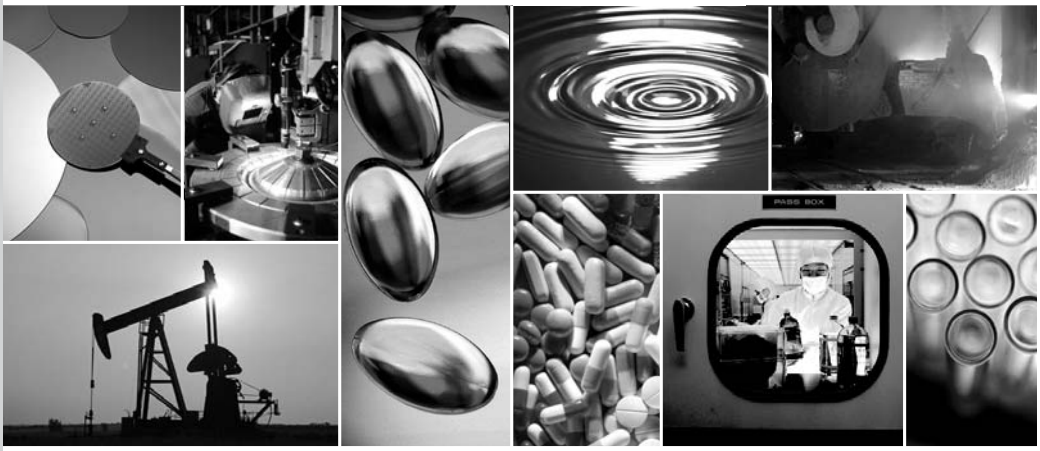
AquaMate
User Manual



Note

This manual is being revised, so some of the information you will find in it is out-of-date. Please accept our apologies for any confusion this may cause. Any reference to Unicam, Spectronic Instruments or Thermo Spectronic has changed to Thermo Electron Corporation, and the contact and trademark information has also changed. On the next page, you will find a current disclaimer and up-to-date contact and trademark information. Please contact Thermo Electron if you have any questions or concerns.

P/N 949923046011

Thermo
ELECTRON CORPORATION

For technical assistance, please contact:

Technical Support
Thermo Electron Corporation
5225 Verona Road
Madison WI 53711-4495
U.S.A.

Telephone: 1-800-642-6538 (U.S.A.) or +1 608-273-5015 (worldwide)
Fax: +1 608-273-5045 (worldwide)
E-mail: techsupport.analyze@thermo.com

User Manual

Issue 3b
010718

Thermo Spectronic (Europe, Middle East and Africa)
Mercers Row, Cambridge CB5 8HY, UK
Tel: +44 (0)1223 446600
Fax: +44 (0)1223 446644
E-mail: info@thermospectronic.co.uk
www.thermospectronic.com

Thermo Spectronic (North America and Latin America)
820 Linden Avenue, Rochester, NY 14625, USA
Tel: (800) 654-9955 or (716) 248-4000
Fax: (716) 248-4014
E-mail:info@thermospectronic.com
www.thermospectronic.com

For Indian Sub-continent, Far East and Australasia
Contact Thermo Spectronic (Europe, Middle East and Africa)

Thermo Spectronic

A Thermo Electron business

USER MANUAL

CONTENTS

Navigate through this document by scrolling, or click on a section title to move to that section directly.

Return to Welcome Page

Return to Welcome Page

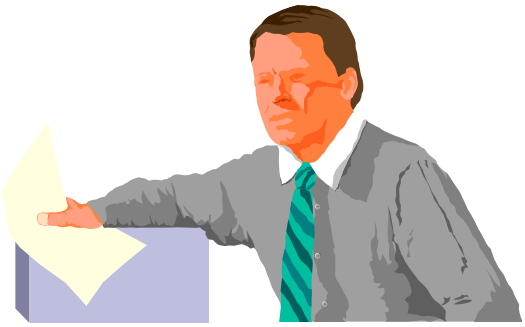
Getting Started with AquaMate spectrophotometers

AquaMate spectrophotometers are entire instruments which are operated through their integral control panels. Hard copy of results can be made with a pre-installed internal printer or a separate external printer.

THIS SYSTEM IS DESIGNED TO BE USER INSTALLED -

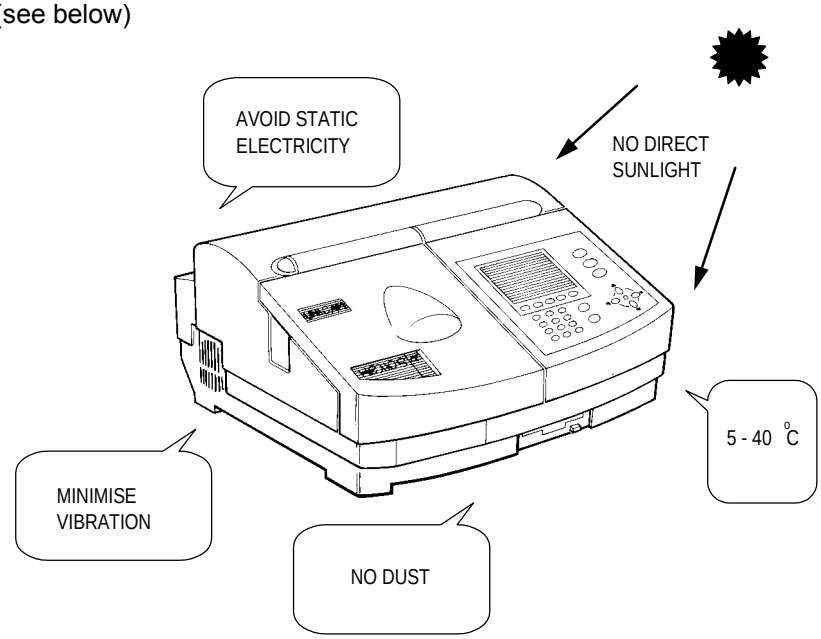
So, use the following procedures to quickly get your new spectrophotometer system in position and running the way you want it.

1. **Read the Safety instructions on page 3 of this manual.**

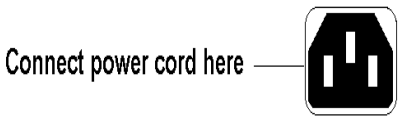


2. Check the component parts of the system against the Despatch Note and Packing List. **Immediately report by telephone (confirmed in writing) any discrepancies**.

3. Find a suitable location. (see below)

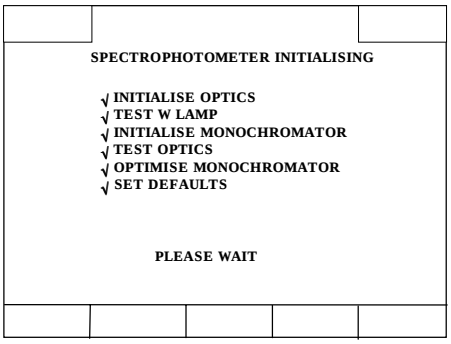


4. Connect the supplied power cord to the spectrophotometer.



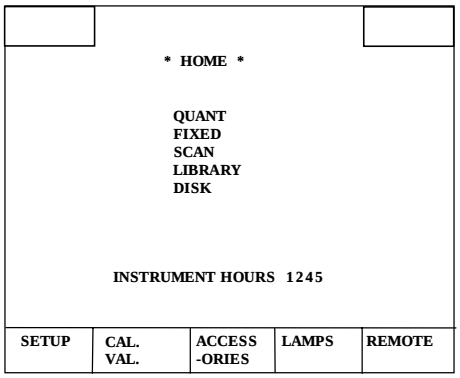
5. Ensure NO SAMPLE(S) are in place in the sample compartment .
- Turn the spectrophotometer on.

6. Local Control display shows this sequence if OK
- ✓ appear sequentially as each test is completed.



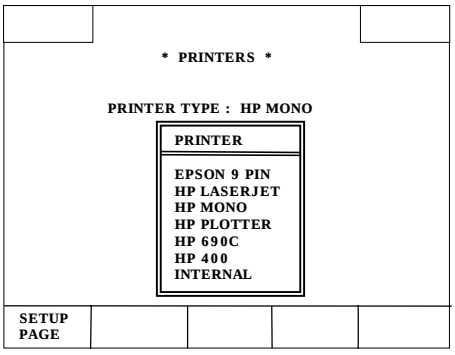
Approximately

3 minutes



THIS COMPLETES THE INSTALLATION OF AN AQUAMATE SYSTEM - IF YOU WISH TO INSTALL AN EXTERNAL PRINTER GO TO POINT 7.

Connecting up a Printer to an AquaMate system



7. **ENSURE THAT THE SPECTROPHOTOMETER IS TURNED OFF -**

Now, connect the printer to the Parallel port on the spectrophotometer using the cable supplied.

8. To set up the Printer in the software:

POWER UP THE SYSTEM AND ALLOW TO INITIALISE

- From HOME page, press SETUP.
- select PRINTER using the cursor keys,
- press ENTER. The PRINTERS page is displayed with the default printer (HP Mono / Internal) selected.
- press ENTER again to display the Printer Menu and using the cursor keys, select the required printer.
- press ENTER.

THIS COMPLETES THE INSTALLATION OF AN AQUAMATE SYSTEM

SAFETY

- THIS SPECTROPHOTOMETER SYSTEM HAS BEEN DESIGNED TO BE USER INSTALLED.

  READ THIS PAGE CAREFULLY BEFORE INSTALLING AND USING THE INSTRUMENT AND ITS ACCESSORIES.

- The safety statements in this manual comply with the requirements of the HEALTH AND SAFETY AT WORK ACT 1974.

- The instrument and accessories described in this manual are designed to be used by properly trained personnel only. Adjustment, maintenance and repair of exposed equipment must be carried out only by qualified personnel who are aware of the hazards involved. Where indicated in the relevant manual, certain maintenance processes may be carried out by the user, who must be fully aware of, and apply, the following safety precautions.

- For the correct and safe use of this instrument and its accessories it is essential that both operating and servicing personnel follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

- Specific warning and caution statements, where applicable, can be found throughout the manual. Warning and caution statements and/or symbols are marked on the apparatus where necessary.

- The instrument covers and accessories should only be removed by personnel who have been trained to avoid the risk of electric shocks. The mains electricity supply to the instrument must be disconnected at the mains supply connector and at least three minutes allowed for capacitors to discharge.

- Some of the chemicals used in spectrophotometry are corrosive, and/or flammable and samples may be radioactive, toxic or potentially infective. Care should be taken to follow the normal laboratory procedures for handling chemicals.

- The UV radiation from a deuterium lamp can be harmful to the skin and eyes. Always view the lamp through protective glasses/goggles that will absorb the UV radiation and avoid looking directly at the deuterium arc. Do not expose the skin to direct or reflected UV radiation.

- Whenever it is likely that safety protection has been impaired, the instrument and/or accessory must be made inoperative and secured against any unintended operation. The matter should then be referred to the appropriate servicing authority. Safety protection is likely to be impaired if for example, the instrument fails to perform the intended measurements or shows visible damage.

Return to Index

GENERAL

Introduction

- The range comprises a group of UV-Visible and Visible spectrophotometers which can be controlled independently via an integral keypad and LCD display.

- The system is composed of a spectrophotometer with integral keypad, LCD display, 1.44 Mbyte Disk Drive, Local Control Software and output device.

LCD display contrast can be controlled during initialisation, or from the HOME page using the left and right arrow keys.

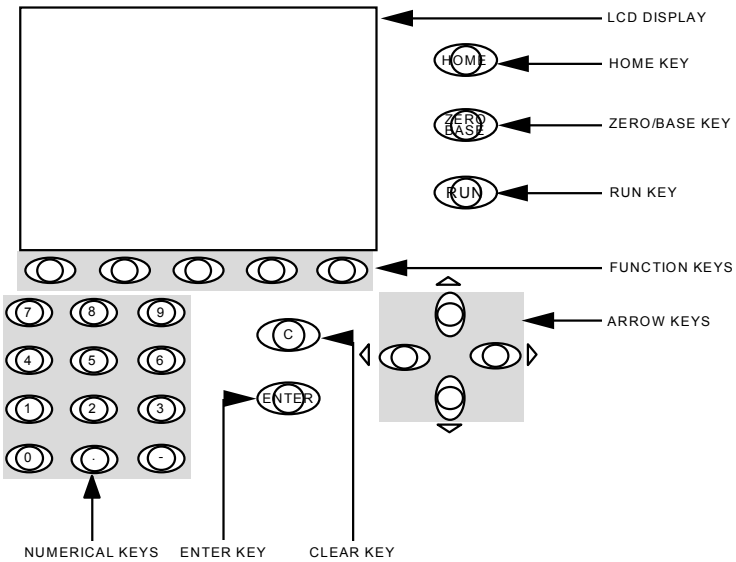
- Always remove disks from the disk drive when not in use. Never power-up the instrument with a disk in place, as permanent damage may be caused to the disk.

The only exception to this rule is when upgrading the instrument software. Then, automatic recognition of a software disk causes an automatic upgrade of the software.

- The Local Control software controls all aspects of the systems operation.

- The Local Control software provides automatic calculation of results from measurements using user-defined equations in QUANT and FIXED modes.

User Interface



Key	Operation
Arrow Keys	Highlight menu options, or move track cursor, or move Cell Programmer, depending on page in use. Change display contrast with <> from Home Page.
Numerical Keys	Enter numbers, minus and decimal point.
Function Keys	Access and perform system functions. Operation depends on screen in use, and is indicated by labels at bottom of screen.
Clear	Clears entry leaving field or parameter ready for new entry, clears pop-up, and clears error messages.
Enter	Enters changes to field or parameter.
Run	Starts instrument measurement according to current method.
Home	Returns to Home page.
Zero/Base	Performs a zero.

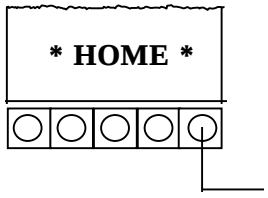
REMOVE THE SAMPLE AND ENSURE THAT THE SAMPLE BEAM IS CLEAR OR CONTAINS THE BLANK SAMPLE RELEVANT TO THE ANALYSIS BEFORE ZEROING THE INSTRUMENT.

Software

The Local Control Software is organised in a tree structure with all functions accessed initially from the HOME Page. Movement between the software pages is controlled by function keys or by highlighting with cursor keys and pressing ENTER. Home will always go to the HOME page.

The QUANT and FIXED applications are entirely separate. Only one application can be operational at any one time. Loading another application will overwrite any current data.

Local and Computer Control



- From switch-on the instrument will automatically be under the control of the LOCAL CONTROL software. To enable control from an external computer press REMOTE on the HOME page. Control will go to the computer providing the instrument is idle.

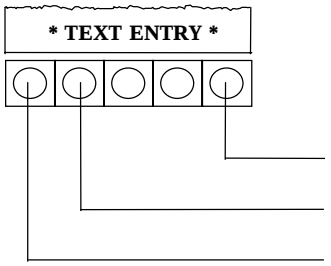
- To return control to the Local Control software press the HOME key. Control will revert to the Local Control software providing that the instrument is idle, and the PC software has relinquished control.

TEXT ENTRY Page

This page is used for entry of method, operator, and sample identities and units in all applications. The title displayed at the top of the page depends on which parameter is being edited. On entry to this page the name field is filled with the current value.

OPERATOR	Enter up to 11 characters for operator ID.
METHOD ID	Enter up to 11 characters for method description.
UNITS	Enter up to 11 characters for units.
SAMPLE ID	Enter up to 11 characters for sample ID

- Use the Arrow keys to move the cursor to the required character and press ENTER. Once all the required characters have been entered press ACCEPT. Numbers are entered using the numeric keypad. If you make a mistake  will act as a backspace or CLEAR will clear the whole entry.



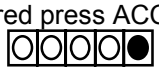
(←) - Acts as backspace and clears the last character in the line.

ACCEPT - Enters the names and returns to the calling screen.

CANCEL - Abandons the naming operation and returns the calling page. The original entry is not changed.

SAVE/RENAME

This page is used for saving or renaming files from any part of the LOCAL CONTROL software. The page is used to name a file and/or change the ID.

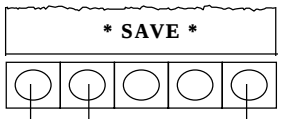
- On coming to the page the Filename field is ready for editing. Use the Arrow keys to move the cursor to the required character and press ENTER. Once all the required characters have been entered press ACCEPT. Numbers are entered using the numeric keypad. If you make a mistake  will act as a backspace or CLEAR will clear the whole entry.

Filenames are limited to 8 characters.

- To change the FILE TYPE highlight the field and press ENTER to display the pop-up menu. Available formats are NORMAL (the native file type of the Local Control Software) and CSV (Comma separated variable). Highlight your choice and press ENTER to select.

- The ID field will contain the characters entered for the method. To edit the ID highlight the ID field and press ENTER, change as necessary then press ACCEPT.

- To select the destination of the file, highlight the DRIVE field. Pressing ENTER will toggle between LIBRARY and DISK.



(←) - Acts as backspace and clears the last character in the line.

ACCEPT/SAVE. ACCEPT (if edit is in progress) - Accepts the edited field ready for saving.
SAVE (not present during an edit) - saves file to Library or Disk.

CANCEL - Abandons the naming operation. No files will be changed and the software returns to the calling screen.

Return to Index

QUANT

Instrument and analysis parameters are set up on the QUANT page. Move the cursor to the required parameter using the Up/Down Arrow keys. Change the parameter by pressing the ENTER key.

- Once all results have been collected, save the data.

QUANT METHOD Page

```
        * QUANT *

ID                  :
WAVELENGTH          : 550.0 nm
BANDWIDTH           : 2.0 nm
INTEGRATION         : 1 s
STANDARDS           : 3
REPLICATES          : 1
UNITS               :
CURVE FIT           : LINEAR
MEASURE STDS        : YES
TIMER(S)            : 0
LAMP CHANGE         : 325 nm
OPERATOR            :
UVCALC              : 0
CELL PROG           : AUTO
REF MODE            : OFF
```

ID : Enter a description using the TEXT ENTRY screen.

- The ID identifies the method and will be saved with the method and any results produced by the method.

WAVELENGTH : Select a wavelength between 190.0 nm, or 315.0nm for AquaMate Vis, and 1100.0 nm.

If the wavelength requires the Deuterium lamp (if fitted) then this will be switched on. The current data will be lost if the wavelength is changed.

BANDWIDTH : This is fixed at 2.0 nm.

INTEGRATION : Enter integration time in seconds.

This sets the integration time for which the result is measured.
The current data will be lost if the integration time is changed.

STANDARDS : Brings up the Standards Entry Page

Use the up and down arrow keys to move through the list of standards. When the standard to be entered or edited is highlighted, press ENTER to display the Edit pop-up. Use the numeric keys to enter the concentration of the standard and press ENTER when finished. The instrument returns to the Standards Entry page with the highlight on the next standard on the list. Up to 20 standards can be specified.

Changing the standards will cause any current data to be lost.

REPLICATES : Enter number of replicates for each standard.

- Sets the number of times each standard is measured (maximum 3). Each value obtained is used in the calibration.

UNITS : Enter units for concentration using the TEXT ENTRY page.

CURVE FIT : Select from LINEAR / LINEAR TO 0 / QUADRATIC / QUAD TO 0.

- Selects the curve fit algorithm used in the calibration.

LINEAR	performs a linear calibration. At least two standards are required.
LINEAR TO 0	performs a linear calibration forced through zero.
QUADRATIC	performs a quadratic fit on the data. At least three standards are required.
QUAD TO 0	performs a quadratic fit with the data forced through zero. At least two standards are required.

Changing the curve fit will cause the existing calibration to be recalculated.
Any results associated with the previous calibration will be lost.

MEASURE STDS : Toggles between YES and NO.

- When YES, and Standard concentrations have been entered from the Quant Standards page, pressing Calibrate causes the instrument to prompt the user to put the standard in the beam and press Run to measure, for each Standard in turn.

- When NO, pressing Calibrate causes the system to prompt for an absorbance to be entered manually for each Standard, effectively enabling a calibration originating elsewhere to be entered.

TIMER(S) : Displays the AquaMateTimers Page

Up to four countdown timers may be defined. Use the arrow keys to move around the list of timers and press ENTER to change an individual item. For each timer, select the title to be displayed, the duration of the timer and the required action on timeout:

TITLE : Select from TIMER / WAIT / SHAKE / INVERT / SWIRL / BOIL / HEAT

DURATION : Set a time in the range 00.01 to 99.59, using . to separate minutes and seconds.

ACTION : Select from PAUSE/CONTINUE

If the timeout action is set to PAUSE, the instrument will display a prompt when the timer has finished. The user is given the choice between stopping, zeroing, and continuing the measurement sequence. If CONTINUE is selected, the instrument will automatically continue to the next stage in the measurement sequence.

Use the CHANGE MODE function key to set the OPERATING MODE as MULTIPLE USE or SINGLE USE. In SINGLE USE mode, the timers will be run before the first measurement only.

When the operating mode is set to MULTIPLE USE, all timers will be used before each measurement.

Use the RUN TIMERS function key to operate the timers without initiating a measurement sequence.

Once the timers have been set up, press the ACCEPT function key to accept the new list or the CANCEL function key to return to the FIXED METHOD page without changing the timers.

- When RUN is pressed to start a measurement, the specified sequence of timers will be started, with the remaining time for the current timer being displayed on the screen. Any timer may be interrupted by selecting the STOP softkey. Once the last timer has finished, the measurement will be made in the normal way.

N.B. Timers can be used in conjunction with a sipper (in AUTOMATIC mode). They cannot be used with a cell programmer in AUTO mode.

LAMP CHANGE **:** Select from 315, 320, 325, 330, 335, 340, D2, W.
Not available in AquaMate Vis.

- Selects the wavelength at which the source is changed between the Tungsten and Deuterium lamps. Selecting D2, or W overrides any changeover and the selected lamp will be used regardless of the wavelength set.

Any current data will be lost if the lamp changeover wavelength is changed.

OPERATOR **:** Switches to the TEXT ENTRY screen.

The operator name is automatically saved with the method and any data produced by the method.
Changing the operator name will not cause any current data to be lost.
If User Log-on is in operation, the operator name cannot be changed.

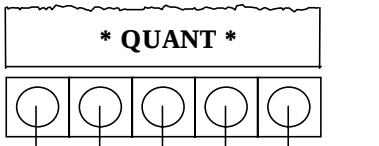
UVCALC **:** Switches to the UVCALC screen.

