances will be displayed.

The results of the selected calculation will be displayed below the Wavelength/Absorbance data.



Saving a method allows access to the table through ***Recalling a Method***.

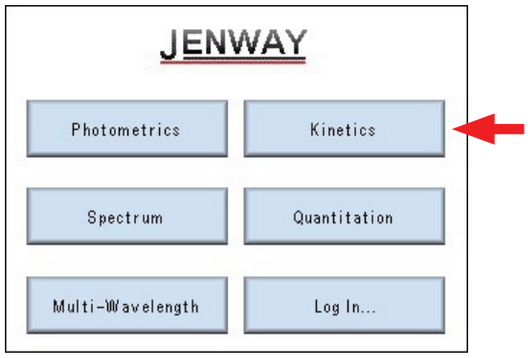
SECTION 8 - Kinetics Mode

8.1 PRINCIPLES OF MEASUREMENT

A number of tests run on a spectrophotometer involve an active ingredient. On addition of this active ingredient, the absorbance or the transmittance of the sample, will be seen to either increase or decrease. The absorbance or transmittance is recorded at regular intervals at a preset wavelength for a set time.

A graph is then plotted to show how the absorbance or transmittance changes over time. From the graph, the concentration of the sample can be calculated. This mode is ideal for continuous monitoring as well as the calculation of concentration in enzyme activity studies, with calibration possible against a standard or known factor.

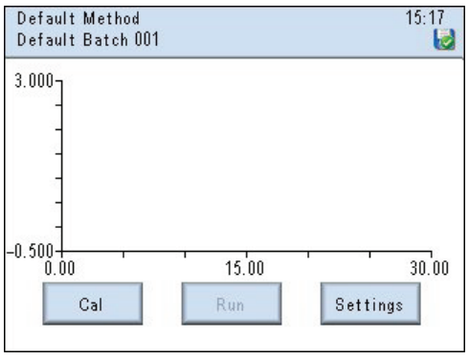
Select the ***Kinetics*** Mode from the ***Main Menu*** options:



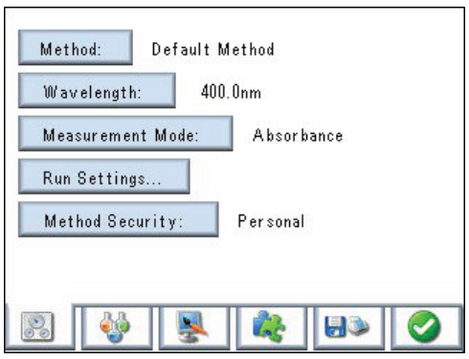
8.3 FREE OPERATION

Settings

If the user is not logged in then the main measurement screen will automatically be displayed when the ***Kinetics*** mode is selected from the ***Main Menu***.



To enter the required parameters for the sample(s) under test, select the ***Settings*** key and the instrument will display the following screen:



Mode settings - method name, wavelength, measurement mode, run settings, method security (if logged in)

Calibration – allows setting of Concentration cal standard, factor, resolution and units of measurement

Measurement display – allows auto scaling, axis setting and colour selection

Accessory options – varies with type of accessory module fitted

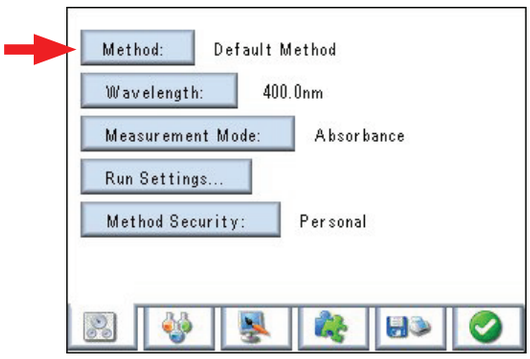
Allows selection of internal or external printer, graph details, batch ID and the Auto Log options

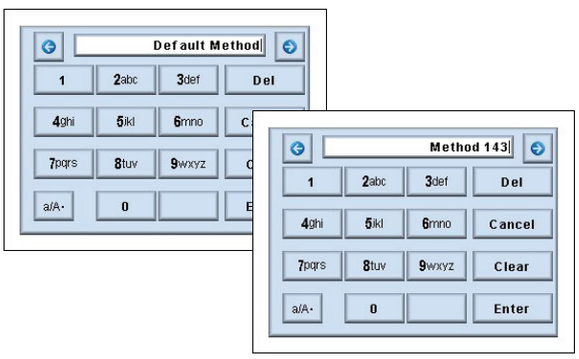
Press to accept settings entered

Setting Method ID

To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.

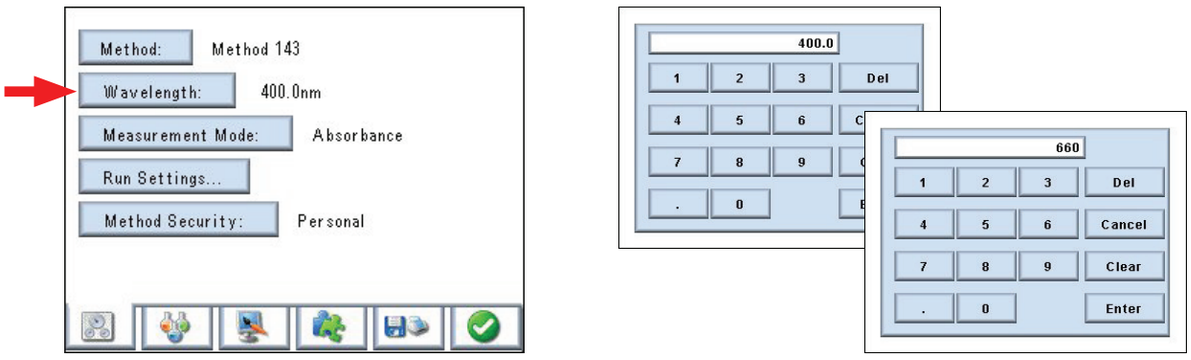
Note: The new Method ID can only be used to identify the method on a printout to the internal or external printer module. The generic user has no additional facility to store or recall these results or the method settings.





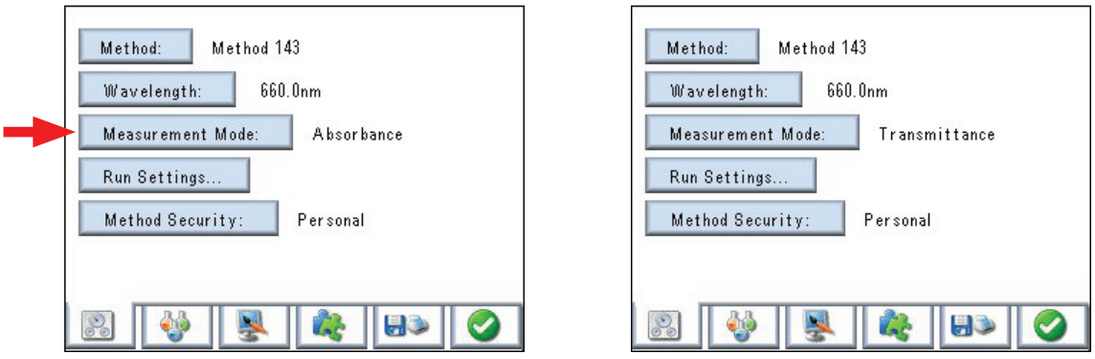
Setting Wavelength

Select the ***Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out).



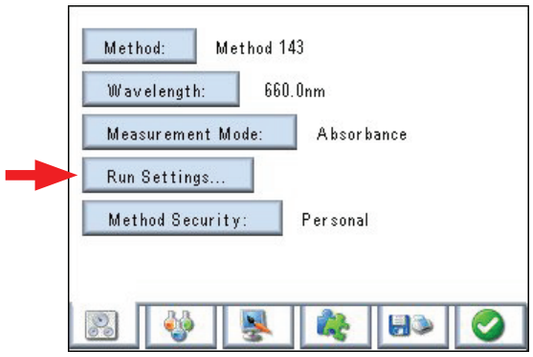
Selecting Measurement Mode

The ***Measurement Mode*** key toggles between Absorbance and Transmittance.



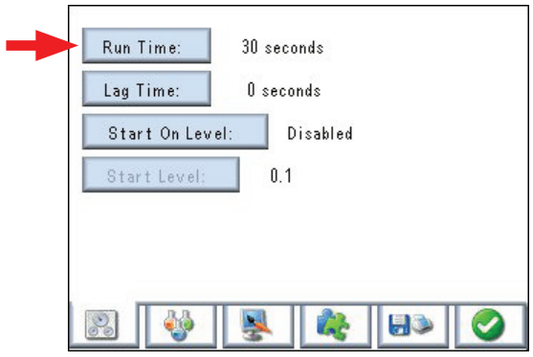
Run Settings...

Selecting ***Run Settings...*** opens a dedicated sub-menu.



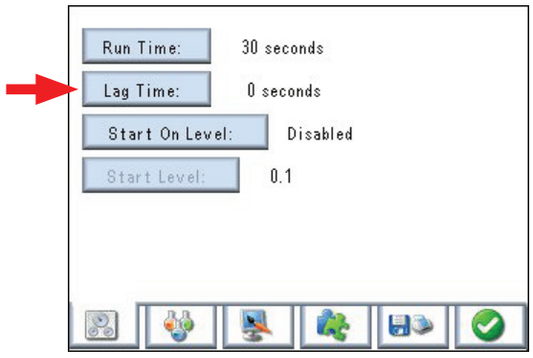
Setting Run Time

Selecting the ***Run Time*** key displays a numeric keypad. Clear the current setting and enter the required time, in seconds, for the measurement period. The limits for this setting are from 30 to 9999 seconds (2.75 hours).



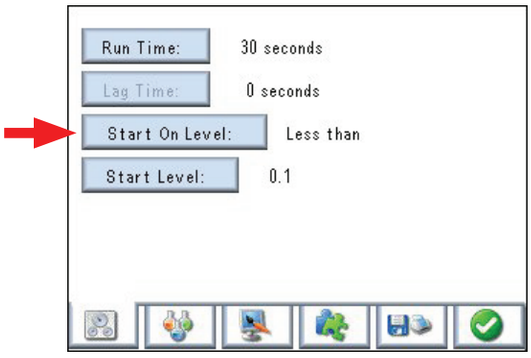
Setting Lag Time

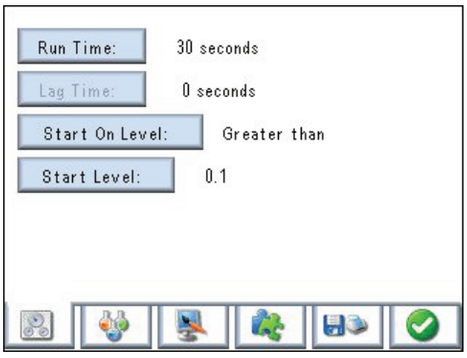
Selecting the ***Lag Time*** key displays a numeric keypad. Clear the current setting and enter the required lag time in seconds. The lag time is a portion of the run time over which no data is collected, starting from the beginning of the run time. This allows for any latency or non-linear reaction to be disregarded. Setting this to zero means data will be collected over the full run time. The limits for this setting are from 0 to 9999 seconds.



Setting Start On Level

Selecting the ***Start On Level*** key disables the lag time option. Repeated presses of this key cycle through the ***Greater Than***, ***Less Than*** and ***Disabled*** options. With ***Greater Than*** or ***Less Than*** selected data collection will start when the measured value (Absorbance or Transmittance) is above or below the value entered in the ***Start Level*** setting.

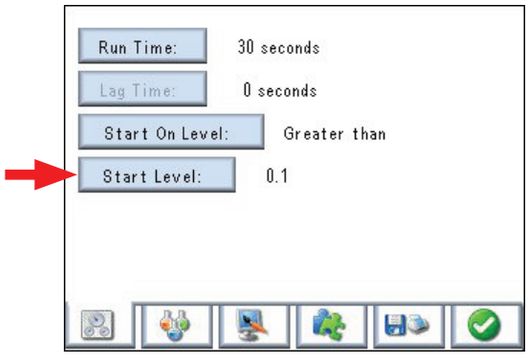




Setting Start Level

Selecting the ***Start Level*** key displays a numeric keypad. Clear the current setting and enter the required level above or below which data collection is required.

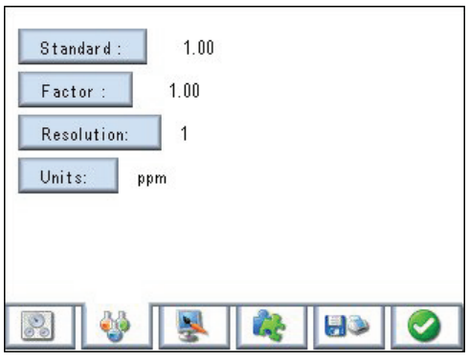
Limits for this setting are – 0.299 to 2.999Abs and 0.1 to 199.1%T.



Setting Method Security - This option is only applicable to logged in users.

Setting Concentration Parameters

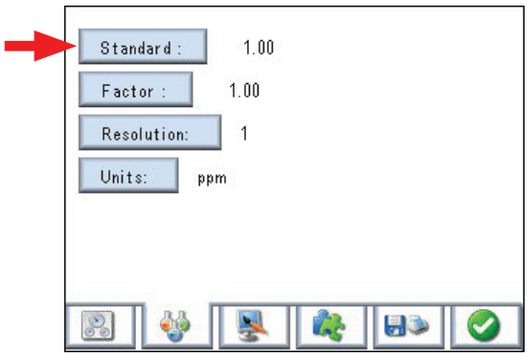
The rate of change of absorbance can be converted to concentration using a known factor or reference concentration value. Whichever is not required should be set to unity so that it is ignored in the calculation.

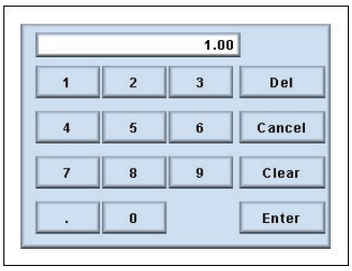


Standard

Select the Standard key and enter the concentration value of the calibration standard. Values from

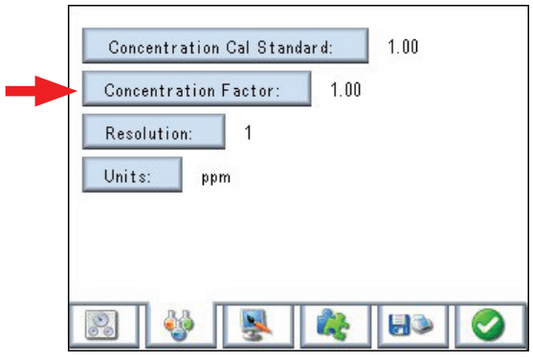
–9999.99 to 9999.99 can be entered. If a concentration value is not to be used then this should be set to 1.00.





Factor

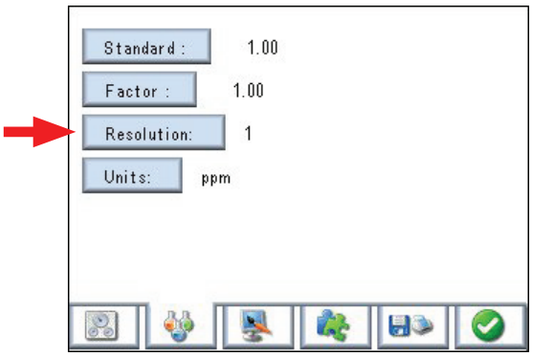
This is the value by which the rate of change is multiplied to give the concentration. Select the Factor key and enter the factor value. Values from –9999.99 to 9999.99 can be entered. If a Factor is not to be used this value should be set to 1.00.



Selecting Resolution

This enables the resolution of the result to be set. Resolution can be set using the ***Resolution*** key to scroll through the available options.

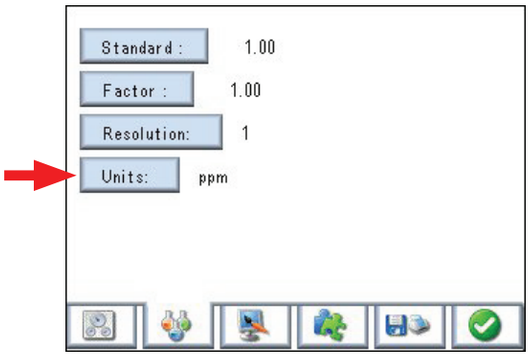
Resolution options are: 1, 0.1, 0.01 and 0.001.



Selecting Units

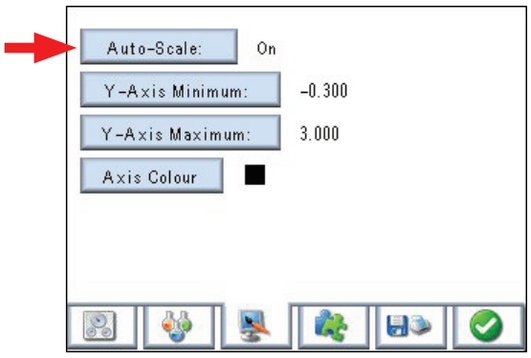
Selection of units is made using the ***Units*** key to scroll through the available measurement options. The following units are available:- mEq/l, ppm, mg/l, g/l, %, µg/ml, mg/ml, g/dl, mg/dl, µg/l, ng/l, µg/dl, M, mM, µM/l, U/l, mU/l, U/ml, blank.

Note: The unit is simply a name tag added to the result. Due to the variety of samples that may be measured it is impossible to enable any direct conversion between units.



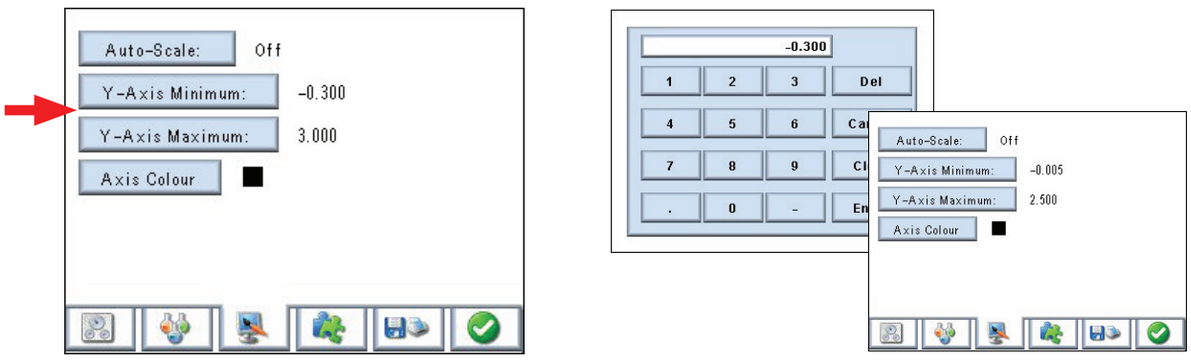
Setting Auto-Scale

The ***Auto-Scale*** key toggles between ***On*** and ***Off***. With the ***Auto-Scale*** function ***On*** the instrument will automatically set the Y-axis maxima to a level that will fit the graph of the kinetics run. When set to ***Off*** the manual settings for Y-axis maximum and minimum are non-functional. These settings can be changed with post run analysis tools to enable alternative views and printouts after the run has been completed.



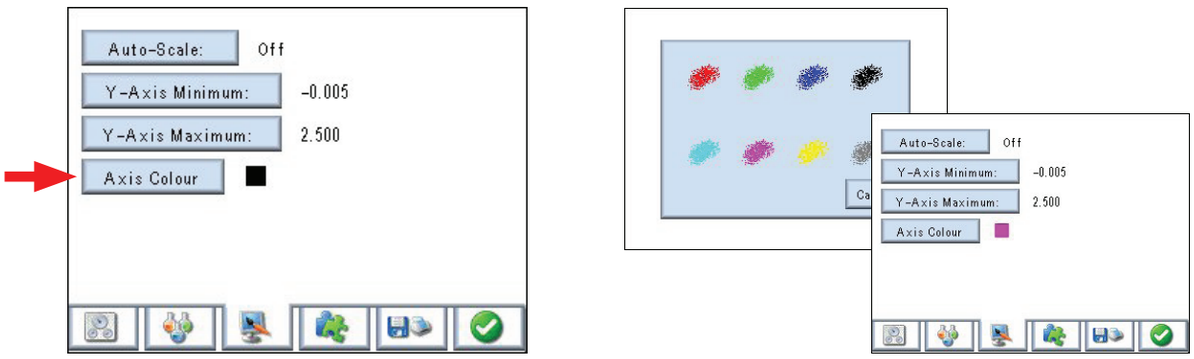
With the ***Auto-Scale*** function set to ***Off*** the ***Y-Axis Minimum*** enables the lowest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Minimum*** key and a numeric keypad will be displayed for entry of this value. This value can be between –0.301 and 2.999.

The ***Y-Axis Maximum*** enables the highest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Maximum*** key and a numeric keypad will be displayed for entry of this value. This value can be between 3.000 and –0.300.



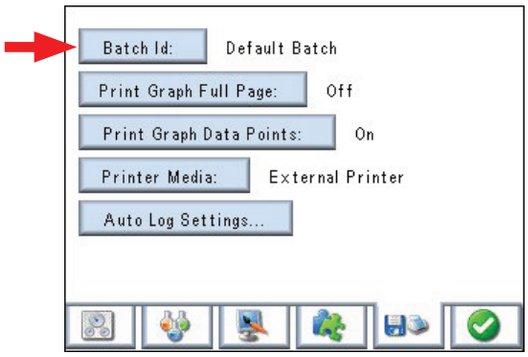
Selecting Axis Colour

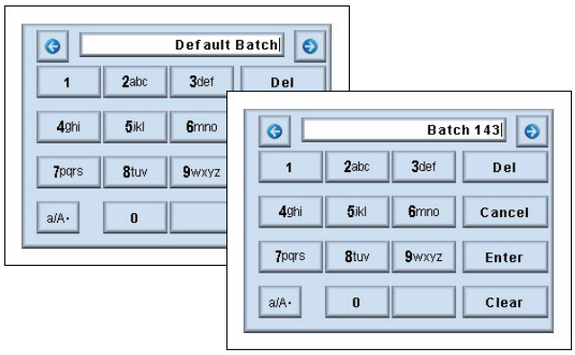
Selecting the ***Axis Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred colour. Once selected, the screen will update to show the selected colour.



Setting Batch ID

Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Select ***Enter*** to accept or ***Cancel*** to remain as a default.





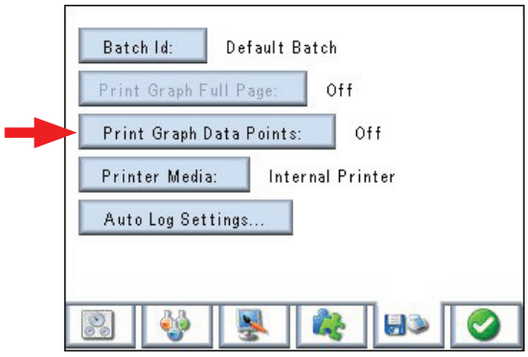
Setting Graph Data Points

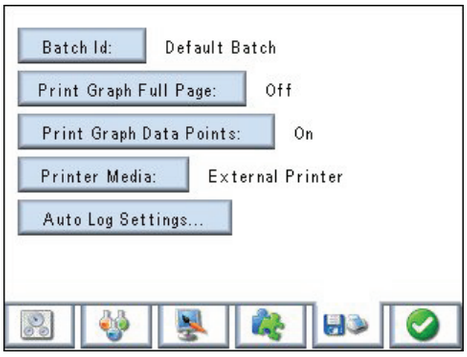
The option to print graphs on a full page is only available if the ***External*** printer is selected. If available and set to ***On*** the graph will be printed on one page (typically A4 landscape format) with the data on following pages.

If available and set to ***Off*** the graph will be printed with the data below it (typically top half A4 portrait).

The ***Print Graph Data Points*** key toggles between ***On*** and ***Off***.

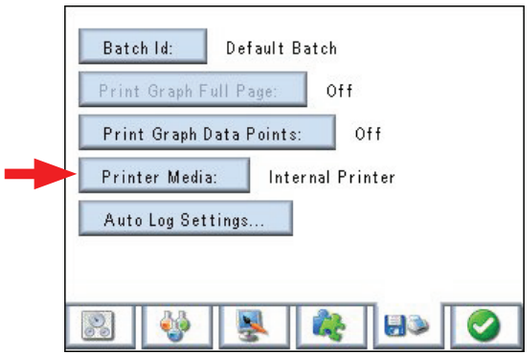
With this key set to ***On*** all the data points that make up the graph will be printed in a table following the graph.

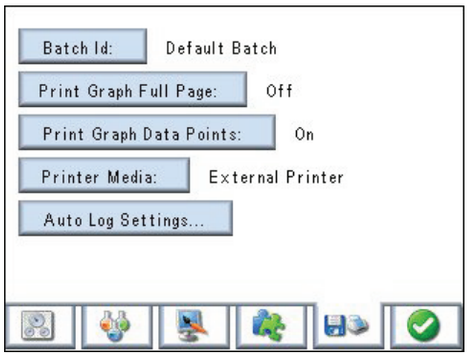




Selecting Printer Media

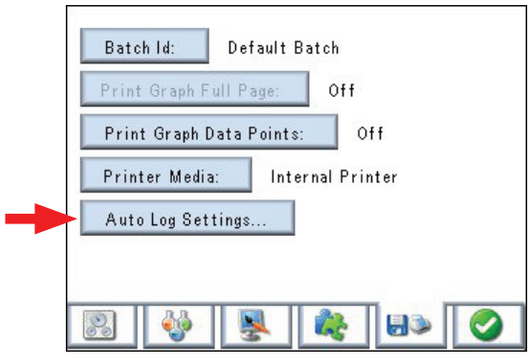
The ***Printer Media*** options toggle between Analog, Internal and External Printers.





Auto Log Settings...

Selecting ***Auto Log Settings...*** opens a dedicated sub-menu.



This option can be toggled between ***Off***, ***On*** and ***Timed***.

When the ***Auto Log*** option is selected to ***On*** the user can set the destination (toggles between internal and external printer, analog and memory);

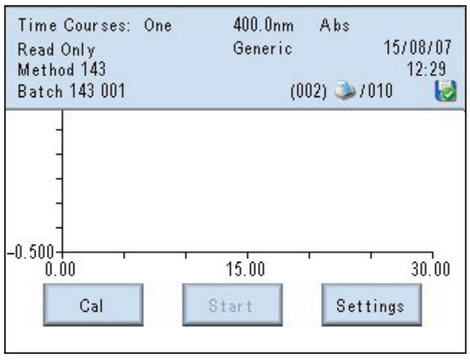
When the ***Auto Log*** option is set to ***Timed*** the user can set;

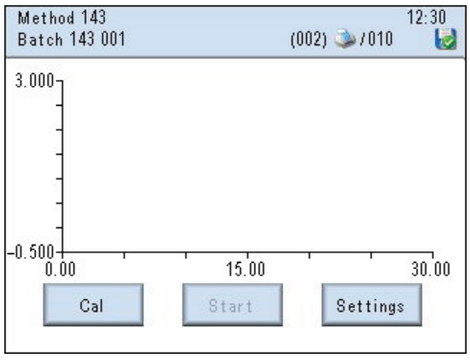
timed interval between 3 and 9999 seconds using the numeric keypad;

the destination (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.