- See UVCalc Section.

CELL PROG **:** Switches to the CELL PROG. screen (if fitted).

REF MODE **:** Toggles the status of the Cell Programmer Reference Mode (if fitted).

QUANT Page function keys



VIEW CALIB - Switches to the QUANT GRAPH page if a valid calibration exists.

VIEW RESULTS - Switches to the Quant Results page if there are any sample results.

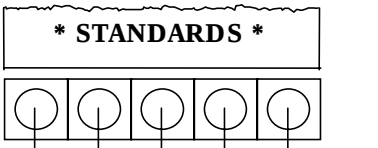
SAVE METHOD - Brings up the SAVE page from where the method can be saved to Disk.

PRINT METHOD - Prints the current method parameters and the standards table on the printer.

CALIBRATE - Switches to the Standards Entry page.

QUANT STANDARDS Page

- This page lists the standards as defined in the QUANT METHOD. Before the system can be calibrated each standard must have a concentration entered.
- To enter Standard concentrations use the up and down arrow keys to move through the list of standards. When the standard to be entered or edited is highlighted press ENTER to display the Edit pop-up. Use the numeric keys to enter the concentration of the standard and press ENTER when finished. The instrument returns to the Standards Entry Page with the highlight on the next standard on the list. Up to 20 standards can be specified. When all the standards have been entered, press the ACCEPT function key to return to the QUANT Page with the new list of standards, or CANCEL to return leaving the old list unchanged.
- If a calibration has been done then the correlation coefficient and the equation are displayed.
- If a calibration has not been done pressing RUN causes the warning prompt "CANNOT RUN WITHOUT CALIBRATION" to appear, otherwise it takes a sample measurement and switches to the Quant Results screen. Pressing ZERO/BASE starts a zero using the current method.



VIEW CALIB - Switches to the QUANT GRAPH page if a valid calibration exists

VIEW RESULTS - Switches to the QUANT RESULTS page if there are any results in the table.

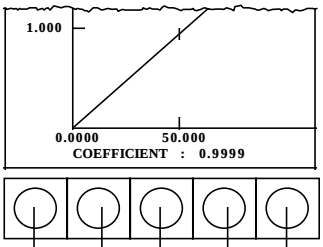
QUANT PAGE - Switches back to the Quant page.

EDIT STD – Available after calibration. Allows each standard to be used, ignored or remeasured.

EDIT CURVE – Available after calibration. Allows curve fit to be changed.

QUANT CALIBRATION

- Press ZERO/BASE to zero the instrument with the current method. (See page 5).
- To calibrate the system press return to the QUANT page and press CALIBRATE. The QUANT CALIBRATION graph will be displayed and the instrument will prompt for each standard (and replicate) in turn. As the measurements of the standards proceed the datapoints are marked on the graph. When all the standards have been measured the system calculates the equation, rescales the graph then draws and displays the line of best fit on the graph.
- A calibration can be stopped by pressing the STOP function key. The calibration will be aborted and the software will return to the QUANT STANDARDS page. Any values obtained will be lost.
- If a calibration has not been done pressing RUN causes the warning prompt "CANNOT RUN WITHOUT CALIBRATION" to appear, otherwise it takes a sample measurement and switches to the Quant Results screen.



VIEW RESULTS - Switches to the Quant Results page if there are results.

QUANT PAGE - Switches back to the Quant page.

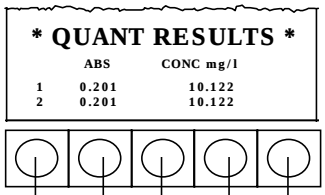
STANDARDS - Switches to the Quant Standards page.

PRINT GRAPH - Prints the Quant method and calibration graph.

SAVE METHOD - Switches to the SAVE page.

QUANT RESULTS Page

- To view further pages of results use the Up and Down arrow keys.
- Pressing RUN takes another sample measurement and displays the result.
- Results are numbered sequentially and any batch can be of up to 600 samples.



CLEAR RESULTS - Deletes all results from the results table.

QUANT PAGE - Switches back to the Quant page.

SAVE DATA - Brings up the SAVE page.

PRINT LIST - Gives a printout of the results.

LIMS – Sends the results via the RS232 port.

Return to Index

FIXED

- Instrument and analysis parameters are set up on the FIXED page. Move the cursor to the required parameter using the Up/Down Arrow keys. Change the parameter by pressing the ENTER key.
- Once the method has been set up press ZERO/BASE to zero the instrument for the current method (See page 5) and press RUN. The spectrophotometer will perform a measurement and display the result on the FIXED RESULTS page.
- Once all results have been collected, save the data.

FIXED METHOD Page

```
        * FIXED *
MODE              : ABS
ID                :
λ SELECT          : SINGLE λ
WAVELENGTH(S)     : 550.0 nm
BANDWIDTH         : 2.0 nm
INTEGRATION       : 1 s
TIMER(S)          : 0
LAMP CHANGE       : 325 nm
OPERATOR          :
UVCALC            : 0
CELL PROG         : AUTO
REF MODE          : OFF
```

MODE **:** Select from ABS and %T.

ABS Selects Absorbance.
%T Selects % transmittance.

ID **:** Enter a description using the TEXT ENTRY screen.

- The ID identifies the method and unless changed will be saved with the method and any results produced by the method.

λ SELECT **:** Select from SINGLE λ /MULTI λ /SERIAL λ.

SINGLE λ This option is used to measure each sample at a single wavelength which is the same for each sample.
MULTI λ This option allows each sample to be measured at up to 20 wavelengths, which are the same for each sample.
SERIAL λ This option allows a single wavelength measurement to be made at a different wavelength on up to 9 samples.

WAVELENGTH(S) **:**

SINGLE λ Use the numeric key pad to enter the required wavelength into the pop-up box. Press ENTER when finished.

MULTI λ Use the up and down arrow keys to move to the wavelength to be entered or edited and press ENTER to display the edit box. Use the numeric keypad to enter the wavelength and press ENTER when finished. The instrument returns to the MULTI λ screen with the next wavelength in the list highlighted. Up to 20 wavelengths may be entered. When the list is finished press the ACCEPT function key to accept the new list or the CANCEL function key to return to the FIXED METHOD page without changing the wavelength list.

SERIAL λ Press ENTER to display the edit box for the wavelength to be used for the first sample. Data entry is as for MULTI λ above. When the required wavelengths have been entered press ACCEPT to accept the new list, or press CANCEL to return to the FIXED METHOD page leaving the original list unchanged.

If the wavelength requires the Deuterium lamp (if fitted) then this will be switched on. The current data will be lost if the wavelength is changed.

BANDWIDTH **:** This is fixed at 2.0 nm.

INTEGRATION : Enter integration time in seconds.

- This sets the integration time for which the result is measured.

The current data will be lost if the integration time is changed.

TIMER(S) **:** Displays the AquaMateTimers Page

Up to four countdown timers may be defined. Use the arrow keys to move around the list of timers and press ENTER to change an individual item. For each timer, select the title to be displayed, the duration of the timer and the required action on timeout:

TITLE **:** Select from TIMER / WAIT / SHAKE / INVERT / SWIRL / BOIL / HEAT

DURATION **:** Set a time in the range 00.01 to 99.59, using . to separate minutes and seconds.

ACTION **:** Select from PAUSE/CONTINUE

If the timeout action is set to PAUSE, the instrument will display a prompt when the timer has finished. The user is given the choice between stopping, zeroing, and continuing the measurement sequence. If CONTINUE is selected, the instrument will automatically continue to the next stage in the measurement sequence.

Use the CHANGE MODE function key to set the OPERATING MODE as MULTIPLE USE or SINGLE USE. In SINGLE USE mode, the timers will be run before the first measurement only. When the operating mode is set to MULTIPLE USE, all timers will be used before each measurement.

Use the RUN TIMERS function key to operate the timers without initiating a measurement sequence.

Once the timers have been set up, press the ACCEPT function key to accept the new list or the CANCEL function key to return to the FIXED METHOD page without changing the timers.

- When RUN is pressed to start a measurement, the specified sequence of timers will be started, with the remaining time for the current timer being displayed on the screen. Any timer may be interrupted by selecting the STOP softkey. Once the last timer has finished, the measurement will be made in the normal way.

N.B. Timers can be used in conjunction with a sipper (in AUTOMATIC mode). They cannot be used with a cell programmer in AUTO mode.

LAMP CHANGE **:** Select from 315, 320, 325, 330, 335, 340, D2, W.
Not available in AquaMate Vis.

Selects the wavelength at which the source is changed between the Tungsten and Deuterium lamps. Selecting D2, or W overrides any changeover and the selected lamp will be used regardless of the wavelength set.

OPERATOR **:** Switches to the TEXT ENTRY screen.

- The operator name is automatically saved with the method and any data produced by the method.

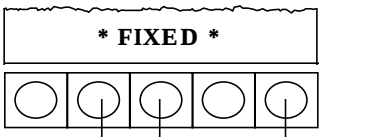
Changing the operator name will not cause any current data to be lost.
N.B. If user log-on is in operation, the operator name cannot be changed.

UVCALC **:** Switches to the UVCALC screen.

CELL PROG **:** Switches to the CELL PROG. screen (if fitted).

REF MODE **:** Toggles the status of the Cell Programmer reference mode (if fitted).

FIXED Method Page Function Keys



VIEW RESULTS - Switches to the FIXED RESULTS page.

SAVE METHOD - Brings up the SAVE page from where the method can be saved to Disk.

PRINT METHOD - Prints the current method parameters on the printer.

- Pressing RUN starts a fixed measurement using the current method and switches to the FIXED RESULTS page.

- Pressing ZERO starts a zero using the current method.

Any changes to the WAVELENGTH, BANDWIDTH, INTEGRATION or LAMP CHANGE parameters will invalidate the current results.

If AUTOPRINTING is selected (see SETUP for details), a change to the MODE parameter will invalidate the current results.

FIXED RESULTS Page

- The layout of the page depends on the Mode and λ Select in use.

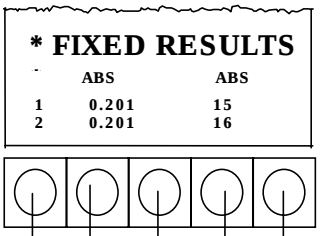
  SINGLE λ In ABS or %T modes up to 2 columns of results are displayed per page. Results accumulate on the same page until it is full.

  MULTI λ Two columns of results are displayed per page. Results of each sample always start on a new page.

  SERIAL λ One column of results is displayed per page. Results accumulate on the same page until it is full.

- To move up or down pages of results use the Up/Down arrow keys.

- Results are numbered sequentially from 1 to 600.



CLEAR RESULTS - All results are cleared ready for the start of the next batch.

FIXED PAGE - Returns to the FIXED METHOD page.

SAVE DATA - Brings up the SAVE page from where the results can be saved to Disk.

PRINT LIST - Prints the list on the selected printer.

LIMS EXPORT – Sends the results via the RS232 port.

- Press RUN to take another sample measurement.

- Press ZERO/BASE to zero the instrument at the wavelength(s) specified in the method. (See page 5).

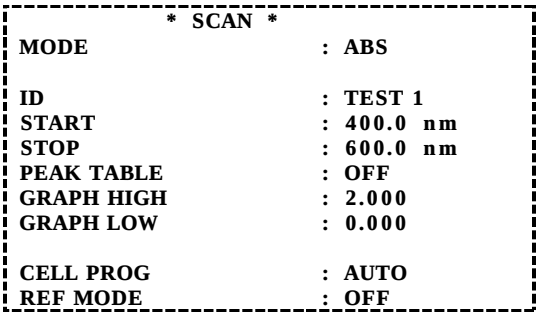
Return to Index

SCAN

- To select Scan highlight the SCAN option on the HOME PAGE and press ENTER. The SCAN Methods page is displayed and from here the instrument and analysis parameters can be set up.
- Move the cursor to the required parameter using the Up/Down Arrow keys. Press ENTER to enable a parameter to be changed.
- Once the method has been set up press ZERO/BASE to perform a baseline scan with the current method (see page 5) and then press RUN. The spectrophotometer will perform the scan and display the result on the SCAN GRAPH page. From here the spectrum can be manipulated and printed.
- The scan speed is set to 600 nm per min., and the data interval is 0.5nm.

SCAN PARAMETERS Page

Note: The current spectrum will be lost if any of the method parameters are changed.



MODE : Select from ABS / %T / I.

ABS	Selects Absorbance.
%T	Selects % transmittance.
I	Selects Intensity mode. This will measure the intensity of the signal in the sample beam.

The current spectrum will be lost if the Scan Mode is changed.

ID : Enter a description using the TEXT ENTRY screen.

START : Select a wavelength between 190.0 nm (315.0 nm for AquaMate Vis) and 1096.0 nm.

- Selects start wavelength.

The Deuterium lamp will be switched on if a wavelength less than 325.0 nm is selected for an AquaMate Vis. The Start wavelength must be at least 4 nm less than Stop wavelength. The current spectrum will be lost if the Start wavelength is changed.

STOP : Select a wavelength between 194.0 nm (319.0 nm for AquaMate Vis) and 1100.0 nm.

- Selects stop wavelength.

The Stop wavelength must be at least 4 nm greater than the Start wavelength. The current spectrum will be lost if the Stop wavelength is changed.

PEAK TABLE : Select from OFF / PEAKS / TRACK / RATIO / CORR. RATIO / PEAK HEIGHT.

This selects the type of peak picking done automatically as part of the method. Results are reported on the Peaks Page.

OFF Sets Peak Table to Off. No peaks information is produced as part of the scan.

PEAKS Picks the highest peaks in a spectrum up to a maximum of 10 peaks.

TRACK This function allows the Absorbance (or other mode) values to be reported at up to 10 user selected wavelengths. To enter the Desired wavelengths select PEAK TABLE TRACK then press VIEW GRAPH.

You do not have to have a spectrum present on the graph to enter the selected wavelengths. Press MANIPULATE and select TRACK. For each wavelength move the cursor to the desired position press ENTER. Once all the wavelengths have been entered go back to the SCAN METHOD page and save the method.

RATIO This function allows the ratio λ_1/λ_2 to be automatically calculated at the end of the scan. To enter the desired wavelengths select PEAK TABLE and press ENTER then select RATIO. A pop up box Appears in which to enter the first wavelength. Enter the desired wavelength and press ENTER. Repeat for the second wavelength. Once all the method parameters have been set save the method.

CORR RATIO This function allows the ratio of two wavelengths to be calculated relative to a third wavelength $(\lambda_1-\lambda_3)/(\lambda_2-\lambda_3$ automatically at the end wavelength and press ENTER. Repeat for the second and correction wavelengths. Once all the method parameters have been set save the method.

PEAK HEIGHT This function allows the height of a peak to be calculated relative To a local baseline rather than y = 0. To enter the desired wavelengths, select PEAK TABLE and press ENTER then select PEAK HEIGHT. A pop-up box appears in which to enter the wavelengths required. λ_1 and λ_3 define the baseline, λ_2 defines the peak. Once all the parameters have been set, save the method.

GRAPH HIGH : Select from range (GRAPH LOW + 0.01) to 6.00.

Sets the upper graph limits on the SCAN GRAPH page.
GRAPH HIGH must be 0.01 greater than GRAPH LOW.

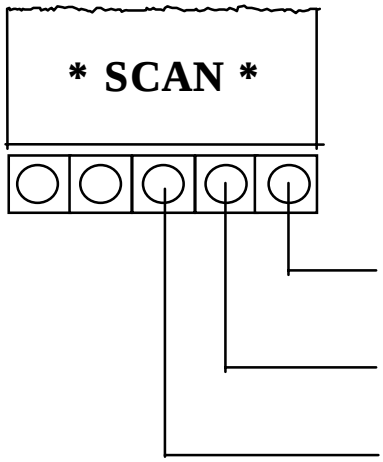
GRAPH LOW : Select from range -0.3 to (GRAPH HIGH- 0.01).

Sets the lower graph limits on the SCAN GRAPH page.
GRAPH LOW must be 0.01 less than GRAPH HIGH.

CELL PROG : Appears when the Cell Programmer is fitted. Switches to the CELL PROG screen.

REF MODE : Appears when the Cell Programmer is fitted. Toggles the status of the Cell Programmer reference mode.

SCAN PARAMETERS page function keys



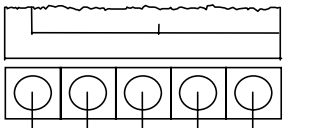
VIEW RESULTS - Switches to the Scan Peak Table screen if any of the peak functions have been performed or the Track Table screen if track has been used.

VIEW GRAPH - Switches to the Scan Graph screen.

SAVE METHOD - Brings up the Filename Function screen and then saves the method including ID and track wavelengths if the PEAK TABLE parameter is set to TRACK.

SCAN GRAPH Page

- This page displays spectra and allows them to be manipulated.



VIEW RESULTS - Switches to the PEAK TABLE page.

SCAN PAGE - Returns to the SCAN page.

CHART OUTPUT – Plots the spectrum on an analogue chart recorder.

PRINT GRAPH - Provides a hardcopy of the results as shown on screen.

MANIPULATE - Displays the Manipulate options.

- Pressing RUN starts a scan using the current method.
- Pressing ZERO/BASE starts a baseline using the current method. (See page 5).

MANIPULATE OPTIONS

MANIPULATE
TRACK RESCALE MODE PEAKS ORIGINAL

TRACK Reports x and y axis values using the tracking cursor.

RESCALE Changes x and y axis scales automatically or manually.

MODE Changes mode. Select from %T or ABS.

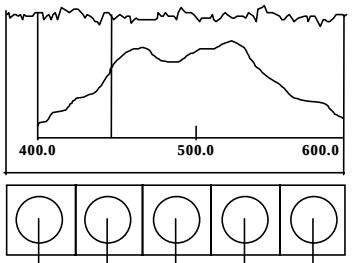
PEAKS Finds spectral peaks. Select from PEAKS / RATIO / CORR. RATIO / PK HEIGHT.

ORIGINAL Resets the graph to display the data as originally collected.

TRACK

- To move the vertical cursor across the screen use the Left and Right Arrow keys. The cursor always moves to a data point regardless of the displayed scales. Pressing ENTER places a marker at the current wavelength. Up to 10 wavelengths can be selected.

TRACK page function keys



- Pressing CLEAR will delete markers in turn, highest number first.
- The x-axis values are listed on the TRACK table page. Further markers can be added to the spectrum at any time; however selecting TRACK will cause any previous PEAK TABLE information to be lost.

VIEW TABLE - Switches to the TRACK TABLE page.

FAST/SLOW - Toggles between two cursor speeds. In FAST mode the cursor jumps 5% of the graph or to the next data point whichever is the greater. In SLOW mode the cursor jumps to the next data point or the next display pixel whichever is the greater. The function key label shows the next speed ie the opposite to the one selected.

CLEAR ALL - Clears all the markers and the TRACK TABLE.

PRINT GRAPH - Provides a hardcopy of the results showing the markers and x and y-axis values.

SCAN GRAPH - Returns to the SCAN GRAPH page.

RESCALE

RESCALE
AUTO GRAPH HIGH GRAPH LOW GRAPH START GRAPH STOP PROCEED

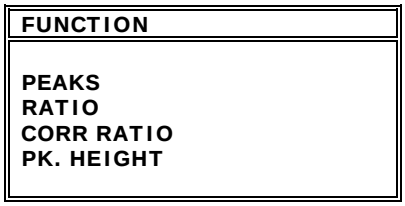
- This option gives pop-up menus for changing the graph x and y -axis scales.
- Move the cursor to one of the options and press ENTER to select an operation.

AUTO	Displays the SCAN GRAPH with the x and y-axes rescaled so that the Spectrum fills the screen.
GRAPH HIGH	Pops up a window for entry of the GRAPH HIGH limit.
GRAPH LOW	Pops up a window for entry of the GRAPH LOW limit.
GRAPH START	Pops up a window for entry of the required start wavelength.
GRAPH STOP	Pops up a window for entry of the required stop wavelength.
PROCEED	Used after GRAPH HIGH, GRAPH LOW, GRAPH START or GRAPH STOP to return to the SCAN GRAPH page with the graph rescaled using the new parameters.

MODE : Select from ABS / %T.

ABS	Selects Absorbance.
%T	Selects % transmittance.

PEAKS



- This option enables the spectrum to be automatically searched for peaks. Move the cursor to one of the options and press ENTER to perform a search. When the search is complete the spectrum is displayed with the peak positions marked. For a peak to be found there must be more than 15 data points between that point and a previous peak.

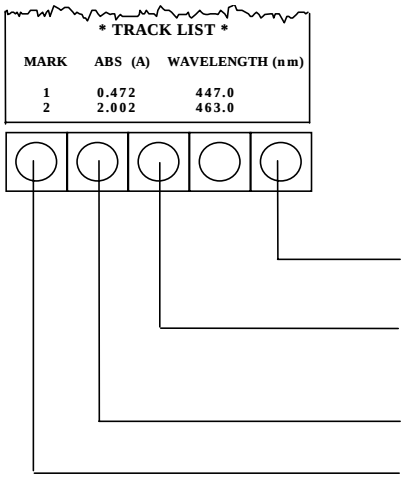
For RATIO and CORR RATIO, enter the wavelengths as prompted. All results can be viewed by pressing  VIEW RESULTS.

PEAKS	Marks the 10 highest peaks.
RATIO	Calculates the ratio λ_1/λ_2.
CORR RATIO	Calculates the ratio $(\lambda_1-\lambda_3)/(\lambda_2-\lambda_3)$.
PK HEIGHT	Calculates the peak maximum relative to a local baseline.

ORIGINAL

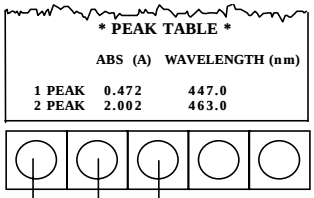
- This removes any manipulation and displays the spectrum as originally collected and specified by the scan method.

TRACK TABLE Page



- The list shows the y-axis values of the spectrum for the wavelengths marked during TRACK. The measured values will be ABS, %T, or INTENSITY depending on the current mode.

PEAK TABLE PAGE



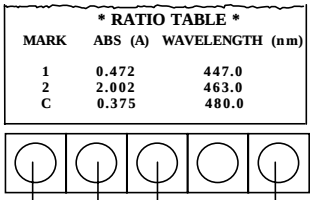
- The list shows the positions and values of the peaks as calculated by the function selected in MANIPULATE PEAKS. The measured values will be ABS, %T, or INTENSITY depending on the current mode and are sorted by wavelength.