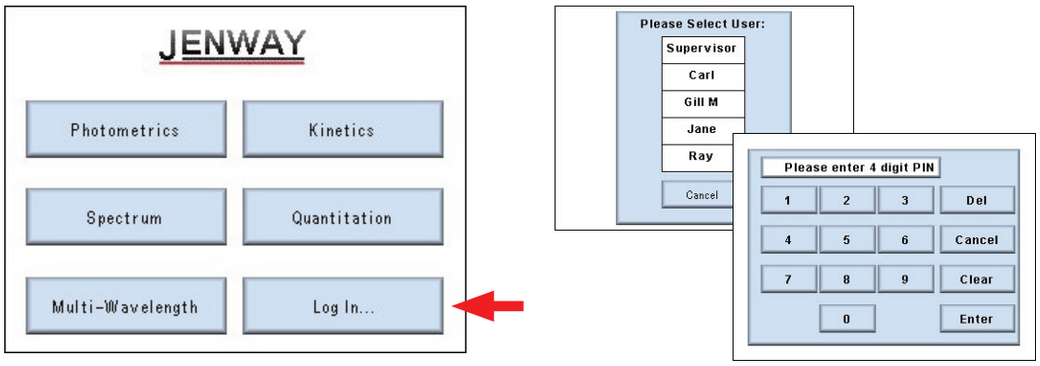


8.3 LOGGED IN MEASUREMENT

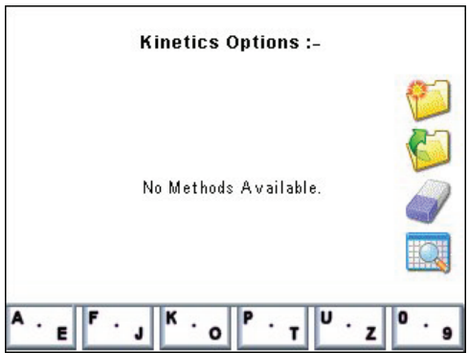
PIN Codes – each user is allocated a 4 digit PIN code that is required when logging in.

Select ***Log In...*** from the ***Main Menu*** and a list of users will be shown. Select the appropriate user name and a numeric keypad will be displayed.

Enter your 4 digit PIN code and press the ***Enter*** key to confirm.



Once logged in method screen options will be displayed:



Methods are stored sequentially by measurement mode. Once the first page is full (8 methods for the selected mode) cursor arrows are displayed in the top corners enabling the user to browse to subsequent or previous pages of 8 methods.

Alternatively, pressing one of the alphanumeric keys along the bottom of the screen will display all available methods with the initial character that is highlighted.

Note: Repeated pressing of a key sequentially highlights the characters between those displayed.

Create a New Method

For the following functions first touch a method or result to select it.

Open the Selected Method

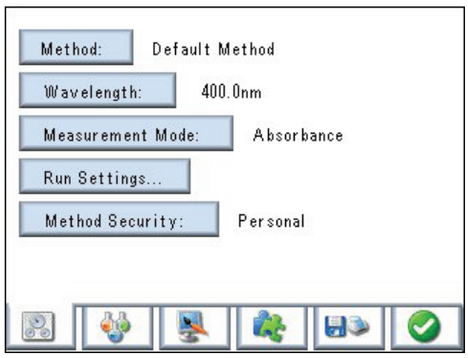
Erase the Selected Method

Browse Results – linked to the selected method

Open specific results in the selected batch

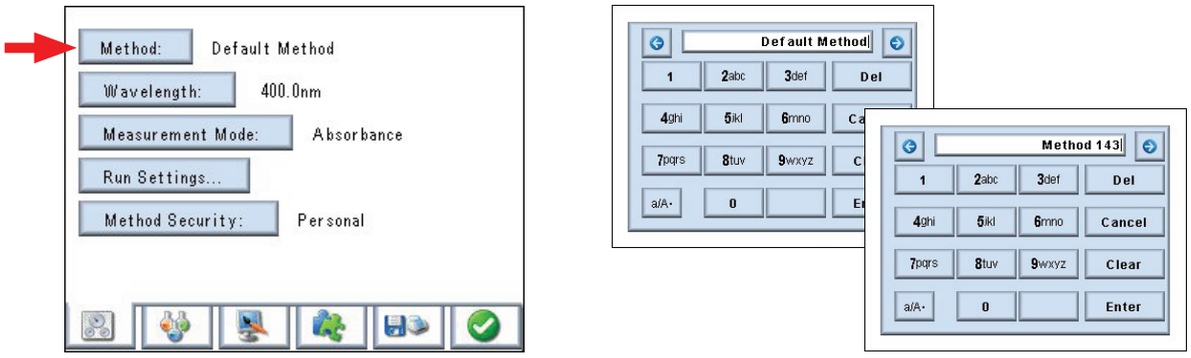
Creating a New Method

To enter the Method ID, appropriate measurement parameters and the level of Method Security required for the method being created select the ***New File*** icon.



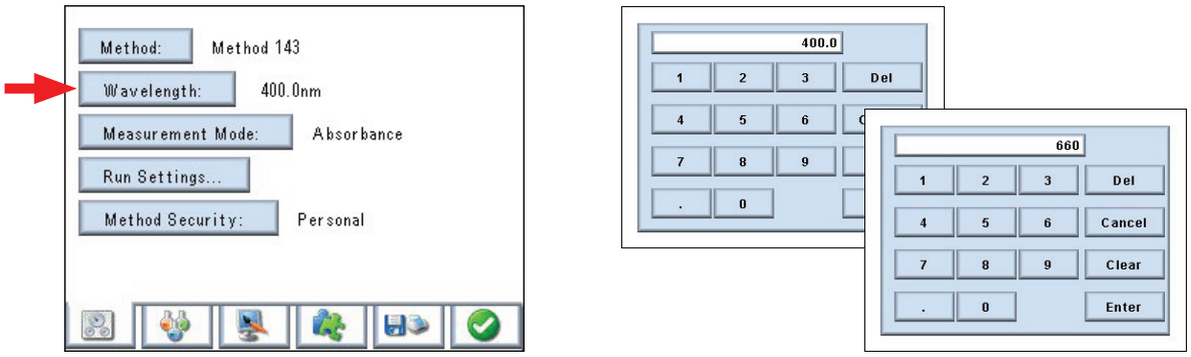
Setting Method ID

To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.



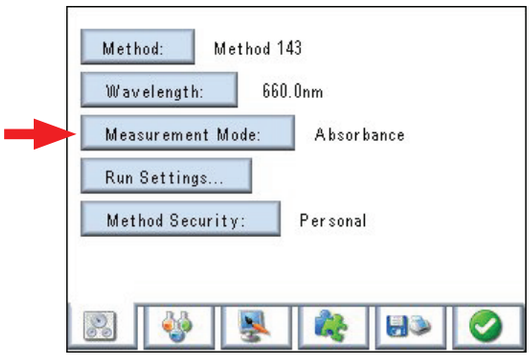
Setting Wavelength

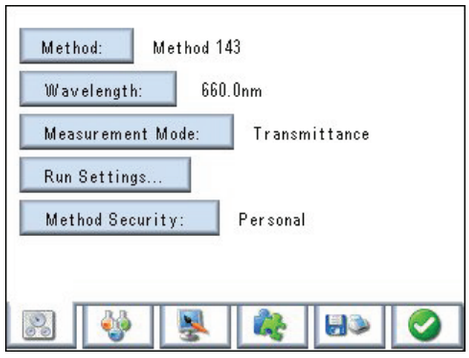
Select the ***Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out).



Selecting Measurement Mode

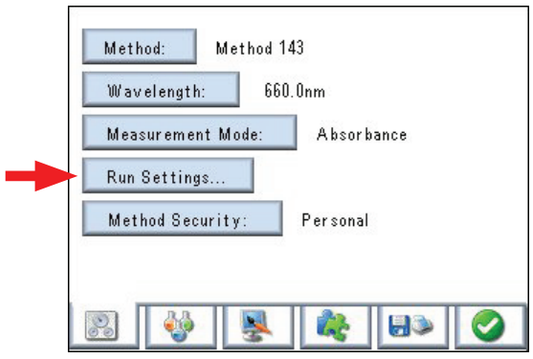
The ***Measurement Mode*** key toggles between Absorbance and Transmittance.





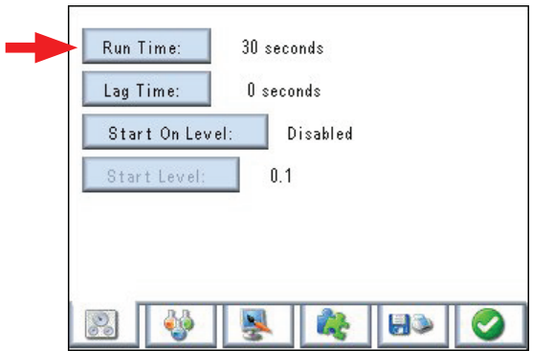
Run Settings...

Selecting ***Run Settings...*** opens a dedicated sub-menu.



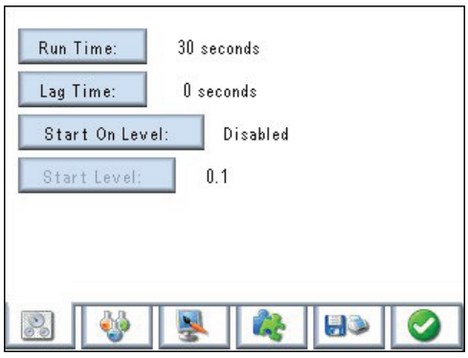
Setting Run Time

Selecting the ***Run Time*** key displays a numeric keypad. Clear the current setting and enter the required time, in seconds, for the measurement period. The limits for this setting are from 30 to 9999 seconds (2.75 hours).



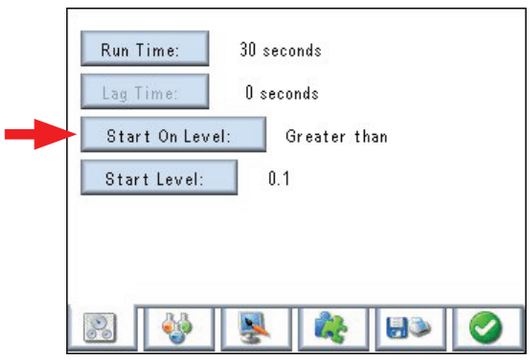
Setting Lag Time

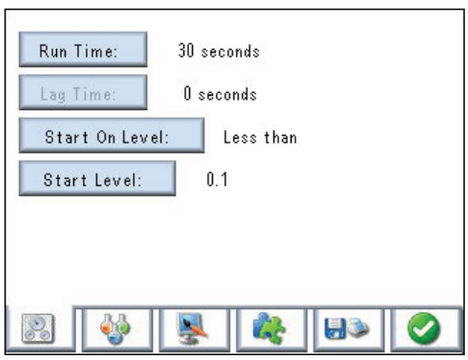
Selecting the ***Lag Time*** key displays a numeric keypad. Clear the current setting and enter the required lag time in seconds. The lag time is a portion of the run time over which no data is collected, starting from the beginning of the run time. This allows for any latency or non-linear reaction to be disregarded. Setting this to zero means data will be collected over the full run time. The limits for this setting are from 0 to 9999 seconds.



Setting Start On Level

Selecting the ***Start On Level*** key disables the lag time option. Repeated presses of this key cycle through the ***Greater Than***, ***Less Than*** and ***Disabled*** options. With ***Greater Than*** or ***Less Than*** selected data collection will start when the measured value (Absorbance or Transmittance) is above or below the value entered in the ***Start Level*** setting.

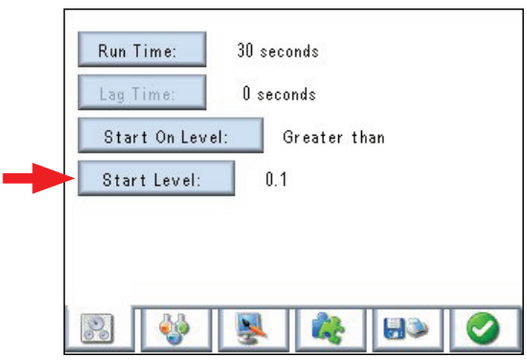




Setting Start Level

Selecting the ***Start Level*** key displays a numeric keypad. Clear the current setting and enter the required level above or below which data collection is required.

Limits for this setting are – 0.299 to 2.999Abs and 0.1 to 199.1%T.



Setting Method Security

The 67 Series spectrophotometers can support up to 10 individual users plus one Supervisor who has full administrative rights.

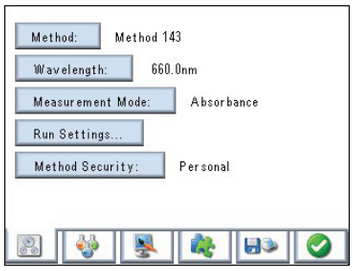
Logged in users can create methods with three levels of security options:

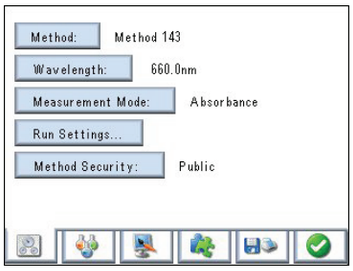
Personal – these methods are only accessible by the originator.

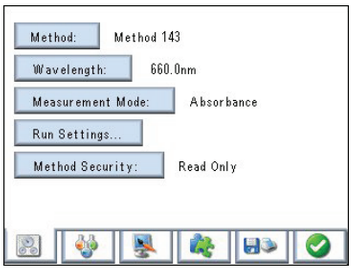
Public – these methods are available for use and modification by any logged in user.

Read-Only – these methods can be accessed by all logged in users, but can only be modified by the originator.

The preferred level of protection can be achieved by selecting the ***Method Security*** key that toggles between ***Personal***, ***Public*** and ***Read-Only*** options.

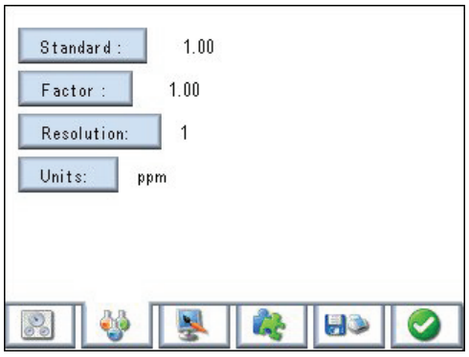






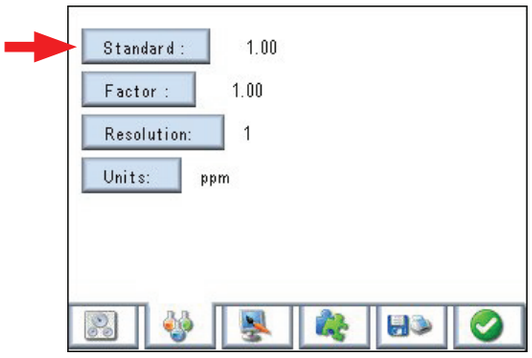
Setting Concentration Parameters

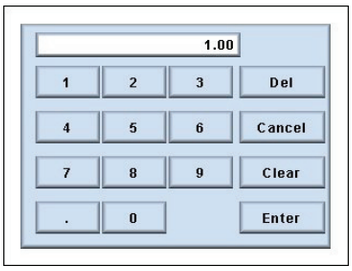
The rate of change of absorbance can be converted to concentration using a known factor or reference concentration value. Whichever is not required should be set to unity so that it is ignored in the calculation.



Standard

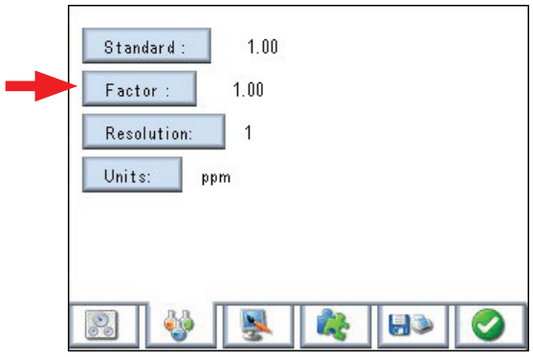
Select the Standard key and enter the concentration value of the calibration standard. Values from –9999.99 to 9999.99 can be entered. If a concentration value is not to be used then this should be set to 1.00.





Factor

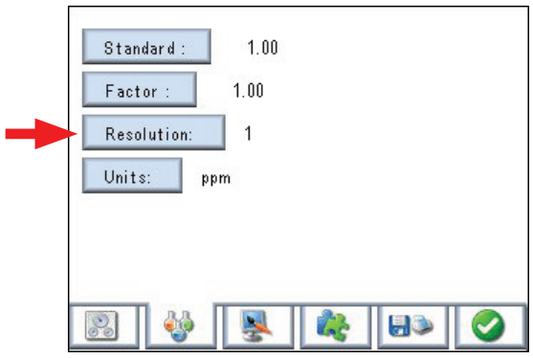
This is the value by which the rate of change is multiplied to give the concentration. Select the Factor key and enter the factor value. Values from 0.01 to 9999 can be entered. If a Factor is not to be used this value should be set to 1.00.



Selecting Resolution

This enables the resolution of the result to be set. Resolution can be set using the ***Resolution*** key and scrolling though the available options.

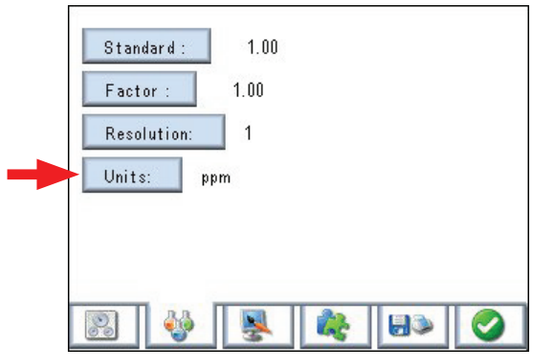
Resolution options are: 1, 0.1, 0.01 and 0.001.



Selecting Units

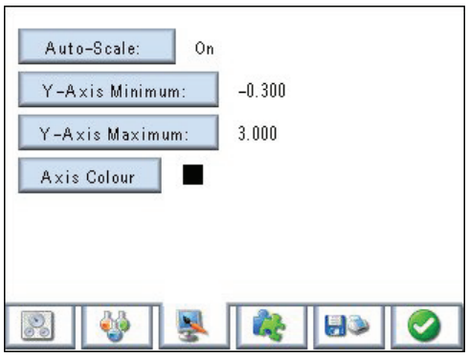
Selection of units is made using the ***Units*** key to scroll through the available measurement options. The following units are available:- mEq/l, ppm, mg/l, g/l, %, µg/ml, mg/ml, g/dl, mg/dl, µg/l, ng/l, µg/dl, M, mM, µM/l, U/l, mU/l, U/ml, blank.

Note: The unit is simply a name tag added to the result. Due to the variety of samples that may be measured it is impossible to enable any direct conversion between units.



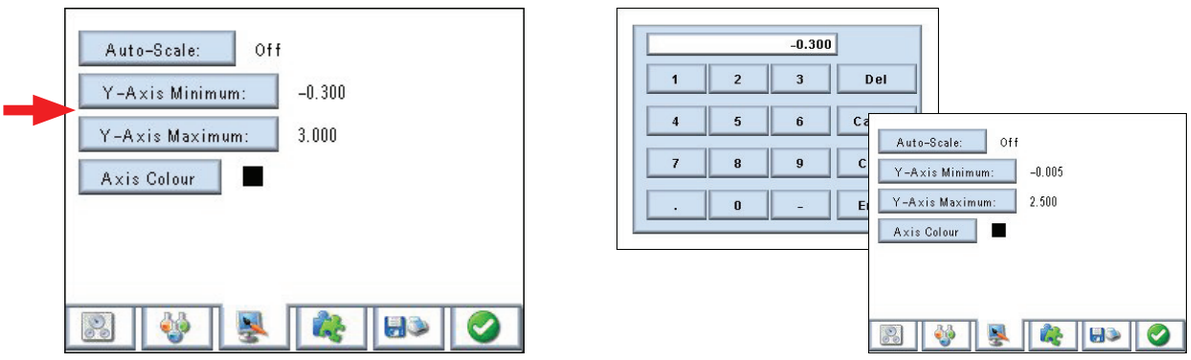
Setting Auto-Scale

The ***Auto-Scale*** key toggles between ***On*** and ***Off***. With the ***Auto-Scale*** function ***On*** the instrument will automatically set the Y-axis maxima to a level that will fit the graph of the kinetics run. When set to ***On*** the manual settings for Y-axis maximum and minimum are non-functional. These settings can be changed with post run analysis tools to enable alternative views and printouts after the run has been completed.



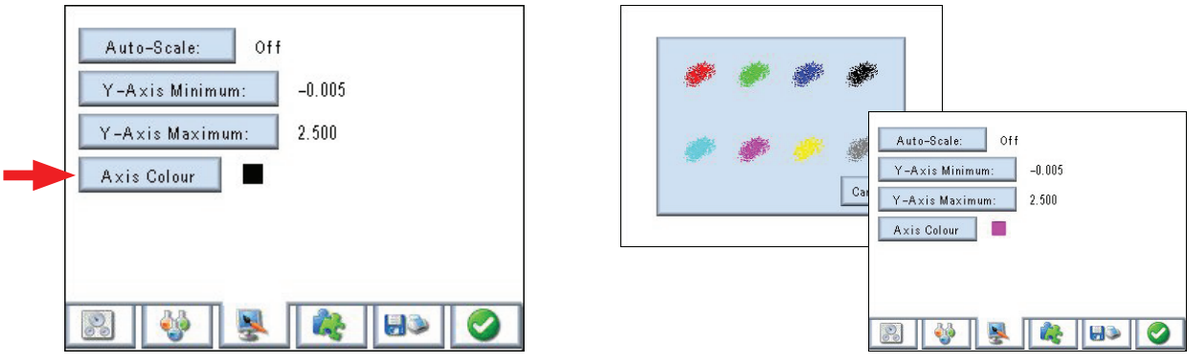
With the ***Auto-Scale*** function set to ***Off*** the ***Y-Axis Minimum*** enables the lowest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Minimum*** key and a numeric keypad will be displayed for entry of this value. This value can be between –0.301 and 2.999.

The ***Y-Axis Maximum*** enables the highest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Maximum*** key and a numeric keypad will be displayed for entry of this value. This value can be between 3.000 and –0.300.



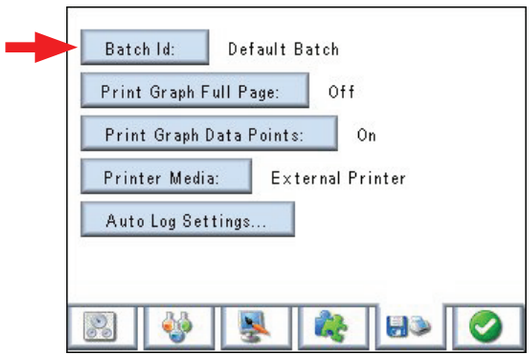
Selecting Axis Colour

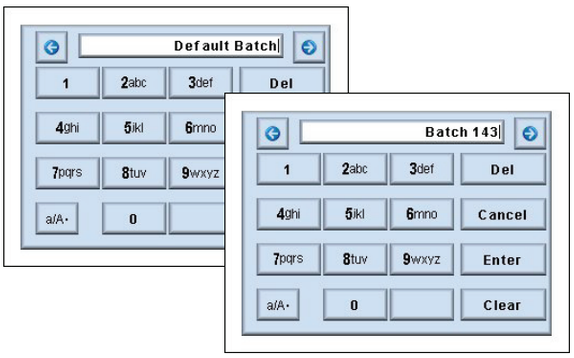
Selecting the ***Axis Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred colour. Once selected, the screen will update to show the selected colour.



Setting Batch ID

Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Select ***Enter*** to accept or ***Cancel*** to remain as a default.





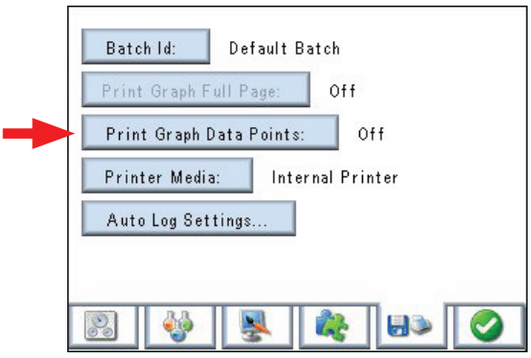
Setting Graph Data Points

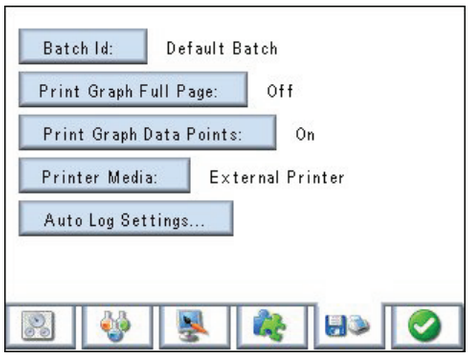
The option to print graphs on a full page is only available if the ***External*** printer is selected. If available and set to ***On*** the graph will be printed on one page (typically A4 landscape format) with the data on following pages.

If available and set to ***Off*** the graph will be printed with the data below it (typically top half A4 portrait).

The ***Print Graph Data Points*** key toggles between ***On*** and ***Off***.

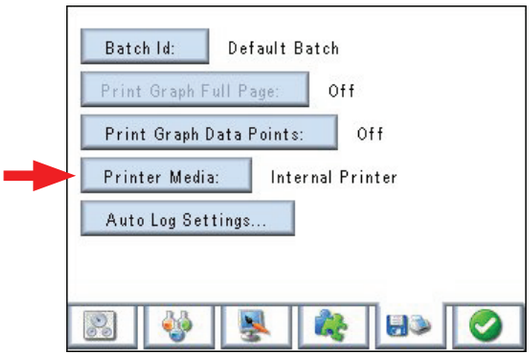
With this key set to ***On*** all the data points that make up the graph will be printed in a table following the graph.

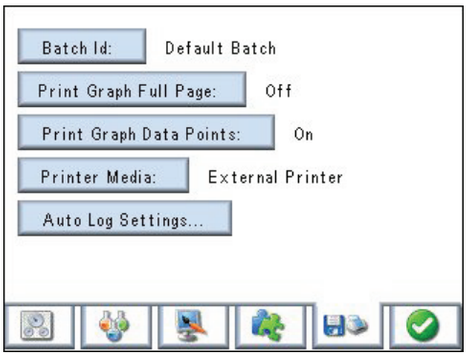




Selecting Printer Media

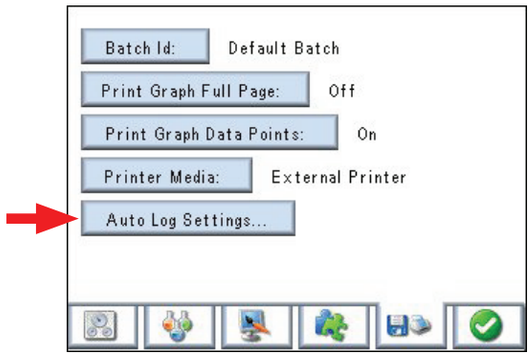
The ***Printer Media*** options toggle between Analog, Internal and External Printers.





Auto Log Settings...

Selecting ***Auto Log Settings...*** opens a dedicated sub-menu. This option can be toggled between ***Off***, ***On*** and ***Timed***.