CHART OUTPUT – Plots the spectrum on an analogue chart recorder.

PRINT LIST - Prints the list on the selected printer.

SCAN GRAPH - Returns to the SCAN GRAPH page.

RATIO TABLE Page



- The page shows the positions and values of the wavelengths and the ratio as selected by the RATIO or CORR RATIO functions.

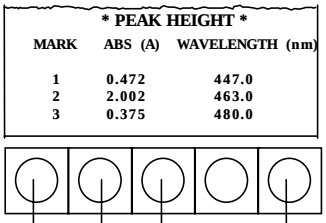
VIEW GRAPH - Returns to the SCAN GRAPH page.

CHART OUTPUT – Plots the spectrum on an analogue chart recorder.

PRINT LIST - Prints the list on the selected printer.

SCAN GRAPH - Returns to the SCAN GRAPH page.

PEAK HEIGHT Page



- This page shows the position and values of the wavelengths and the peak height as selected by the PEAK HEIGHT function.

VIEW GRAPH - Returns to the SCAN GRAPH page.

CHART OUTPUT – Plots the spectrum on an analogue chart recorder.

PRINT LIST - Prints the list on the selected printer.

SCAN GRAPH - Returns to the SCAN GRAPH page.

Return to Index

UVCALC

- Almost by definition, quantitative analytical procedures are built around two fundamental key principles, measurement of the parameter, and subsequent calculations based on these measurements.

- In UV-Visible spectrophotometry, and many other 'mature' techniques the science associated with the measurement of the parameter is well developed; to such a degree that there are fully validated 'test kits' available from the leading chemical suppliers in the key areas of bio-chemical and environmental / water chemistry. In addition, most laboratories also have their own fully developed internal procedures.

- In these days of instruments controlled by on-board software it is some what surprising that the analyst at the bench may still have to manually use a calculator to perform a final calculation, and then make an informed decision as to whether the result meets expected criteria. At this point, even the most experienced analyst can still make a transcription error, mis-interpret a written figure, etc.

- With defined procedures, many 'standard methods' will document the final calculation in the form of an algebraic formula. ***Uv****calc* allows these formulae to be entered in the software method, together with the control limits.

- ***Uv****calc* provides automatic calculation of results from measurements using user- defined equations. The measurement is obtained from the spectrophotometer in the form of individual results in Fixed and Quant methods.

SPECIFICATION

- Up to 4 different equations may be applied to each measurement.

- The formula editor supports +, -, *, /, and bracketing.

- Allowed operands include Measurements, Constants (entered via the numeric keypad), Fixed & Variable Factors (input by the user at run-time) and ***uv****calc* Results from preceeding equations.

- Each formula may have up to 20 characters

- Equations will be saved with the current application method, and ***uv****calc* results saved with the current results.

- Equations, results, units and pass/fail results are included on the hardcopy output.

OPERATION

- UVCALC appears as a menu item on both the FIXED and QUANT method pages.
- Pressing enter when the UVCALC line is highlighted will present a list of 4 ***uv****calc* equations.
- Highlighting and entering one of these will present the EQUATION PARAMETERS page in the following format:

```
FORMULA        :
TITLE          :
UNITS          :
TEST RESULTS   : NO
UPPER LIMIT    : 0.000
LOWER LIMIT    : 0.000
```

In QUANT mode, there is an additional parameter:

```
CONC VALUES    : YES
```

- To create a formula, select FORMULA and press ENTER. A “keyboard” will appear , with the following symbols

```
M     F     R     (     )
+     -     *     /
SPACE
```

M Measurement. On selecting this a pop up appears providing the choice between the different types of measurements available. Up to 9 different measured results may be specified for each ***uv****calc* equation in FIXED mode. These measurements will comprise a combination of up to 9 different one-off measurements (measured at the start of the run only) and one measurement which will be remeasured with each press of RUN.

Up to 9 different QUANT measurements may be specified. These measurements may be either a standard (S1…S6) (measured as part of the normal calibration process) or a sample (X).

F Numerical factor to be input by the user at run-time.

“Fixed” factors are input once before the first measurement of a sequence. The value of a Fixed factor will be cleared if you select CLEAR RESULTS from the results page or if you return to the main menu.

“Variable” factors are input before every sample measurement.

R A ***uv****calc* result from a preceeding equation in the list.

The required formula can then be built up by highlighting the required symbol and pressing “ENTER”

NB: Navigation around the screen is achieved in all cases as per the normal operation of the software, ie. using the arrow keys to move around.

- To clear the formula, press “C”. To accept it, press ACCEPT

TITLE & UNITS allow the user to enter a suitable description and units for the equation.

TEST RESULTS toggles between “ON” & “OFF”, whilst the “LIMIT” lines set the allowable limits for the test.

CONC VALUES (QUANT only) toggles between “YES” and “NO”. If “YES” is selected, the concentrations of standards or samples are used for the Measurement items in the equation. Otherwise the measured absorbance values will be used in the calculations.

“HOW TO....”

How to set up a FIXED calculation (M1 * 50.0)

- On the FIXED page, select the UVCALC item and press ENTER
- Select EQUATION 1 and press ENTER
- Select FORMULA and press ENTER
- Highlight “M” and press ENTER

  A pop-up will appear giving the choice of
  ONCE ONLY - CONSTANT
  MEASURE EACH RUN
- Highlight “MEASURE EACH RUN” and press ENTER
- Highlight “*” and press ENTER
- Key in “50”
- Press ACCEPT

  *This will return you to the main **uv**calc page*
- Make appropriate entries for the TITLE and UNITS line
- Press ACCEPT twice

  This will return you to the FIXED page
- Insert sample and press RUN

  The results page will display the actual absorbance value and also the result of the calculation.

How to add parameters to the end of an existing FIXED *uvcalc* equation

e.g. to modify **M1*50.0** by adding a weight correction, so the equation becomes

M1*50.0 *(F1/F2)

Where F1 = Nominal weight (Fixed Factor)
F2 = Actual weight (Variable Factor)

❒ On the FIXED page, go to the ***uv****calc* line and press ENTER

❒ Select EQUATION 1 and press ENTER

The equation prepared earlier should be displayed

❒ Select FORMULA and press ENTER

The cursor should be at the end of the existing formula

❒ Highlight "*" and press ENTER

❒ Highlight "(" and press ENTER

❒ Highlight "F" and press ENTER

A pop-up will appear giving the choice of
FIXED FACTOR
VARIABLE FACTOR

❒ Highlight "FIXED" and press ENTER

❒ Enter a suitable ID for the factor and press ACCEPT

❒ Highlight "/" and press ENTER

❒ Highlight "F" and press ENTER

This time, select "Variable Factor" from the pop-up

❑ Enter a suitable ID for the factor and press ACCEPT

❑ Highlight ") " and press ENTER

❑ Press ACCEPT to return to the main ***uv****calc* page.

❑ Press ACCEPT twice more to return to the FIXED page

❑ Insert sample and press RUN. You will be prompted when to input the factor values.

How to modify an existing FIXED *uvcalc* equation

e.g to modify the initial equation **M1*50.0** so the equation becomes

(M2-M1)*50.0

Where M1 becomes a once only constant
and M2 is measured with each run

- On the FIXED page, select UVCALC and press ENTER
- Select EQUATION 1 and press ENTER

The equation should now be displayed

- Select FORMULA and press ENTER

The cursor should be at the end of the existing formula

- Press SWITCH FIELDS and navigate the cursor to “M1”. Press ENTER
- Alter selection to “ONCE ONLY”
- Press SWITCH FIELDS
- Enter the “(“ , “M2”, and “-” .

  For M2 , select “MEASURE WITH EACH RUN”
- Press SWITCH FIELDS and move the cursor to the “*”
- Press SWITCH FIELDS again and add the closing bracket.
- Press ACCEPT

  *This will return you to the main **uv**calc page*
- Make appropriate entries for the TITLE and UNITS line
- Press ACCEPT twice

  This will return you to the FIXED page.

ERROR MESSAGES

The following error messages may occur if you make a mistake in entering an equation or in setting the system up.

ONLY 1 FACTOR MAY BE ENTERED WITH SAMPLE
You have attempted to create a formula with two or more factors for each sample

THIS FORMULA HAS TOO MANY CONSTANTS
You have created a formula with more than 9 numbers in it.

FORMULA CONTAINS AN INVALID NUMBER
You have attempted to create a formula with an invalid input

BRACES DO NOT MATCH IN FORMULA
You have created a formula with too many brackets at one end

ALL BINARY OPERATIONS REQUIRE TWO OPERANDS
You have created a formula with an incomplete arithmetical operation
(e.g. 3-+4)

INVALID COMBINATION OF OPERANDS
You have created a formula with missing operator(s)
(e.g. F1(M1))

BRACE MISSING?- UNMATCHED CLOSE BRACE
You have created a formula with a close brace(bracket) before or without an open brace.

THIS FORMULA CANNOT START WITH THIS TOKEN
You have created a formula with an invalid initial token (i.e. an operator rather than an operand)

FORMULA CONTAINS OUT OF RANGE STANDARD
In QUANT mode, a specified standard is no longer in the calibration.

ONLY ONE MULTIPLE MEASUREMENT IS ALLOWED
In FIXED mode, you have created a formula with an invalid initial token

FORMULA CONTAINS INVALID RESULT TOKEN
The result from an earlier calculation is no longer being produced.

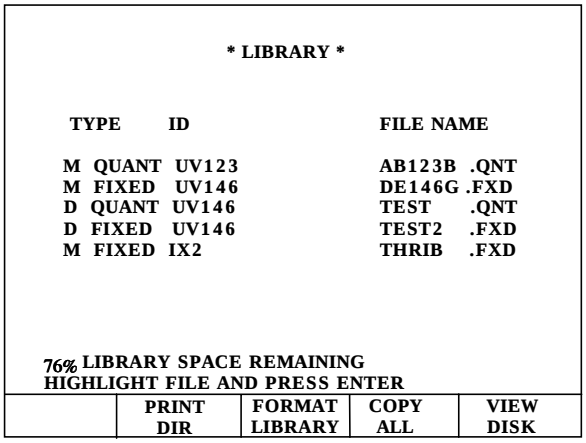
UVCALC: INVALID CELL PROGRAMMER MODE
An invalid cell programmer mode has been selected. Check settings.

Return to Index

LIBRARY Page

- To access the Library select LIBRARY on the HOME page and press ENTER.

The library is where all the method and data files are stored, and consists of two areas, the instrument library and the disk drive. From the library, files can be loaded, renamed, copied to or from the disk drive, and deleted. Saving files to the library is done from the method and result pages of the application.



- The LIBRARY Page lists all the files in the Library, including the file type, description, and file name.

FILE TYPE

This describes the type of information contained in the file.

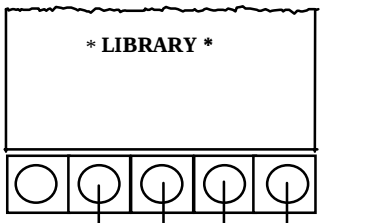
M QUANT	Quant method, including calibration
D QUANT	Quant results, including method and calibration
M FIXED	Fixed wavelength method
D FIXED	Fixed wavelength results and method
M SCAN	Scan method

DESCRIPTION

This is the description entered when the file was saved, and corresponds to the Method ID.

FILENAME

This is the DOS compatible filename used by the instrument and a computer.



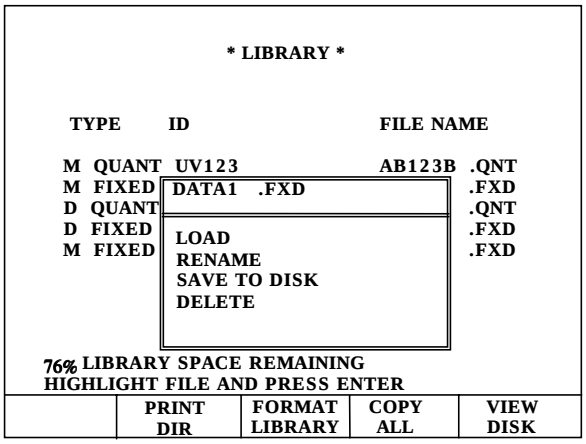
VIEW DISK - Switches to the DISK page.

COPY ALL - Copies all files from Library to Disk

FORMAT LIBRARY - Clears all files from the library. *THIS WILL DELETE ALL THE FILES IN THE LIBRARY.*

PRINT DIR - Prints a list of all the files in the Library.

Using the Library



To perform an operation on a library file first select the file. To do this move the cursor to highlight the required file using the Up/Down Arrow keys.

If the file does not appear on the list the > and < arrow keys will scroll one page at a time down and up the list. There is a slight delay after the key is pressed while the next section of the directory is loaded. Once the required file is in the window, move the cursor to it using the Up/Down arrow keys as above.

With the required file highlighted, press ENTER to display the LIBRARY pop-up menu. Use the Up/Down arrow keys to highlight the required operation and press ENTER.

LOAD	Loads the file from the Library
RENAME	Switches to the SAVE/RENAME page where file name and description can be changed.
SAVE TO DISK	Copies the highlighted file to the disk
DELETE	Removes the highlighted file from the library.

DISK Page

- This page allows access to the instrument disk drive. It lists all the files on the disk currently in the instrument drive, including file type, description and file name.

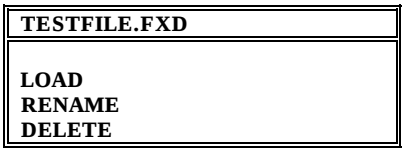
FILE TYPE

This describes the type of information contained in the file

M QUANT	Quant method including calibration.
D QUANT	Quant results including method and calibration.
M FIXED	Fixed wavelength method.
D FIXED	Fixed wavelength results and method.
M SCAN	Scan method

- Move the cursor to highlight the required file using the Up/Down Arrow keys. If the file does not appear on the list the > and < arrow keys will scroll one page at a time down and up the list. There is a slight delay after the key is pressed while the next section of the directory is loaded. Once the required file is in the window, move the cursor to it using the Up/Down arrow keys as above.

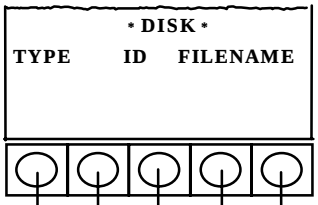
- When the required file is highlighted, select the file by pressing the ENTER key. The popup menu will appear. Then highlight the required operation and press ENTER.



LOAD -Loads the file from Disk.

RENAME - Switches to the SAVE/RENAME page were file name and description can be changed.

DELETE - Removes the highlighted file from the Disk.



VIEW LIBRARY – Switches to the LIBRARY page.

READ DISK - Reads the disk and refreshes the directory listing.

FORMAT DISK - Formats the disk as a 1.44 Mb disk. *THIS WILL DELETE ALL THE FILES ON THE DISK.*

PRINT DIR - Prints the list of files on the disk.

COPY ALL – Copies all AquaMate method files from the Disk to the Library. *ENSURE THAT THE DISK CONTAINS ONLY VALID AQUAMATE DATA OR METHOD FILES.*

Return to Index

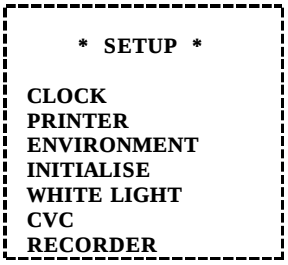
SETUP

Overview of Setup Options

- This section describes how to set up the instrument.
- The main system setup options are available directly from the SETUP function key on the HOME page.

SETUP Page

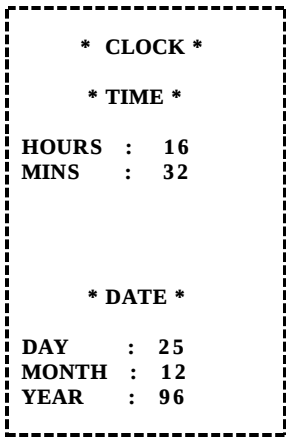
- From the SETUP page move the cursor to the required option using the Up/Down Arrow keys. Select the option by pressing the ENTER key.



CLOCK : Switches to the CLOCK page.
PRINTER : Switches to the PRINTER page.
ENVIRONMENT : Switches to the ENVIRONMENT page.
INITIALISE : Switches to the OPTICAL INITIALISATION page.
WHITE LIGHT : Switches to the WHITE LIGHT Page.
CVC : Switches to the SETUP CVC Page.
RECORDER : Switches to the RECORDER Page.

To return to the HOME page press HOME.

CLOCK Page



- From this page the internal spectrophotometer clock/calendar can be reset.
- To reset the time or date highlight the required parameter and press ENTER. Enter the new value using the number keys and press ENTER.
- Once all the parameters have been changed press ACCEPT.

The date or time will not be changed unless ACCEPT is pressed.

- CANCEL cancels the edit, leaving the previous values unchanged

PRINTERS Page

- This page sets the system to work with the selected printer.
- The printer type is always highlighted. If an internal printer is supplied, this will be the default printer, otherwise the default printer is HP Mono.To choose a printer press ENTER to display the list of supported printers, and select using cursor keys. Press ENTER to confirm entry.

PRINTER
EPSON 9 PIN HP LASERJET HP MONO HP PLOTTER HP 690C HP 400 INTERNAL

Printer options	Supported Printers
EPSON 9 PIN	Epson 9 or 24 Pin Dot Matrix, using ESC/P language.
HP LASERJET	HP Laserjet Series
HP MONO	HP Deskjet 500 Series (and above) - Black & White
HP PLOTTER	Compatible with plotters using HPGL language.
HP 690C	HP Deskjet 690C – Colour
HP 400	HP Deskjet 400 - Mono
INTERNAL	Supplied thermal printer only

Printers not on the above list that claim Epson 9 pin / 24 pin / ESC/P or HP PCL (Programming Control Language) Level 3 compatibility should work with the instrument but are not guaranteed to do so and are therefore not supported. If in doubt contact Thermo Spectronic approved Customer Support.

Note: Printers designed to work only in a Windows environment are not compatible with AquaMate Software

Before attempting to print using an external printer at any point during operation of the instrument, ensure that the printer is ready to print. Failure to do so will result in an error condition. Press CLEAR to clear the error message. Then rectify the problem with the printer, and try again.

ENVIRONMENT Page

This page is used to select the language used for the software, the use of the beep, date format, and to enable/disable Automatic Calibration Validation and LIMS (Laboratory Information Management System) Support and to select the default filetype used when saving results.

* ENVIRONMENT *	
LANGUAGE	: ENGLISH
SOUND	: OFF
DATE FORMAT	: dd/MM/yy
AUTOMATIC CAL. VAL.	: OFF
DEFAULT FILE TYPE	: NORMAL
LIMS SUPPORT	: OFF
USE SAMPLE IDS	: OFF
AUTOSAVE RESULTS	: OFF
AUTOPRINT RESULTS	: OFF
USER LOG-ON	: OFF
HISTORY FILE	: OFF

LANGUAGE : Select from the list. The language used immediately changes to the one selected.
SOUND : Turns the warning beeper ON or OFF. If set to OFF then the only indication of any error is the screen message.
DATE FORMAT: Defaults to dd/MM/yy, but will toggle with ENTER to MM/dd/yy.

AUTOMATIC CAL. VAL. : Toggles between **OFF** and **ON** with Enter.

- When ON, and the CVC (Calibration Validation Carousel) is fitted, the instrument automatically waits on start-up for the warm-up period (60 minutes) and then performs the Wavelength and Absorbance calibration tests (See CVC Section). Pressing Clear aborts the calibration.

LIMS SUPPORT **:** Toggles between **OFF** and **ON**.

- When **ON**, results, methods and sample IDs (when selected) are exported automatically after each measurement to the central LIMS computer via the RS232 port.

THIS INTERFACE MUST BE CONNECTED BEFORE LIMS SUPPORT IS ACTIVATED.

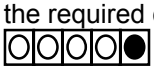
USE SAMPLE IDS **:** Choose between OFF, SEEDED and PROMPT USER.

- **OFF** - The system does not attach an identity to the sample.

- **SEEDED** - Enables the system to be set up to attach an identity to each sample automatically. This appears on the screen and the print-out. It is also exported to the LIMS (when enabled) with the results of the run and method used.

  Selection of **SEEDED** causes two additional items to appear in the Environment Menu:

  SAMPLE ID **:** Enter the name of the sample via the Text Entry Page.

  Use the Arrow keys to move the cursor to the required character and press ENTER. Once all the required characters (up to 11) have been entered press ACCEPT. If you make a mistake  will act as a backspace or CLEAR will clear the whole entry.

  SAMPLE ID SEED **:** Sets the number to be used for the first sample, via the numeric keypad.

  The Sample ID is incremented automatically before each run. Set the seed to zero for the results of the first run to be numbered 1.

- **PROMPT USER** - Before each run the Text Entry Page appears and the user is prompted to enter an identity for the sample.
  NOTE - a) When the Cell Programmer is used in AUTO mode the Sample ID is incremented automatically without stopping for ID confirmation between samples.
  b) PROMPT USER is not compatible with the Sipper used in Sip and Run or AutoSampler modes

DEFAULT FILE TYPE **:** Selects the default file type on the SAVE/RENAME page.

- Available formats are:

  NORMAL - The native file type used by the Local Control software
  CSV - Comma separated variable

  Use up/down arrow keys to highlight choice and press ENTER to confirm selection.

AUTOSAVE RESULTS **:** Toggles between ON and OFF.

When **ON,** results are saved automatically after each run. Selecting **ON** causes two additional items to appear in the Environment menu:

FILENAME - Enter a filename of up to 5 characters via the Text Entry Page.

FILE NUMBER - Enter a number between 0 and 999 via the numeric keypad. The number is appended to the filename and incremented automatically after each run.

AUTOPRINT RESULTS **:** Toggles between ON and OFF.

When **ON,** results are printed automatically after each run.

Before attempting to print at any point during operation of the instrument ensure that the printer is ready to print, ie switched on, connected to the instrument, and supplied with paper. Failure to do so will result in an error condition. Press Clear to clear the error message (the system may take a little time to respond). Ensure the printer is ready and retry.

USER LOG-ON **:** The default setting is OFF. Changing the setting to ON is password protected.

When set to **OFF,** any user has full access to all the functions of the instrument.
When set to **ON,** users must identify themselves by user name and password at log-on, and then have access to whichever functions are enabled for them by the System Administrator.