When the ***Auto Log*** option is selected to ***On*** the user can set the destination (toggles between internal and external printer, analog and memory);

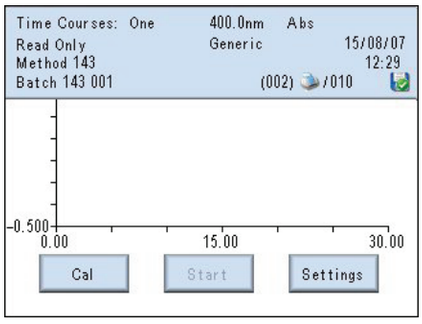
When the ***Auto Log*** option is set to ***Timed*** the user can set;

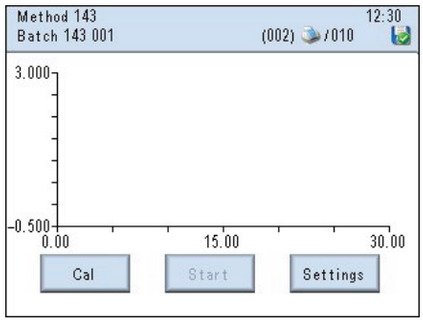
the timed interval between 3 and 9999 seconds using the numeric keypad;

the destination (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.





Save

Tools

Print

Settings

Erase

Search Results

Open Results

Save

Saving Methods

Having entered all your required settings on the tabbed pages the method can be saved by simply pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result.

If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options. Alternatively, when the ***Auto Log*** option is set to ***On*** or ***Timed*** and the destination option is ***Memory*** all results will be saved automatically.

Sharing Methods

Methods can be shared with other users by setting the security level at either ***Read-Only*** where other users can use but not modify the method or, ***Public*** where they can use and modify the method. Other users must then ensure that under ***Method View Settings*** (Settings/User Preferences/Method View Settings) they have enabled ***Public*** and/or ***Read-Only*** methods or turned ***All Methods*** on.

Recalling Methods

Following selection of the operating mode from the main menu the method browse screen is displayed. This will show all methods that the current user has access to, based on their selections in the ***Method View Settings*** (refer to Sharing Methods). If the first page is full, cursor arrows will be displayed to enable navigation to and from additional pages.

Alternatively, selection may be made using the alphanumeric menu bar at the bottom of the screen.

Repeated pressing of each character set will display the full alphanumeric range and the screen will show all methods starting with the highlighted character.

Touch the required method when it is displayed on the screen to highlight it, touch the ***Open File*** icon to display the main measurement screen for that method.

Editing Methods

Use the Recalling Methods procedure to recall the required method. With the measurement screen displayed touch the ***Settings*** option. Adjust the settings as required and touch the ***Green Tick*** icon on completion. The modified method can then be saved by pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result. If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options.

Note: If the Method name was not changed during editing it will be saved with the same name but with a new date and time to ensure traceability. If the old method is no longer required it should be deleted as detailed in Deleting Methods.

Deleting Methods

To delete methods highlight the required method in the Browse screen as described in Recalling Methods and then touch the ***Eraser*** icon.

A warning message will be displayed to ensure this action is required. On confirmation the selected file will be deleted.

If the current user does not have the required privileges to delete the selected method then an information message will be displayed advising that the method cannot be deleted.

Privileges required for deleting designated methods:

Public Methods – only the Supervisor and Originator can delete these.

Read-Only Methods – only the Supervisor and Originator can delete these.

Personal Methods – Only the Originator can delete these methods. (The Supervisor can delete these by re-setting the Originator's PIN code and then logging in as the Originator).

Saving Results

After completion of a measurement the result can be saved by simply pressing the ***Save*** key on the display surround. The result is saved under the method that created it, with the entered Batch ID and an incremental number along with the time and date of the measurement. Results can also be saved as part of the ***Auto Log*** function, which will vary depending on the type of sampling accessory fitted.

Printing Results

After completion of a measurement the result can be printed, by simply pressing the ***Print*** key on the display surround. The result will be printed to either the internal or external printer, as selected by the user in the ***Printer Settings*** option.

The first result of any new batch is preceded by a print header, which gives details of the method settings and Batch ID. Results can also be printed as part of the ***Auto Log*** function, which will vary depending on the type of sampling accessory fitted.

Recalling Results

Stored results are always directly linked to the method that created them. To access results first recall the method as described in ***Recalling Methods***. With the method highlighted touch the ***Search Results*** icon. This will open a screen detailing all results available to the current user. Touch the required result or batch (depending on the mode) and then the ***Open Specific Result*** icon. This will display the results on the screen. The ***Tools*** option can then be used to work on these results (depending on mode). It is also possible to print the result by simply pressing the ***Print*** key on the display surround. Options to print to the Internal or External printer or to the CSV file will be displayed. Printing to the CSV (Comma Separated Values) file will save the data in CSV format on the external data card. (If a card is not fitted the instrument will display a prompt). This is in text format and can be viewed and printed in Excel®.

In ***Kinetics*** mode an additional option is available (Analogue Mode). This allows results to be output via the rear panel analogue sockets to a chart recorder or similar device.

Sharing Results

Results attached to ***Personal Methods*** cannot be accessed by any other user.

Results attached to ***Read-Only*** and ***Public Methods*** can be accessed by all users, based on their current ***Method View Settings***.

8.4 PERFORMING MEASUREMENTS – All Users

With a method created, or recalled and opened, the kinetics measurement screen is displayed.

Before starting a run, a zero absorbance calibration must be carried out to standardise the instrument at the selected wavelength.

Select the ***Cal*** key and wait while the prompt advises of the calibration progress. When completed the ***Run*** key becomes active.

Place a prepared sample cuvette in the sample chamber and close the lid. Select the ***Run*** key to start the measurement. If a lag time has been programmed a countdown prompt will be displayed for its duration and then the run will commence. The plot being will be displayed as the measurements are taken over the run time.

On completion of the run a calculated concentration value is shown to the right of the graph, tagged with the units of measurement selected. Further samples can be measured in the same way.

Post Run Tools

On completion of a measurement, or with a recalled result displayed, a number of tools can be used to analyse and display the data.

Pressing the ***Tools*** icon on the display surround displays the bottom toolbar with icons for a number of functions:

Pressing the ***Measurement Display*** icon gives access to options for:

Auto-Scale – pressing this icon switches Auto-Scale on and off. When Off the Y-Axis scale is set to the manual values entered in the settings. When On it will set the Y-Axis to give the maximum resolution for the display area.

Pressing this icon decreases the resolution of the displayed concentration, cycling through 0.001, 0.01, 0.1 and 1.

Pressing this icon increases the resolution of the displayed concentration, cycling through 1, 0.1, 0.01 and 0.001.

Pressing the information icon displays details of the curve with the mean rate of change, plus the formula of the line of best fit.

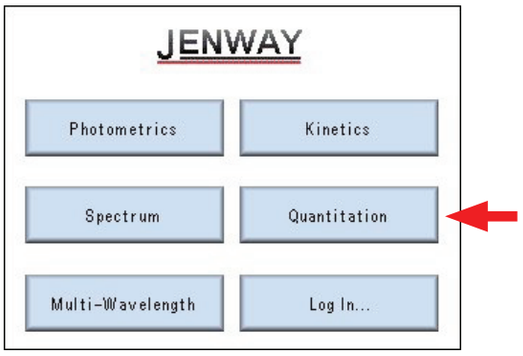
When this option is selected the QWheel™ is activated to control the display cursors. Initially both cursors are active to select a portion of the curve. Pressing the Cursor Select icon activates the right and left cursor in turn to adjust the size of the selected area. The start and end times selected by the cursors are independently displayed at the right side of the toolbars.

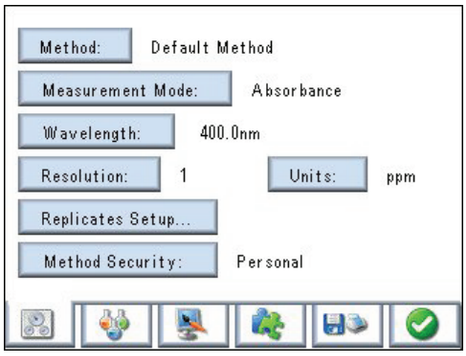
By pressing the Calculator icon the concentration value is re-calculated based on the part of the curve selected. This function can be used for method development and selecting the optimum run times, lag and incubation periods.

SECTION 9 - Quantitation Mode

9.1 PRINCIPLES OF MEASUREMENT

The concentration of a substance in a sample can be found by comparing it to prepared standardised solutions of that substance. A number of standard solutions are carefully made over a range of concentrations. These solutions are measured by the spectrophotometer at a set wavelength and a graph created of the concentration against the absorbance or transmittance. Samples can then be measured in terms of absorbance or transmittance and the concentration calculated by the spectrophotometer by comparison to the graphical plot of the known concentration standards. Linear, quadratic and cubic curve fit functions are available, plus automation with an optional 8-cell changer module.

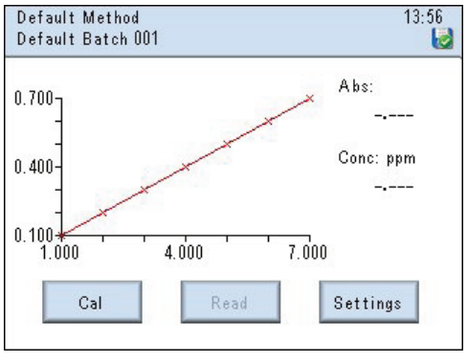




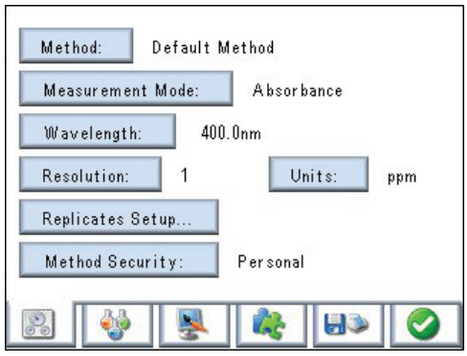
9.2 FREE OPERATION

Settings

If the user is not logged in then the main measurement screen will automatically be displayed when the ***Quantitation*** mode is selected from the ***Main Menu***.



To enter the required parameters for the sample(s) under test, select the ***Settings*** key and the instrument will display the following screen:



Mode settings – method name, wavelength, measurement mode, resolution, units, method security (if logged in)

Calibration – allows setting of cal standards (up to 20)

Measurement display – allows setting of curve fit, auto scaling, axis setting and colour selection

Accessory options – varies with type of accessory module fitted

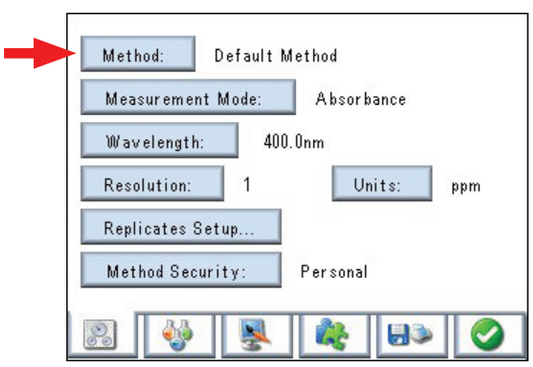
Allows selection of internal or external printer, graph details, batch ID and the Auto Save options

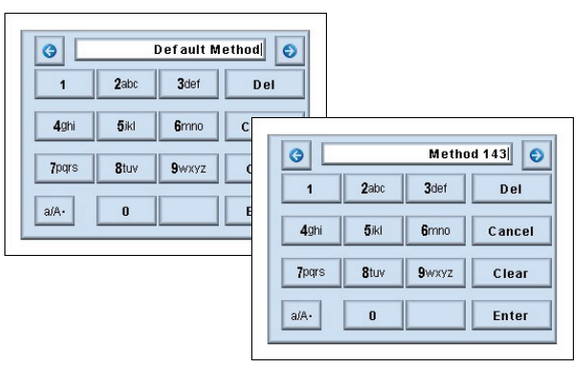
Press to accept settings entered

Setting Method ID

To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.

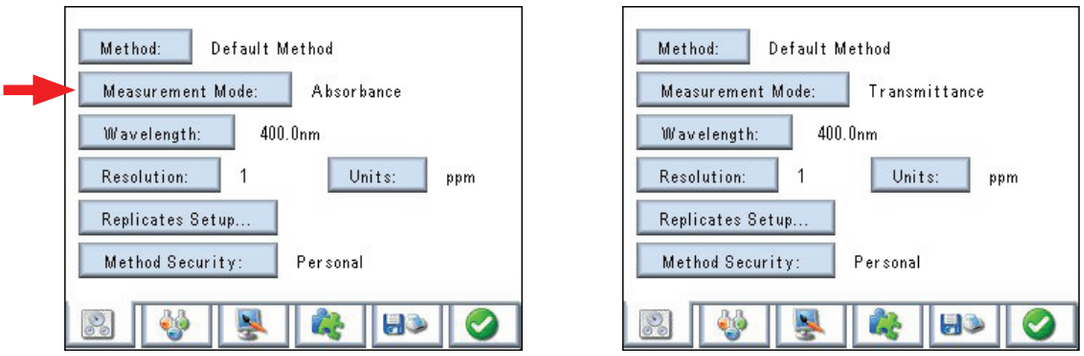
Note: The new Method ID can only be used to identify the method on a printout to the internal or external printer module. The generic user has no additional facility to store or recall these results or the method settings.





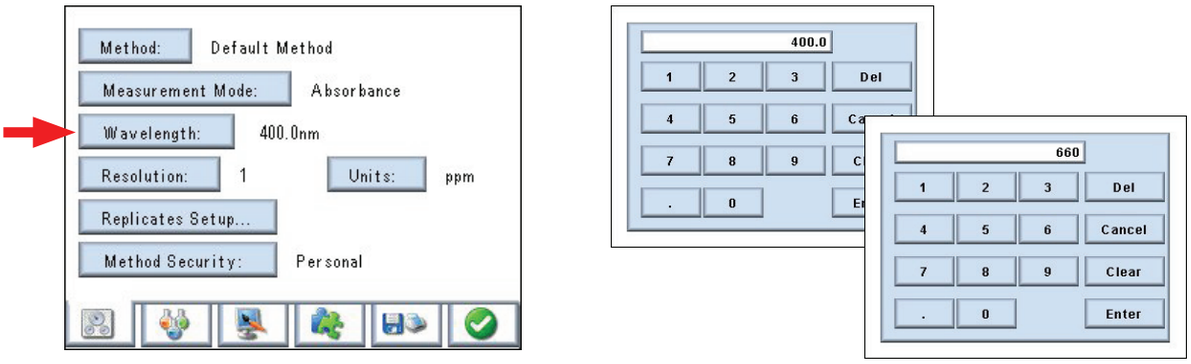
Selecting Measurement Mode

The ***Measurement Mode*** key toggles between Absorbance and Transmittance.



Setting Wavelength

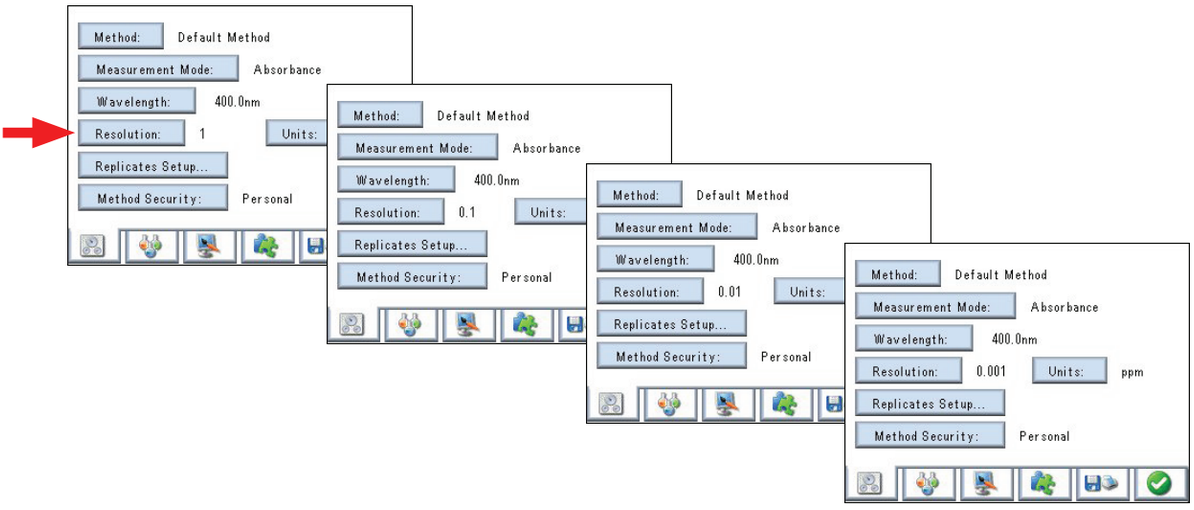
Select the ***Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out).



Selecting Resolution

This enables the resolution of the result to be set. Resolution can be set using the ***Resolution*** key to scroll through the available options.

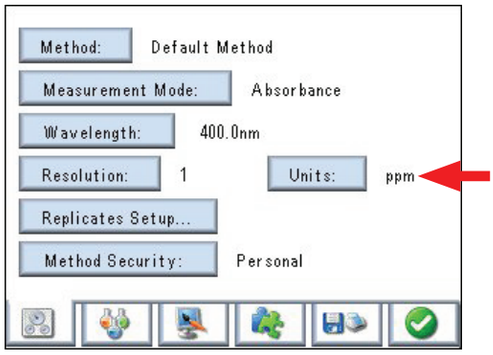
Resolution options are: 1, 0.1, 0.01 and 0.001.



Selecting Units

Selection of units is made using the ***Units*** key to scroll through the available measurement options. The following units are available:- mEq/l, ppm, mg/l, g/l, %, µg/ml, mg/ml, g/dl, mg/dl, µg/l, ng/l, µg/dl, M, mM, µM/l, U/l, mU/l, U/ml, blank.

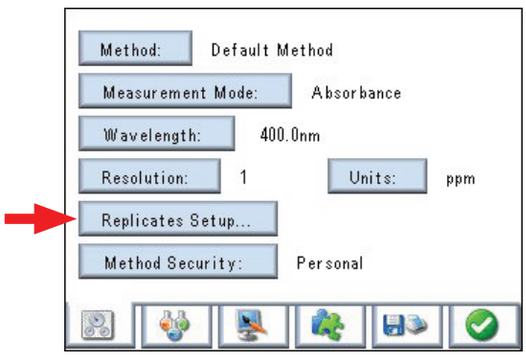
Note: The unit is simply a name tag added to the result. Due to the variety of samples that may be measured it is impossible to enable any direct conversion between units.

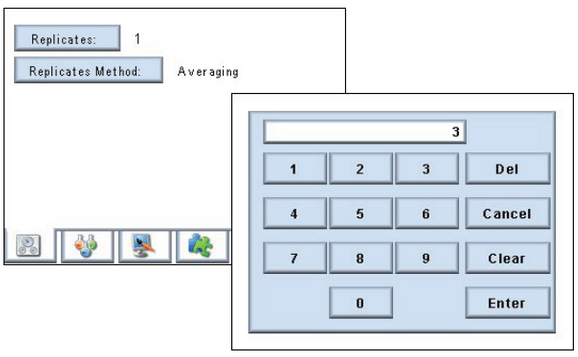


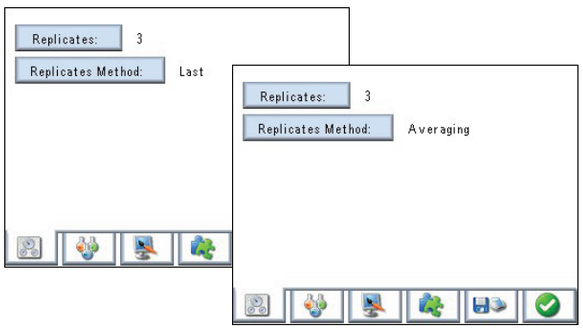
Replicates Setup...

Selecting ***Replicates Setup...*** opens a dedicated sub-menu.

Up to 5 replicates may be selected, with the recorded result being the average of the 5 or as the last measured result.





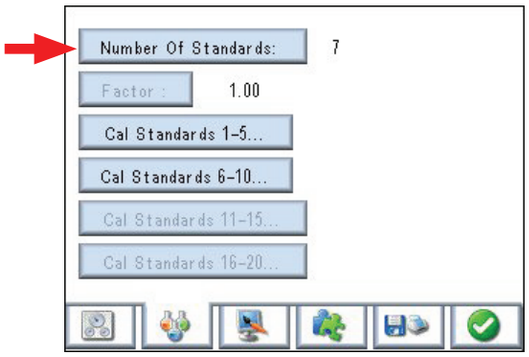


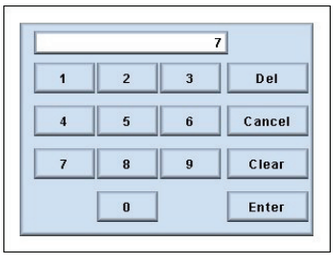
Setting Method Security

This option is only applicable to logged in users.

Selecting Calibration Standards

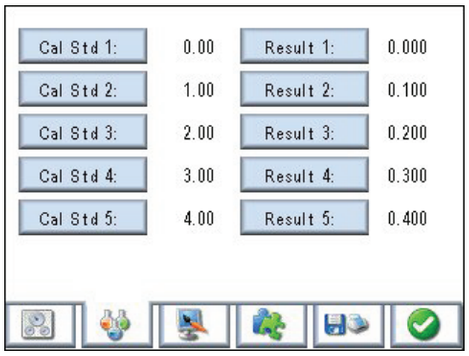
Up to 20 calibration standards may be used to plot the calibration curve (with up to 5 replicates for each). Select the ***Number Of Standards*** key and enter the total number of standards to be used (including the blank) via the numeric keypad. The value entered can be from 2 to 20. Depending on the number entered the subsequent keys with values beyond the requirements will be greyed out.





If the ***Number of Standards*** is set to zero then it is possible to set a ***Factor*** using the numeric keypad (the range if from –9999.99 to 9999.99). Touching each of the active keys below this enables the values for each standard to be input. If working from a pre-defined calibration curve or table the corresponding absorbance value for each standard can be entered as the result. If creating the curve from a set of standards the ***Results*** column will be re-populated with the measured absorbances once the calibration curve has been created.

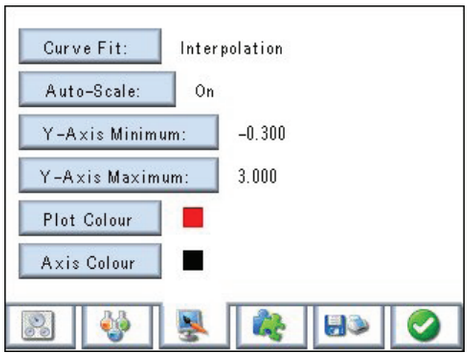
Selecting the ***Cal Std 1*** key opens a numeric input window. Enter the value for the first standard (this may be the blank). When completed a corresponding absorbance value can be entered in a similar manner by selecting the ***Result 1*** key, if working from a pre-defined calibration curve.

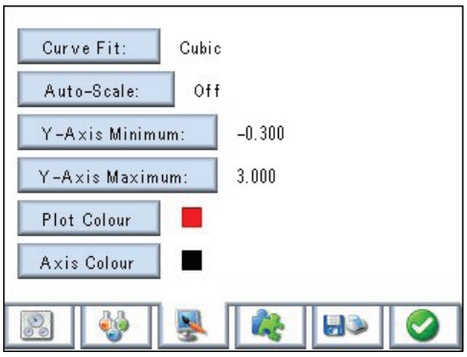


Further standard (and absorbance values, if required) can be entered in a similar manner for all the standards selected under ***Number Of Standards***.

Setting Curve Fit

The ***Curve Fit*** key scrolls through the available options – Interpolation, Interpolation through Zero, Linear Regression, Regression through zero, Quadratic, Quadratic through zero, Cubic, Cubic through zero. The selected curve fit can be changed on recalled results and with post measurement tools.

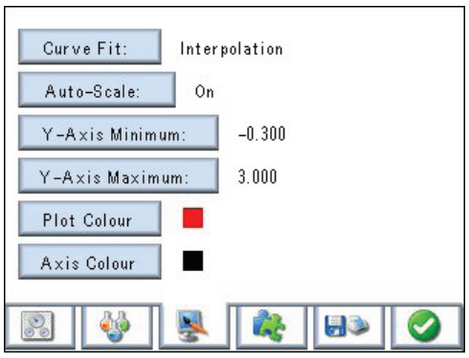




Setting Auto-Scale

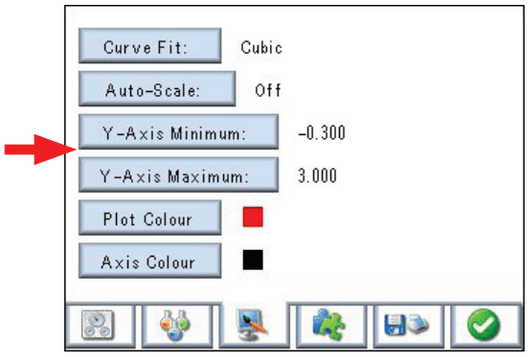
The ***Auto-Scale*** key toggles between ***On*** and ***Off***. With the ***Auto-Scale*** function ***On*** the instrument will automatically set the Y-axis maxima to a level that will best fit the calibration curve.

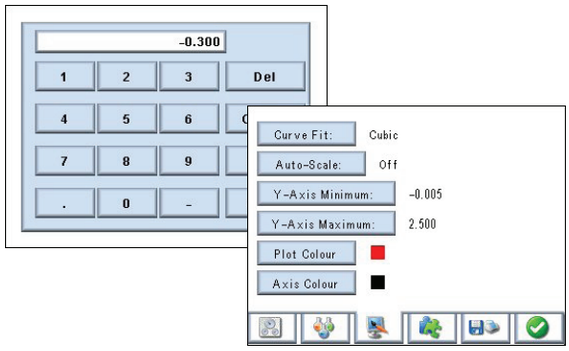
When set to ***On*** the manual settings for Y-axis maximum and minimum are non-functional. These settings can be changed with post calibration analysis tools to enable alternative views and printouts after the scan has been completed.



With the ***Auto-Scale*** function set to ***Off*** the ***Y-Axis Minimum*** enables the lowest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Minimum*** key and a numeric keypad will be displayed for entry of this value. This value can be between –0.301 and 2.999.

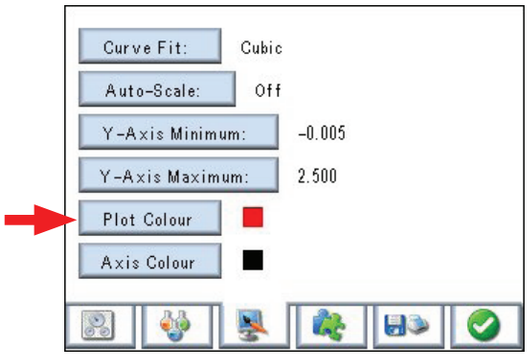
The ***Y-Axis Maximum*** enables the highest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Maximum*** key and a numeric keypad will be displayed for entry of this value. This value can be between 3.000 and –0.300.

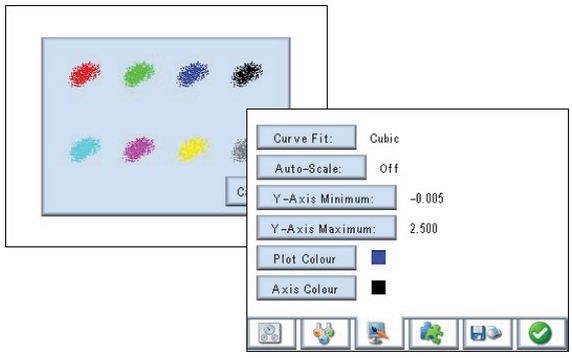




Selecting Plot Colour

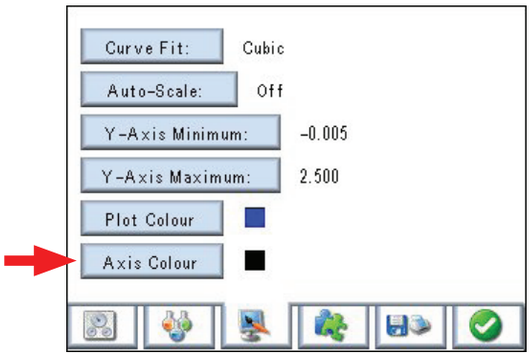
Selecting the ***Plot Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred colour. Once selected, the screen will update to show the selected colour.

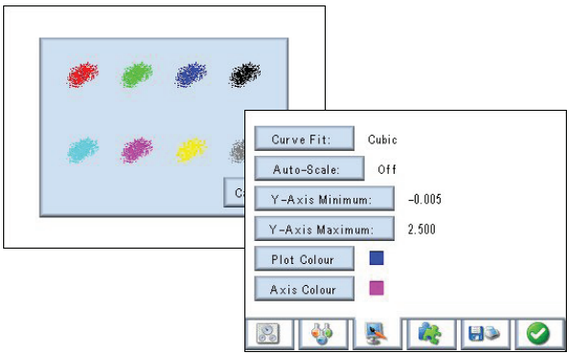




Selecting Axis Colour

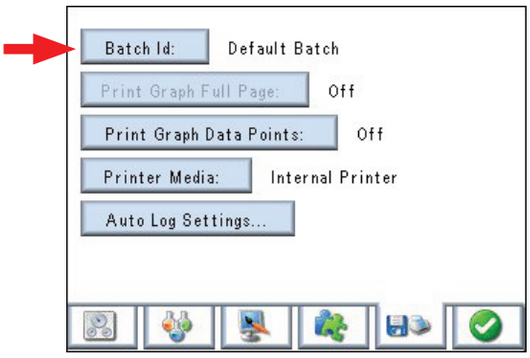
Selecting the ***Axis Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred colour. Once selected, the screen will update to show the selected colour.

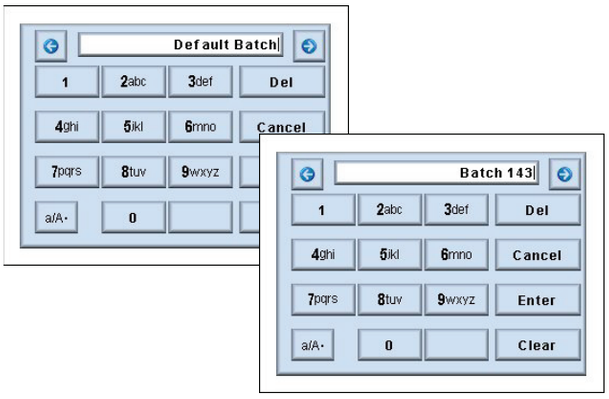




Setting Batch ID

Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Touch ***Enter*** to accept or ***Cancel*** to remain as a default.



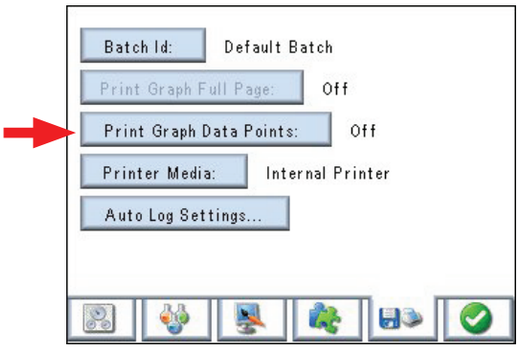


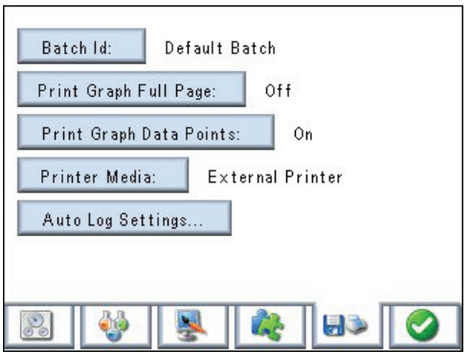
Setting Graph Data Points

The option to print graphs on a full page is only available if the ***External*** printer is selected. If available and set to ***On*** the curve will be printed on one page (typically A4 landscape format) with the data on following pages. If available and set to ***Off*** the curve will be printed with the data below it (typically top half A4 portrait).

The ***Print Graph Data Points*** key toggles between ***On*** and ***Off***.

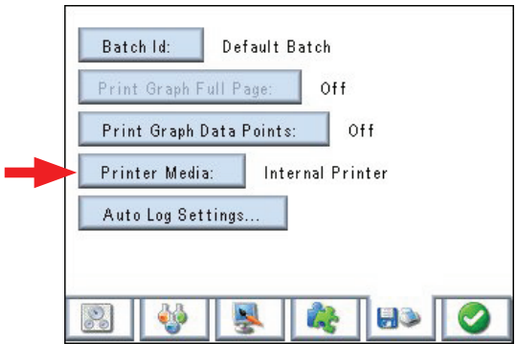
With this key set to ***On*** all the data points that make up the graph will be printed in a table following the graph.

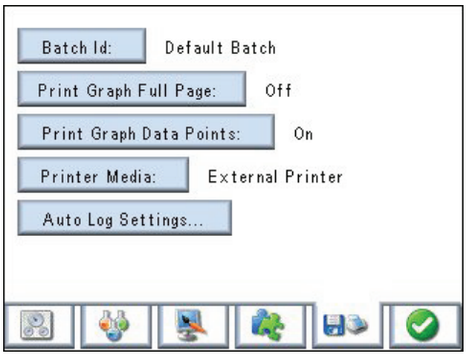




Selecting Printer Media

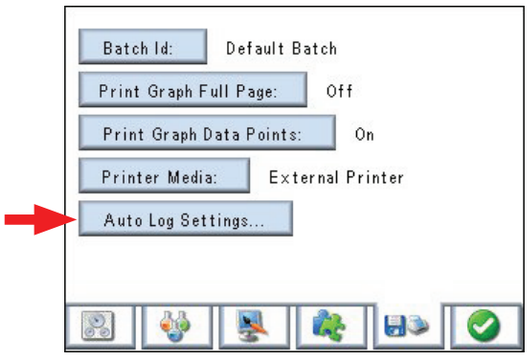
The ***Printer Media*** options toggle between Internal and External Printers.

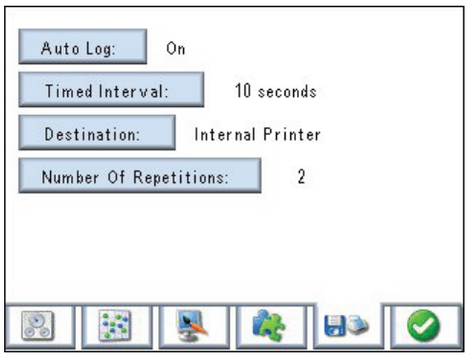




Auto Log Settings...

Selecting ***Auto Log Settings...*** opens a dedicated sub-menu.





This option can be toggled between ***Off***, ***On*** and ***Timed***. When the ***Auto Log*** option is selected to ***On*** the user can set the destination (toggles between internal and external printer and memory;

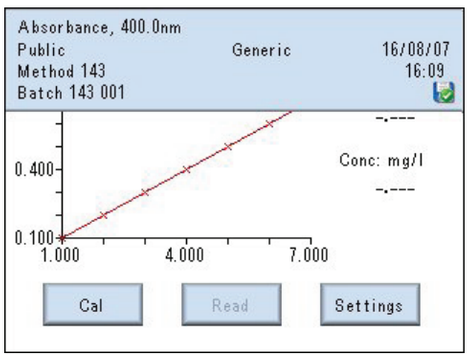
When the ***Auto Log*** option is set to ***Timed*** the user can set;

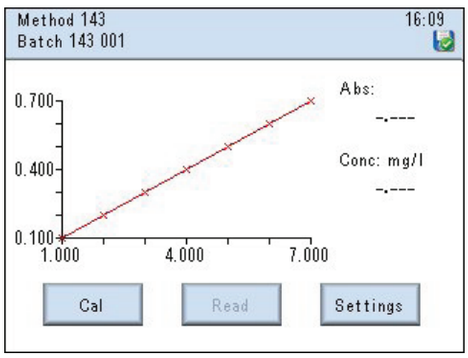
the timed interval between 3 and 9999 seconds using the numeric keypad;

the destination (toggles between internal or external printer and memory);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.



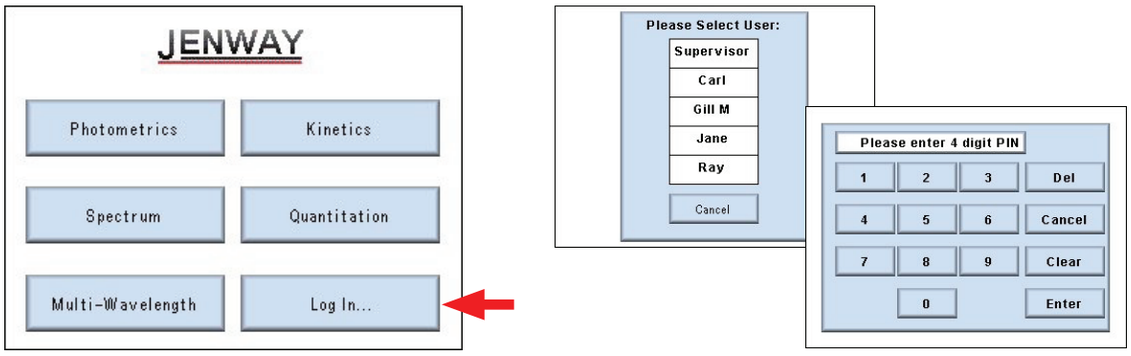


9.3 LOGGED IN MEASUREMENT

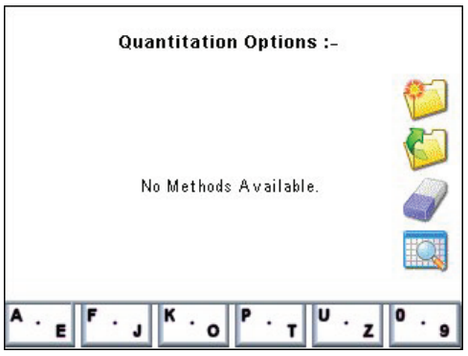
PIN Codes – Each user is allocated a 4 digit PIN code that is required when logging in.

Select ***Log In...*** from the ***Main Menu*** and a list of users will be shown. Select the appropriate user name and a numeric keypad will be displayed.

Enter your 4 digit PIN code and press the ***Enter*** key to confirm.



Once logged in method screen options will be displayed:



Methods are stored sequentially by measurement mode. Once the first page is full (8 methods for the selected mode) cursor arrows are displayed in the top corners enabling the user to browse to subsequent or previous pages of 8 methods.

Alternatively, pressing one of the alphanumeric keys along the bottom of the screen will display all available methods with the initial character that is highlighted.

Note: Repeated pressing of a key sequentially highlights the characters between those displayed.

Create a New Method

For the following functions first touch a method or result to select it.

Open the Selected Method

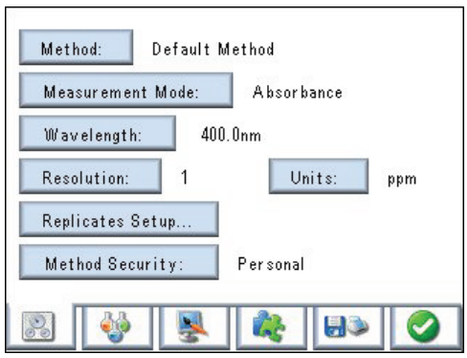
Erase the Selected Method

Browse Results – linked to the selected method

Open specific results in the selected batch

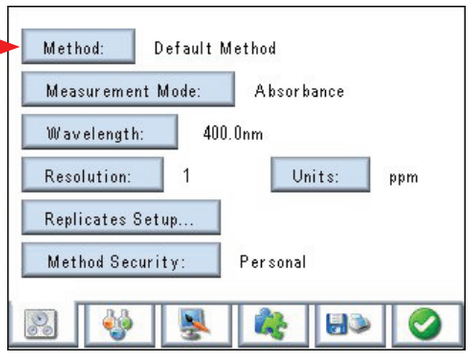
Creating a New Method

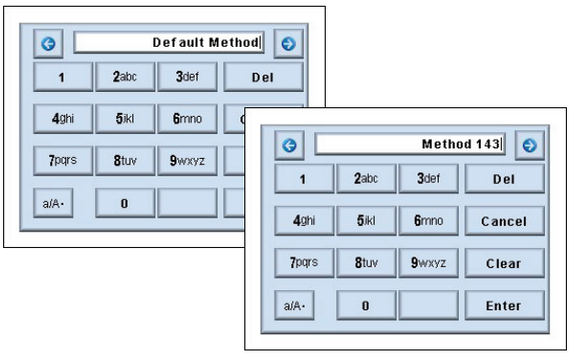
To enter the Method ID, appropriate measurement parameters and the level of Method Security required for the method being created select the ***New File*** icon.



Setting Method ID

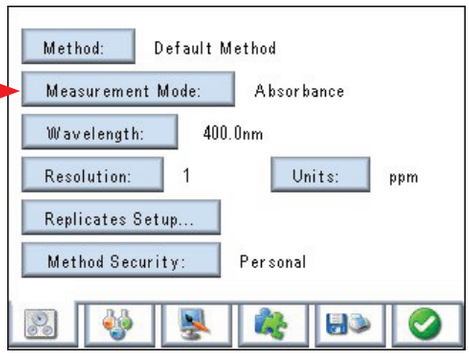
To allocate a Method name select the ***Method*** key and enter the preferred name using the alphanumeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the method name will remain as Default Method. The ***Enter*** key accepts the new method ID and returns you to the previous menu.

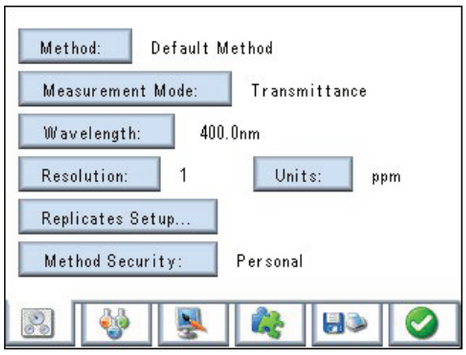




Selecting Measurement Mode

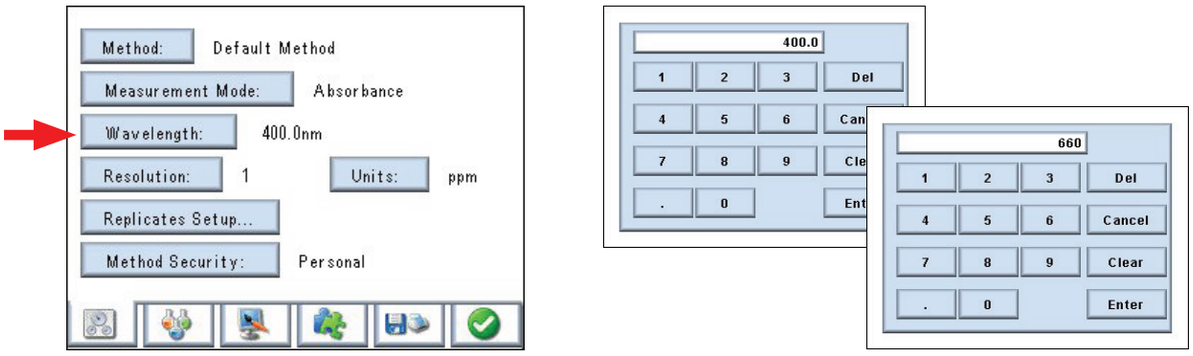
The ***Measurement Mode*** key toggles between Absorbance and Transmittance.





Setting Wavelength

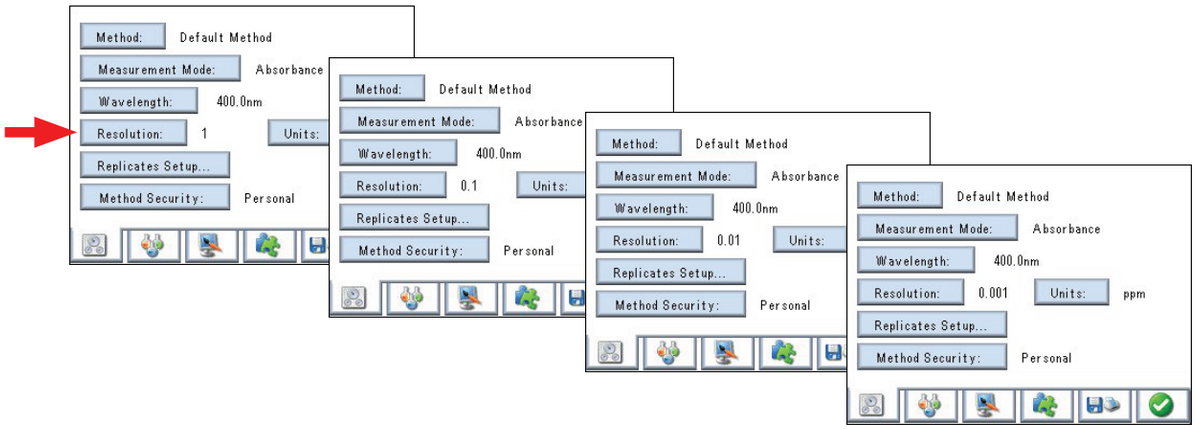
Select the ***Wavelength*** key and enter the wavelength using the numeric keypad. The ***Clear*** key will clear all information entered from the screen. The ***Del*** key allows individual letters or digits to be removed. The ***Cancel*** key will return you to the previous menu and the wavelength will not alter. The ***Enter*** key accepts the new wavelength and returns you to the previous menu. (At certain wavelengths order selecting filters may be heard switching in or out).



Selecting Resolution

This enables the resolution of the result to be set. Resolution can be set using the ***Resolution*** key to scroll through the available options.

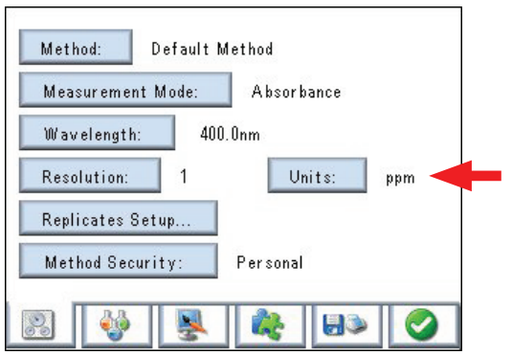
Resolution options are: 1, 0.1, 0.01 and 0.001.



Selecting Units

Selection of units is made using the ***Units*** key to scroll through the available measurement options. The following units are available:- mEq/l, ppm, mg/l, g/l, %, µg/ml, mg/ml, g/dl, mg/dl, µg/l, ng/l, µg/dl, M, mM, µM/l, U/l, mU/l, U/ml, blank.

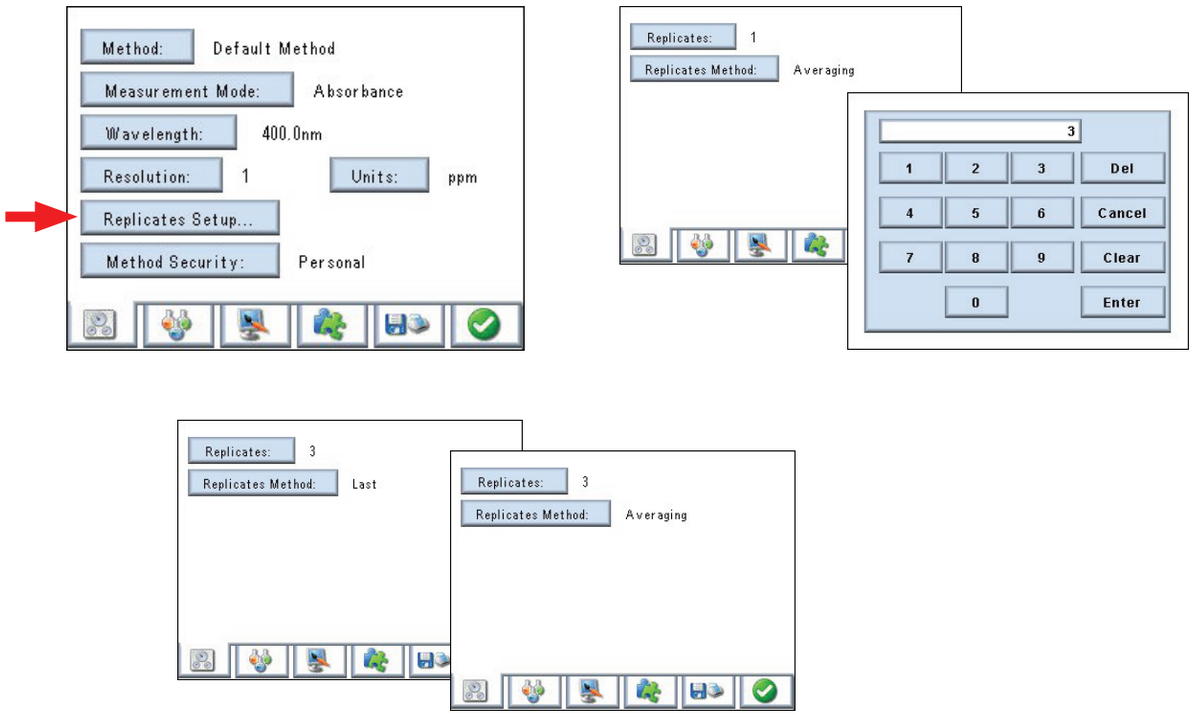
Note: The unit is simply a name tag added to the result. Due to the variety of samples that may be measured it is impossible to enable any direct conversion between units.



Replicates Setup...

Selecting ***Replicates Setup...*** opens a dedicated sub-menu.

Up to 5 replicates may be selected with the recorded result being the average of the 5 or as the last measured result.



Setting Method Security

The 67 Series spectrophotometers can support up to 10 individual users plus one Supervisor who has full administrative rights.

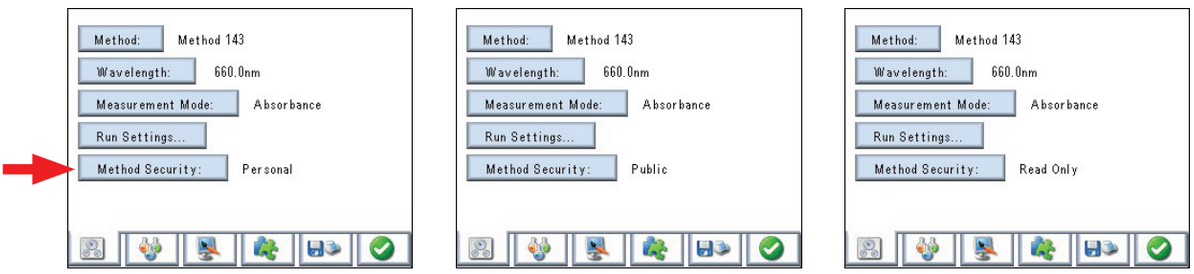
Logged in users can create methods with three levels of security options:

Personal – these methods are only accessible by the originator.

Public – these methods are available for use and modification by any logged in user.

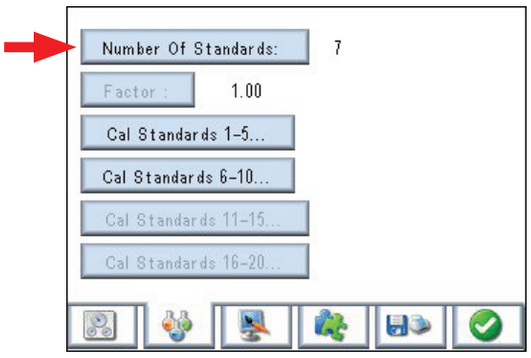
Read-Only – these methods can be accessed by all logged in users, but can only be modified by the originator.

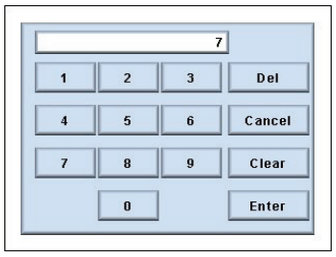
The preferred level of protection can be achieved by selecting the ***Method Security*** key that toggles between ***Personal***, ***Public*** and ***Read-Only*** options.



Selecting Calibration Standards

Up to 20 calibration standards may be used to plot the calibration curve (with up to 5 replicates for each). Select the ***Number Of Standards*** key and enter the total number of standards to be used (including the blank) via the numeric keypad. The value entered can be from 2 to 20. Depending on the number entered the subsequent keys with values beyond the requirements will be greyed out.

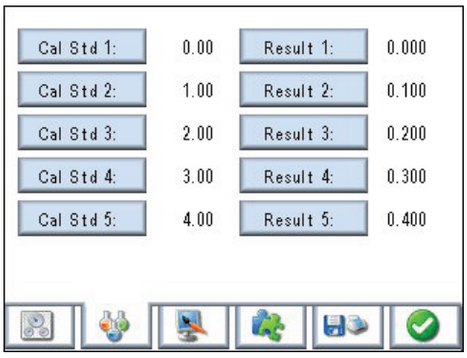




If the Number of Standards is set to zero then it is possible to set a Factor using the numeric keypad (the range is from –9999.99 to 9999.99). Touching each of the active keys below this enables the values for each standard to be input. If working from a pre-defined calibration curve or table the corresponding absorbance value for each standard can be entered as the result. If creating the curve from a set of standards the ***Results*** column will be re-populated with the measured absorbances once the calibration curve has been created.

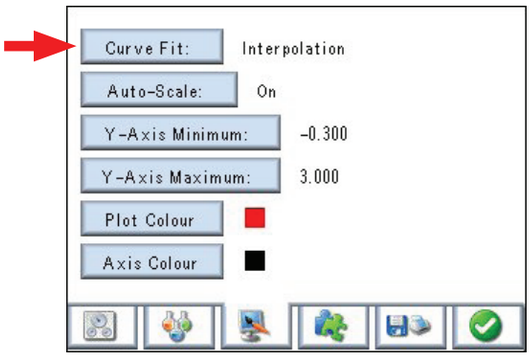
Selecting the ***Cal Std 1*** key opens a numeric input window. Enter the value for the first standard (this may be the blank). When completed a corresponding absorbance value can be entered in a similar manner by selecting the ***Result 1*** key, if working from a pre-defined calibration curve.