Setting User Log-on to ON is password protected. Use the up and down arrow keys to move the highlight to **USER LOG-ON** and press Enter. This brings up the Text Entry Page. When the correct password is entered USER LOG-ON is set to ON, otherwise an error message is displayed, and it remains set to OFF. The default password is ADMIN. Note that the password is case sensitive, and in this password all the letters are upper case.

Logging on as ADMIN gives access to the system at Administrator level, and the CHANGE USERS function key is enabled.

*** CURRENT USERS ***

NAME	PASSWORD	PRIVILEGES E	C	F	I	H	L
ADMIN	ADMIN	√	√	√	√	√	√
----------	----------	–	–	–	–	–	–
----------	----------	–	–	–	–	–	–
----------	----------	–	–	–	–	–	–
----------	----------	–	–	–	–	–	–
----------	----------	–	–	–	–	–	–
----------	----------	–	–	–	–	–	–
----------	----------	–	–	–	–	–	–
----------	----------	–	–	–	–	–	–
----------	----------	–	–	–	–	–	–

E = EDIT METHODS
C = CALIBRATIONS
F = DELETE FILES
I = INITIALISATIONS
H = HISTORY FILE
L = RESET LIFETIMES

CANCEL	ACCEPT		USERS 11 - 20	

Pressing the CHANGE USERS function key brings up the CURRENT USERS page. Up to 20 users can be listed by name and password. The privileges of each user can be set individually by the Administrator, and can be any combination of Edit Methods, Calibrations, Delete Files, Initialisations, History File, Reset Lifetimes.

Only the Administrator is able to change passwords or edit the Current Users Page. It is strongly recommended that a new user name and password for the Administrator are set as soon as USER LOG-ON is activated, and that USER LOG-ON is activated whenever the instrument is to be used in a multi-user environment.

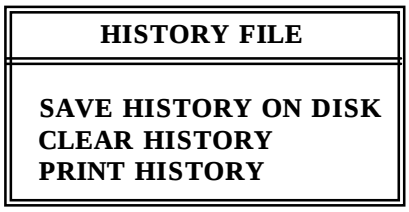
After USER LOG-ON is enabled, each time the instrument is powered up the user will be prompted to log on by entering name and password. At the close of a session the user logs off by pressing the LOG OFF function key on the Home Page, and choosing whether to PROCEED or STOP. When PROCEED is chosen the system waits for the next user to enter their name.

USER LOG-ON can be reset to OFF only by the Administrator. After USER LOG-ON has been set to OFF the list of users is cleared and the default User Name and Password are both reset to ADMIN.

HISTORY FILE : Toggles between ON and OFF.

The History File contains the history of the instrument. An entry is put into the file when there are changes to EHT calibrations, sipper calibrations and CVU tests, noting date, time and user. The file will also contain records of operations carried out by engineers during maintenance visits.

When **HISTORY FILE** is set to ON the HISTORY FILE function key becomes available on the Environment Page, unless USER LOG-ON is enabled and the user has been denied access by the Administrator. Pressing this function key brings up the History File Pop-up box.



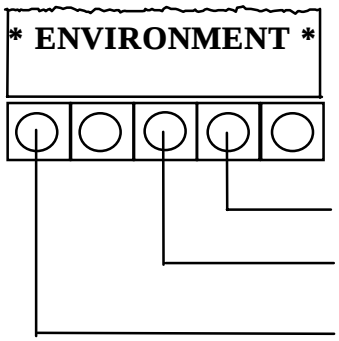
SAVE HISTORY ON DISK - The user is prompted for a file name and the instrument history is saved in CSV format which may be read by a suitable spreadsheet or text editor.

CLEAR HISTORY - Clears the Instrument History.

PRINT HISTORY - The Instrument History is printed out.

Make sure the printer is connected and ready before selecting PRINT HISTORY.

The History File contains a maximum of 400 entries. When the number of entries reaches 390 a warning message is displayed, and it is necessary for the Administrator or a user with the History File privilege save to disk and/or print the existing history file, then clear the history file to make room for more entries.



HISTORY FILE - Appears when History File is enabled.

CHANGE USERS - Available only to Administrator when User Log-on enabled.

SETUP PAGE - Returns to the SETUP page.

OPTICAL INITIALISATION Page

- This page is used to reset the instrument and define its initialisation and default baseline. These procedures ensure the optimum performance of the spectrophotometer.

INITIALISATION TYPE **:** When selected this displays a pop-up menu to choose between initialisation of optics or baseline.

OPTICS - During initialisation the instrument performs some simple hardware checks, calculates various data tables and measures the dark current. The filter wheel is then initialised before the instrument drives to the default wavelength and performs an autozero.

BASELINE - This re-measures the default baseline. Ensure that both lamps are on and that the spectrophotometer is fully warmed up. This process will take about one hour.

The default baseline should be re-measured whenever one of the source lamps is changed or if the instrument is working at temperatures significantly different from 25 °C, or if the wavelength calibration is altered.

INITIALISE WITH D2 **:** *Not available in AquaMate Vis.*
This sets the instrument to initialise with or without the Deuterium lamp on. If set to ON then the instrument will automatically strike the Deuterium lamp during initialisation.

WHITE LIGHT Page

- The **WHITE LIGHT** feature is used to facilitate alignment of optical accessories in the sample compartment.

- When the **INITIALISE** function key is pressed the instrument will align the grating so that the zero order diffraction passes through the sample compartment. This provides a beam of white light which can be seen when a white card or similar is placed in the light path.

- When alignment is completed, pressing the **STOP** function key returns the grating to its normal position and pressing the **SETUP PAGE** function key returns to the Setup Page.

SET UP CVC Page

- This page allows the CVC calibration data (provided on disk) to be loaded into the spectrophotometer memory. For full details please see the CVC section of this manual.

RECORDER Page

```
        * RECORDER *

CHART HIGH (ABS)          : 3.000
CHART LOW (ABS)           : -0.300

CHART HIGH (%T)           : 200.0
CHART LOW (%T)            : 0.1

CHART HIGH (I)            : 99.9999
CHART LOW (I)             : 0.0000
```

- The Chart High and Chart Low parameters set the full scale deflection on the analogue chart recorder output for each of the available measurement modes. On startup, these limits are set to the maximum measurement ranges (as shown above).
- To reset the limits highlight the required parameter and press ENTER. Enter the new value using the number keys and press ENTER.

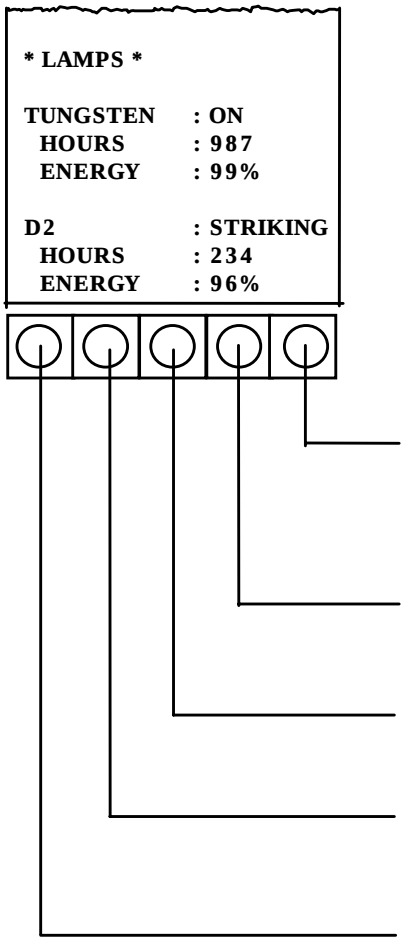
Using a Chart Recorder

- Use the Recorder Lead (part number 4401 172 00401) to connect the recorder to the socket labelled REC located to the rear of the spectrophotometer. This lead is used for both 0-10mV and 0-1V full scale deflection (fsd) chart recorders. Use the blue plug for 0-10mV, or the red plug for 0-1V.
- N.B. If your chart recorder is capable of either voltage range, it is advisable to use the 0-1V setting and only use the 2 appropriate plugs (red and black).
- The Chart High and Chart Low parameters set the 0 to 1V full scale deflection (fsd) on the analogue chart recorder output for each of the available measurement modes.
- Operating tip: if you are working with absorbances close to zero best results are obtained if the Chart Low (ABS) limit is set to a small negative value, say -0.1A.
- Now navigate to your chosen method, insert a blank sample and press ZERO. Once the instrument has finished zeroing, adjust the chart recorder backoff so that its baseline is at the required position.
- N.B. The chart recorder will be driven off scale while the instrument is zeroing.

LAMPS Page – AquaMate

- The lamp functions are available directly from the LAMPS key on the SETUP page. If User Log-on is not in use, the HOME page will also have a LAMPS key.
- This page shows the status of the Tungsten Halogen and Deuterium lamps whether ON, OFF or FAILED, and their appropriate energy levels. It also allows the lamp hours to be reset and the Deuterium lamp to be switched on or off.
- The HOURS parameter states the number of hours that the lamp has been in use.

The Tungsten Halogen lamp should be replaced after 2000 hours. The Deuterium lamp should be replaced after 1000 hours.
Whenever a lamp is changed then the hours parameter should be reset to zero.



RESET W HRS - Resets hours and measures energy at the appropriate wavelength. **ALLOW THE LAMP AT LEAST 10 MINUTES TO WARM UP BEFORE RESETTING ITS HOURS.**

RESET D2 HRS - Resets hours and measures energy at the appropriate wavelength. **ALLOW THE LAMP AT LEAST 10 MINUTES TO WARM UP BEFORE RESETTING ITS HOURS.**

W ENERGY - **ALLOW THE LAMP AT LEAST 10 MINUTES TO WARM UP BEFORE MEASURING ITS ENERGY. CLEAR BOTH SAMPLE AND REFERENCE BEAMS BEFORE MEASURING LAMP ENERGIES.**

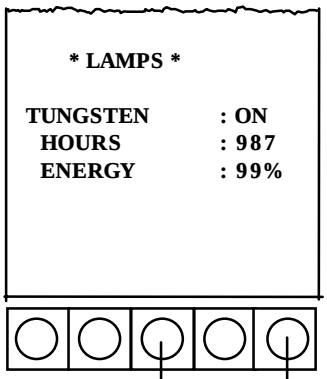
W ENERGY - **ALLOW THE LAMP AT LEAST 10 MINUTES TO WARM UP BEFORE MEASURING ITS ENERGY. CLEAR BOTH SAMPLE AND REFERENCE BEAMS BEFORE MEASURING LAMP ENERGIES.**

SWITCH D2 -Turns the Deuterium lamp ON or OFF depending on its current status.

LAMPS Page – AquaMate Vis

- The lamp functions are available directly from the LAMPS key on the SETUP page. If User Log-on is not in use, the HOME page will also have a LAMPS key.
- This page shows the status of the Tungsten Halogen lamp whether ON, OFF or FAILED, and its energy level. It also allows the lamp hours to be reset.
- The HOURS parameter states the number of hours that the lamp has been in use.

The Tungsten Halogen lamp should be replaced after 2000 hours.
Whenever a lamp is changed then the hours parameter should be reset to zero.



RESET W HRS - Resets hours and measures energy at the appropriate wavelength. **ALLOW THE LAMP AT LEAST 10 MINUTES TO WARM UP BEFORE RESETTING ITS HOURS.**

W ENERGY - **ALLOW THE LAMP AT LEAST 10 MINUTES TO WARM UP BEFORE MEASURING ITS ENERGY. CLEAR BOTH SAMPLE AND REFERENCE BEAMS BEFORE MEASURING LAMP ENERGIES.**

Return to Index

AQUAMATE METHOD DISKS

INTRODUCTION

- Water analysis using UV-visible spectroscopy is built around two fundamental principles; measurement of an analyte and subsequent calculations based on these measurements to yield results in terms of concentration. In this day and age water analysis has advanced to such a degree that there are fully validated test kits available from leading suppliers that facilitate the practical aspects of performing water analyses. The AquaMate system takes full advantage of the vast range of test kits from these sources, not only through its ability to house the various cells/cuvettes used, but also by providing the methods required.

- The AquaMate system comes with 20 methods programmed into its library. The full range of methods are available on the four PC format floppy disks supplied:- Disk 1 provides the set-ups and all defined equations for the Merck Spectroquant® tests, Disk 2 provides the methods for the Hach water analysis kits, Disk 3 contains the methods for the Dr. Lange cuvette and pipette test kits and disk 4 contains the methods for CHEMetrics Vacu-Vials® kits. In addition to this the AquaMate software allows the user to modify or create new methods by entering formulae into its unique uvcalc software.

- Further information on available methods and method formats, etc, can be found in the REFERENCE section at the end of this chapter.

SET-UP PROCEDURE

- *BEFORE BEGINNING IT IS RECOMMENDED THAT BACK-UP COPIES OF THE METHODS DISKS ARE MADE AND THE MASTERS RETAINED IN A SECURE, SAFE LOCATION.*

- With this procedure the small number of method files required for a specific laboratory environment are copied from one or more of the methods disks on to another disk. These methods can either be run directly from this disk or saved to the LIBRARY and run from there.

- Whilst not essential to the use of the software this procedure will allow for the production of a ‘Methods Disk’ that is User specific and may contain files from any of the three methods disks. It will also allow fast access to any required method from the DISK or LIBRARY options on the HOME page.

1. From the REFERENCE section identify the required .FXD or .QNT file or files.

2. On a PC, using the back-up copy of the chosen method disk and any appropriate ‘File Management software’ e.g. File Manager, Explorer etc. copy these files onto a formatted 3½” HD disk and label the disk ‘Methods Disk’.

3. These methods can then be used by selecting the DISK option from the HOME page, highlighting the chosen method using the arrow keys and pressing ENTER. A menu box will appear with the following options:

   LOAD
   RENAME
   SAVE TO LIBRARY
   DELETE

To run the method from the disk select LOAD and press ENTER. To save the method to the LIBRARY select SAVE TO LIBRARY. The 20 preinstalled methods found in the library can be deleted to make space for the user's preferred methods. These 20 methods can be found on the Merck/Hach methods disks should the user wish to use these methods in the future.

OPERATION

Running files from a 'Methods Disk' or the library

1. To run from the 'Methods Disk' insert the disk into the disk drive, select DISK from the HOME page. Alternatively to run a file from the library select LIBRARY from the HOME page.
2. From the directory of methods shown on the screen, use the arrow keys to highlight the desired method
3. Pressing Enter/Load will now load the method

Running from Disk 1, Disk 2, Disk 3 or Disk 4

- Methods can be run directly from these disks but with between 70 and 180 files on each disk, selection of the desired file may prove to be laborious.

Running Individual Methods

Disk 1 – Merck Spectroquant® Methods

- All Merck Spectroquant® Methods are .FXD files. The majority of files have the following format:

14xxxPyy.FXD

where:
14xxx = Merck Catalogue Number
yy = pathlength of cell in mm
FXD = FIXED application in software

- In some cases the Merck catalogue number is of the format 10xxxx. In this case the AquaMate files have the following format:
0xxxxPyy.FXD

- Once the relevant method has been loaded the FIXED page is displayed. The file name appears at the top of the screen.

Operation

1. The sample preparation should be carried out according to the instructions supplied with the test kit.
2. When the blank has been prepared place it into the cell holder and press the ZERO BASE key. The instrument will then zero against the blank
3. Insert the prepared sample into the cell holder and press the RUN key. A measurement will be carried out and the FIXED RESULTS page will be displayed
4. From the FIXED RESULTS page additional samples can be measured by inserting the sample and pressing the RUN key.

- In all but one method (14825P50.FXD) the relationship between absorbance and concentration is linear over the specified measuring range and takes the general form
  C = A x FACTOR

- Therefore, the uvcalc equation typically takes the following form
  Method: 14566P16.FXD Zinc
  Equation: M1∗4.88

- **The factors entered are those documented by Merck. However, the values of these factors may be affected by local conditions. We recommend that in all cases the factors are checked with standard solutions appropriate to the laboratory and the equation modified accordingly.**

- It should be noted that timers are not incorporated into the Merck method programmes. These may easily be added if desired by referring to the TIMERS section of the FIXED application pages of this manual.

Disk 2 – Hach Test Kit Methods

- The Hach test kit methods are of two types, either .FXD files or .QNT files.

- Instructions for running the Hach methods on Aquamate are stored in PDF format on the accompanying CD, together with a copy of Adobe Acrobat® Reader version 5.

.FXD Files

- The .FXD files have the following format:
  Hxxxx.FXD

  where:
  xxxx = Hach Program Number
  FXD = FIXED application in software

- Once the relevant .FXD method has been loaded the FIXED page is displayed. The file name appears at the top of the screen.

- If the Hach method indicates that timers are required then a number between 1 and 4 will be seen next to the TIMER(S) option on the FIXED page.

Operation

1. The Hach procedure should be followed until the first timer is required. In order to start the first timer press the RUN key. The screen will show the action to be carried out and the time remaining:
   i.e.: SHAKE REMAINING TIME : 02.46
2. The instrument will beep to indicate the end of the time period and a TIMER FINISHED menu box will appear with the following options:
   PROCEED
   ZERO
   STOP
3. In order to start the next timer select PROCEED using the arrow keys and press ENTER. The next timer will begin. At the end of this timer the same TIMER FINISHED menu box will appear.
4. If the method procedure requires that a zero measurement be taken, insert the blank, select the ZERO option using the arrow keys and press ENTER. A zero measurement will be taken and a menu box will appear with options to PROCEED or STOP.
5. To take a measurement, insert the sample into the cell holder and select PROCEED. A sample measurement will be carried out and the FIXED RESULTS page is displayed.

From this page additional samples can be measured by inserting a sample and pressing the RUN key.

6. By selecting the STOP option from any of the menu boxes the procedure will be aborted.
7. Some procedures require that a zero measurement is taken before the timer sequence is activated. In this case perform a zero measurement by inserting the blank and pressing the ZERO BASE key. The RUN key can then be pressed to activate the first timer.

- In all cases the relationship between absorbance and concentration takes the general form

  C = A x FACTOR

- Therefore, the uvcalc equation typically takes the following form

  Method: H1310.FXD Bromine
  Equation: M1∗2.25

- **The factors entered are generic. We recommend that in all cases the factors are checked with standard solutions appropriate to the laboratory and the equation modified accordingly.**

.QNT Files

- The .QNT files have the following format:

  Hxxxx.QNT

  where:
  xxxx = Hach Program Number
  QNT = QUANT application in software

- .QNT files are set up for methods that require calibration graphs for each new batch of reagent.

- Once the relevant .QNT file has been loaded the QUANT page is displayed. The file name appears at the top of the screen.

Operation

- Calibrations have been prepared for most of the Hach QUANT methods. These methods are ready for use as soon as they have been loaded. **However, these calibrations may be affected by local conditions. We recommend that in all cases user calibrations should be performed with standard solutions appropriate to the laboratory and stored under a new method name.**

- In a few cases new calibrations are required for each reagent batch or plating bath formulation. These methods must be calibrated by the user before they can be used.

- General instructions for performing a calibration follow below. Specific instructions and details of standard preparation are included in the PDF file for the method.

  a) The standards to be prepared can be viewed by selecting STANDARDS from the QUANT page, using the arrow keys, and pressing ENTER. These standards should be compared to those detailed in the on the Hach procedure sheet and should then be prepared. If the preparation of standards requires the same timers as the samples then the timers can be run by selecting the TIMER(S) option from the QUANT page using the arrow keys and pressing the softkey RUN TIMERS.
  b) Once the standards are ready for measurement press the CALIBRATE softkey. Follow the on screen instructions to measure the standards. When all standards have been measured the calibration graph is shown along with the coefficient.

c) At this point press the SAVE METHOD softkey and save the method file either to the library or methods disk. The programme is now ready to use for measuring samples.

1. The Hach procedure should be followed until the first timer is required. In order to start the first timer press the RUN key. The screen will show the action to be carried out and the time remaining:
   i.e.: SHAKE REMAINING TIME : 02.46
2. The instrument will beep to indicate the end of the time period and a TIMER FINISHED menu box will appear with the following options:
   PROCEED
   ZERO
   STOP
3. In order to start the next timer select PROCEED using the arrow keys and press ENTER. The next timer will begin. At the end of this timer the same TIMER FINISHED menu box will appear.
4. If the method procedure requires that a zero measurement be taken, insert the blank, select the ZERO option using the arrow keys and press ENTER. A zero measurement will be taken and a menu box will appear with options to PROCEED or STOP.
5. To take a measurement, insert the sample into the cell holder and select PROCEED. A sample measurement will be carried out and the FIXED RESULTS page is displayed. From this page additional samples can be measured by inserting a sample and pressing the RUN key.
6. By selecting the STOP option from any of the menu boxes the procedure will be aborted.
7. Some procedures require that a zero measurement is taken before the timer sequence is activated. In this case perform a zero measurement by inserting the blank and pressing the ZERO/BASE key. The RUN key can then be pressed to activate the first timer.

- In QUANT mode measurements are automatically taken from the calibration graph in concentration units. The uvcalc equation is therefore of the form:

Method: H1260.QNT Boron
Equation: M1
In effect, the uvcalc equation is used to indicate the chemical form and set the measuring range limits.

Disk 3 – Dr. Lange Cuvette and Pipette Test Kit Methods

- All Dr. Lange cuvette and pipette test methods are .FXD files. These files have the following format:

  Kxxxyyy.FXD
  Wxxxyyy.FXD

  where:
  Kxxx or Wxxx = last four digits of the Lange test kit
  FXD = FIXED application in software

- Once the relevant method has been loaded the FIXED page is displayed. The file name appears at the top of the screen.

Operation

1. The sample preparation should be carried out according to the instructions supplied with the test kit.
2. When the blank has been prepared place it into the cell holder and press the ZERO BASE key. The instrument will then zero against the blank.
3. Insert the prepared sample into the cell holder and press the RUN key. A measurement will be carried out and the FIXED RESULTS page will be displayed
4. From the FIXED RESULTS page additional samples can be measured by inserting the sample and pressing the RUN key.

- In all methods the relationship between absorbance and concentration is linear and takes the general form:
  C = A x FACTOR

- Therefore, the uvcalc equation typically takes the following form
  Method: K307CT.FXD Boron
  Equation: M1∗1.74

- **The factors entered are those documented by Dr Lange. However, the values of these factors may be affected by local conditions. We recommend that in all cases the factors are checked with standard solutions appropriate to the laboratory and the equation modified accordingly.**

- It should be noted that timers are not incorporated into the Dr. Lange methods programmes. These may be easily added if desired by referring to the TIMERS section of the FIXED applications pages in this manual.