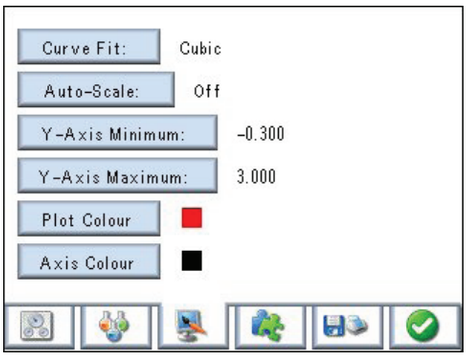
Further standard (and absorbance values, if required) can be entered in a similar manner for all the standards selected under ***Number Of Standards***.



Setting Curve Fit

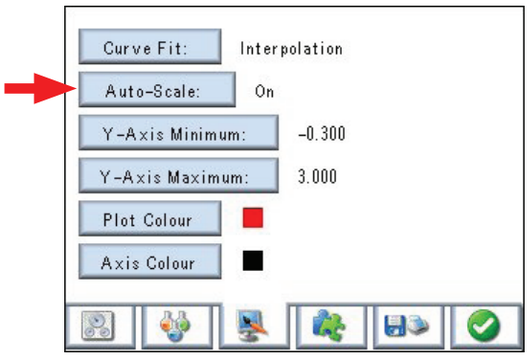
The ***Curve Fit*** key scrolls through the available options - Interpolation, Interpolation through Zero, Linear Regression, Regression through zero, Quadratic, Quadratic through zero, Cubic, Cubic through zero. The selected curve fit can be changed on recalled results and with post scan measurement tools.





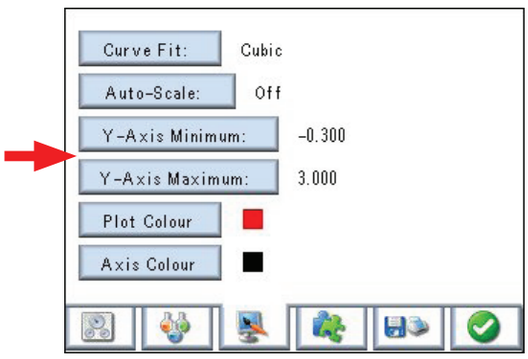
Setting Auto-Scale

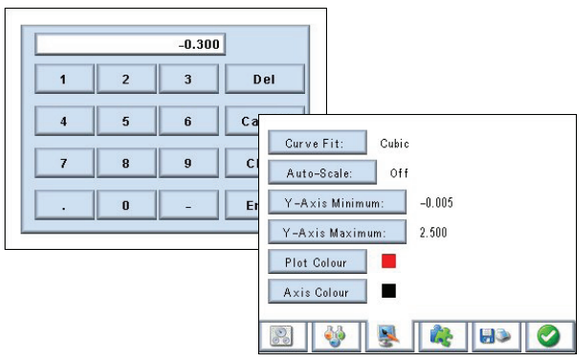
The ***Auto-Scale*** key toggles between ***On*** and ***Off***. With the ***Auto-Scale*** function ***On*** the instrument will automatically set the Y-axis maxima to a level that will best fit the calibration curve in the display area. When set to ***On*** the manual settings for Y-axis maximum and minimum are non-functional. These settings can be changed with post calibration analysis tools to enable alternative views and printouts after the scan has been completed.



With the ***Auto-Scale*** function set to ***Off*** the ***Y-Axis Minimum*** enables the lowest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Minimum*** key and a numeric keypad will be displayed for entry of this value. This value can be between –0.301 and 2.999.

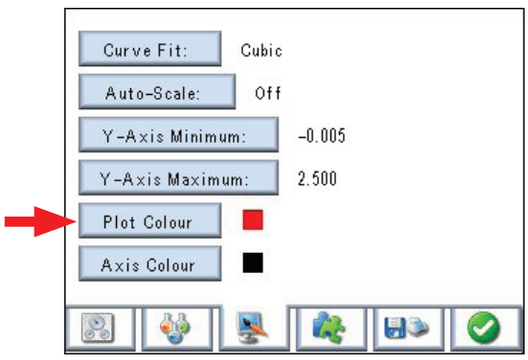
The ***Y-Axis Maximum*** enables the highest displayed level for the Y-axis to be manually set. Select the ***Y-Axis Maximum*** key and a numeric keypad will be displayed for entry of this value. This value can be between 3.000 and –0.300.

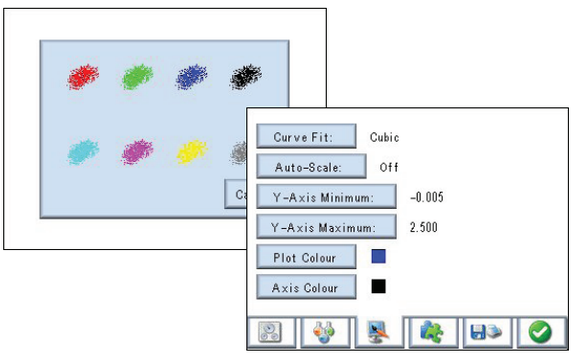




Selecting Plot Colour

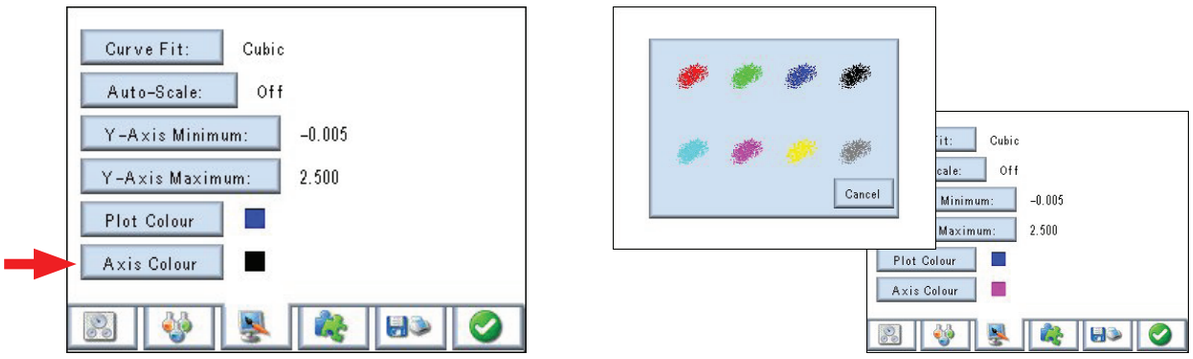
Selecting the ***Plot Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred colour. Once selected, the screen will update to show the selected colour.





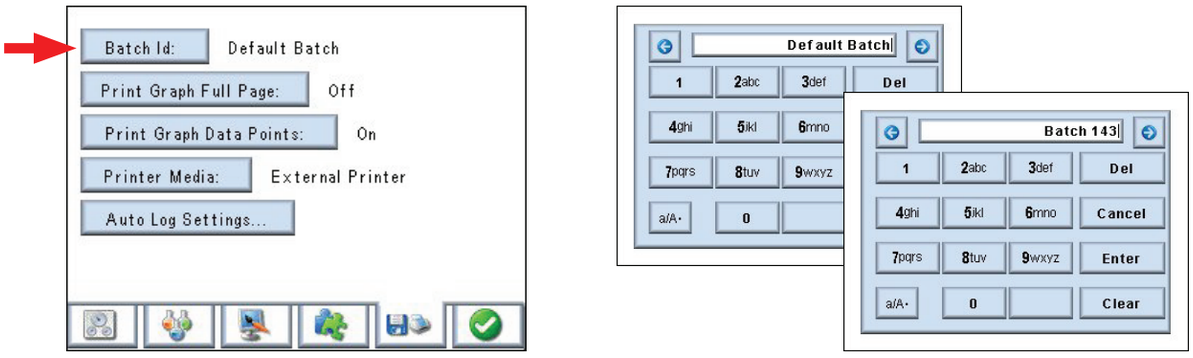
Selecting Axis Colour

Pressing the ***Axis Colour*** key displays a colour selection screen. Touch any one of the eight colours to select the preferred colour. Once selected, the screen will update to show the selected colour.



Setting Batch ID

Select the ***Batch ID*** key and enter the batch code using the alphanumeric keypad. Select ***Enter*** to accept or ***Cancel*** to remain as a default.



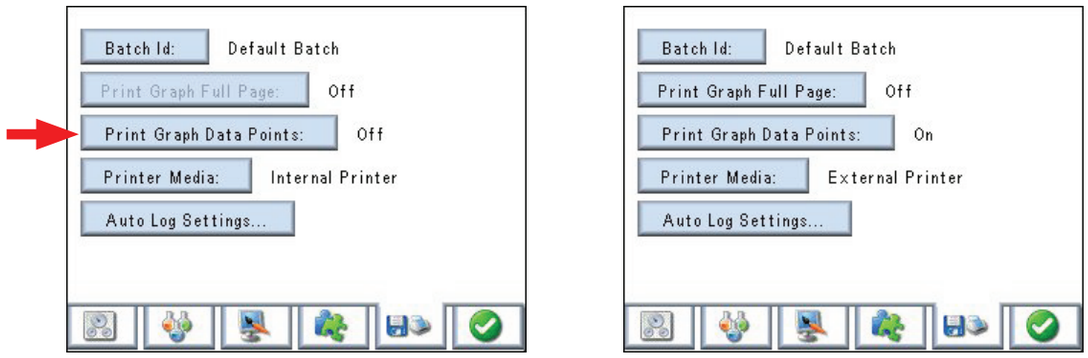
Setting Graph Data Points

The option to print graphs on a full page is only available if the ***External*** printer is selected. If available and set to ***On*** the curve will be printed on one page (typically A4 landscape format) with the data on following pages.

If available and set to ***Off*** the curve will be printed with the data below it (typically top half A4 portrait).

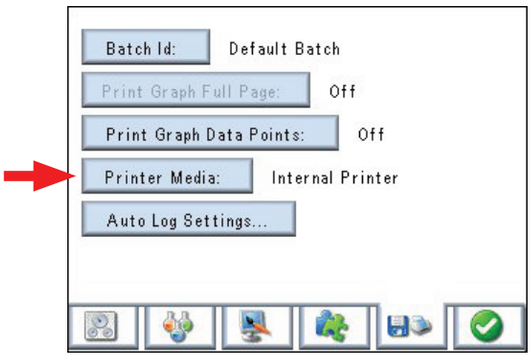
The ***Print Graph Data Points*** key toggles between ***On*** and ***Off***.

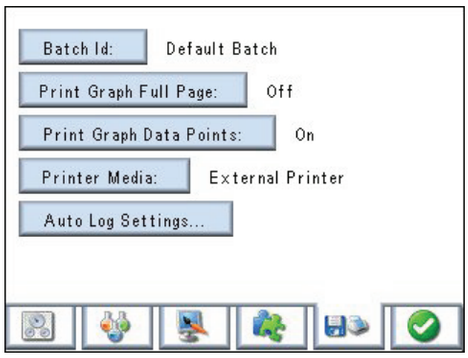
With this key set to ***On*** all the data points that make up the graph will be printed in a table following the graph.



Selecting Printer Media

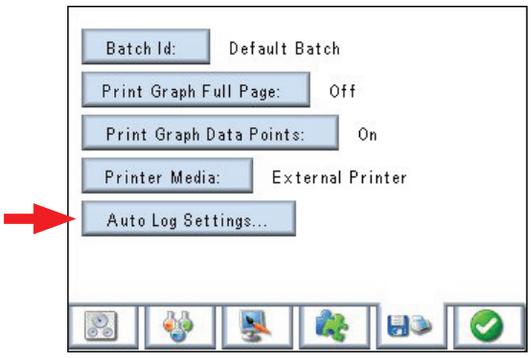
The ***Printer Media*** options toggle between Internal and External Printers.

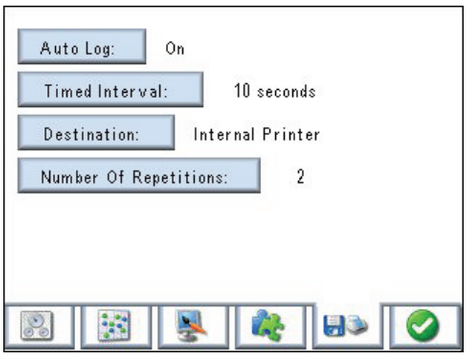




Auto Log Settings...

Selecting ***Auto Log Settings...*** opens a dedicated sub-menu.





This option can be toggled between ***Off***, ***On*** and ***Timed***. When the ***Auto Log*** option is selected to ***On*** the user can set the destination (toggles between internal and external printer and memory);

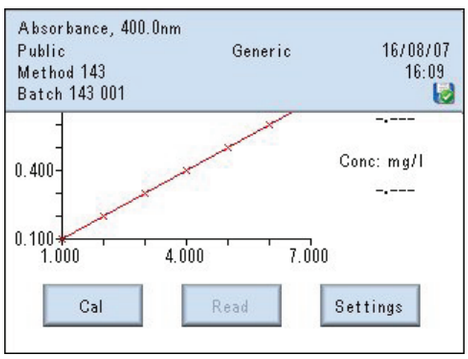
When the ***Auto Log*** option is set to ***Timed*** the user can set;

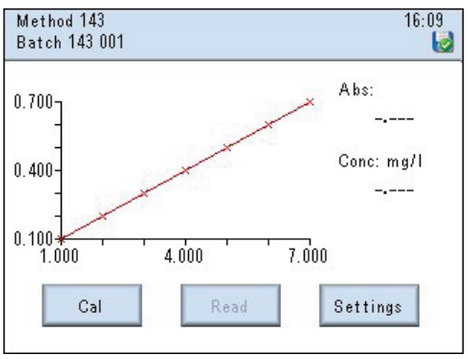
the timed interval between 3 and 9999 seconds using the numeric keypad;

the printer destination (toggles between internal or external);

the number of repetitions from 2 to 999 using the numeric keypad.

To view the set parameters touch the status bar once and a drop down menu will appear. Touching this bar again will return it to its original status.





File & Data Management

Save

Tools

Print

Settings

Erase

Search Results

Open Results

Save

Saving Methods

Having entered all your required settings on the tabbed pages the method can be saved by simply pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result.

If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options. Alternatively, when the ***Auto Log*** option is set to ***On*** or ***Timed*** and the destination option is ***Memory*** all results will be saved automatically.

Sharing Methods

Methods can be shared with other users by setting the security level at either ***Read-Only*** where other users can use but not modify the method or, ***Public*** where they can use and modify the method. Other users must then ensure that under ***Method View Settings*** (Settings/User Preferences/Method View Settings) they have enabled ***Public*** and/or ***Read-Only*** methods or turned ***All Methods*** on.

Recalling Methods

Following selection of the operating mode from the main menu the method browse screen is displayed. This will show all methods that the current user has access to, based on their selections in the ***Method View Settings*** (refer to Sharing Methods). If the first page is full, cursor arrows will be displayed to enable navigation to and from additional pages.

Alternatively, selection may be made using the alphanumeric menu bar at the bottom of the screen.

Repeated pressing of each character set will display the full alphanumeric range and the screen will show all methods starting with the highlighted character.

Touch the required method when it is displayed on the screen to highlight it, touch the ***Open File*** icon to display the main measurement screen for that method.

Editing Methods

Use the Recalling Methods procedure to recall the required method. With the measurement screen displayed touch the ***Settings*** option. Adjust the settings as required and touch the ***Green Tick*** icon on completion. The modified method can then be saved by pressing the ***Save*** key on the display surround. If you do not save at this point but continue to make measurements using the method, it will automatically be saved when you save the first result. If you continue without saving a result you will be prompted to save the method as you exit the operating mode or return to the settings options.

Note: If the Method name was not changed during editing it will be saved with the same name but with a new date and time to ensure traceability. If the old method is no longer required it should be deleted as detailed in Deleting Methods.

Deleting Methods

To delete methods highlight the required method in the Browse screen as described in Recalling Methods and then touch the ***Eraser*** icon.

A warning message will be displayed to ensure this action is required. On confirmation the selected file will be deleted.

If the current user does not have the required privileges to delete the selected method then an information message will be displayed advising that the method cannot be deleted.

Privileges required for deleting designated methods:

Public Methods – only the Supervisor and Originator can delete these.

Read-Only Methods – only the Supervisor and Originator can delete these.

Personal Methods – Only the Originator can delete these methods. (The Supervisor can delete these by re-setting the Originator's PIN code and then logging in as the Originator).

Saving Results

After completion of a measurement the result can be saved by simply pressing the ***Save*** key on the display surround. The result is saved under the method that created it, with the entered Batch ID and an incremental number along with the time and date of the measurement. Results can also be saved as part of the ***Auto Log*** function by selecting ***Memory*** under the ***Auto Log*** option, which will vary depending on the type of sampling accessory fitted.

Printing Results

After completion of a measurement the result can be printed, by simply pressing the ***Print*** key on the display surround. The result will be printed to either the internal or external printer, as selected by the user in the ***Printer Settings*** option.

The first result of any new batch is preceded by a print header, which gives details of the method settings and Batch ID. Results can also be printed as part of the ***Auto Log*** function, which will vary depending on the type of sampling accessory fitted.

Recalling Results

Stored results are always directly linked to the method that created them. To access results first recall the method as described in ***Recalling Methods***. With the method highlighted touch the ***Search Results*** icon. This will open a screen detailing all results available to the current user. Touch the required result or batch (depending on the mode) and then the ***Open Specific Result*** icon. This will display the results on the screen. The ***Tools*** option can then be used to work on these results (depending on mode). It is also possible to print the result by simply pressing the ***Print*** key on the display surround. Options to print to the Internal or External printer or to the CSV file will be displayed. Printing to the CSV (Comma Separated Values) file will save the data in CSV format on the external data card. (If a card is not fitted the instrument will display a prompt). This is in text format and can be viewed and printed in Excel®.

In ***Kinetics*** mode an additional option is available (Analogue Mode). This allows results to be output via the rear panel analogue sockets to a chart recorder or similar device.

Sharing Results

Results attached to ***Personal Methods*** cannot be accessed by any other user.

Results attached to ***Read-Only*** and ***Public Methods*** can be accessed by all users, based on their current ***Method View Settings***.

9.4 PERFORMING MEASUREMENTS – all users

A minimum of a zero Absorbance calibration must be made before any measurements can be carried out. Having completed this, any pre-existing calibration curve can be used to make measurements against, or a full calibration using the settings in the method can be made as follows:

Selecting the ***Cal*** key will display a prompt to carry out the zero absorbance. This is not part of the calibration curve but ensures the reference levels are set correctly at this wavelength. If a blank is not used for this setting then it should be used for ***Cal Std 1***.

If Interpolation is used as the curve fit, then using the blank for this and ***Cal Std 1*** will ensure the first segment passes through the origin.

Selecting ***Yes*** completes the zero absorbance setting and is followed by a prompt to continue and overwrite the calibration curve.

Selecting ***No*** returns the measurement screen, with the default or existing calibration curve displayed ready for sample measurement.

Selecting Yes continues with construction of a new calibration curve and a prompt display showing ***'Please enter Standard: xx'***. Where ***xx*** is the first standard in the table and could be the blank.

Selecting ***Yes*** completes the measurement of this standard.

Information on the standard and absorbance measured is then displayed along with a prompt to insert the next standard. This process continues until all standards have been measured.

For sample measurement insert the sample cuvette into the sample chamber and select the ***Read*** key. The measured absorbance and calculated concentration are then displayed beside the calibration curve. Results can be printed and saved, as required.

The calibration curve is stored with all results and the method for future reference and use.

Post Quantitation Tools

After construction or recall of a calibration curve the Quantitation Tools can be enabled by pressing the Tools icon on the display surround.

The function of these tools is as follows:

Information

Auto Scale On/Off

Curve Fit

Curve Fit options selection

Resolution decrease

Resolution increase

Pressing this icon displays information on the calibration curve based on the currently selected curve fit. Constants for the curve are displayed with the correlation factors, as applicable.

This icon turns the Auto-Scale on and off. (When set to Off manually entered values from the settings are invoked).

Pressing this icon opens a new menu bar.

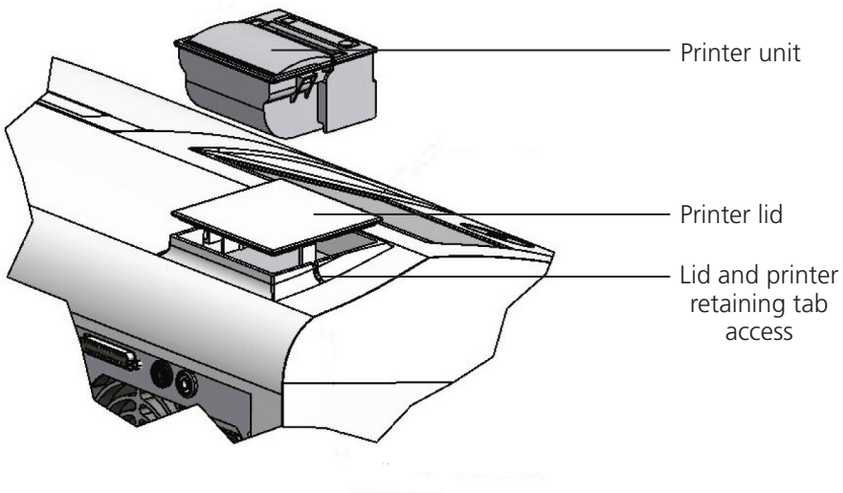
Pressing this icon cycles through the curve fit options. Exit this function by using the Back arrow on the display surround.

Decreases the resolution of the concentration display – 0.001, 0.01, 0.1, 0.

Increases the resolution of the concentration display – 0, 0.1, 0.01, 0.001.

SECTION 10 - Fitting Alternative Modules/Accessories

10.1 INTEGRAL PRINTER UNIT



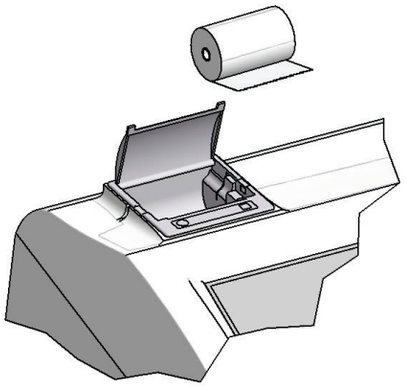
Disconnect the instrument from the mains supply.

The printer lid is located on the upper left hand side of the instrument casing. Release the lid or printer by inserting a thin blade into the retaining tab access and then pressing both the tabs inwards. Carefully remove the lid and retain for possible future requirements.

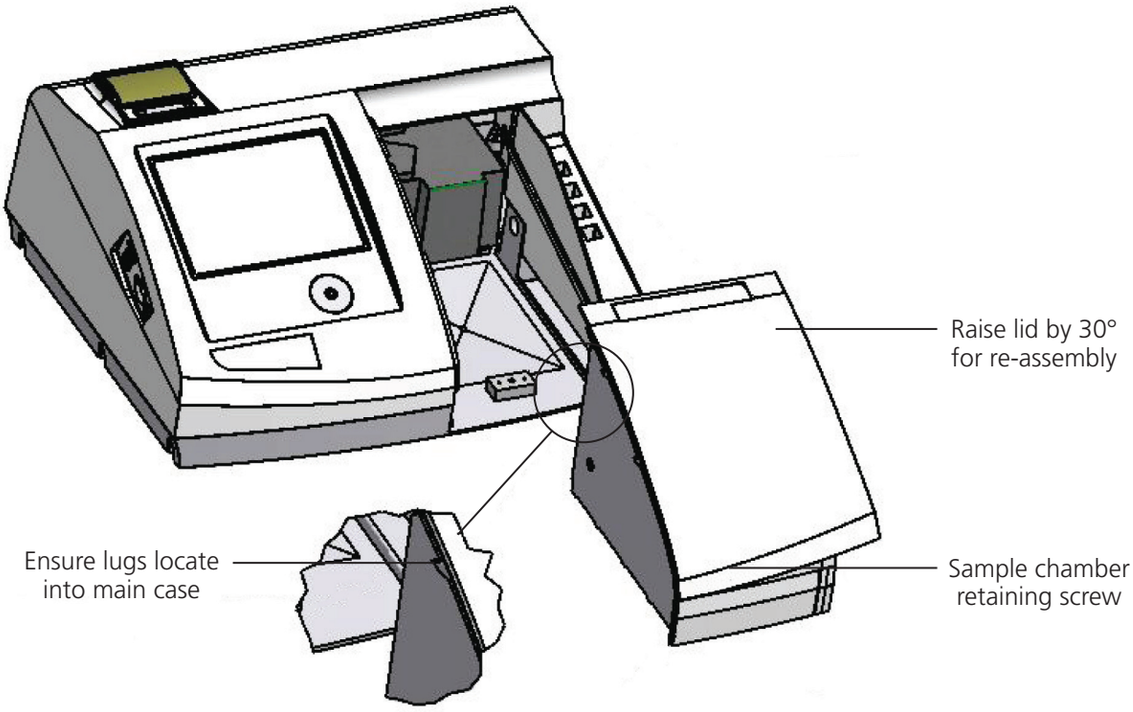
The printer connection lead is attached to the inside of the lid. Care should be taken when removing the lid from the instrument to ensure no damage occurs.

Remove the printer module from the packaging and insert into the recess taking care to secure into the retaining tabs. Detach the printer connection lead from the top of the lid and carefully fit to the printer module. Reconnect the instrument to the mains supply via the rear panel socket. The instrument and printer are now ready for use.

Printer Roll Replacement



10.2 CELL HOLDER MODULES



A number of cell holder module options are available for use with these instruments:

- 10x10mm cell holder
- 8 cell turret
- Water heated turret
- Test tube holder

These are supplied as a complete plug-in module as detailed above. To fit these modules the following procedure should be used:

Disconnect the instrument from the mains supply.

Check the installed sample chamber module and remove any filled cuvettes to avoid spillage.

Raise the lid and loosen the sample chamber retaining screw located at the front of the module. Lifting the front carefully remove the module from the instrument and store safely for possible future use.

Unpack the new module and check to ensure no damage has occurred during transit.

To install the new module raise the lid by 30° and gently ease it into the instrument compartment taking care that the lugs shown in the diagram locate into the main casework.

Once the module is in position, tighten the sample chamber retaining screw.

Re-connect the mains supply to the rear panel of the instrument. The instrument is now ready for use with the new module.

10.3 AUTOMATIC 8 & 6 CELL CHANGER MODULES

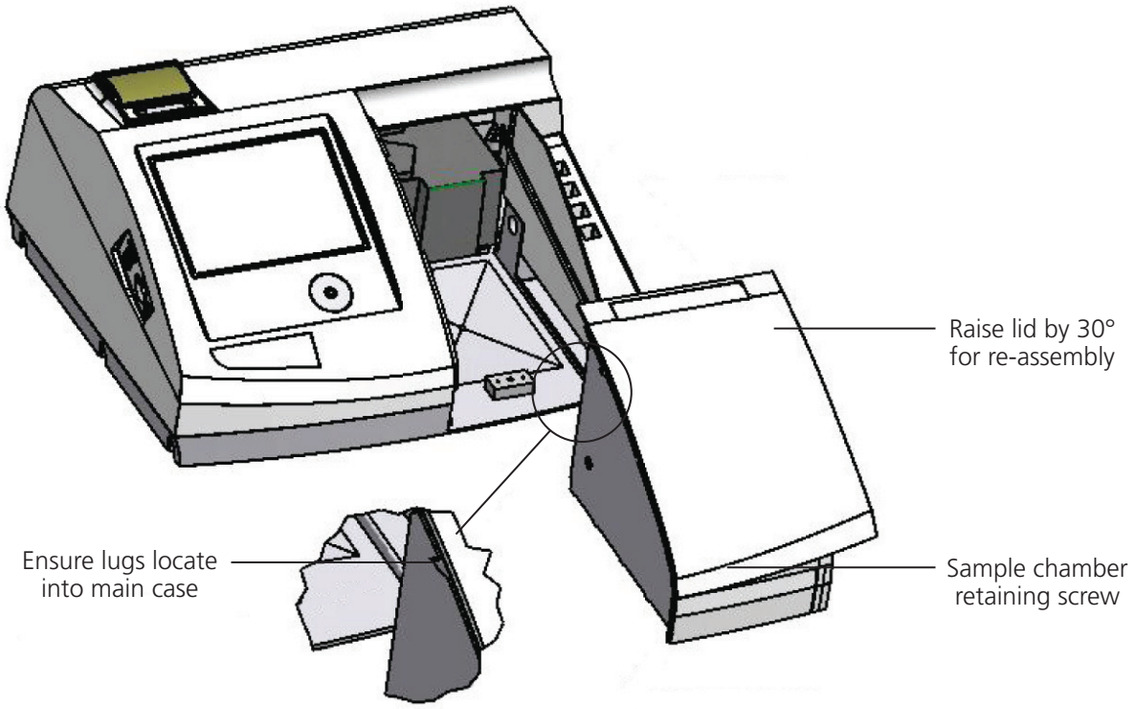
Overview

The automatic 8-cell changer accepts 8 x 10mm path length cuvettes and the automatic 6-cell changer accepts 6 x 10mm path length cuvettes with the addition of a water jacket for temperature control through an external, thermostated, circulating water-bath.

The automatic 8-cell and 6-cell changers enhance the performance of the 67 Series spectrophotometers and introduce a level of flexible automation to many tasks.

The advantages range from the simple automatic, sequential measurement of up to eight/six samples in any mode of operation to the programming of multiple carousels for the measurement of over 7000 samples. With options for storing 8/6 individual blanks (including full baseline spectral scans) to enable the matching of un-matched cuvettes as well as running multiple kinetic assays in parallel and automating the creation of calibration curves. The power and versatility of these accessories is realised through a simple, intuitive graphical interface.

Fitting the 8 or 6 Cell Changer Module (as a separate accessory option)



If you are changing from an existing sample chamber module to the automatic 8 or 6 cell changer the following installation instructions should be followed:

Disconnect the instrument from the mains supply.

Check the installed sample chamber module and remove any filled cuvettes to avoid spillage.

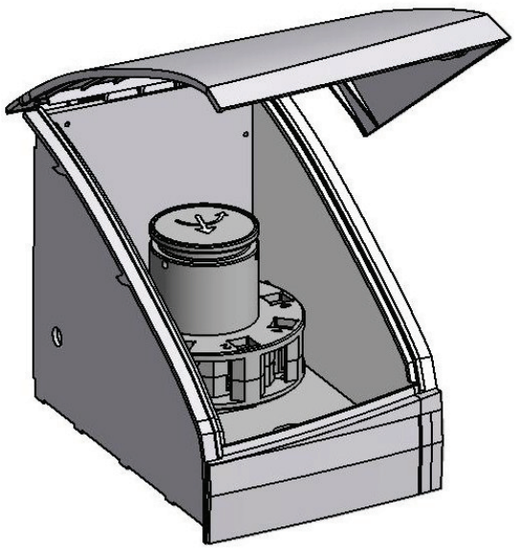
Raise the lid and loosen the sample chamber retaining screw located at the front of the module. Lifting the front carefully remove the module from the instrument and store safely for possible future use.

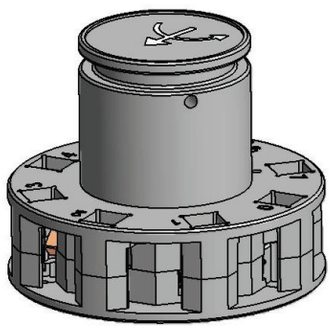
Unpack the new module and check to ensure no damage has occurred during transit. To install the new module raise the lid by 30° and gently ease it into the instrument compartment taking care that the lugs shown in the diagram locate into the main casework. Once the module is in position, tighten the sample chamber retaining screw.

Installation - 8 Cell Changer Carousel

If your instrument was ordered with the automatic 8 cell changer it will be supplied with the module installed but with the carousel packed separately to avoid damage in transit. This should be un-packed and be carefully located onto the motor shaft by gently pushing it down onto the shaft.

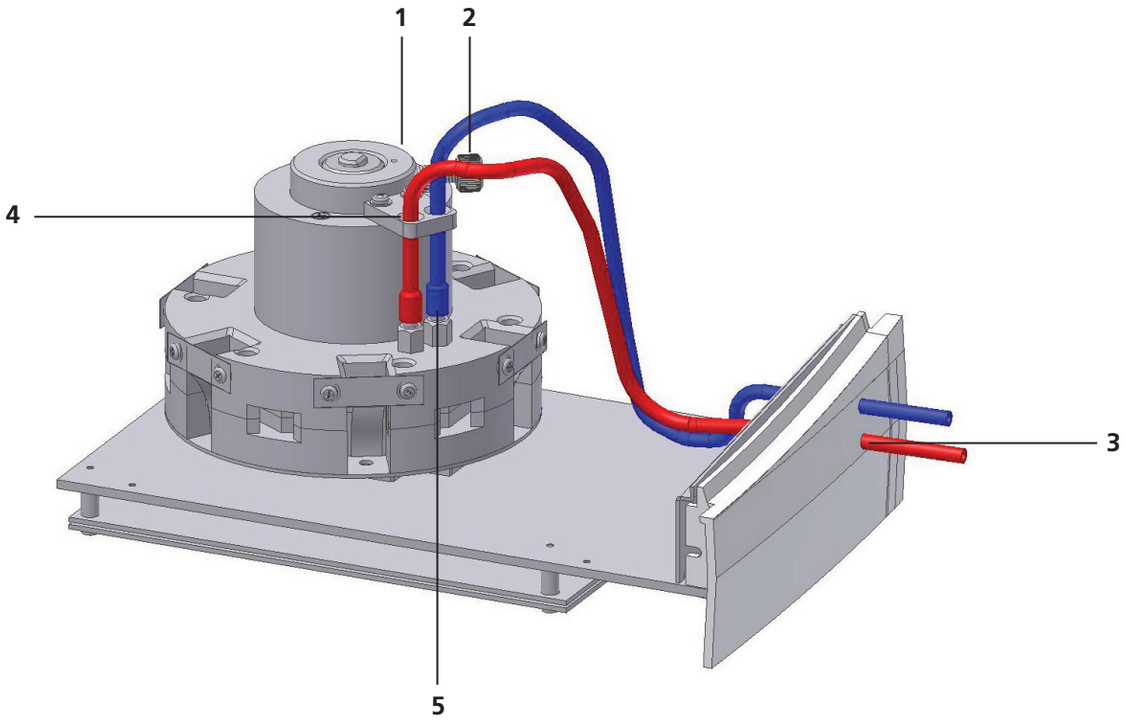
The carousel should then be rotated until the carousel drive is engaged. No additional alignment is required.





Installation – 6 Cell Changer Carousel

If your instrument was ordered with the automatic 6 cell changer it will be supplied with the module installed but with the carousel packed separately to avoid damage in transit. This should be un-packed and be carefully located onto the motor shaft. Line up the 2 orientation marks (1) and fully tighten the thumbscrew (2). No additional alignment is required.



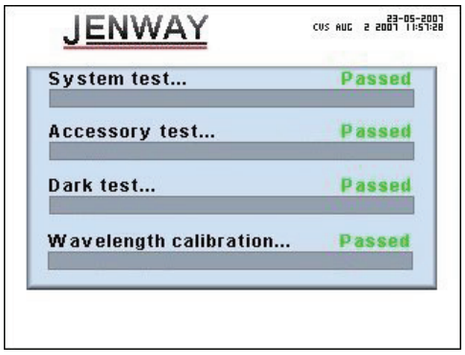
Tubing

Note: The 6 cell changer is supplied with 2 metres of silicon tubing (023 027). The use of alternative tubing or using lengths in excess of 1 metre is not recommended.

Feed the tubing through the front of the module (3), leaving sufficient slack in the tubing to allow free rotation of the turret, and without causing pinching or excessive straining on the tubes. Pass through the guide (4) and push firmly over the connector (5). Fit both tubes in the same manner.

Re-connect the mains supply to the rear panel of the instrument. The instrument is now ready for use with the new module.

The instrument will then perform the power on self-test protocol. The power on and self-test screen will be shown:



If the module has been successfully installed the instrument will show **'Passed'** alongside the ***Accessory test...*** indicator.

If the module is incorrectly fitted to the instrument the message **'None Found'** will be displayed. If this occurs switch the instrument off and disconnect from the mains supply. Remove the module and carefully refit. Reconnect the instrument to the mains supply and switch on. If the fault remains please contact your local dealer for advice.

If the carousel is incorrectly fitted the message **'Unable to calibrate multicell holder'** will be displayed and the ***Accessory test...*** will show **'Failed 08'**. In this instance switch the instrument off and fit the carousel, ensuring correct alignment as detailed below.

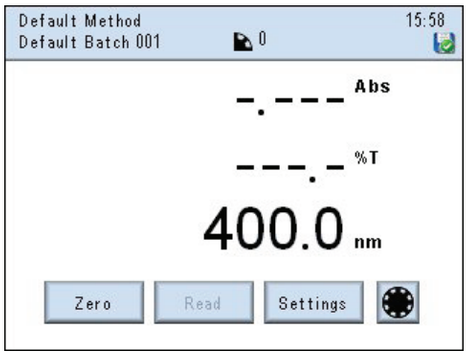
If the **'Failed 08'** message is displayed again, switch the instrument off and disconnect from the mains supply. Remove the module and check for any obvious signs of damage. Carefully refit the module following the fitting procedure and power up the instrument. If the instrument fails again please consult your dealer for advice.

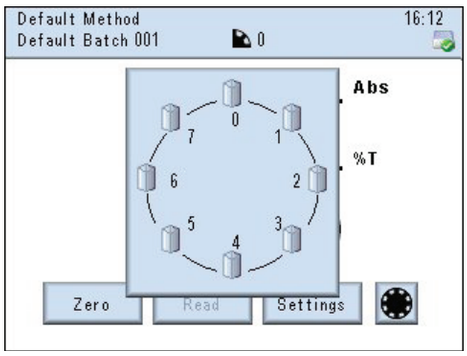
Manual Operation

The following operating parameters apply to all modes with the exception of Kinetics.

When the 8 or 6 cell changer is fitted two additional icons will be displayed. The icon at the top of the screen in the status bar indicates the current cell position.

The icon at the bottom of the display allows the user access to an input screen for selection of cuvette positions.





Automatic Operation

Selecting the ***Accessory*** icon from the ***Method Set-up*** options opens the tabbed page for the accessory settings.

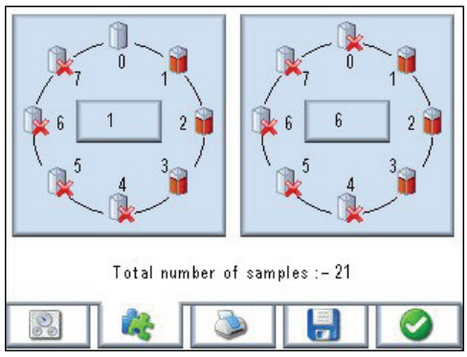
The setting options are identical for the Photometrics, Spectrum and Multi-Wavelength modes. The Quantitation mode is similar with just the addition of a manual or automatic option for the generation of calibration curves. Kinetics is fully automated for multiple, parallel kinetic assays and simply requires the input of the number of samples to be run simultaneously.

Automatic Multi-Cell

Selecting the ***Automatic Multi-Cell*** key alternates the setting between ***Enabled*** and ***Disabled***. In the latter case all the other options are irrelevant and are greyed out, the automatic multi-cell changer can then only be used in the ***Manual*** mode as described above. With ***Enabled*** selected the other options can be set to the desired status for the current method.

Cell Configuration

The carousel positions are numbered from 0 to 7/5 for the two versions. Selecting the ***Cell Configuration*** key displays the graphic set-up screen showing two carousels with options to set each cell position so that it is treated as either a blank or sample or not measured at all. The selection of these options is controlled by the logical demands of typical measurement sequences.



The carousel on the left is for the main configuration and may be the only one required. The one on the right is for further carousels if they differ from the first one. The number in the centre of each indicates the number of repetitions of that particular carousel set-up that is required. If only the first is required the number in the right hand one should be set to zero.

Simply selecting each cell icon cycles it through the three options, ***Blank***, when the icon is clear, ***Sample***, when the icon is coloured red and ***Ignore*** (do not measure), when it is crossed through. This sequence is governed by the following criteria so in certain circumstances selecting from the three options may be restricted.

Samples/Blanks must be grouped together sequentially from position 0, as soon as a position is set to Ignore all following positions will be ignored. Samples/Blanks should be added from position 0 upwards or set to Ignore from 7/5 downwards.

Position 0 of the first carousel (left-hand side) must always contain a blank.

Position 1 of the first carousel (left-hand side) can be set as a Blank or a Sample. If this position is set as a blank then all further positions in the first carousel will be set as blanks, i.e. this carousel will be used for storing blanks against which the corresponding position on the second carousel will be measured. In this case the second carousel will be set to have the same number of samples as the number of blanks set on the first carousel.

If the first carousel contains only one blank then position 0 on the second carousel can be either a blank (for re-setting the blank level for that carousel) or a Sample that will be measured against the stored blank value from the first carousel.

To check and confirm the settings made the display shows the total number of samples that will be measured from the current settings.

Dwell Time

Selecting the ***Dwell Time*** button activates a numeric input screen that enables the time delay between measuring each sample to be set. This can be set from 0 to 9999 seconds. A countdown clock is displayed in the top menu bar on the measurement screen when a dwell time has been set.

Result Destination

Selecting the ***Result Destination*** button enables the result of each measurement to be Printed or Saved automatically and cycles through options for Internal Printer, External Printer and Memory.

Change Turret Prompt

Selecting the ***Change Turret*** prompt enables a prompt message to be displayed at the completion of the programmed measurements for each carousel. If multiple carousels have been programmed it is recommended that this option is set to ***Yes***.

10.4 SIPPER PUMP MODULE

Overview

The Sipper Pump accessory is based on a programmable peristaltic pump that can be set to repeatedly deliver accurate, controlled volumes of sample into a flow through cuvette.

This enables a single flow through cuvette to be used for many applications, removing the need to decant samples into individual cuvettes, the need for washing re-usable glass or quartz cuvettes or for maintaining stocks and disposing of single use plastic cuvettes.

Many types of flow through cuvettes are available for different applications. Please contact Jenway for additional information or advice.

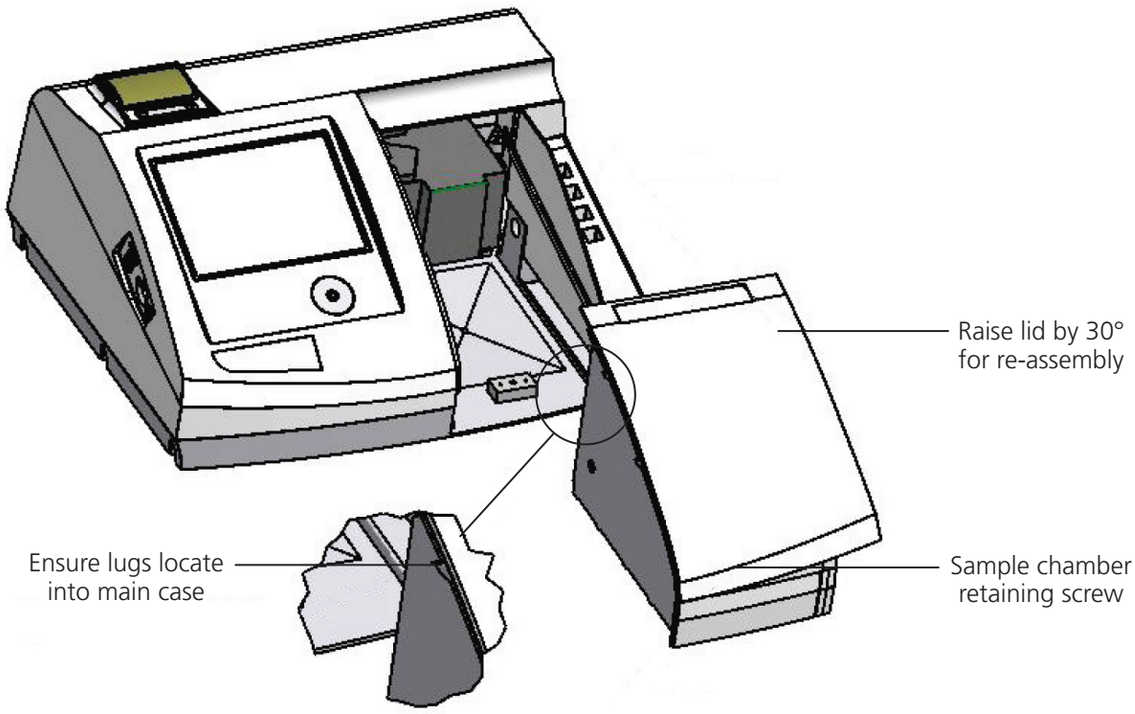
By injecting a controlled air-gap between samples when used in the segmented mode, very small sample volumes can be 'pushed' into the chamber of a micro flow through cuvette. Where viscous or oily samples persist in the sample chamber the air-gap segment can be completely or partially replaced with a wash solution.

Setting and calibration of the uptake volumes is easily carried out using the interactive menus and graphic user interface on any of the 67 Series spectrophotometers.

Installation

If your instrument was ordered with the sipper pump module it will be supplied with the module installed but without the tubing fitted. A separate kit is supplied (refer fitting instructions).

Fitting the Sipper Pump Module (as a separate accessory option)



This is supplied as a complete plug-in module as detailed above. If you are changing from an existing sample chamber module to the sipper pump the following installation instructions should be used:

Disconnect the instrument from the mains supply.

Check the installed sample chamber module and remove any filled cuvettes to avoid spillage.

Raise the lid and loosen the sample chamber retaining screw located at the front of the module. Lifting the front carefully remove the module from the instrument and store safely for possible future use.

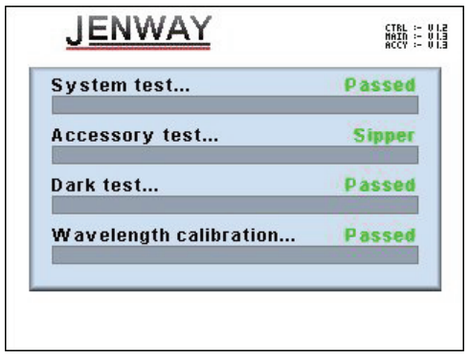
Unpack the new module and check to ensure no damage has occurred during transit.

To install the new module raise the lid by 30° and gently ease it into the instrument compartment taking care that the lugs shown in the diagram locate into the main casework.

Once the module is in position, tighten the sample chamber retaining screw.

Re-connect the mains supply to the rear panel of the instrument. Switch the instrument on using the power switch located on the rear panel. The instrument is now ready for use with the new module.

The instrument will then perform the power on self-test protocol. The power on and self-test screen will be shown:



If the module has been successfully installed the instrument will show **'Sipper'** alongside the ***Accessory test...*** indicator.

If the module is incorrectly fitted to the instrument the message **'None Found'** will be displayed. If this occurs switch the instrument off and disconnect from the mains supply. Remove the module and carefully refit. Reconnect the instrument to the mains supply and switch on. If the fault remains please contact your local dealer for advice.

Fitting the Sipper Pump Tubing

The Tubing Kit supplied with this module contains:

- Sipper Pump Tubing (1 metre) – 023 029
- Capillary Tubing (0.5 metre) – 023 030
- Sipper Probe – 632 063

In addition a 2.5mm Sample Mask (035 242) for use with micro cell, is supplied with the accessory module.

For traditional sipping:

Note: It is recommended that all tubing runs are kept as short as possible. Tubes must not be allowed to obstruct the light path.

For 1.8 ml flow through cells ensure that the sample flows into the smallest chamber i.e. the cell fills from the bottom up. For 80µl flow through cells the direction of the flow is shown on the cell.

1. Connect the sipper pump tubing (023 029) to the outlet port on the flow-through cuvette.

2. Secure the tubing using the clip on the right hand side of the pump head.

3. Ease the tubing around the rollers by carefully rotating them clockwise, by hand. Clamp the tubing into the clip on the left hand side of the motor.

4. Once secured, ensure the tubing is routed into the two retaining clips located on the module base plate at the side of the pump head.

5. Cut the tubing at the point where it fits comfortably on to the left hand tube located on the inside of the front bulkhead.

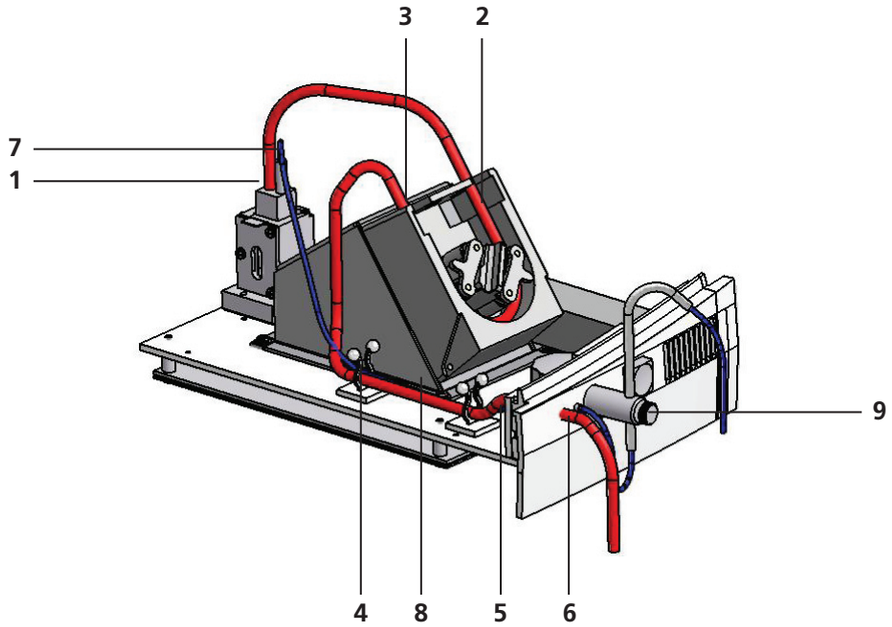
6. Connect a suitable length of this tubing to the external waste pipe.

7. Cut a small length (approx. 10mm) of the sipper pump tube (023 029) and push this over one end of the capillary tube (023 030). Connect this to the inlet port of the flow-through cuvette.

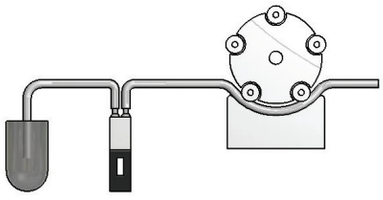
8. Route the tube into the two retaining clips located on the module base plate at the side of the pump head.

9. Fit the sipper probe (632 063) and secure using the thumbscrew. Feed the capillary tubing through the tube and up through the sipper probe, allowing sufficient length for it to pass into a suitable receptacle.

Sipper Tube Schematic



Traditional 'sipping' arrangement



For pumping:

Note: It is recommended that all tubing runs are kept as short as possible. Tubes must not be allowed to obstruct the light path.

1. Cut 2 pieces of sipper pump tubing (023 029) approx. 300mm in length. Take 1 length of tubing and fit this to the pump head, as shown, securing the tubing using the clip on the right hand side of the pump head.

2. Ease the tubing around the rollers by carefully rotating them clockwise, by hand. Clamp the tubing into the clip on the left hand side of the motor.

3. Fit the other end on to the inlet port on the flow-through cuvette.

4. Fit the second 300mm length of tubing to the outlet port of the flow-through cuvette. Once secured, ensure the tubing is routed into the two retaining clips located on the module base plate at the side of the pump head.

5. Fit the other end of the tubing on to the outlet port, located on the inside of the front bulkhead.

6. Connect a suitable length of sipper pump tubing to the external outlet port.

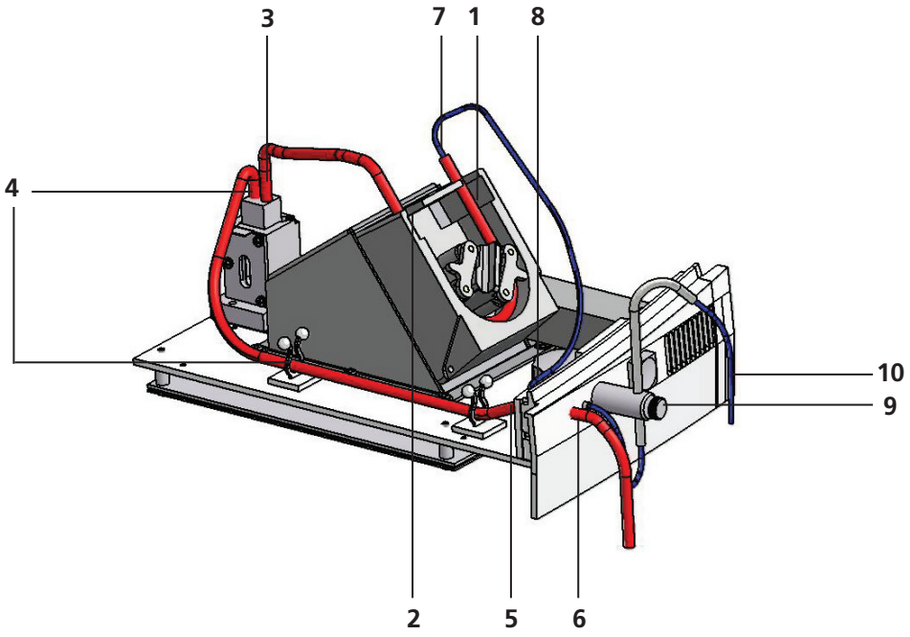
7. Insert one end of the capillary tube (023 030) into the sipper pump tubing, as shown.

8. Feed the other end through the inlet port located on the inside of the bulkhead.

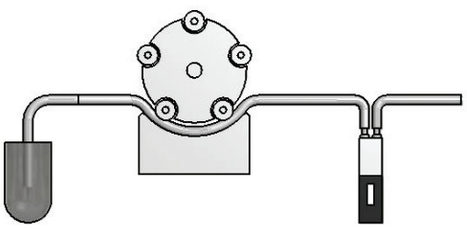
9. Fit the sipper probe (623 063) and secure into position using the thumbscrew.

10. Carefully feed the tubing up through the sipper probe, allowing sufficient length for it to pass into a receptacle.

Pump Tube Schematic



Traditional Pumping Arrangement



Checking the Sipper Pump

After fitting the tubing it is recommended that the following check is performed to ensure the cuvette fills correctly and that there are no leaks present.

Select ***Photometrics*** from the ***Main Menu***. (You do not need to log in for this check).

Select ***Settings*** and the icon.

Select ***Independent*** from the ***Operating Mode*** options.

Press to accept.

The switch on the front of the accessory will illuminate.