Disk 4 – CHEMetrics Vacu-Vial® Methods

- All CHEMetrics Vacu-Vial® Methods are .FXD files. These files have the following format:
  Cxxxx.FXD

- Once the relevant method has been loaded the FIXED page is displayed. The file name appears at the top of the screen.

Operation

1. The sample preparation should be carried out according to the instructions supplied with the test kit.
2. Prepare the blank following the instructions supplied with the test kit. Place it into the cell holder and press the ZERO BASE key. The instrument will then zero against the blank.
3. Insert the prepared sample into the cell holder and press the RUN key. A measurement will be carried out and the FIXED RESULTS page will be displayed
4. From the FIXED RESULTS page additional samples can be measured by inserting the sample and pressing the RUN key.

- In all methods the relationship between absorbance and concentration is linear and takes the general form:
  C = A x FACTOR + INTERCEPT

- Therefore, the uvcalc equation typically takes the following form
  Method: C1603.FXD Bromine
  Equation: M1*7.89 + 0.04

- The FACTOR and INTERCEPT values have been determined by CHEMetrics specifically for Aquamate. **However, the values of these factors may be affected by local conditions. We recommend that in all cases the factors are checked with standard solutions appropriate to the laboratory and the equation modified accordingly.**

- It should be noted that timers are not incorporated into CHEMetrics methods programmes. These may be easily added if desired by referring to the TIMERS section of the FIXED applications pages in this manual.

FIXED RESULTS and QUANT RESULTS Pages

- The FIXED RESULTS and QUANT RESULTS pages clearly show:
  the absorbance of the sample
  the concentration of the analyte
  PASS/FAIL indicator

- The pass/fail indicates whether the recorded concentration of the sample falls within the measurement range of the test. If PASS is displayed then the analyte concentration is within the measuring range of the selected test. If <FAIL is seen the analyte concentration in the sample is too low and if >FAIL is displayed the analyte concentration is too high. In either of these cases, select a different method with an appropriate measuring range or dilute the sample accordingly.

REFERENCE

- The following section contains charts which detail the programmes available on the four AquaMate methods disks:

	Merck - Disk 1				
Analyte	**Range**	**Cell Type**	**Units**	**Program**	**AquaMate File no.**
Alcohol	0.40 - 5.00 g/l	16mm Round	g/l Alco	14965	14965P16.FXD
	0.40 - 5.00 g/l	10mm Rectangular	g/l Alco	14965	14965P10.FXD
Aluminium	0.02 - 1.50 mg/l	10 mm Rectangular	mg/l Al	14825	14825P10.FXD
	0.05 - 0.75 mg/l	20mm Rectangular	mg/l Al	14825	14825P20.FXD
	0.05 - 0.35 mg/l	50mm Rectangular	mg/l Al	14825	14825P50.FXD
Boron	0.050 - 0.800 mg/l	10mm Rectangular	mg/l B	14839	14839P10.FXD
Cadmium	0.025 - 1.000 mg/l	16mm Round	mg/l Cd	14834	14834P16.FXD
	0.025 - 1.000 mg/l	20mm Rectangular	mg/l Cd	14834	14834P20.FXD
	0.025 - 1.000 mg/l	10mm Rectangular	mg/l Cd	14834	14834P10.FXD
	0.010 - 0.300 mg/l	50mm Rectangular	mg/l Cd	14834	14834P50.FXD
Calcium	5 - 80 mg/l	20mm Rectangular	mg/l Ca	14815	14815P20.FXD
	10 - 160 mg/l 1.0 - 15.0 mg/l*	10mm Rectangular	mg/l Ca mg/l Ca	14815	14815P10.FXD
Chloride	5 - 125 mg/l	16mm Round	mg/l Cl^-	14730	14730P16.FXD
	5 - 125 mg/l	20mm Rectangular	mg/l Cl^-	14730	14730P20.FXD
	5 - 125 mg/l	10mm Rectangular	mg/l Cl^-	14730	14730P10.FXD
Chlorine	0.01 - 1.50 mg/l	50mm Rectangular	mg/l Cl_2	14828	14828P50.FXD
	0.05 - 4.00 mg/l	20mm Rectangular	mg/l Cl_2	14828	14828P20.FXD
	0.10 - 7.50 mg/l	10mm Rectangular	mg/l Cl_2	14828	14828P10.FXD
Chlorine, Chlorine Dioxide & Ozone	0.01 - 1.00 mg/l 0.02 - 1.00 mg/l 0.01 - 1.00 mg/l	50mm Rectangular	mg/l Cl_2 mg/l ClO_2 mg/l O_3	14732	14732P50.FXD
	0.05 - 2.50 mg/l 0.05 - 2.50 mg/l 0.05 - 2.50 mg/l	20mm Rectangular	mg/l Cl_2 mg/l ClO_2 mg/l O_3	14732	14732P20.FXD
	0.10 - 5.00 mg/l 0.10 - 5.00 mg/l 0.10 - 5.00 mg/l	10mm Rectangular	mg/l Cl_2 mg/l ClO_2 mg/l O_3	14732	14732P10.FXD
Chromium	0.05 - 2.00 mg/l	16mm Round	mg/l Cr	14552	14552P16.FXD
	0.05 - 2.00 mg/l	20mm Rectangular	mg/l Cr	14552	14552P20.FXD
	0.05 - 2.00 mg/l	10mm Rectangular	mg/l Cr	14552	14552P10.FXD
	0.010 - 0.600 mg/l	50mm Rectangular	mg/l Cr	14758	14758P50.FXD
	0.03 - 1.50 mg/l	20mm Rectangular	mg/l Cr	14758	14758P20.FXD
	0.05 - 3.00 mg/l	10mm Rectangular	mg/l Cr	14758	14758P10.FXD
COD, Oxygen Demand, Chemical	4.0 - 40.0 mg/l	16mm Round	mg/l COD	14560	14560P16.FXD
	10 - 150 mg/l	16mm Round	mg/l COD	14540	14540P16.FXD
	15 - 300 mg/l	16mm Round	mg/l COD	14895	14895P16.FXD
	50 - 500 mg/l	16mm Round	mg/l COD	14690	14690P16.FXD
	100 - 1500 mg/l	16mm Round	mg/l COD	14541	14541P16.FXD
	300 - 3500 mg/l	16mm Round	mg/l COD	14691	14691P16.FXD
	500 - 10000 mg/l	16mm Round	mg/l COD	14555	14555P16.FXD
Copper	0.10 - 8.00 mg/l	16mm Round	mg/l Cu	14553	14553P16.FXD
	0.05 - 3.00 mg/l	20mm Rectangular	mg/l Cu	14553	14553P20.FXD
	0.10 - 6.00 mg/l	10mm Rectangular	mg/l Cu	14553	14553P10.FXD
	0.02 - 1.20 mg/l	50mm Rectangular	mg/l Cu	14767	14767P50.FXD
	0.05 - 3.00 mg/l	20mm Rectangular	mg/l Cu	14767	14767P20.FXD
	0.10 - 6.00 mg/l	10mm Rectangular	mg/l Cu	14767	14767P10.FXD
Cyanide	0.010 - 0.500 mg/l	16mm Round	mg/l CN^-	14561	14561P16.FXD
	0.005 - 0.250 mg/l	20mm Rectangular	mg/l CN^-	14561	14561P20.FXD
	0.010 - 0.500 mg/l	10mm Rectangular	mg/l CN^-	14561	14561P10.FXD
	0.002 - 0.100 mg/l	50mm Rectangular	mg/l CN^-	14800	14800P50.FXD
	0.005 - 0.250 mg/l	20mm Rectangular	mg/l CN^-	14800	14800P20.FXD
	0.010 - 0.500 mg/l	10mm Rectangular	mg/l CN^-	14800	14800P10.FXD
	0.002 - 0.100 mg/l	50mm Rectangular	mg/l CN^-	109701	09701P50.FXD
	0.005 - 0.250 mg/l	20mm Rectangular	mg/l CN^-	109701	09701P20.FXD
	0.010 - 0.500 mg/l	10mm Rectangular	mg/l CN^-	109701	09701P10.FXD

	Merck - Disk 1				
Analyte	**Range**	**Cell Type**	**Units**	**Program**	**AquaMate File no.**
Fluoride	0.10 - 1.50 mg/l	16mm Round	mg/l F^-	14557	14557P16.FXD
	0.10 - 1.50 mg/l	20mm Rectangular	mg/l F^-	14557	14556P20.FXD
	0.10 - 1.50 mg/l	10mm Rectangular	mg/l F^-	14557	14557P10.FXD
	0.025 - 0.500 mg/l	50mm Rectangular	mg/l F^-	14557	14557P50.FXD
Formaldehyde	0.1 - 10.0 mg/l	16mm Round	mg/l HCHO	14500	14500P16.FXD
	0.05 - 6.00 mg/l	20mm Rectangular	mg/l HCHO	14500	14500P20.FXD
	0.1 - 10.0 mg/l	10mm Rectangular	mg/l HCHO	14500	14500P10.FXD
	0.02 - 1.50 mg/l	50mm Rectangular	mg/l HCHO	14678	14678P50.FXD
	0.05 - 4.00 mg/l	20mm Rectangular	mg/l HCHO	14678	14678P20.FXD
	1.00 - 9.00 mg/l	10mm Rectangular	mg/l HCHO	14678	14678P10.FXD
Gold	0.5 - 12.0 mg/l	10mm Rectangular	mg/l Au	14821	14821P10.FXD
Hardness, Residual		16mm Round	mg/l Ca	14683	14683P16.FXD
	0.25 - 2.50 mg/l	20mm Rectangular	mg/l Ca	14683	14683P20.FXD
	0.50 - 5.00 mg/l	10mm Rectangular	mg/l Ca	14683	14683P10.FXD
Hardness, Total	5 - 150 mg/l	16mm Round	mg/l Ca	14565	14565P16.FXD
	5 - 100 mg/l	20mm Rectangular	mg/l Ca	14565	14565P20.FXD
	5 - 150 mg/l	10mm Rectangular	mg/l Ca	14565	14565P10.FXD
Hydrazine	0.02 - 1.00 mg/l	50mm Rectangular	mg/l N_2H_4	14797	14797P50.FXD
	0.10 - 2.50 mg/l	20mm Rectangular	mg/l N_2H_4	14797	14797P20.FXD
	0.20 - 5.00 mg/l	10mm Rectangular	mg/l N_2H_4	14797	14797P10.FXD
	0.005 - 0.400 mg/l	50mm Rectangular	mg/l N_2H_4	109711	09711P50.FXD
	0.01 - 1.00 mg/l	20mm Rectangular	mg/l N_2H_4	109711	09711P20.FXD
	0.02 - 2.00 mg/l	10mm Rectangular	mg/l N_2H_4	109711	09711P10.FXD
Hydrogen Peroxide	2.0 - 20.0 mg/l	16mm Round	mg/l H_2O_2	14731	14731P16.FXD
	0.25 - 5.00 mg/l	50mm Rectangular	mg/l H_2O_2	14731	14731P50.FXD
	2.0 - 20.0 mg/l	10mm Rectangular	mg/l H_2O_2	14731	14731P10.FXD
Iron	0.05 - 4.00 mg/l	16mm Round	mg/l Fe	14549	14549P16.FXD
	0.03 - 2.50 mg/l	20mm Rectangular	mg/l Fe	14549	14549P20.FXD
	0.05 - 5.00 mg/l	10mm Rectangular	mg/l Fe	14549	14549P10.FXD
	0.005 - 1.000 mg/l	50mm Rectangular	mg/l Fe	14761	14761P50.FXD
	0.03 - 2.50 mg/l	20mm Rectangular	mg/l Fe	14761	14761P20.FXD
	0.05 - 5.00 mg/l	10mm Rectangular	mg/l Fe	14761	14761P10.FXD
	1.0 - 50.0 mg/l	16mm Round	mg/l Fe	14896	14696P16.FXD
	1.0 - 50.1 mg/l	20mm Rectangular	mg/l Fe	14896	14896P20.FXD
	1.0 - 50.0 mg/l	10mm Rectangular	mg/l Fe	14896	14896P10.FXD
Lead	0.10 - 5.00 mg/l	16mm Round	mg/l Pb	14833	14833P16.FXD
	0.10 - 5.00 mg/l	20mm Rectangular	mg/l Pb	14833	14833P20.FXD
	0.10 - 5.00 mg/l	10mm Rectangular	mg/l Pb	14833	14833P10.FXD
Magnesium	5.0 - 50.0 mg/l	16mm Round	mg/l Mg	14684	14684P16.FXD
	5.0 - 50.0 mg/l	20mm Rectangular	mg/l Mg	14684	14684P20.FXD
	5.0 - 50.0 mg/l	10mm Rectangular	mg/l Mg	14684	14684P10.FXD
Manganese	0.01 - 2.00 mg/l	50mm Rectangular	mg/l Mn	14770	14770P50.FXD
	0.25 - 5.00 mg/l	20mm Rectangular	mg/l Mn	14770	14770P20.FXD
	0.50 - 10.00 mg/l	10mm Rectangular	mg/l Mn	14770	14770P10.FXD
Nickel	0.10 - 6.00 mg/l	16mm Round	mg/l Ni	14554	14554P16.FXD
	0.05 - 2.50 mg/l	20mm Rectangular	mg/l Ni	14554	14554P20.FXD
	0.10 - 5.00 mg/l	10mm Rectangular	mg/l Ni	14554	14554P10.FXD
	0.05 - 2.00 mg/l	50mm Rectangular	mg/l Ni	14785	14785P50.FXD
	0.20 - 5.00 mg/l	20mm Rectangular	mg/l Ni	14785	14785P20.FXD
	0.10 - 5.00 mg/l	10mm Rectangular	mg/l Ni	14785	14785P10.FXD

	Merck - Disk 1				
Analyte	**Range**	**Cell Type**	**Units**	**Program**	**AquaMate File no.**
Nitrogen, Ammonia	0.01 - 2.00 mg/l 0.01 - 2.60 mg/l	16mm Round	mg/l NH_4-N mg/l NH_4^+	14739	14739P16.FXD
	0.01 - 2.00 mg/l 0.01 - 2.60 mg/l	10mm Rectangular	mg/l NH_4-N mg/l NH_4^+	14739	14739P10.FXD
	0.20 - 8.00 mg/l 0.30 - 10.00 mg/l	16mm Round	mg/l NH_4-N mg/l NH_4^+	14558	14558P16.FXD
	0.20 - 8.00 mg/l 0.30 - 10.00 mg/l	10mm Rectangular	mg/l NH_4-N mg/l NH_4^+	14558	14558P10.FXD
	0.5 - 16.0 mg/l 0.6 - 21.0 mg/l	16mm Round	mg/l NH_4-N mg/l NH_4^+	14544	14544P16.FXD
	0.5 - 16.0 mg/l 0.6 - 21.0 mg/l	10mm Rectangular	mg/l NH_4-N mg/l NH_4^+	14544	14544P10.FXD
	4.0 - 80.0 mg/l 5.0 - 100.0 mg/l	16mm Round	mg/l NH_4-N mg/l NH_4^+	14559	14559P16.FXD
	4.0 - 80.0 mg/l 5.0 - 100.0 mg/l	10mm Rectangular	mg/l NH_4-N mg/l NH_4^+	14559	14559P10.FXD
	0.010 - 0.500 mg/l 0.010 - 0.650 mg/l	50mm Rectangular	mg/l NH_4-N mg/l NH_4^+	14752	14752P50.FXD
	0.03 - 1.50 mg/l 0.04 - 1.90 mg/l	20mm Rectangular	mg/l NH_4-N mg/l NH_4^+	14752	14752P20.FXD
	0.05 - 3.00 mg/l 0.06 - 3.90 mg/l	10mm Rectangular	mg/l NH_4-N mg/l NH_4^+	14752	14752P10.FXD
Nitrogen, Nitrate	0.11 - 3.40 mg/l 0.5 - 15.0 mg/l	16mm Round	mg/l NO_3-N mg/l NO_3^-	14556	14556P16.FXD
	0.05 - 1.50 mg/l 0.25 - 6.50 mg/l	20mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14556	14556P20.FXD
	0.10 - 3.00 mg/l 0.5 - 13.0 mg/l	10mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14556	14556P10.FXD
	1.0 - 50.0 mg/l 4 - 220 mg/l	16mm Round	mg/l NO_3-N mg/l NO_3^-	14764	14764P16.FXD
	1.0 - 50.0 mg/l 4 - 220 mg/l	10mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14764	14764P10.FXD
	0.5 - 18.0 mg/l 2.0 - 80.0 mg/l	16mm Round	mg/l NO_3-N mg/l NO_3^-	14542	14542P16.FXD
	0.02 - 10.0 mg/l 1.0 - 45.0 mg/l	20mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14542	14542P20.FXD
	0.5 - 20.0 mg/l 2.0 - 90.0 mg/l	10mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14542	14542P10.FXD
	0.5 - 25.0 mg/l 2 - 110 mg/l	16mm Round	mg/l NO_3-N mg/l NO_3^-	14563	14563P16.FXD
	0.25 - 12.5 mg/l 1.0 - 55.0 mg/l	20mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14563	14563P20.FXD
	0.5 - 25.0 mg/l 2 - 110 mg/l	10mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14563	14563P10.FXD
	0.2 - 10.0 mg/l 1.0 - 45.0 mg/l	20mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14773	14773P20.FXD
	0.5 - 20.0 mg/l 2.0 - 90.0 mg/l	10mm Rectangular	mg/l NO_3-N mg/l NO_3^-	14773	14773P10.FXD

	Merck - Disk 1				
Analyte	**Range**	**Cell Type**	**Units**	**Program**	**AquaMate File no.**
Nitrogen, Nitrite	0.020 - 0.610 mg/l 0.05 - 2.00 mg/l	16mm Round	mg/l NO_2-N mg/l NO_2^-	14547	14547P16.FXD
	0.010 - 0.500 mg/l 0.03 - 1.60 mg/l	20mm Rectangular	mg/l NO_2-N mg/l NO_2^-	14547	14547P20.FXD
	0.020 - 1.000 mg/l 0.100 - 3.00 mg/l	10mm Rectangular	mg/l NO_2-N mg/l NO_2^-	14547	14546P10.FXD
	0.005 - 0.200 mg/l 0.015 - 0.650 mg/l	50mm Rectangular	mg/l NO_2-N mg/l NO_2^-	14776	14776P50.FXD
	0.010 - 0.500 mg/l 0.03 - 1.60 mg/l	20mm Rectangular	mg/l NO_2-N mg/l NO_2^-	14776	14776P20.FXD
	0.02 - 1.00 mg/l 0.10 - 3.00 mg/l	10mm Rectangular	mg/l NO_2-N mg/l NO_2^-	14776	14776P10.FXD
Nitrogen, Total	0.5 - 15.0 mg/l	16mm Round	mg/l N	14537	14537P16.FXD
	0.3 - 10.0 mg/l	20mm Rectangular	mg/l N	14537	14537P20.FXD
	0.5 - 15.0 mg/l	10mm Rectangular	mg/l N	14537	14537P10.FXD
	10 - 150 mg/l	16mm Round	mg/l N	14763	14763P16.FXD
	10 - 150 mg/l	10mm Rectangular	mg/l N	14763	14763P10.FXD
Oxygen, Dissolved	0.5 - 12.0 mg/l	16mm Round	mg/l O_2	14694	14694P16.FXD
	0.5 - 12.0 mg/l	20mm Rectangular	mg/l O_2	14694	14694P20.FXD
	0.5 - 12.0 mg/l	10mm Rectangular	mg/l O_2	14694	14694P10.FXD
Phenols	0.10 - 2.50 mg/l	16mm Round	mg/l phenol	14551	14551P16.FXD
	0.025 - 1.000 mg/l	50mm Rectangular	mg/l phenol	14551	14551P50.FXD
	0.10 - 2.50 mg/l	20mm Rectangular	mg/l phenol	14551	14551P20.FXD
	0.10 - 2.50 mg/l	10mm Rectangular	mg/l phenol	14551	14551P10.FXD
Phosphorus, PMB	0.01 - 1.00 mg/l 0.05 - 3.00 mg/l	50mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14848	14848P50.FXD
	0.03 - 2.50 mg/l 0.10 - 7.50 mg/l	20mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14848	14848P20.FXD
	0.05 - 5.00 mg/l 0.2 - 15.0 mg/l	10mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14848	14848P10.FXD
	0.05 - 5.00 mg/l 0.2 - 15.3 mg/l	16mm Round	mg/l PO_4-P mg/l PO_4^{3-}	14543	14543P16.FXD
	0.03 - 2.50 mg/l 0.10 - 7.50 mg/l	20mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14543	14543P20.FXD
	0.05 - 5.00 mg/l 0.2 - 15.0 mg/l	10mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14543	14543P10.FXD
	0.5 -25 mg/l 1.5 - 75.0 mg/l	16mm Round	mg/l PO_4-P mg/l PO_4^{3-}	14729	14729P16.FXD
	0.5 -25 mg/l 1.5 - 75.0 mg/l	10mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14729	14729P10.FXD
Phosphorus, VM	0.5 - 25.0 mg/l 1.5 - 75.0 mg/l	16mm Round	mg/l PO_4-P mg/l PO_4^{3-}	14546	14546P16.FXD
	0.5 - 15.0 mg/l 1.5 - 45.0 mg/l	20mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14546	14546P20.FXD
	1.0 - 30.0 mg/l 3.0 - 90.0 mg/l	10mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14546	14546P10.FXD
	0.5 - 15.0 mg/l 1.5 - 45.0 mg/l	20mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14842	14842P20.FXD
	1.0 - 30.0 mg/l 3.0 - 90.0 mg/l	10mm Rectangular	mg/l PO_4-P mg/l PO_4^{3-}	14842	14842P10.FXD
Potassium	5.0 - 50.0 mg/l	16mm Round	mg/l K	14562	14562P16.FXD
	5.0 - 50.0 mg/l	20mm Rectangular	mg/l K	14562	14562P20.FXD
	5.0 - 50.0 mg/l	10mm Rectangular	mg/l K	14562	14562P10.FXD
Silica	0.005 - 0.750 mg/l	50mm Rectangular	mg/l Si	14794	14794P50.FXD
	0.05 - 2.50 mg/l	20mm Rectangular	mg/l Si	14794	14794P20.FXD
	0.1 - 5.00 mg/l	10mm Rectangular	mg/l Si	14794	14794P10.FXD

	Merck - Disk 1				
Analyte	**Range**	**Cell Type**	**Units**	**Program**	**AquaMate File no.**
Silver	0.25 - 1.50 mg/l	20mm Rectangular	mg/l Ag	14831	14831P20.FXD
	0.50 - 3.00 mg/l	10mm Rectangular	mg/l Ag	14831	14831P10.FXD
Sulphate	5 - 250 mg/l	16mm Round	mg/l SO_4^{2-}	14548	14548P16.FXD
	5 - 250 mg/l	20mm Rectangular	mg/l SO_4^{2-}	14548	14548P20.FXD
	5 - 250 mg/l	10mm Rectangular	mg/l SO_4^{2-}	14548	14548P10.FXD
	100 - 1000 mg/l	16mm Round	mg/l SO_4^{2-}	14564	14564P16.FXD
	100 - 1000 mg/l	20mm Rectangular	mg/l SO_4^{2-}	14564	14564P20.FXD
	100 - 1000 mg/l	10mm Rectangular	mg/l SO_4^{2-}	14564	14564P10.FXD
	25 - 300 mg/l	10mm Rectangular	mg/l SO_4^{2-}	14791	14791P10.FXD
Sulphide	0.020 - 0.500 mg/l	50mm Rectangular	mg/l S^{2-}	14779	14779P50.FXD
Sulphite	0.05 - 3.00 mg/l	50mm Rectangular	mg/l SO_3^{2-}	14394	14394P50.FXD
	0.5 - 15.0 mg/l	20mm Rectangular	mg/l SO_3^{2-}	14394	14394P20.FXD
	1.0 - 25.0 mg/l	10mm Rectangular	mg/l SO_3^{2-}	14394	14394P10.FXD
	1.0 - 25.0 mg/l	16mm Round	mg/l SO_3^{2-}	14394	14394P16.FXD
Surfactants Determination	0.05 - 2.0 mg/l	16mm Round	mg/l MBAS	14697	14697P16.FXD
Tin	0.10 - 2.50 mg/l	16mm Round	mg/l Sn	14622	14622P16.FXD
	0.10 - 1.50 mg/l	20mm Rectangular	mg/l Sn	14622	14622P20.FXD
	0.10 - 2.50 mg/l	10mm Rectangular	mg/l Sn	14622	14622P10.FXD
Zinc	0.050 - 0.500 mg/l	50mm Rectangular	mg/l Zn	14566	14566P50.FXD
	0.20 - 5.00 mg/l	20mm Rectangular	mg/l Zn	14566	14566P20.FXD
	0.20 - 5.00 mg/l	10mm Rectangular	mg/l Zn	14566	14566P10.FXD
	0.20 - 5.00 mg/l	16mm Round	mg/l Zn	14566	14566P16.FXD
	0.05 - 2.50 mg/l	10mm Rectangular	mg/l Zn	14832	14832P10.FXD

	HACH - Disk 2			
Analyte	**Method**	**Range**	**Program no.**	**AquaMate File no.**
Aluminium	Eriochrome Cyanine R	0 - 0.250 mg/l	1010	H1010.QNT
	Aluminon	0 - 0.800 mg/l	1000	H1000.QNT
Arsenic	Silver Diethyldithiocarbamate	0 - 0.200 mg/l	1050	H1050.QNT
Barium	Turbidimetric	0 - 100 mg/l	1100	H1100.QNT
	Turbidimetric (AccuVac)	0 - 100 mg/l	1110	H1110.QNT
Boron	Carmine	0 - 14.0 mg/l	1250	H1250.QNT
	AzoMethine-H	0 - 1.5 mg/l	1260	H1260.QNT
Bromine	DPD	0 - 4.50 mg/l	1300	H1300.FXD
	DPD (AccuVac)	0 - 4.50 mg/l	1310	H1310.FXD
Cadmium	Dithizone	0 - 80 µg/l	1350	H1350.QNT
Chloride	Mercuric Thiocyanate	0 - 25.0 mg/l	1400	H1400.QNT
Chlorine, Free	DPD	0 - 2.00 mgl	1450	H1450.FXD
	DPD (AccuVac)	0 - 2.00 mgl	1460	H1460.FXD
	DPD	0 - 5.00 mg/l	1470	H1470.FXD
	DPD (TNT)	0 - 5.00 mg/l	1480	H1480.FXD
Chlorine, Total	DPD	0 - 2.00 mg/l	1450	H1450.FXD
	DPD (AccuVac)	0 - 2.00 mg/l	1460	H1460.FXD
	DPD	0 - 5.00 mg/l	1470	H1470.FXD
	DPD (TNT)	0 - 5.00 mg/l	1480	H1480.FXD
Chlorine Dioxide	Chlorophenol Red	0 - 1.00 mg/l	1500	H1500.FXD
	Direct Reading	0 - 50 mg/l	1510	H1510.FXD
	Direct Reading	0 - 1000 mg/l	1520	H1520.FXD
Chromium, Hexavalent	1,5-Diphenylcarbohydrazide	0 - 0.700 mg/l	1560	H1560.QNT
	1,5-Diphenylcarbohydrazide	0 - 0.700mg/l	1570	H1570.QNT
Chromium, Total	Alkaline Hypobromite Oxidation	0 - 0.700 mg/l	1580	H1580.QNT
Chromium, Trivalent	Direct Reading	0 - 20.0 g/l	1550	H1550.FXD
Cobalt	PAN	0 - 2.00 mg/l	1600	H1600.QNT
COD, Oxygen Demand,	Reactor Digestion	0 - 40 mg/l	2700	H2700.QNT
Chemical	Reactor Digestion	0 - 150 mg/l	2710	H2710.QNT
	Reactor Digestion (Hg Free)	0 - 150 mg/l		H2715.QNT
	Reactor Digestion	0 - 1500 mg/l	2720	H2720.QNT
	Reactor Digestion (Hg Free)	0 - 1500 mg/l		H2725.QNT
	Reactor Digestion	0 - 15 g/l	2720	H2720+.QNT
	Manganese III	20 - 1000mg/l	2730	H2730.QNT
Colour, True and Apparent	Platinum-Cobalt	0 - 500 units	1670	H1670.QNT
	Platinum-Cobalt	0 - 500 units	1680	H1680.QNT
Copper	Porphyrin	0 - 210.0 µg	1720	H1720.QNT
	Bicinchoninate	0 - 5.000 mg/l	1700	H1700.QNT
	Bicinchoninate (AccuVac)	0 - 5.000 mg/l	1710	H1710.QNT
Copper, Autocatalytic	Colorimetric	0 - 3.00 g/l	1690	H1690.QNT
Cyanide	Pyridine-Pyrazalone	0 - 0.240 mg/l	1750	H1750.QNT
Detergents, Anionic	Crystal Violet	0 - 0.275 mg/l	1850	H1850.QNT
Fluoride	SPADNS	0 - 2.00 mg/l	1900	H1900.QNT
	SPADNS (AccuVac)	0 - 2.00 mg/l	1910	H1910.QNT
Formaldehyde	MBTH	0 - 500 µg/l	1950	H1950.QNT
Hardness	Chlorophosphonazo	0 - 1000 µg/l	2000	H2000.FXD
Hardness, Calcium or	Calmagite, Colorimetric	0 - 4.00 mg/l	2020 (Mg)	H2020.QNT
Magnesium			2010 (Ca)	H2010.QNT
Hydrazine	p-Dimethylamino-benzaldehyde	0 - 600 µg/l	2050	H2050.QNT
	p-Dimethylamino-benzaldehyde (AccuVac)	0 - 600 µg/l	2060	H2060.QNT
Iodine	DPD	0 - 7.00 mg/l	2100	H2100.FXD
	DPD (AccuVac)	0 - 7.00 mg/l	2110	H2110.FXD
Iron, Total	FerroZine	0 - 1.400 mg/l	2175	H2175.QNT
	FerroMo	0 - 1.800 mg/l	2160	H2160.QNT
	TPTZ	0 - 1.800 mg/l	2190	H2190.QNT
	TPTZ (AccuVac)	0 - 1.800 mg/l	2195	H2195.QNT
	FerroVer	0 - 3.00 mg/l	2165	H2165.QNT
	FerroVer (AccuVac)	0 - 3.00 mg/l	2170	H2170.QNT

	HACH - Disk 2			
Analyte	**Method**	**Range**	**Program no.**	**AquaMate File no.**
Iron, Ferrous	1,10-Phenanthroline	0 - 3.00 mg/l	2150	H2150.QNT
	1,10-Phenanthroline (AccuVac)	0 - 3.00 mg/l	2155	H2155.QNT
Lead	Fast Column Extraction (LeadTrak)	0 - 150 µg/l	2210	H2210.QNT
	Dithizone	0 - 300 µg/l	2200	H2200.QNT
Manganese	PAN	0 - 0.700 mg/l	2260	H2260.QNT
	Periodate Oxidation	0 - 20.0 mg/l	2250	H2250.QNT
Molybdenum, Molybdate	Ternary Complex	0 - 3.00 mg/l	2300	H2300.QNT
	Mercaptoacetic Acid	0 - 50.0 mg/l	2310	H2310.QNT
	Mercaptoacetic Acid (AccuVac)	0 - 50.0 mg/l	2320	H2320.QNT
Nickel	Heptoxime	0 - 1.80 mg/l	2360	H2360.QNT
Nickel, Autocatalytic	Photometric	0 - 8.00 g/l	2350	H2350.QNT
Nitrogen, Ammonia	Salicylate	0 - 0.80 mg/l	2455	H2455.QNT
	Nessler (TNT)	0 - 2.50 mg/l	2400	H2400.QNT
	Salicylate (TNT)	0 - 2.500 mg/l	2460	H2460.QNT
	Salicylate (TNT)	0 - 50.0 mg/l	2465	H2465.QNT
Nitrogen, Monochloramine and free ammonia	Salicylate (PP or AccuVac)	0 - 0.50 mg/l	2470	H2470.FXD
Nitrogen, Nitrate	Cadmium Reduction	0 - 0.50 mg/l	2515	H2515.QNT
	Cadmium Reduction	0 - 5.0 mg/l	2520	H2520.QNT
	Cadmium Reduction (AccuVac)	0 - 5.0 mg/l	2525	H2525.QNT
	Cadmium Reduction	0 - 30.0 mg/l	2530	H2530.QNT
	Cadmium Reduction (AccuVac)	0 - 30.0 mg/l	2535	H2535.QNT
	Chromotropic Acid (TNT)	0 - 30.0 mg/l	2511	H2511.QNT
Nitrogen, Nitrite	Diazotization	0-0.3000 mg/l	2610	H2610.FXD
	Diazotization (AccuVac)	0-0.3000 mg/l	2620	H2620.FXD
	Diazotization (TNT)	0-0.5000 mg/l	2630	H2630.FXD
	Ferrous Sulphate	0 - 250 mg/l	2600	H2600.FXD
Nitrogen, Total Inorganic	Titanium Reduction (TNT)	0 - 25.0 mg/l	2550	H2550.QNT
Nitrogen, Total Kjeldahl	Nessler	0 - 150 mg/l	2410	H2410.QNT
Nitrogen, Total	Persulphate Digestion (TNT)	0 - 25 mg/l	2558	H2558.QNT
Palladium	N,N'-Dimethyldithiooxamide	0 - 250 mg/l	2850	H2850.QNT
Phenols	4-Aminoantipyrine	0 - 0.200 mg/l	2900	H2900.QNT
Phosphonates	Persulphate/UV Oxidation	0 - 2.50 to 0 - 125 mg/l	2950	H2950.QNT
Phosphorus, Reactive	PhosVer 3, Ascorbic Acid	0 - 2.500 mg/l	3025	H3025.QNT
	PhosVer 3, (AccuVac)	0 - 2.500 mg/l	3030	H3030.QNT
	PhosVer 3 (TNT)	0 - 5.00 mg/l	3035	H3035.QNT
	Amino Acid	0 - 30.00 mg/l	3010	H3010.QNT
	Molybdovanadate	0 - 45.00 mg/l	3015	H3015.QNT
	Molybdovanadate (AccuVac)	0 - 45.00 mg/l	3020	H3020.QNT
Phosphorus, Total	PhosVer 3 (TNT)	0 - 3.50 mg/l	3036	H3036.QNT

	HACH - Disk 2			
Analyte	**Method**	**Range**	**Program no.**	**AquaMate File no.**
Phosphorus, Acid Hydrolyzable	Ascorbic Acid (TNT)	0 - 5.00 mg/l	3037	H3037.QNT
Platinum	N,N'-Dimethyldithiooxamide	0 - 10 g/l	3150	H3150.QNT
Potassium	Colorimetric	0 - 7.0 mg/l	3100	H3100.QNT
Quaternary Ammonium Compounds	Direct Binary Complex	0 - 5.00 mg/l	3200	H3200.QNT
Selenium	Diaminobenzidine	0 - 1.000 mg/l	3300	H3300.QNT
Silica	Heteropoly Blue	0 - 1.600 mg/l	3360	H3360.QNT
	Silicomolybdate	0 - 100 mg/l	3350	H3350.QNT
Silver	Colorimetric	0 - 0.700 mg/l	3400	H3400.FXD
Sulphate	SulfaVer 4	0 - 70.0 mg/l	3450	H3450.QNT
	SulfaVer 4 (AccuVac)	0 - 70.0 mg/l	3460	H3460.QNT
Sulphide	Methylene Blue	0 - 800 µg/l	3500	H3500.FXD
Tannin and Lignin	Tyrosine	0 - 9.0 mg/l	3550	H3550.QNT
Turbidity	Radiation Attenuation	0 - 5000 FAU	3750	H3750.QNT
Volatile Acid	Esterification	0 - 2800 mg/l	3800	H3800.QNT
Zinc	Zincon	0 - 3.000 mg/l	3850	H3850.QNT

	Lange - Disk 3				
Analyte	**Range**	**Units**	**Cell**	**Program no.**	**AquaMate File no.**
BOD Oxygen demand, biological (5 day)	0.5-12 mg/l	BOD5	11 mm round	LCK554	K554CT.FXD
Carbonate/Carbon dioxide	55 - 550 mg/l	CO_2	11mm round	LCK 388	K388CT.FXD
Chloride	70-1000 mg/l	Cl^-	11mm round	LCK 311	K311CT.FXD
Chlorine, Total	0.05 - 1.5 mg/l 0.05 - 1.5 mg/l	mg/l Cl_2 mg/l O_3	11mm round	LCW 510	W510RC.FXD
	0.03 - 0.4 mg/l 0.03 - 0.4 mg/l	mg/l Cl_2 mg/l O_3	50mm Rectangular	LCW 510	W510P50.FXD
Chromium	0.03 - 1.0 mg/l	mg/l Cr	11mm round	LCK 313	K313CT.FXD
	0.005 - 0.25 mg/l	mg/l Cr	50mm Rectangular	LCK 313	K313P50.FXD
COD, Oxygen Demand, Chemical	15 - 150 mg/l	mg/l COD	11mm round	LCK 314	K314CT.FXD
	50 - 300 mg/l	mg/l COD	11mm round	LCK 614	K614CT.FXD
	150 - 1000 mg/l	mg/l COD	11mm round	LCK 114	K114CT.FXD
	100 - 2000 mg/l	mg/l COD	11mm round	LCK 514	K514CT.FXD
	5 - 60 g/l	g/l COD	11mm round	LCK 914	K914CT.FXD
Copper	0.01 - 1.0 mg/l	mg/l COD	11mm round	LCK 529	K529CT.FXD
	0.1 - 8.0 mg/l	mg/l COD	11mm round	LCK 329	K329CT.FXD
Cyanide	0.01 - 0.60 mg/l	mg/l CN	11mm round	LCK 315	K315CT.FXD
	0.01 - 0.60 mg/l	mg/l CN	11mm round	LCK 316	K316CT.FXD
Detergents, Anionic	0.01 - 0.80 mg/l	DE	50mm Rectangular	LCW 017	W017P50.FXD
	0.1 - 2.0 mg/l	DE	10mm Rectangular	LCW 017	W017P10.FXD
Formaldehyde	0.01 - 1.0 mg/l	mg/l HCHO	50mm Rectangular	LCK 325	K325P50.FXD
	0.5 - 10.0 mg/l	mg/l HCHO	11mm round	LCK 325	K325CT.FXD
Hydrazine	0.01 - 2.0 mg/l	mg/l N_2H_4	10mm Rectangular	LCW 025	W025P10.FXD
Iron	0.01 - 1.0 mg/l	mg/l Fe	11mm round	LCK 521	K521CT.FXD
	0.2 - 6.0 mg/l	mg/l Fe	11mm round	LCK 321	K321CT.FXD
	0.2 - 6.0 mg/l	mg/l Fe(II)	11mm round	LCK 320	K320CT.FXD
Manganese	0.02 - 1.0 mg/l	mg/l Mn	50mm Rectangular	LCW 032	W032P50.FXD
	0.2 - 5.0 mg/l	mg/l Mn	10mm Rectangular	LCW 032	W032P10.FXD
Nickel	0.05 - 1.0 mg/l	mg/l Ni	50mm Rectangular	LCK 537	K537P50.FXD
	0.1 - 6.0 mg/l	mg/l Ni	11mm round	LCK 337	K337CT.FXD
Nitrogen, Ammonia	0.02 - 2.50 mg/l 0.015 - 2.0 mg/l	NH_4 NH_4-N	11mm round	LCK 304	K304CT.FXD
	1.3 - 15.0 mg/l 1 - 12 mg/l	NH_4 NH_4-N	11mm round	LCK 305	K305CT.FXD
	2.5 - 60.0 mg/l 2 - 47 mg/l	NH_4 NH_4-N	11mm round	LCK 303	K303CT.FXD
	60 - 167 mg/l 47 - 130 mg/l	NH_4 NH_4-N	11mm round	LCK 302	K302CT.FXD
Nitrogen, Nitrate	1 - 60 mg/l 0.23 - 13.50 mg/l	NO_3 NO_3-N	11mm round	LCK 339	K339CT.FXD
	22 - 155 mg/l 5 - 35 mg/l	NO_3 NO_3-N	11mm round	LCK 340	K340CT.FXD
Nitrogen, Nitrite	0.05 - 2.0 mg/l 0.015 - 0.6 mg/l	NO_2 NO_2-N	11mm round	LCK 341	K341CT.FXD
	0.005 - 0.100 mg/l 0.002 - 0.030 mg/l	NO_2 NO_2-N	50mm Rectangular	LCK 341	K341P50.FXD
	2 - 20 mg/l 0.6 - 6.0 mg/l	NO_2 NO_2-N	11mm round	LCK 342	K342CT.FXD
Nitrogen, Total Kjeldahl	1 – 10 mg/l 10 – 200 mg/l 200 – 2000 mg/l	mg/l TKN mg/l TKN mg/l TKN	11mm round	LCW909	W909CT.FXD
Phenols	0.05 - 5.0 mg/l	Phenol	11mm round	LCK 345	K345CT.FXD
Organic Complexing Agents	3 – 20 mg/l NTA	NTA	11mm round	LCW907	W907CT.FXD
Orthophosphate	5 - 90 mg/l 1.6 - 30.0 mg/l 3.7 - 70.0 mg/l	PO_4 PO_4-P P_2O_5	11mm round	LCK 049	K049CT.FXD

	Lange - Disk 3				
Analyte	**Range**	**Units**	**Cell**	**Program no.**	**AquaMate File no.**
Phosphorus, Total	0.01 – 0.50 mg/l 0.03 – 1.50 mg/l 0.02 – 1.20 mg/l	PO_4-P PO_4 P_2O_5	50mm Rectangular	LCK349	K349P50.FXD
	0.05 - 1.50 mg/l 0.15 - 4.50 mg/l 0.15 - 3.50 mg/l	PO_4-P PO_4 P_2O_5	11mm round	LCK 349	K349CT.FXD
	0.5 - 5.0 mg/l 1.5 - 15.0 mg/l 1.2 - 11.5 mg/l	PO_4-P PO_4 P_2O_5	11mm round	LCK 348	K348CT.FXD
	2 - 20 mg/l 6 - 60 mg/l 4.5 - 45.0 mg/l	PO_4-P PO_4 P_2O_5	11mm round	LCK 350	K350CT.FXD
Potassium	8 - 50 mg/l	K	11mm round	LCK 328	K328CT.FXD
Silicic Acid	0.01 - 0.80 mg/l 0.005 - 0.40 mg/l	SiO_2 Si	50mm Rectangular	LCW 028	W028P50.FXD
	0.8 – 20 mg/l 0.4 – 10 mg/l 20 – 100 mg/l 10 – 50 mg/l	SiO_2 Si SiO_2 Si	11mm round		W028CT.FXD
Silver	5 - 400 mg/l 400 - 2500 mg/l	Ag	11mm round	LCK 355	K355CT.FXD
Sulphate	40 - 150 mg/l	SO_4	11mm round	LCK 153	K153CT.FXD
Sulphide	0.1 - 2.0 mg/l	S^{2-}	10mm Rectangular	LCW 053	W053P10.FXD
Sulphite	0.1 - 5.0 mg/l	SO_3	10mm Rectangular	LCW 054	W054P10.FXD
Surfactants Determination	0.2 - 2.0 mg/l		11mm round	LCK 332	K332CT.FXD
	0.5 - 25.0 mg/l		50mm Rectangular	LCW 018	W018P50.FXD
Zinc	0.02 – 0.80 mg/l	Zn	11mm round	LCK360	K360CT.FXD

	CHEMetrics Disk 4			
Analyte	Method	Range	Program No.	Aquamate File No.
Ammonia	Nessler	0 - 7mg/L	1503	C1503.FXD
(Nitrogen)	Nessler	0 - 14mg/L	1523	C1523.FXD
Bromine	DDPD	0 - 9 mg/L	1603	C1603.FXD
Chlorine	DDPD	0 - 4mg/L	2503	C2503.FXD
	DPD	0 - 6mg/L	2513	C2513.FXD
Chlorine Dioxide	DPD	0 - 11mg/L	2703	C2703.FXD
Chromate	Diphenylcarbazide	0 - 3.5mg/L	2803	C2803.FXD
	Diphenylcarbazide	0 - 7mg/L	2823	C2823.FXD
Copper	Bathocuproine	0 - 7mg/L	3503	C3503.FXD
	Bathocuproine	0 - 14mg/L	3523	C3523.FXD
Cyanide	Isonicotinic barbituric acid	0 - 0.4mg/L	3803	C3803.FXD
DEHA	PDTS	0 - 2mg/L	3903	C3903.FXD
Formaldehyde	Purpald	0 - 8mg/L	4203	C4203.FXD
Glycol	Purpald	0 - 10mg/L	4403	C4403.FXD
Hydrazine	PDMAB	0 - 0.7mg/L	5003	C5003.FXD
Iron	Phenanthroline	0 - 6mg/L	6003	C6003.FXD
	PDTS	0 - 2.5mg/L	6023	C6023.FXD
	Phenanthroline	0 -12mg/L	6013	C6013.FXD
Molybdate	Catechol	0 - 25mg/L	6703	C6703.FXD
Nitrate	Cd Reduction/Chromotrophic Acid	0 - 1.5mg/L	6903	C6903.FXD
	Cd Reduction/Chromotrophic Acid	0 - 3mg/L	6923	C6923.FXD
	Cd Reduction/Chromotrophic Acid	0 - 60mg/L	6933	C6933.FXD
Nitrite	Azo dye	0 - 0.8mg/L	7003	C7003.FXD
COD	Reactor Digestion	0 - 150mg/L	7350	C7350.FXD
Oxygen Demand,	Reactor Digestion	0 - 1500mg/L	7360	C7360.FXD
Chemical	Reactor Digestion	0-15000mg/L	7370	C7370.FXD
Oxygen	Indigo carmine	0 - 2mg/L	7503	C7503.FXD
	Indigo carmine	0 - 15mg/L	7513	C7513.FXD
	Rhodazine D	0 - 0.8mg/L	7553	C7553.FXD
Ozone	DDPD	0 - 2mg/L	7403	C7403.FXD
Peracetic Acid	DDPD	0 - 4mg/L	7903	C7903.FXD
Peroxide	DDPD	0 - 2mg/L	5503	C5503.FXD
	DDPD	0 - 4mg/L	5543	C5543.FXD
Phenols	4-Aminoantipyrine	0 - 8mg/L	8003	C8003.FXD
	4-Aminoantipyrine	0 - 16mg/L	8023	C8023.FXD
Phosphate	Vanadomolybdophosphoric Acid	0 - 40mg/L	8503	C8503.FXD
	Stannous Chloride	0 - 5mg/L	8513	C8513.FXD
Silica	Heteropoly Blue	0 - 4mg/L	9003	C9003.FXD
Sulphide	Methylene Blue	0 - 1.5mg/L	9503	C9503.FXD
	Methylene Blue	0 - 3mg/L	9523	C9523.FXD
Zinc	Zincon	0 - 3.0mg/L	9903	C9903.FXD
	Zincon	0 - 6.0mg/L	9923	C9923.FXD

Return to Index

This page is intentionally left blank.