Offer up a receptacle of water or coloured solution to the inlet tube. Press the accessory switch and allow the pump to run, ensuring the cuvette fills correctly and that no leaks are present. If the operation is satisfactory press the accessory switch again to stop the pump.

Good Practice Guidelines

Sample Size - the cuvette must be filled with solution. If sample volume is limited, the two-stage uptake cycle can be used, i.e; sufficient sample is taken up to ultimately fill the cuvette, followed by air during the second part of the uptake cycle. The sample will be drawn into the cuvette and only air will occupy the tubing dead space leading to the cuvette.

Sample Characteristics – viscous samples may cause high levels of carryover. A simple test going from a blank to a standard solution and back to a blank, will determine the degree of carryover. With normal aqueous solutions it should be possible to keep this figure below 1%. If this cannot be achieved and it is critical to the test, it may be necessary to include a wash cycle between samples.

System Cleaning – at the end of a sample run it is important to leave the system clean. This can usually be achieved by pumping deionised water through the system. If the nature of the sample is such that water will not adequately clean the system, other solvents may be used, providing they are compatible with the components that will be contacted during cleaning, i.e; PTFE, glass and silicon rubber tubing.

Pump Tubing – the tubing has a finite life and will need to be changed when pumping rates decrease to unacceptable levels, or the walls of the tubing stick together.

Note: If left under roller pressure for prolonged periods, the pump tubing may not pump. In such cases the tubing should be removed from the roller assembly and be reformed by hand. Normal operation should be restored. *This is not a sign of tube wear*.

It is recommended that the tubing should be removed if the sipper pump is not being used for a prolonged period.

Setting Up the Sipper Pump

There are three modes of operation:

1. Independent 2. Segmented 3. Bi-Directional

1. Independent

This is similar to the old continuous mode. Here operation of the sipper pump is via the switch on the front of the accessory module. It can be switched on and off independently of the measurement functions of the spectrophotometer.

This is the simplest mode of operation and can be used to take up samples from bulk containers or as a bypass from a flow or pipeline.

Measurements may be made on the flowing sample using the auto-log function or the pump switched off and measurement on the stopped flow be made manually on the instrument.

This mode is also useful for checking the cuvette and tubing for correct and leak free connection.

No other options are available with this mode selected.

2. Segmented

This mode uses the programmability feature to take up a controlled volume of each sample in a sequential manner. This chain of sample segments can be broken up, by inserting an air (or wash) segment between each. If air (or wash) is not needed, this option is set to zero during calibration. This can be controlled by using the switch on the front of the accessory module or the touch screen of the instrument, depending on the ***Automatic Sip*** setting and the instrument measurement mode selected. The sample always moves forward from the container to the waste receptacle.

3. Bi-Directional

This is identical to the segmented mode, but here the sample is returned to the original container, i.e; pump direction is reversed during the drain sequence.

For draining a flow through cuvette:

Note: Whilst using a 1.8 ml flow cell, order numbers 035 025 (glass) and

035 044 (quartz), the sample can only be drained in ***Bi-Directional*** mode.

If you wish to drain the flow through cell between sample measurements in ***Independent*** or ***Segmented*** modes it is recommended that you use a 80µl flow through cell; order numbers 035 045 (glass) and 035 047 (quartz).

Automatic Sip On/Off

When ***Automatic Sip*** is set to ***On*** the measurement sequence is followed automatically once the sample measurement is started. This is dependent on both the instrument and sipper mode with various prompts and warnings displayed, as necessary. In general, the instrument controls will produce the same effect as a press of the accessory pushbutton.

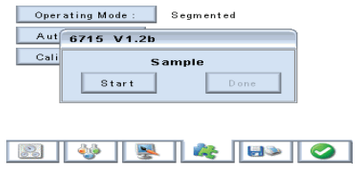
Note: Measuring calibration standards using the sipper pump can only be performed when ***Automatic Sip*** is set to ***On***.

With **Automatic Sip** set to **Off** the sipper will go through the sample handling process step-by-step with each press of the accessory pushbutton.

In ***Kinetics*** mode when ***Auto Log*** is set to ***On*** readings will not be saved or printed until the sample has been drained. In all other modes the result is printed before the drain cycle.

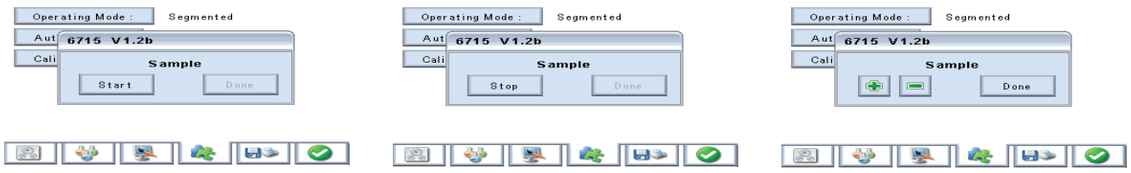
Calibrating the Sipper Pump

From the ***Accessory Settings*** menu press ***Calibrate***. The following screen is displayed:

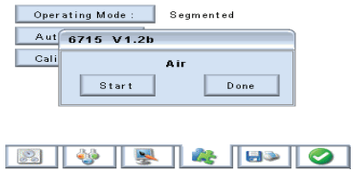


Offer a sample to the inlet tube in the sipper probe.

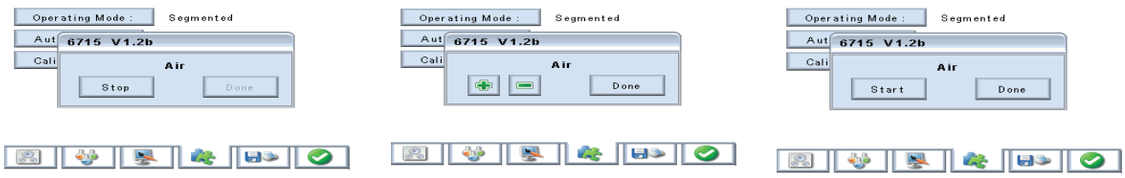
Press ***Start***, the sipper pump will start to operate. View the sample being taken up through the polythene tube to the flow-through cuvette. Ensure the sample fills the chamber of the flow-through cuvette, press ***Stop*** when the sample is just visible in the outlet tube. Further adjustment to the sample uptake can be made using the + / - (uptake volume) buttons. When the correct level is achieved press the ***Done*** button.



A prompt for air segmentation is given. If separation of samples is not required pressing the ***Done*** button will skip this process and a drain cycle will be performed and the instrument will return to the ***Accessory Settings*** menu.



If air segmentation is required remove the sample and press the ***Start*** button. View the air being taken up through the polythene tube to the cuvette. Press ***Stop*** when the air reaches the required position. Further adjustment to the air uptake can be made using the + / - (uptake air) button. When the correct level is achieved press the ***Done*** button. A drain cycle will be performed and the instrument will return to the ***Accessory Settings*** menu.



The sample and air volumes selected during calibration are stored in the method and will be accurately reproduced during the measurement cycles.

Note: A typical use for air segmentation is to 'push' a micro-volume of sample into the cuvette. To do this, take up a very small sample volume into the polythene tube, while viewing it, take up air to move the sample into the cuvette.

Note: To ensure good laboratory practice before turning off the instrument ensure that the sample has drained from the sipper pump into the waste receptacle.

10.5 PELTIER MODULE

This accessory module is fitted into the instrument casing by following the instructions for the Cell Accessories.

Overview of Operation

This temperature controlled sample module uses the electronic peltier heat-transfer effect to maintain a constant temperature around the sample cuvette, heating or cooling as necessary to maintain control. A desired sample temperature between 20 and 50°C (or 68 and 122°F) that can be set to a resolution of 0.1°C (1° F) is available within the Accessory settings on the spectrophotometer. Additional icons and data will appear in the status bar at all times showing the actual temperature and the set (target) level. Control is fully automatic and once set is stored within the method, needing no further entry or adjustment when that method is re-used at a later date.

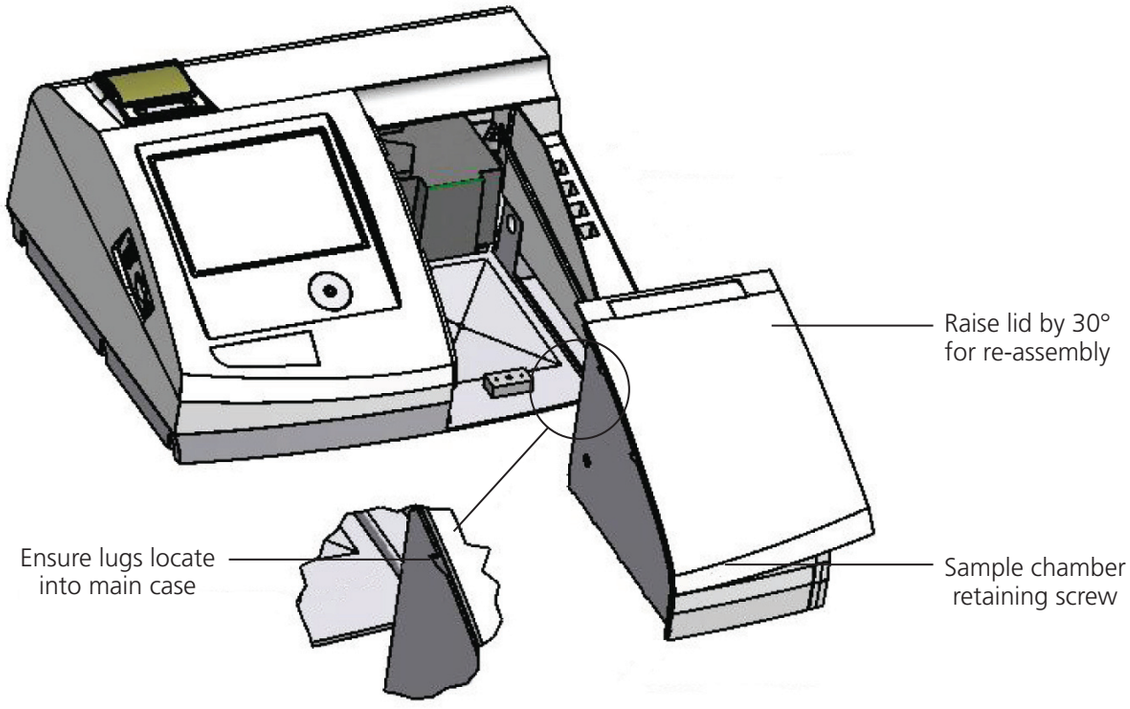
Note: Depending on the insulating/conducting properties of the material used in the chosen cuvette a varying period of equilibration may be required to bring the actual sample temperature to that shown on the display.

Warning: Do not cover or obstruct the exhaust air vent on the front of the accessory module, this will adversely affect the temperature regulation and may damage the peltier element or control components.

Installation

If your instrument was ordered with the Peltier it will be supplied with the module installed.

Fitting the Peltier Module (as a separate accessory option)



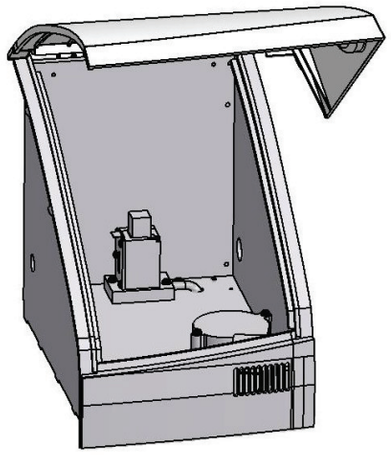
If you are changing from an existing sample chamber module to the Peltier the following installation instructions should be followed:

Disconnect the instrument from the mains supply.

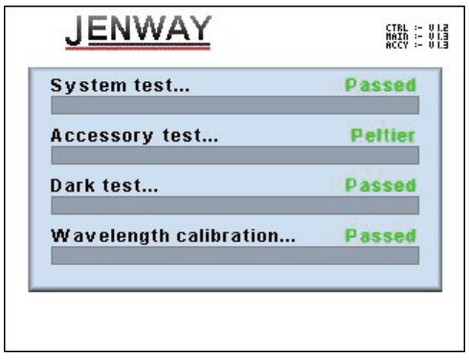
Check the installed sample chamber module and remove any filled cuvettes to avoid spillage.

Raise the lid and loosen the sample chamber retaining screw located at the front of the module. Lifting the front carefully remove the module from the instrument and store safely for possible future use.

Unpack the new module and check to ensure no damage has occurred during transit. To install the new module raise the lid by 30° and gently ease it into the instrument compartment taking care that the lugs shown in the diagram locate into the main casework. Once the module is in position, tighten the sample chamber retaining screw.



Re-connect the mains supply to the rear panel of the instrument. The instrument is now ready for use with the new module. The instrument will then perform the power on self-test protocol. The power on and self-test screen will be shown:

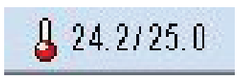


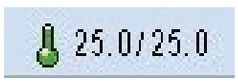
If the module has been successfully installed the instrument will show **'Passed'** alongside the ***Accessory test...*** indicator.

If the module is incorrectly fitted to the instrument the message **'None Found'** will be displayed. If this occurs switch the instrument off and disconnect from the mains supply. Remove the module and carefully refit. Reconnect the instrument to the mains supply and switch on. If the fault remains please contact your local dealer for advice.

Operation

When the Peltier module is fitted an additional icon will be displayed at the top of the screen in the stat us bar.





The red thermometer indicates that the set temperature has not been achieved and cooling/heating is taking place. The first value shows the actual peltier temperature.

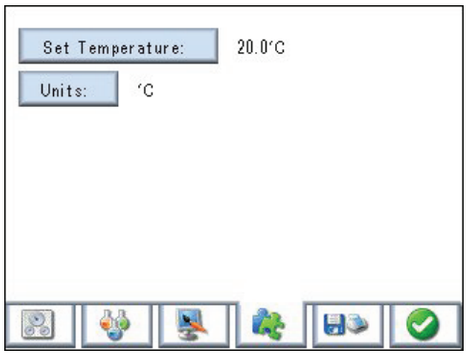
The second displayed value shows the current set temperature.

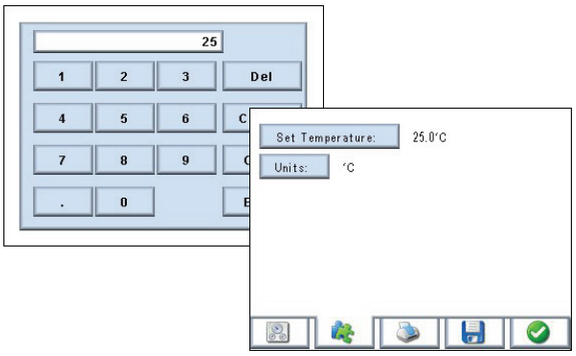
Temperatures can set between 20°C and 50°C (68 and 122° F).

Once optimum temperature has been achieved (within ±0.5°C) the thermometer will change to green.

Setting Temperature

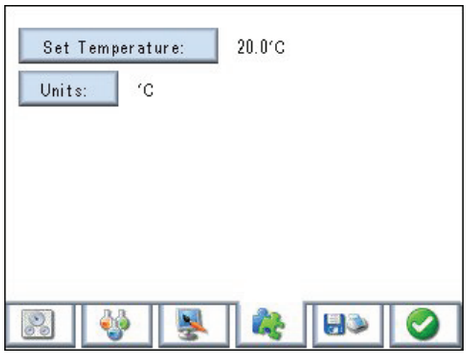
To set the required temperature select the ***Set Temperature*** key and enter the value using the numeric keypad. The ***Clear*** key will clear all information entered on the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu. The ***Enter*** key accepts the new value and returns you to the previous screen.

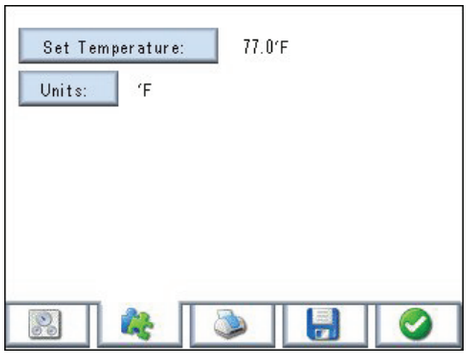




Selecting Units

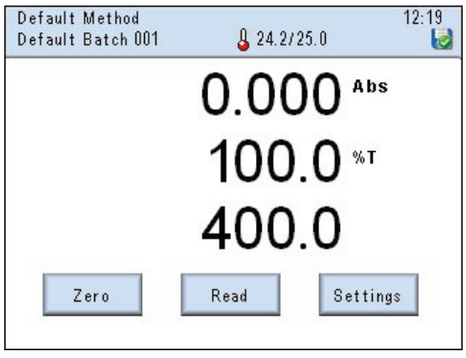
The ***Units*** key toggles between °C and °F.

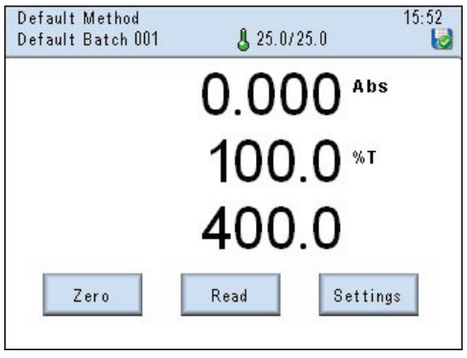




Operating Display

A red thermometer icon indicates heating or cooling is in progress, a green thermometer shows the actual temperature is within ±0.5 degrees Celsius of the set temperature the displayed data is 'actual temperature/set temperature'.





Specification

Temperature Range: 20 to 50°C or 68 to 122°F

Temperature Resolution: 0.1°C or 1°F

Accuracy: ±0.5°C

Stability: ±0.3°C

Red/Green Window: ±0.5°C

10.6 SIPPER/PELTIER MODULE

Overview

The Sipper Pump accessory is based on a programmable peristaltic pump that can be set to repeatedly deliver accurate, controlled volumes of sample into a flow through cuvette.

This enables a single flow through cuvette to be used for many applications, removing the need to decant samples into individual cuvettes, the need for washing re-usable glass or quartz cuvettes or for maintaining stocks and disposing of single use plastic cuvettes.

Many types of flow through cuvettes are available for different applications. Please contact Jenway for additional information or advice.

By injecting a controlled air-gap between samples when used in the segmented mode, very small sample volumes can be 'pushed' into the chamber of a micro flow through cuvette. Where viscous or oily samples persist in the sample chamber the air-gap segment can be completely or partially replaced with a wash solution.

Setting and calibration of the uptake volumes is easily carried out using the interactive menus and graphic user interface on any of the 67 Series spectrophotometers.

This temperature controlled sample module uses the electronic peltier heat-transfer effect to maintain a constant temperature around the sample cuvette, heating or cooling as necessary to maintain control. A desired sample temperature between 20 and 50°C (or 68 and 122°F) that can be set to a resolution of 0.1° C (1° F) is available within the Accessory settings on the spectrophotometer. Additional icons and data will appear in the status bar at all times showing the actual temperature and the set (target) level. Control is fully automatic and once set is stored within the method, needing no further entry or adjustment when that method is re-used at a later date.

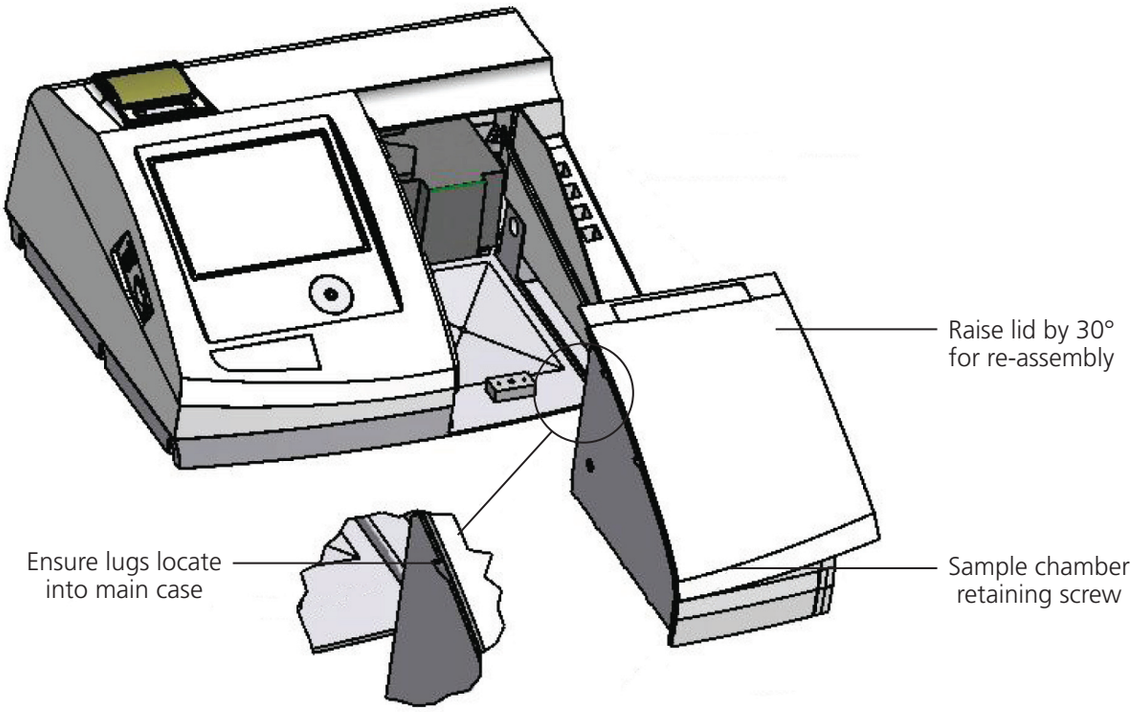
Note: Depending on the insulating/conducting properties of the material used in the chosen cuvette a varying period of equilibration may be required to bring the actual sample temperature to that shown on the display.

Warning: Do not cover or obstruct the exhaust air vent on the front of the accessory module, this will adversely affect the temperature regulation and may damage the peltier element or control components.

Installation

If your instrument was ordered with the sipper pump module it will be supplied with the module installed but without the tubing fitted. A separate kit is supplied (refer fitting instructions).

Fitting the Sipper/Peltier Module (as a separate accessory option)



This is supplied as a complete plug-in module as detailed above. If you are changing from an existing sample chamber module to the sipper/peltier the following installation instructions should be used:

Disconnect the instrument from the mains supply.

Check the installed sample chamber module and remove any filled cuvettes to avoid spillage.

Raise the lid and loosen the sample chamber retaining screw located at the front of the module. Lifting the front carefully remove the module from the instrument and store safely for possible future use.

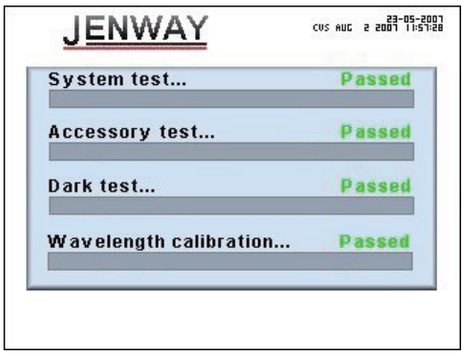
Unpack the new module and check to ensure no damage has occurred during transit.

To install the new module raise the lid by 30° and gently ease it into the instrument compartment taking care that the lugs shown in the diagram locate into the main casework.

Once the module is in position, tighten the sample chamber retaining screw.

Re-connect the mains supply to the rear panel of the instrument. Switch the instrument on using the power switch located on the rear panel. The instrument is now ready for use with the new module.

The instrument will then perform the power on self-test protocol. The power on and self-test screen will be shown:



If the module has been successfully installed the instrument will show **'Passed'** alongside the ***Accessory test...*** indicator.

If the module is incorrectly fitted to the instrument the message **'None Found'** will be displayed. If this occurs switch the instrument off and disconnect from the mains supply. Remove the module and carefully refit. Reconnect the instrument to the mains supply and switch on. If the fault remains please contact your local dealer for advice.

Fitting the Sipper Pump Tubing

The Tubing Kit supplied with this module contains:

Sipper Pump Tubing (1 metre) – 023 029

Capillary Tubing (0.5 metre) – 023 030

Sipper Probe – 632 063

In addition a 2.5mm Sample Mask (035 242) for use with micro cell, is supplied with the accessory module.

For traditional sipping:

Note: It is recommended that all tubing runs are kept as short as possible. Tubes must not be allowed to obstruct the light path.

For 1.8 ml flow through cells ensure that the sample flows into the smallest chamber i.e. the cell fills from the bottom up. For 80µl flow through cells the direction of the flow is shown on the cell.

1. Connect the sipper pump tubing (023 029) to the outlet port on the flow-through cuvette.

2. Secure the tubing using the clip on the right hand side of the pump head.

3. Ease the tubing around the rollers by carefully rotating them clockwise, by hand. Clamp the tubing into the clip on the left hand side of the motor.

4. Once secured, ensure the tubing is routed into the two retaining clips located on the module base plate at the side of the pump head.

5. Cut the tubing at the point where it fits comfortably on to the left hand tube located on the inside of the front bulkhead.

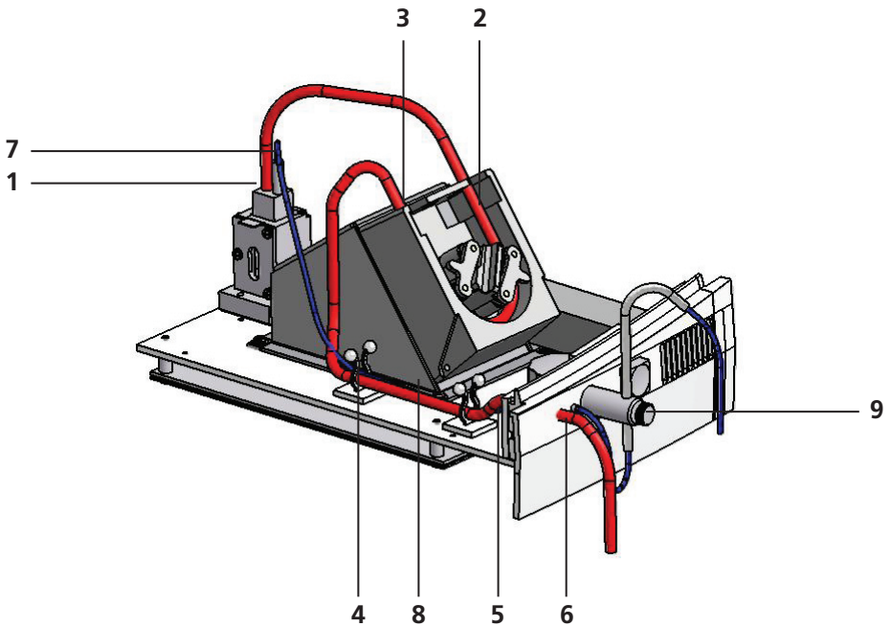
6. Connect a suitable length of this tubing to the external waste pipe.

7. Cut a small length (approx. 10mm) of the sipper pump tube (023 029) and push this over one end of the capillary tube (023 030). Connect this to the inlet port of the flow-through cuvette.

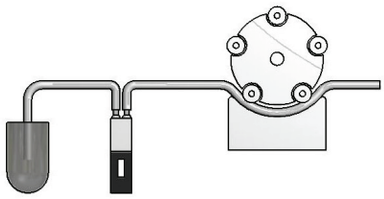
8. Route the tube into the two retaining clips located on the module base plate at the side of the pump head.