CELL PROGRAMMER

- The 7 Cell Programmer accessory enables up to seven samples to be presented for measurement sequentially.

- This section describes the operation of the accessory with the software and also describes its removal / refit.

When the Cell Programmer is installed then a status box appears on the top right hand side of the screen, to the left of the Absorbance/Wavelength box, on all the pages (except HOME) indicating the the presence of the accessory and its setting.

If this status box is displayed, then the Cell Programmer can be moved manually using the < > arrow keys. To step foward/backward many positions, repeated pressing of the key will be 'remembered' by the system.

```
        * CELL   PROG *

CELL POS.          : 1
MODE               : MANUAL
REF. MODE          : OFF
LAST CELL          : 7
CELL CYCLES        : 5
SPEED              : HIGH
```

- This page allows the Cell Programmer to be set up for the required analysis. To reach this page highlight the CELL PROGRAMMER option from the QUANT or FIXED method pages, and press ENTER.

- Alternatively, press ACCESSORIES from the HOME page then select CELL PROG and press ENTER.

CELL POS. : Used to change the current cell position, using <> arrow keys. This change is reflected in the Status box.

MODE : Selects from MANUAL / RUN&STEP / AUTO / OFF.

MANUAL Cell position is only changed by use of the <> key on the keyboard.

RUN&STEP Allows measurement on the current cell then automatically moves to the next cell ready for the next measurement.

AUTO Performs a measurement on each of the cells in turn.

OFF Turns off the Cell Programmer. The instrument now behaves as if it has a single cell only.

The number of cells automatically measured in sequence (maximum of 7) will be dependent on the value of the LAST CELL parameter

REF. MODE : Toggles between ON and OFF with Enter.

- When ON, in all the above modes CELL 1 is assigned as the REFERENCE position and a zero will be performed.

LAST CELL : Sets the number of cells to be used in the range 1 to 7.

CELL CYCLES : Sets the number of cycles (up to 300). For example, if set to 4 then each cell will be measured in turn according to the application method being used four times. MODE must be set to AUTO.

SPEED : Brings up a pop-up list to enable HIGH, MEDIUM or LOW rotation speed to be selected.

FUNCTION KEYS

INITIALISE	Resets the accessory and places cell 1 in the sample beam.

CELL PROGRAMMER - REMOVAL AND REFIT

This procedure is essential for the fitting of any of the alternative cell holders available for long pathlength cells, single cell thermostatting, or the MiniSipper.

If the Cell Programmer basket is removed / replaced at any time, the 'Refit' procedure must always be repeated.

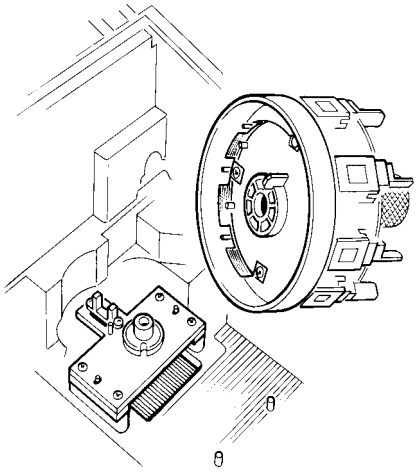
REMOVAL:

- ❒ Holding the basket firmly with one hand, unscrew the central screw anti-clockwise until the basket is released.
- ❒ **REPLACE THE COVER ON THE OPTOSENSOR**, and secure the cell holder.

REFIT:

- ❒ Remove the cover from the optosensor, and remove the cell holder.
- ❒ Indentify the position of the 'keyway' on the motor shaft.
- ❒ View the underside of the basket to locate the position of the moulded 'key'.
- ❒ Re-locate the basket on the shaft ensuring a positive location of the key in the keyway, and tightened the central screw clockwise.
- ❒ **From the CELL PROG page use the INITIALISE function key to correctly align the basket with the spectrophotometer.**

This last action is important to ensure the correct operation of the system. Whilst there is significant resistance to manual movement of the motor, it is suggested that 'as routine' initialisation of the Cell Programmer should be performed as a check before any measurements are performed.



Return to Index

SUPERSIPPER

- The SuperSipper is an optional accessory that enables samples to be drawn into a flowcell of the user's choice for automatic measurement. After the measurement is complete the sample may be sent to waste or returned to its original vessel. A continuous pumping mode allows the system to be washed through when required, e.g. between applications.

- This section describes the operation of the SuperSipper with the Local Control software. Full details of the installation and operation of the accessory are described in the SuperSipper Installation and Maintenance Manual (9499 230 29611) supplied with the SuperSipper.

- To operate the SuperSipper, install as described in the above manual. Present the sample to the SuperSipper and press the switch. The required sample volume will be drawn into the tubing. When the system beeps remove the sample and the required air gap will be drawn in. Once the measurement has taken place press the switch again. The sample will be pumped out of the flowcell either to waste or returned to the sample vessel.

When the sipper is connected a status box is displayed on the right hand side of all the method screens that indicates the presence of the SuperSipper and its status.

SIPPER Page

```
        * SIPPER *

SIPPER          : OFF
MODE            : SIP
AIR GAP         : 50 cm
SAMPLE VOL.     : 1.000 ml
SAMPLE          : WASTE
LOW VOL.        : OFF
```

- This page allows the SuperSipper to be set up for the required analysis. The method set on this page will be saved with any data produced by the software.

- To reach this page press ACCESSORIES from the HOME page then select SIPPER and press ENTER.

To change a parameter highlight the required value using the Up/Down Arrow keys and press ENTER.

SIPPER **:** Selects from ON, OFF or STANDBY.

In STANDBY mode, the sipper pumps a small volume approximately every 30 minutes. This is to change the point at which pressure is applied to the Sipper tubing, thus preventing the formation of a permanent kink. The first 6 movements are in the Return direction, and the next 6 are in the Waste direction. The total volume pumped is sufficiently small as to ensure that any sample present remains in the tubing. When the sipper is operated normally, its clock is reset and the Standby process re-starts.

MODE **:** Selects from SIP / SIP&RUN / CONTINUOUS / AUTOSAM / AUTOMATIC.

SIP Sets the system to fill the flowcell. If SAMPLE is set to RETURN then alternate switch presses will fill and empty the flowcell. In this mode instrument operation is completely independent of the SuperSipper

SIP&RUN Sets the system to fill the flowcell and automatically perform a measurement. If SAMPLE is set to RETURN then alternate switch presses will fill and empty the flowcell. The current method used to produce the result (e.g. if FIXED is current then the sample will be scanned using the FIXED METHOD as set).

CONTINUOUS Sets the system to pump continuously to waste. Alternate switch presses will start and stop pumping. In this mode instrument operation is completely independent of the SuperSipper.

AUTOSAM Sets the system to work with the Gilson 221XL and 222XL Autosamplers. Refer to the Autosampler Interface manual for further details.

AUTOMATIC In this mode, the sipper pump is controlled by the instrument. The flowcell is automatically filled when the user presses RUN. The sample is always pumped to WASTE in this mode. In addition, the sipper switch is used to pump continuously to WASTE. Alternate switch presses will start and stop pumping.

AIR GAP **:** Enter value between 0 and 500 cm.

Sets the gap between the trailing meniscus of the current sample and the leading meniscus of the next sample. The gap is measured to the nearest centimetre.

For best results set the airgap no less than 8cm from the flowcell.

SAMPLE VOL **:** Enter a value between 0.2 and 9.999 ml.

Sets the volume of sample to be pumped.

SAMPLE **:** Selects from WASTE or RETURN.

WASTE After measurement the sample is pumped through the flowcell to waste by the act of pumping the next sample.

RETURN After measurement the pump direction is reversed and the sample is returned to the sample vessel.

LOW VOL **:** Toggles ON or OFF.

Automatically adjusts the pumping time to maintain the correct air gap for narrow uptake tubing.

OFF Use standard internal diameter (1.1mm) uptake tube.

ON Use narrow internal diameter (0.8mm) uptake tube

FUNCTION KEYS

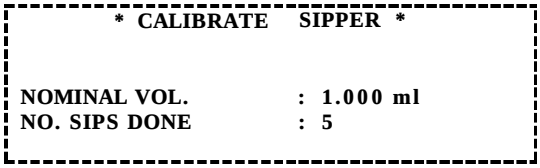
VIEW CALIB Goes to the SIPPER CALIBRATION page.

CALIBRATE Starts the Sipper calibration procedure.

Sipper Calibration

- This calibrates the SuperSipper to take account of variations in pump and uptake tubing and sample viscosities. A volume is set and using the appropriate solvent and tubing several sips are performed. The actual volume sipped is entered and a calculation done to produce a calibration factor. This factor is then used to adjust the pumping time to ensure that the correct volume of sample is always used.
- Details of the calibration used are displayed on the SIPPER CALIBRATION page.

CALIBRATE SIPPER Page



- Using the solvent and tubing which will be used for the sample solutions offer a measuring cylinder filled to the highest gradation to the sipper uptake tube and press the switch plate.

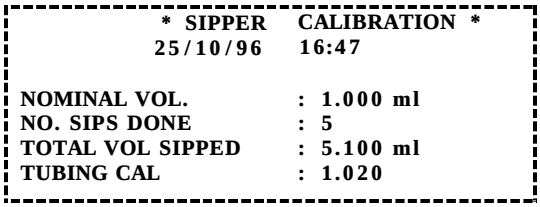
The sipper will pump a sample and the spectrophotometer will issue a beep. Withdraw the measuring cylinder and the sipper will pump the air gap. The values used for sample volume and air gap are those set on the SIPPER page.

- Repeat this process for a number of cycles up to a maximum of 10 then press ENTER.
- Measure the total volume taken from the measuring cylinder and enter this. The calibration will be displayed.

FUNCTION KEY

SIPPER PAGE	Returns to the SIPPER page and abandons the calibration.

SIPPER CALIBRATION Page



- This page displays the current sipper calibration.
- To alter the calibration, press CALIBRATE

FUNCTIONS KEYS

SIPPER PAGE	Returns to the SIPPER page.
CALIBRATE	Starts the calibration procedure.

Return to Index

MINISIPPER

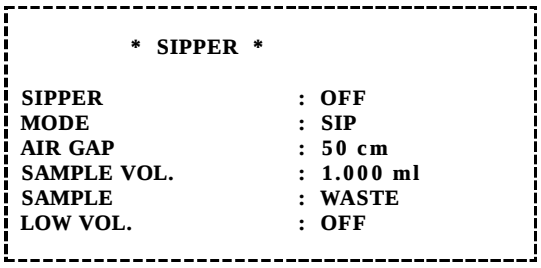
- The MiniSipper is an optional accessory that enables samples to be drawn into a flowcell of the user's choice for automatic measurement. After the measurement is complete the sample is sent to Waste. A continuous pumping mode allows the system to be washed through when required, e.g. between applications.

- This section describes the operation of the MiniSipper with the Local Control software. Full details of the installation and operation of the accessory are described in the MiniSipper Installation and Maintenance Manual (9499 230 45111) supplied with the MiniSipper.

- To operate the MiniSipper install as described in the above manual. Present the sample to the MiniSipper and press the switch. The required sample volume will be drawn into the tubing. When the system beeps remove the sample and the required air gap will be drawn in. Once the measurement has taken place press the switch again. The sample will be pumped out of the flowcell to waste.

When the sipper is connected a status box is displayed on the right hand side of all the method screens that indicates the presence of the MiniSipper and its status.

SIPPER Page



- This page allows the MiniSipper to be set up for the required analysis. The method set on this page will be saved with any data produced by the software.

- To reach this page press ACCESSORIES from the HOME page then select SIPPER and press ENTER.

To change a parameter highlight the required value using the Up/Down Arrow keys and press ENTER.

SIPPER **:** Toggle ON or OFF.
Switches the MiniSipper ON or OFF.

MODE **:** Selects from SIP / SIP&RUN / CONTINUOUS / AUTOMATIC.

SIP Sets the system to fill the flowcell.

SIP&RUN Sets the system to fill the flowcell and automatically perform a measurement. The current method is used to produce the result (e.g. if FIXED is current then the sample will be measured using the FIXED METHOD as set).

CONTINUOUS Sets the system to pump continuously to waste. Alternate switch presses will start and stop pumping. The instrument will not process any key presses while the MiniSipper is pumping in continuous mode.

AUTOMATIC In this mode, the sipper pump is controlled by the instrument. The flowcell is automatically filled when the user presses RUN. The sample is always pumped to WASTE in this mode. In addition, the sipper switch is used to pump continuously to WASTE. Alternate switch presses will start and stop pumping.

AIR GAP : Enter value between 0 and 500 cm.

Sets the gap between the trailing meniscus of the current sample and the leading meniscus of the next sample. The gap is measured to the nearest centimetre.

For best results set the airgap no less than 8cm from the flowcell.

SAMPLE VOL : Enter a value between 0.5 and 9.999 ml.

Sets the volume of sample to be pumped.

SAMPLE : Set to WASTE.

After measurement the sample is pumped through the flowcell to waste by the act of pumping the next sample.

LOW VOL : Set to OFF.

A standard internal diameter (4.0mm) uptake tube is used.

FUNCTION KEYS

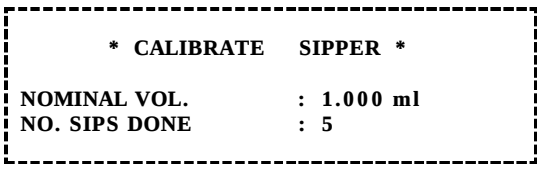
VIEW CALIB Goes to the SIPPER CALIBRATION page.

CALIBRATE Starts the Sipper calibration procedure.

Sipper Calibration

- This calibrates the SuperSipper to take account of variations in pump and uptake tubing and sample viscosities. A volume is set and using the appropriate solvent and tubing several sips are performed. The actual volume sipped is entered and a calculation done to produce a calibration factor. This factor is then used to adjust the pumping time to ensure that the correct volume of sample is always used.
- Details of the calibration used are displayed on the SIPPER CALIBRATION page.

CALIBRATE SIPPER Page



- Using the solvent which will be used for the sample solutions, offer a measuring cylinder filled to the highest gradation to the sipper uptake tube and press the switch.

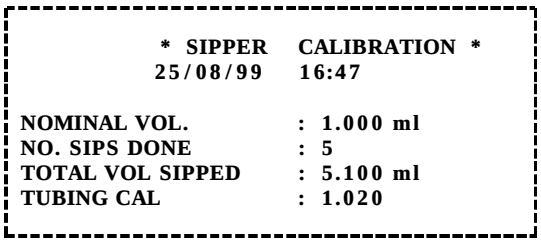
The sipper will pump a sample and the spectrophotometer will issue a beep. Withdraw the measuring cylinder and the sipper will pump the air gap. The values used for sample volume and air gap are those set on the SIPPER page.

- Repeat this process for a number of cycles up to a maximum of 10 then press ENTER.
- Measure the total volume taken from the measuring cylinder and enter this. The calibration will be displayed.

FUNCTION KEY

SIPPER PAGE	Returns to the SIPPER page and abandons the calibration.

SIPPER CALIBRATION Page



- This page displays the current sipper calibration.
- To alter the calibration press CALIBRATE

FUNCTIONS KEYS

SIPPER PAGE	Returns to the SIPPER page.
CALIBRATE	Starts the calibration procedure.

Return to Index

CALIBRATION VALIDATION CAROUSEL (CVC)

- The Calibration Validation Carousel replaces the standard cell basket, and allows for the automatic checking of the spectrophotometer to specification, by measurement of the fundamental operating parameters.

THE PROCESS OF CALIBRATION OF ITS WAVELENGTH AND ABSORBANCE FILTERS IS ACCREDITED BY THE UNITED KINGDOM ACCREDITATION SERVICE (UKAS) TO AN ISO/IEC GUIDE 25 APPROVED PROCEDURE.

- Calibration can be performed automatically on start-up if the CVC is fitted. From the SETUP menu select ENVIRONMENT, select AUTOMATIC CAL. VAL. and toggle to ON with the Enter key. On start-up the instrument will then automatically wait for the warm-up period (60 minutes) and then perform tests 1,2 and 3 (tests 1 and 2 in AquaMate Vis) . Calibration can be aborted by pressing Clear.

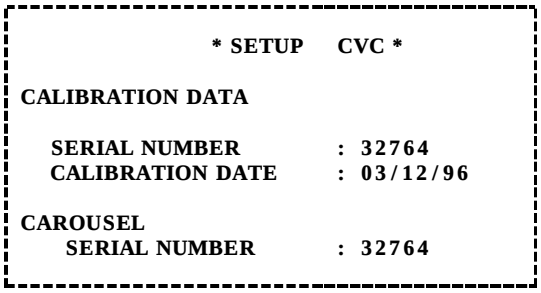
- Calibration values are provided on a PC format floppy disk, which is loaded on installation (see below).

IT IS RECOMMENDED THAT A BACK-UP COPY OF THIS DISK IS MADE BEFORE USE, AND THE MASTER RETAINED IN A SECURE SAFE LOCATION.

- This section describes the installation and operation of the accessory with the software.

- This section also describes its removal / refit.

SETUP CVC



- This page allows the CVC calibration data (provided on disk) to be loaded into the spectrophotometer memory. To reach this page highlight the CVC option from the SETUP page, and press ENTER.

SERIAL NO. : Displays the serial number of the calibration, and therefore the actual parameter values loaded into the memory of the spectrophotometer.

CALIBRATION DATE : Date of original calibration.

CAROUSEL SERIAL NO. : Unique identifier read by initialising the carousel.

FUNCTION KEYS

LOAD DATA	Allows calibration data to be loaded into the spectrophotometer.
INITIALISE	Initialises the carousel, and reads the serial number.
SETUP PAGE	Returns back to SETUP.

SETUP PROCEDURE

- From SETUP, choose CVC, and place the disk in the drive on the spectrophotometer.

The first time this procedure is actioned, a warning message 'W1022 -NVM Checksum' will be displayed. This is expected. Press 'C' to clear.

- With the disk in place, press LOAD DATA. Appearance of the appropriate Serial Number and Calibration Date confirms storage of the data in NVM.

CAROUSEL INSTALLATION

- Remove the cover from the optosensor.
- Identify the position of the 'keyway' on the motor shaft.
- View the underside of the basket to locate the position of the moulded 'key'.
- Re-locate the basket on the shaft ensuring a positive location of the key in the keyway, and tightened the central screw clockwise.
- **From the CVC page use the INITIALISE function key to correctly identify the carousel with the spectrophotometer.**

At this point check that the two serial numbers match.

CVC HOME Page

*** CVC TEST ***

TEST	STATUS	TIME	DATE
1. WAVELENGTH	PASS	11 : 05	03/12/96
2. ABSORBANCE	PASS	11 : 20	03/12/96
3. UV ABSORBANCE	PASS	11 : 25	03/12/96
4. STRAY LIGHT	PASS	11 : 28	03/12/96
5. BANDWIDTH	PASS	11 : 33	03/12/96
6. NOISE	PASS	11 : 38	03/12/96
7. DRIFT	PASS	12 : 40	03/12/96

The UV Absorbance and Bandwidth tests are not available in AquaMateVis..

- This page is reached by pressing CAL. VAL. from the HOME page.
- This page lists the available tests and for each test reports the time and date on which the last test was run and whether it passed or failed.
- To perform a test highlight the required option(s) either individually using the Arrow keys or as a group using the appropriate function keys and press RUN.

The instrument and lamp hours and energies are calculated and displayed on the appropriate page as each test is run.

FUNCTION KEYS

SAVE RESULTS	Goes to the SAVE page from where the current set of results can be saved to Library or Disk. Files are saved with a .TST extension.
PRINT SUMMARY	Prints the summary of results as shown on the page.
PRINT ALL	Prints the summary of results as shown on the page and full details of the results of each of the tests.
TESTS 1-3	AquaMate only - Selects the first three tests in the list. These will be run in sequence when RUN is pressed.
TESTS 1-2	AquaMate Vis only - Selects the first two tests in the list. These will be run in sequence when RUN is pressed.
ALL TESTS	Selects all the tests in the list. These will be run in sequence when RUN is pressed.

Every time a test is run, the carousel serial number is read and recorded on the results. If this does not match the Calibration Data, then the error E3083 - "Serial Numbers do not match" is reported.

RESULTS Pages

- Each results page fully details:

- the test performed.
- the actual, and measured values.
- the differences, tolerances, etc. (as appropriate).
- the spectrophotometer and CVC serial numbers.
- the instrument hours and Tungsten lamp hours and energy.

From each Test Page the following functions are available.

FUNCTION KEYS

TEST PAGE	Returns to the TEST HOME page.
SAVE RESULTS	Goes to the SAVE page from where the results can be saved to Disk.
PRINT RESULT	Prints the result of the test.
STOP	Stops a test. Only present whilst a test is running. If STOP is pressed then any results obtained from a test up to that point are discarded.

CVC - REMOVAL AND REFIT

REMOVAL:

- Holding the basket firmly with one hand, unscrew the central screw anti-clockwise until the carousel is released.
- Replace the CVC (as soon as convenient) in its protective storage box.
- **REPLACE THE COVER ON THE OPTOSENSOR,** unless the Cell Programmer is to be fitted

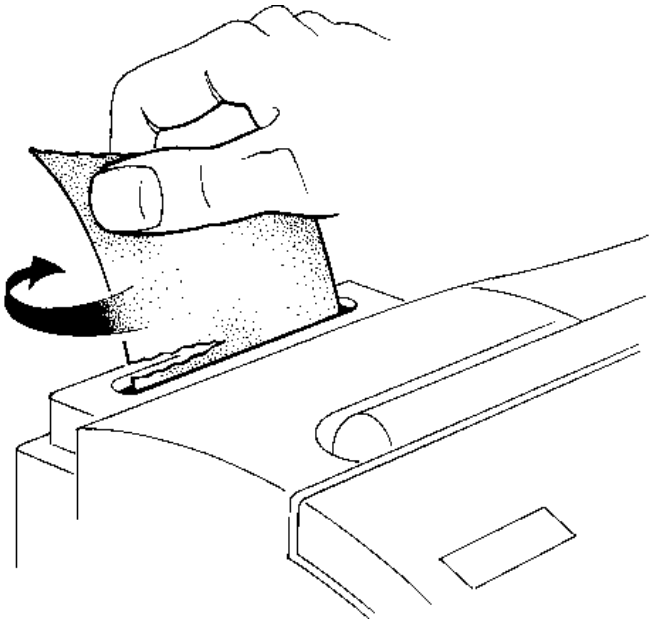
REFIT:

- Remove the cover from the optosensor.
- Identify the position of the 'keyway' on the motor shaft.
- View the underside of the basket to locate the position of the moulded 'key'.
- Re-locate the basket on the shaft ensuring a positive location of the key in the keyway, and tightened the central screw clockwise.
- **From the CVC page use the INITIALISE function key to correctly identify the carousel with the spectrophotometer.**

This last action is important to ensure the correct operation of the system. Whilst the spectrophotometer will check for data to carousel match on running any test, an initial confirmation is recommended.

Return to Index

INTERNAL PRINTER



- The Internal Printer is a factory-fitted thermal-head printer. It is supplied with a roll of 11.2cm wide single-ply thermal paper. Paper rolls may be ordered separately under the following part number: 4401 161 00391
- For long-term storage, it is recommended that the paper is kept away from light and at room temperature.
- A red warning stripe is printed on the paper within 1 metre of the end of the roll. It is recommended that the roll is replaced as soon as the warning stripe is visible to avoid possible paper jams.
- The printer is fitted with a Line Feed Button. Press this once to switch the printer off-line and feed the paper though the printer. Press the button a second time to put the printer back on-line. Do not press the Line Feed Button during printing as this will cause a internal error condition which can only be rectified by restarting the instrument.

To replace the paper roll:

- Cut the paper at the end of the new roll in a “V” to make a point at the end of the paper.
- Carefully feed the printer paper (from the bottom of the roll, i.e. shiny side down) into the back of the printer using the Line Feed Button.
- Keep the Line Feed Button depressed until the paper emerges “squarely” through the top slot of the printer housing.

Return to Index

MAINTENANCE

- The information given in this section deals only with those parts of maintenance or service which can be safely carried out by the user. Work other than that detailed should be carried out by a service engineer.

- **ALWAYS ENSURE THAT THE SAMPLE BEAM IS CLEAR BEFORE SWITCHING ON THE INSTRUMENT. Failure to do so will produce abnormal results.**

- Low lamp energy values can be caused by leaving cells in the sample beam during energy measurements. **ALWAYS CHECK THAT THE SAMPLE BEAM IS CLEAR BEFORE MEASURING LAMP ENERGIES.**

- Abnormal results will be produced if a sample is left in the beam when ZERO/BASE is pressed. **ALWAYS ENSURE THAT THE SAMPLE IS REMOVED AND THAT THE SAMPLE BEAM IS CLEAR OR CONTAINS THE APPROPRIATE ZERO REFERENCE BEFORE ZEROING THE INSTRUMENT.**

- **VERY OFTEN POOR INSTRUMENT PERFORMANCE OR FAILURE CAN BE ATTRIBUTED TO SIMPLE FAILURE OF THE TUNGSTEN LAMP - THEREFORE REPLACE (AS BELOW) USING THE SPARE LAMP PROVIDED BEFORE SEEKING FURTHER ASSISTANCE.**

- If any fault occurs (including the above lamp failure), these are reported by the system as an 'Error condition', and an 'Exxxx' number is generated. Descriptive text is also included with this message.

  DETAILED BELOW ARE THE ERROR CODES PRODUCED IF:

  1. The tungsten lamp fails or is poorly aligned
     E3010 E3011 E3104 E3015 E3030

  2. The deuterium lamp fails (not in AquaMate Vis)
     E3003 E3004 E3005 E3006 E3007 E3008 E3009 E3012 E3013 E3022 E3029 E3044 E3045

  3. The beam is blocked on initialisation
     E3027 E3056

  4. The cell programmer is stalled in use (or fails to initialise)
     E3001 E3002 E3054 E3055 E3082 E3084

  5. The sample compartment is open
     E3053 E3062 E3068 E3069 E3071

- A comprehensive list of these codes is available in the Service Manual for this product. Generation of a code not related to replacement of either the tungsten or deuterium lamps usually requires you to contact your local Thermo Spectronic approved Customer Support Organisation.

ROUTINE MAINTENANCE

Very little maintenance is required to keep the spectrophotometer in good working condition. The interior should be kept as dust free as possible and the sample compartment cleaned regularly; wipe off spilt chemicals immediately.

Replacement sample compartment liners are available under the following part number:

Helios Single Beam : 9423 UV9 7000E

CLEANING INSTRUMENT EXTERIOR

The exterior of the instrument can be cleaned periodically as follows:

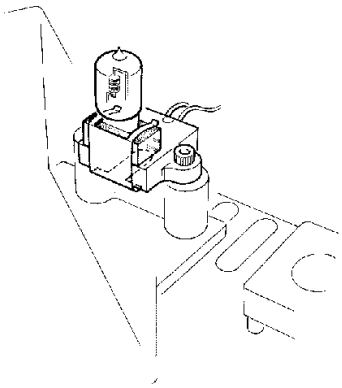
CAUTION: Do not allow moisture to leak into the instrument.

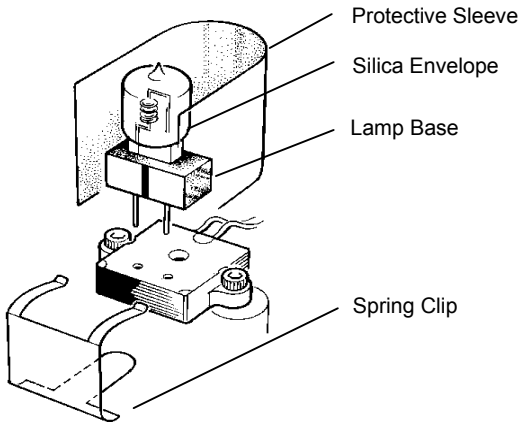
- Switch off the spectrophotometer and disconnect from the mains supply.
- Using a lint free cloth dampened with a weak solution of detergent and water, wipe the exterior surface of the instrument as necessary.
- Wipe over with a cloth dampened with plain water.
- Dry the surface with another cloth.

REMOVAL AND REPLACEMENT OF TUNGSTEN HALOGEN LAMP

WARNING: Switch off and disconnect the spectrophotometer from the mains and allow the lamp to cool for at least 15 minutes before proceeding.

- Remove the back corner cover by turning the fastener one quarter turn anti-clockwise and slide the cover up to remove.
- Now remove vertically upwards the metal lamp cover.





- If fitted, remove the spring clip

- Hold the W lamp and pull upwards to remove.

When fitting the new tungsten halogen lamp, avoid handling the silica envelope. Finger marks become burnt on and cannot be removed after the lamp is switched on. As this can affect the output characteristics, handle only the base of the lamp. If the silica envelope does become contaminated, clean with a powerful degreasing solvent such as absolute alcohol before the lamp is switched on.

- Use the new lamp's protective sleeve, a polythene bag or a piece of tissue paper wrapped around the lamp and insert the pins into the socket.

- Replace the spring clip.

These lamps are manufactured to very high tolerances, but to ensure optimum energy throughput, align the lamp filament exactly as shown in the diagram, with the white line on the lamp base facing towards the front of the instrument.

- Refit both the metal and rear covers.

- Reconnect the spectrophotometer to the mains supply and switch on.

- Lamp hours and energy must be reset from the controlling software.

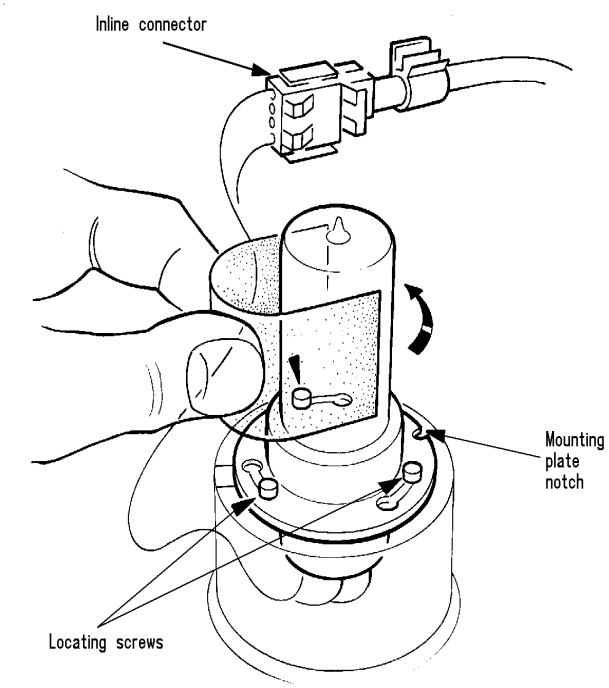
REMOVAL AND REPLACEMENT OF DEUTERIUM LAMP (not AquaMate Vis)

WARNING: (1) Switch off and disconnect the spectrophotometer from the mains supply and allow the lamp to cool for at least 15 minutes before proceeding.

(2) UV radiation from a Deuterium lamp can be harmful to the skin and eyes. Always view the lamp through protective glasses that will absorb UV radiation. Avoid looking directly at the Deuterium arc. Do not expose the skin to direct or reflected UV radiation.

- Set the power switch to off and disconnect the spectrophotometer from the mains supply.

- Remove the back corner cover by turning the fastener one quarter turn anti-clockwise and sliding the cover up to remove.



- Make sure the lamp has cooled, disconnect the lamp at the in-line connector, Using the key provided loosen the three locating screws, rotate lamp assembly anti-clockwise and lift lamp out.

When fitting the Deuterium lamp avoid handling the silica envelope. Finger marks become burnt on and cannot be removed after the lamp is switched on. This can affect the light output characteristics. Handle only the base of the lamp or the mounting plate. If the silica envelope becomes contaminated, clean with a powerful degreasing solvent such as absolute alcohol before the lamp is switched on.

- Take the new lamp, identify the notch in the mounting plate. Locate the lamp such that the notch points towards the lamp change mirror. Tighten locating screws down with the key provided.

- Re-connect the new lamp at the in-line connector.
- Refit the rear cover.
- Reconnect the spectrophotometer to the mains supply and switch on. Allow half an hour for warm up time.
- Lamp hours must be reset by the controlling software.

Return to Index

Fault Finding Guide

Problem	Symptom	Possible Cause
Instrument dead	The fans are not running	1. Ensure the mains lead is firmly pressed home. Some leads are a very tight fit in the three pin IEC connector on the rear of the instrument. 2. If a switched outlet is being used, ensure it is on. 3. Check the fuse in the plug. 4. Try another mains lead. 5. Try another mains outlet. 6. Ensure the power switch on the instrument has been fully operated. 7. If all of the above are OK the power supply may have failed. Contact your local agent.
Display Blank	No text on display, a slight glow can be seen around the edges of the display in subdued lighting.	1. The contrast control is incorrectly set. Go to the HOME page, the right and left arrow keys adjust the contrast. If nothing happens it may be that error messages are being displayed. Press the CLEAR key 5 times at 10 second intervals, to clear the error list, and try again. The display contrast is affected by temperature and may need adjusting from day to day, or as the instrument warms up. 2. The instrument has been put into remote control without allowing it to initialise first. The display will return next time that the instrument is switched on. 3. An unsuccessful attempt has been made to update the software. Connect the instrument to a PC and repeat the software upgrade process.
Any performance problem, Failure to initialise or error 1053	No light can be seen from the ventilation slots in the lamphouse cover.	1. The tungsten lamp has failed, fit a new lamp. A small number of tungsten lamps do fail very rapidly. If this happens fit a new lamp and contact your agent for a free replacement. It is likely that the spare lamp shipped with the instrument will be from the same batch as the one in the instrument.
Lamp energy low Error 1053, Drift at visible wavelengths	Instrument noisy in the visible region.	1. Check the tungsten lamp is correctly fitted and in good condition. The envelope should not show any signs of blackening or opacity. If in doubt replace with a new one. A small number of tungsten lamps do rapidly degrade. If this happens fit a new lamp and contact your agent for a free replacement.
Lamp energy low. Error 1053. Noisy signal.	Cell programmer partially blocking the beam.	1. If the carousel is fitted after using another cell holder, go to the Cell Programmer page and key "Initialise".

		2. Make sure the carousel is not jamming or being fouled on tubing. 3. Make sure there are no cells in the beam.
Fails to initialise.	Error 3093	1. Check that the sample compartment lid is correctly shut. 2. Check that the accessory panel, found at the left hand side of the sample compartment, is in place. 3. Position the instrument so that it is not directly in strong sunlight. 4. If using a water circulator, ensure that black water tubing is used.
Deuterium lamp energy low.	Lamp energy is indicated as low but performance seems OK.	1. Lamp energy was measured with a cell in the beam. Remove all cells and re-measure the lamp energy.
Deuterium Lamp energy low.	Performance is poor in the UV region.	1. Plastic cells that do not transmit in the UV are being used. 2. The deuterium lamp may need replacing.
Fails to initialise.	Error 3027	1. Check that the beams are clear and retry. 2. Record all the error messages 3027 is a general failure message, it is usually preceded by more specific error codes. 3. Check that the tungsten lamp is working. 4. Check that the cell programmer is not blocking the beam. 5. If the problem persists insert a blank formatted disk into the disk drive. Switch the instrument on whilst holding down the RUN key. Debug data will be sent to the disk. Email the file to customer support for further help.

Connecting AQUAMATE to a PC

Terminal programmes.

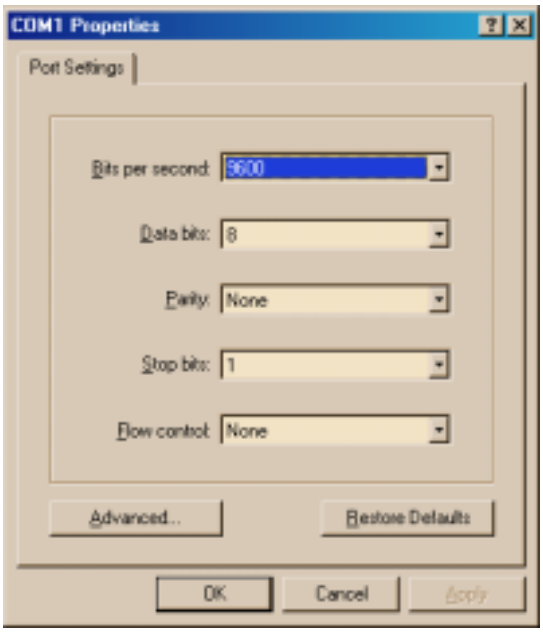
You will need software that allows you to write to and read from the computer's serial port. The communications parameters are:

Baud rate 9600
Data bits 8
Stop bits 1
No parity
Flow control off.
Local Echo on

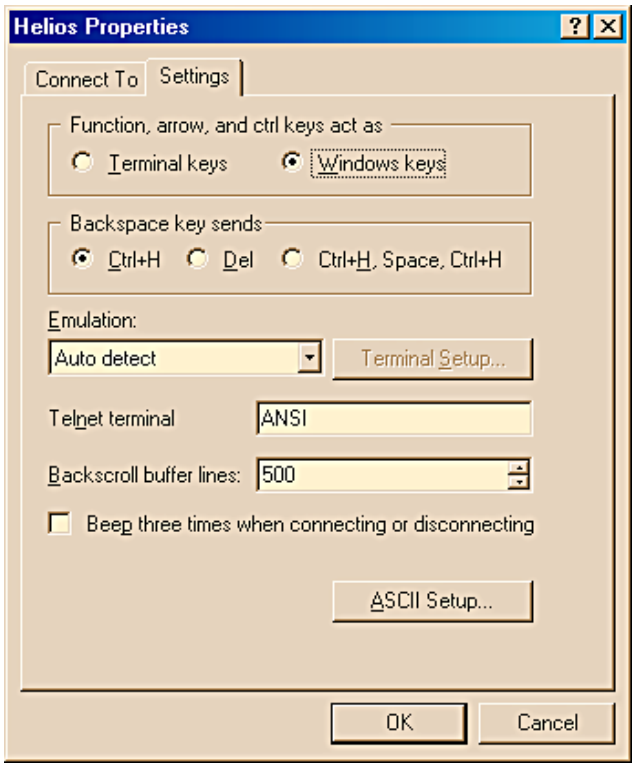
HYPERTERMINAL

You can also use HyperTerminal that comes with Windows 95. To establish a connection, start HyperTerminal and select "New Connection" from the file menu. In the dialogue that appears, type in AquaMate for the name and choose an icon. Key OK. In the next dialogue box select "Direct to COM1" and key OK.

Fill in the COM 1 properties dialogue box as shown below.



Then from the FILE menu select PROPERTIES and then click on the SETTINGS tab. Fill in the dialogue box as shown below. Click on OK.



CONNECTING AQUAMATE TO A PC

1) Use a null modem cable (part number 4013 172 82111) to connect the RS232C port of AquaMate to a free COM port on the PC.

   Here is the pin out data for the RS232 Cable

Pin		Pin
9	to	9
2		3
3		2
4		8
8		4
6		1 and 7
1 and 7	6	
5		5
Earth		Earth

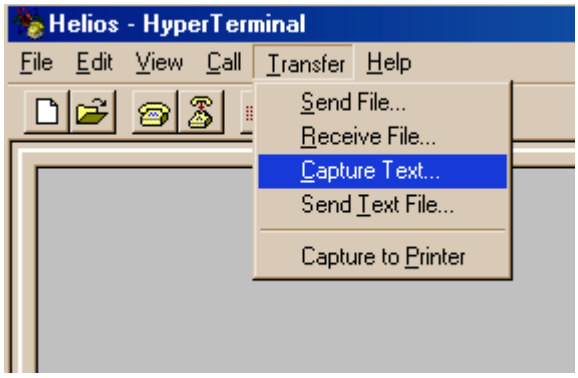
Switch on the PC and set up a terminal programme as described above.

COLLECTING DATA

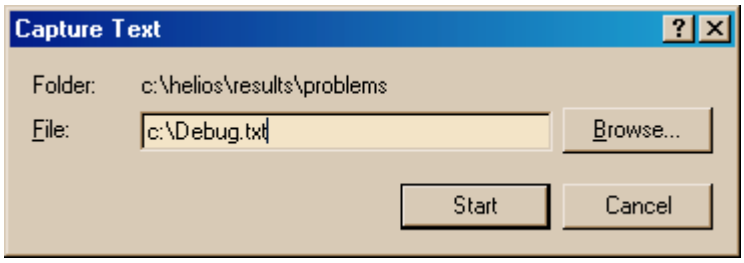
Once you have established control of the instrument and switched on the debug software you will need to collect the data that is returned and save it to file. This can be done by several methods, the next section details one of them.

USING HYPERTERMINAL TO COLLECT DATA

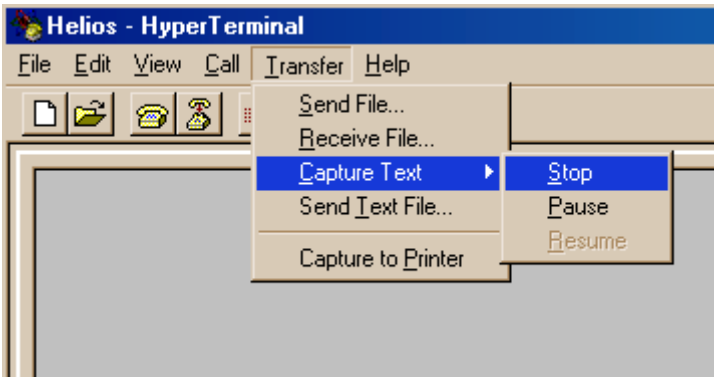
1) From the menu bar select TRANSFERS and then CAPTURE TEXT.



2) The CAPTURE TEXT dialogue box appears. Type in a path and file name then key START.



3) Once the instrument has stopped sending data, from the menu bar Select TRANSFER then CAPTURE TEXT then key STOP to terminate the transfer and save the file.



Return to Index