9. Fit the sipper probe (632 063) and secure using the thumbscrew. Feed the capillary tubing through the tube and up through the sipper probe, allowing sufficient length for it to pass into a suitable receptacle.

Sipper Tube Schematic



Traditional 'sipping' arrangement



For pumping:

Note: It is recommended that all tubing runs are kept as short as possible. Tubes must not be allowed to obstruct the light path.

1. Cut 2 pieces of sipper pump tubing (023 029) approx. 300mm in length. Take 1 length of tubing and fit this to the pump head, as shown, securing the tubing using the clip on the right hand side of the pump head.

2. Ease the tubing around the rollers by carefully rotating them clockwise, by hand. Clamp the tubing into the clip on the left hand side of the motor.

3. Fit the other end on to the inlet port on the flow-through cuvette.

4. Fit the second 300mm length of tubing to the outlet port of the flow-through cuvette. Once secured, ensure the tubing is routed into the two retaining clips located on the module base plate at the side of the pump head.

5. Fit the other end of the tubing on to the outlet port, located on the inside of the front bulkhead.

6. Connect a suitable length of sipper pump tubing to the external outlet port.

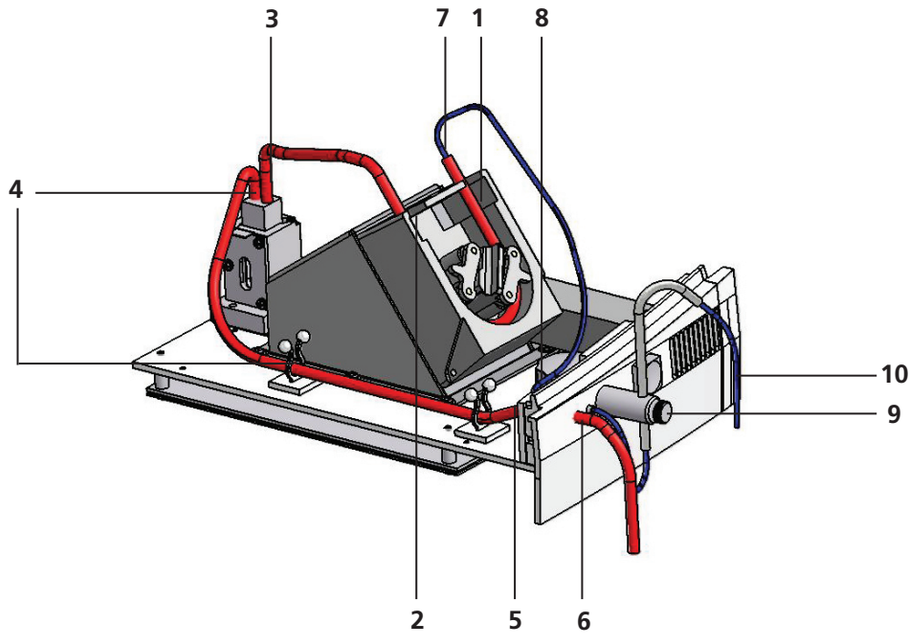
7. Insert one end of the capillary tube (023 030) into the sipper pump tubing, as shown.

8. Feed the other end through the inlet port located on the inside of the bulkhead.

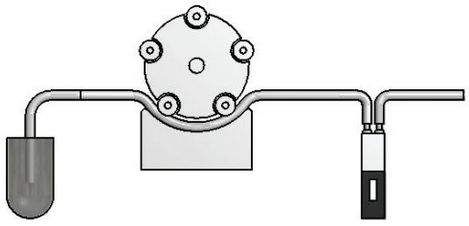
9. Fit the sipper probe (623 063) and secure into position using the thumbscrew.

10. Carefully feed the tubing up through the sipper probe, allowing sufficient length for it to pass into a receptacle.

Pump Tube Schematic



Traditional Pumping Arrangement



Checking the Sipper Pump

After fitting the tubing it is recommended that the following check is performed to ensure the cuvette fills correctly and that there are no leaks present.

Select ***Photometrics*** from the ***Main Menu***. (You do not need to log in for this check).

Select ***Settings*** and the icon.

Select ***Independent*** from the ***Operating Mode*** options.

Press to accept.

The switch on the front of the accessory will illuminate.

Offer up a receptacle of water or coloured solution to the inlet tube. Press the accessory switch and allow the pump to run, ensuring the cuvette fills correctly and that no leaks are present. If the operation is satisfactory press the accessory switch again to stop the pump.

Good Practice Guidelines

Sample Size - the cuvette must be filled with solution. If sample volume is limited, the two-stage uptake cycle can be used, i.e; sufficient sample is taken up to ultimately fill the cuvette, followed by air during the second part of the uptake cycle. The sample will be drawn into the cuvette and only air will occupy the tubing dead space leading to the cuvette.

Sample Characteristics – viscous samples may cause high levels of carryover. A simple test going from a blank to a standard solution and back to a blank, will determine the degree of carryover. With normal aqueous solutions it should be possible to keep this figure below 1%. If this cannot be achieved and it is critical to the test, it may be necessary to include a wash cycle between samples.

System Cleaning – at the end of a sample run it is important to leave the system clean. This can usually be achieved by pumping deionised water through the system. If the nature of the sample is such that water will not adequately clean the system, other solvents may be used, providing they are compatible with the components that will be contacted during cleaning, i.e; PTFE, glass and silicon rubber tubing.

Pump Tubing – the tubing has a finite life and will need to be changed when pumping rates decrease to unacceptable levels, or the walls of the tubing stick together.

Note: If left under roller pressure for prolonged periods, the pump tubing may not pump. In such cases the tubing should be removed from the roller assembly and be reformed by hand. Normal operation should be restored. *This is not a sign of tube wear*.

It is recommended that the tubing should be removed if the sipper pump is not being used for a prolonged period.

Setting Up the Sipper Pump

There are three modes of operation:

1. Independent 2. Segmented 3. Bi-Directional

1. Independent

This is similar to the old continuous mode. Here operation of the sipper pump is via the switch on the front of the accessory module. It can be switched on and off independently of the measurement functions of the spectrophotometer.

This is the simplest mode of operation and can be used to take up samples from bulk containers or as a bypass from a flow or pipeline.

Measurements may be made on the flowing sample using the auto-log function or the pump switched off and measurement on the stopped flow be made manually on the instrument.

This mode is also useful for checking the cuvette and tubing for correct and leak free connection.

No other options are available with this mode selected.

2. Segmented

This mode uses the programmability feature to take up a controlled volume of each sample in a sequential manner. This chain of sample segments can be broken up, by inserting an air (or wash) segment between each. If air (or wash) is not needed, this option is set to zero during calibration. This can be controlled by using the switch on the front of the accessory module or the touch screen of the instrument, depending on the ***Automatic Sip*** setting and the instrument measurement mode selected. The sample always moves forward from the container to the waste receptacle.

3. Bi-Directional

This is identical to the segmented mode, but here the sample is returned to the original container, i.e; pump direction is reversed during the drain sequence.

For draining a flow through cuvette:

Note: Whilst using a 1.8 ml flow cell, order numbers 035 025 (glass) and 035 044 (quartz), the sample can only be drained in ***Bi-Directional*** mode.

If you wish to drain the flow through cell between sample measurements in ***Independent*** or ***Segmented*** modes it is recommended that you use a 80µl flow through cell; order numbers 035 045 (glass) and 035 047 (quartz).

Automatic Sip On/Off

When ***Automatic Sip*** is set to ***On*** the measurement sequence is followed automatically once the sample measurement is started. This is dependent on both the instrument and sipper mode with various prompts and warnings displayed, as necessary. In general, the instrument controls will produce the same effect as a press of the accessory pushbutton.

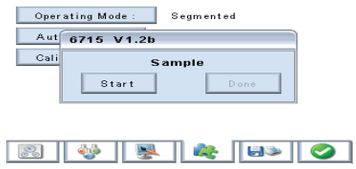
Note: Measuring calibration standards using the sipper pump can only be performed when ***Automatic Sip*** is set to ***On***.

With **Automatic Sip** set to **Off** the sipper will go through the sample handling process step-by-step with each press of the accessory push button.

In ***Kinetics*** mode when ***Auto Log*** is set to ***On*** readings will not be saved or printed until the sample has been drained. In all other modes the result is printed before the drain cycle.

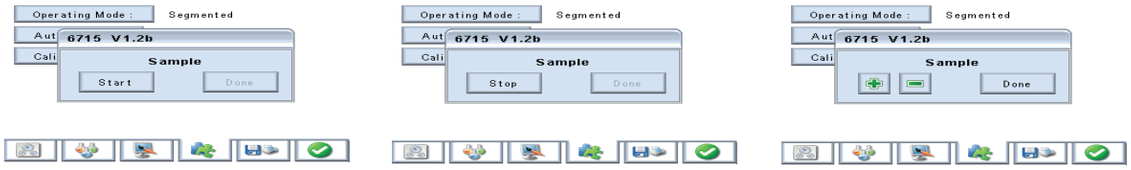
Calibrating the Sipper Pump

From the ***Accessory Settings*** menu press ***Calibrate***. The following screen is displayed:

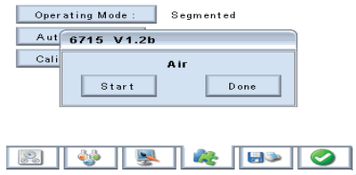


Offer a sample to the inlet tube in the sipper probe.

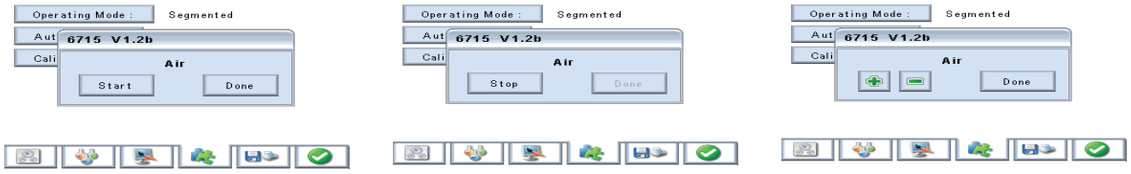
Press ***Start***, the sipper pump will start to operate. View the sample being taken up through the polythene tube to the flow-through cuvette. Ensure the sample fills the chamber of the flow-through cuvette, press ***Stop*** when the sample is just visible in the outlet tube. Further adjustment to the sample uptake can be made using the + / - (uptake volume) buttons. When the correct level is achieved press the ***Done*** button.



A prompt for air segmentation is given. If separation of samples is not required pressing the ***Done*** button will skip this process and a drain cycle will be performed and the instrument will return to the ***Accessory Settings*** menu.



If air segmentation is required remove the sample and press the ***Start*** button. View the air being taken up through the polythene tube to the cuvette. Press ***Stop*** when the air reaches the required position. Further adjustment to the air uptake can be made using the + / - (uptake air) button. When the correct level is achieved press the ***Done*** button. A drain cycle will be performed and the instrument will return to the ***Accessory Settings*** menu.



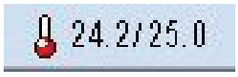
The sample and air volumes selected during calibration are stored in the method and will be accurately reproduced during the measurement cycles.

Note: A typical use for air segmentation is to 'push' a micro-volume of sample into the cuvette. To do this, take up a very small sample volume into the polythene tube, while viewing it, take up air to move the sample into the cuvette.

Note: To ensure good laboratory practice before turning off the instrument ensure that the sample has drained from the sipper pump into the waste receptacle.

Peltier Operation

When the Peltier module is fitted an additional icon will be displayed at the top of the screen in the status bar.



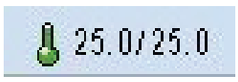
The red thermometer indicates that the set temperature has not been achieved and cooling/heating is taking place.

The first value shows the actual peltier temperature.

The second displayed value shows the current set temperature.

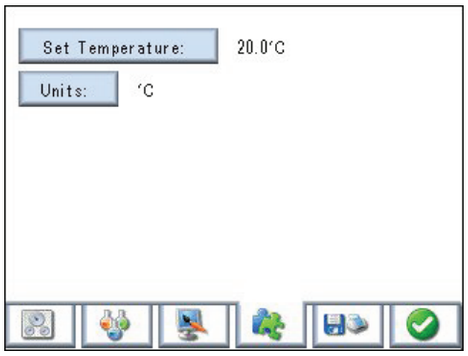
Setting can be made between 20°C and 50°C (68 and 122° F)

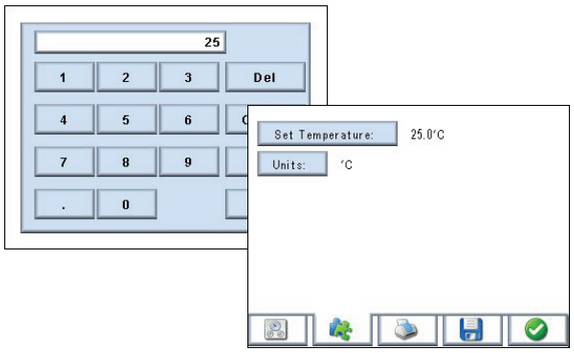
Once optimum temperature has been achieved (within ±0.5°C) the thermometer will change to green.



Setting Temperature

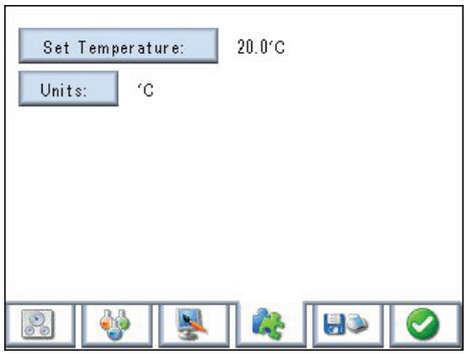
To select the required temperature press the ***Set Temperature*** key and enter the value using the numeric keypad. The ***Clear*** key will clear all information entered on the screen. The ***Del*** key allows individual digits to be removed. The ***Cancel*** key will return you to the previous menu. The ***Enter*** key accepts the new value and returns you to the previous screen.

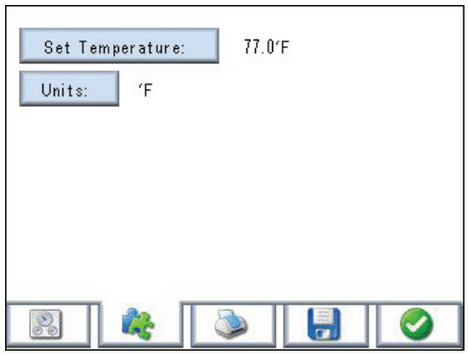




Selecting Units

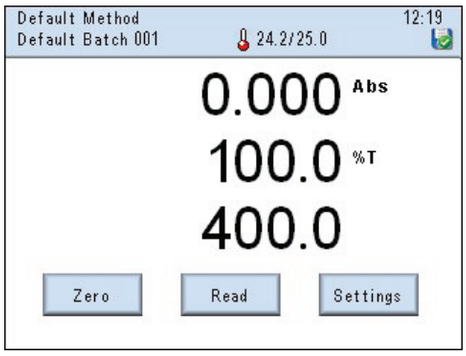
The ***Units*** key toggles between °C and °F.

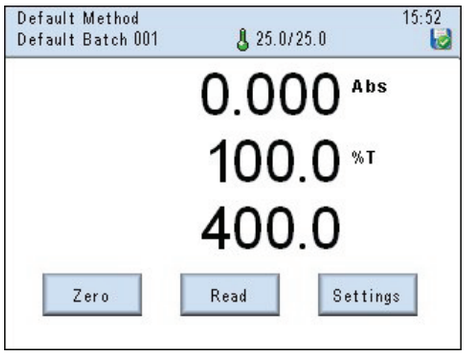




Operating Display

A red thermometer icon indicates heating or cooling is in progress, a green thermometer shows the actual temperature is within ±0.5 degrees Celsius of the set temperature the displayed data is 'actual temperature/set temperature'.





Specification

Temperature Range: 20 to 50°C or 68 to 122°F

Temperature Resolution: 0.1°C or 1°F

Accuracy: ±0.5°C

Stability: ±0.3°C

Red/Green Window: ±0.5°C

SECTION 11 - Maintenance & Troubleshooting

11.1 GENERAL

The 67 Series are designed to give optimum performance with minimum maintenance. It is only necessary to keep the external surfaces clean and free from dust. The sample area should always be kept clean and any accidental spillage should be wiped away immediately.

To give added protection when not in use, the instrument should be disconnected from the mains supply and covered with the optional dust cover.

For longer-term storage or re-shipment it is recommended that the instrument should be returned to the original packing case.

Cleaning

Note: Prior to using any cleaning or decontamination solution, except those recommended below, the user should contact the dealer or manufacturer for advice/confirmation that the proposed method of cleaning will not damage the instrument.

Under no circumstances should a compressed air canister be used to clean the interior surfaces of the instrument since the resultant rapid cooling can cause damage to fragile optical components.

Casework

Do not use aggressive solvents such as acetone or abrasive cleaners for cleaning the instrument surfaces.

For general cleaning the use of a damp cloth should be sufficient. For more thorough cleaning it is possible to use a mild detergent solution, iso-propyl alcohol (a small amount on a cloth) or a dilute solution of Decon 90®.

Touch Screen

The screen can be cleaned using a standard proprietary computer screen cleaner.

Note: The monochromator is a non-serviceable unit and no attempt should be made to repair this item. Failure to observe this recommendation will result in the loss of any Warranty Claim on this product. In the unlikely event of the monochromator requiring service or calibration, it is essential that the manufacturer or your local dealer be contacted immediately for advice.

11.2 LIGHT SOURCE REPLACEMENT

The only routine maintenance that may be required is the replacement of the light source. Failure of the lamp will be detected during the system test at power up of the instrument.

Note: The Model **6700** is fitted with a tungsten halogen lamp.

The Models **6705 and 6715** are fitted with a flash lamp module.

Tungsten Lamp Replacement – Model 6700

Warning: Disconnect the instrument from the mains supply prior to replacing the lamp. Care should be taken when removing the lamp from the holder.

Ensure the lamp is cool prior to handling.

Access to the lamp is gained via the base of the instrument.

Important: Prior to turning the instrument upside down the sample chamber must be checked and any samples removed to avoid spillage or damage.

Carefully turn the instrument over onto a protected work surface and locate the **2 posi-head** Lamp Module Retaining Screws and place carefully to one side, (refer diagram).

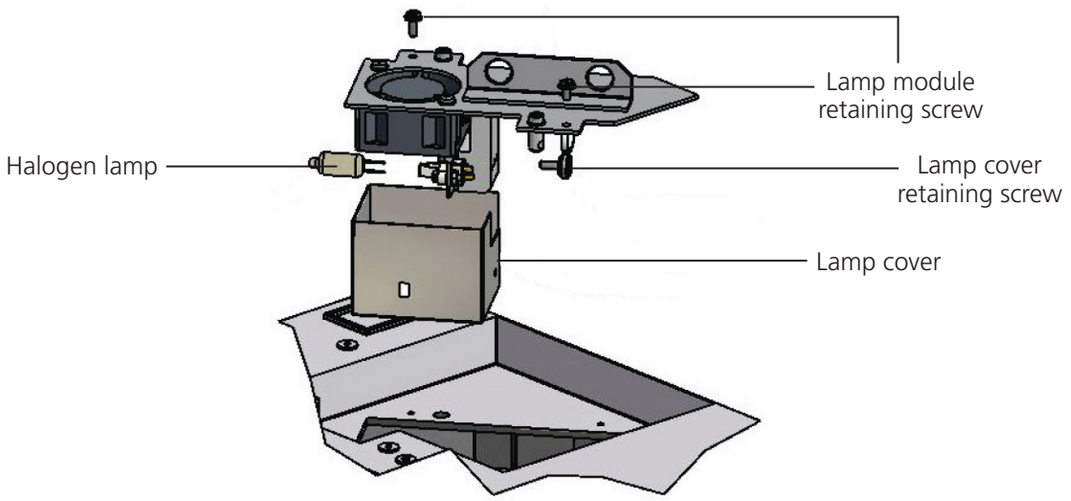
No attempt should be made to remove the 2 socket head screws from the base.

Gently withdraw the module from the base plate and remove the Lamp Cover Retaining Screw. Place carefully to one side.

Remove the Lamp Cover. Locate and carefully remove the tungsten lamp from the holder. The lamp is a plug-in fit and should be removed by gently easing it from the holder.

Carefully remove the replacement lamp from the packaging, ensuring the glass portion of the lamp is not touched.

Important: When fitting the replacement lamp it is essential that the glass envelope is not touched. Finger marks will damage the lamp. Should accidental damage with finger marks occur, the surface of the lamp can be cleaned using iso-propyl alcohol.



Gently insert the lamp into the holder ensuring it is fully pushed home.

Slide the Lamp Module into position in the Lamp Cover and refit the Lamp Cover Retaining Screw.

Refit the 2 posi-head Lamp Module Retaining Screws.

Carefully turn the instrument over. Reconnect the mains supply to the instrument and power up. The self-test power up sequence will be initiated. On successful completion the instrument is ready for use.

In the unlikely event of further failure on power up self-test, please consult the manufacturer or you local dealer for advice.

Flash Lamp Module Replacement – Models 6705 and 6715

Warning: Disconnect the instrument from the mains supply prior to replacing the lamp. Care should be taken when removing the module. Ensure the module is cool prior to handling.

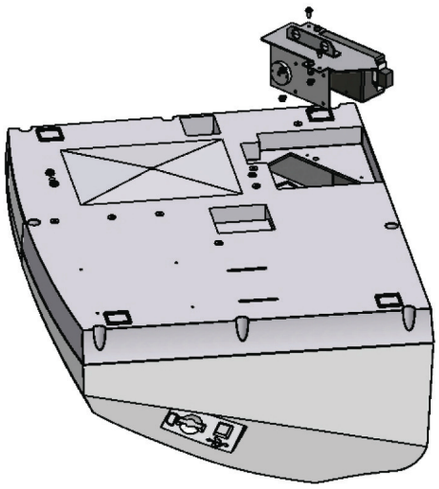
Access to the lamp module is gained via the base of the instrument.

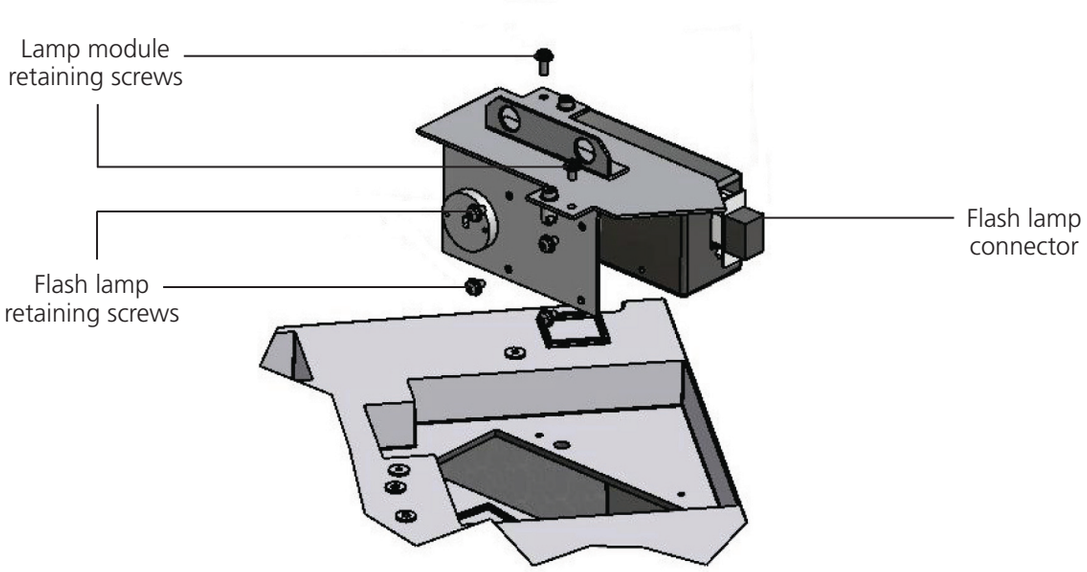
Safety glasses must be worn when UV emissions are present.

Important: Prior to turning the instrument upside down the sample chamber must be checked and any samples removed to avoid spillage or damage.

Carefully turn the instrument over onto a protected work surface and locate the **2 posi-head** Lamp Module Retaining Screws and place carefully to one side, (refer second diagram).

No attempt should be made to remove the 2 socket head screws from the base.





Gently withdraw the housing from the base plate and unplug the Flash Lamp Connector.

Remove the 4 Flash Lamp Retaining Screws and place carefully to one side. Locate and carefully remove the flash lamp module.

Carefully remove the replacement lamp module from the packaging, ensuring the glass portion of the lamp is not touched.

Important: When fitting the replacement lamp it is essential that the glass is not touched. Finger marks will damage the lamp. Should accidental damage with finger marks occur, the surface of the lamp can be cleaned using iso-propyl alcohol.

Gently insert the lamp module into the housing ensuring it is fully pushed home.

Refit the 4 Flash Lamp Retaining Screws. Plug in the Flash Lamp Connector.

Insert the complete assembly into the base plate and refit the 2 posi-head Lamp Module Retaining Screws.

Carefully turn the instrument over. Reconnect the mains supply to the instrument and power up. The self-test power up sequence will be initiated. On successful completion the instrument is ready for use.

In the unlikely event of further failure on power up self-test, please consult the manufacturer or you local dealer for advice.

GLOSSARY OF ICONS

Touch Panel Icons

Standby

Instrument Settings

Back

Save

Toolbar

Printer

Method Screens

Create a New Method

Open the Selected Method

Erase the Selected Method

Browse Results

Open specific results in the selected batch

Touch Screen Mode Icons

Mode settings (all modes)

Accessory options (all modes)

Internal or external printer selection (Photometrics mode)

Batch ID and Auto Save (Photometrics mode)

Enter (all modes)

Analysis Points (Spectrum mode)

Measurement – auto scaling, axis setting, colour selection (Spectrum, Kinetics and Quantitation modes)

Internal or external printer selection, graph details, Batch ID and Auto Save (Spectrum, Multi-Wavelength, Kinetics and Quantitation modes)

Wavelength setting (Multi-Wavelength mode)

Calculations (Multi-Wavelength mode)

Calibration (Kinetics and Quantitation modes)

Spectrum Mode Scan Analysis Icons

Toggles ***Auto Scale*** (Y Axis) ***On*** or ***Off***. If ***Off*** Y axis defaults to manual settings entered in the method.

Cycles round ***Plot Interval*** settings of 0.1, 0.5, 1.0 and 5.0nm

Zoom

Activates the zoom area select cursors that can be positioned using the QWheel™ over the area required. Repeated presses increase the zoom up to 5 times.

Returns the zoom to the next lower level. At x1 this icon is disabled.

Exit Door maintains the zoom display and gives access to the tools for manipulation and analysis of the zoomed portion.

Area Under Curve

Cursor Select

Co-ordinate Tagging

Tag

Delete Tag

Auto Peak & Valley Tagging

Calculate

Find Peaks & Valleys Table

Display Spectrum with Peaks & Valleys

Scroll Up

Scroll Down

Select Derivative

Spectral Overlay

Add scans to overlay

Information

Display More icons

Display Original icons

Add/Subtract scans

Add scans

Delete scans

Return to Original Scan

Quantitation Mode Analysis Icons

Information

Auto Scale On/Off

Curve Fit

Curve Fit options selection

Conc. resolution decrease

Conc. resolution increase

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