

product code:
see ordering information

Ultrospec 1100 *pro*

UV/visible spectrophotometer

Description

The Ultrospec™ 1100 *pro* UV/visible spectrophotometer is an easy to use instrument that is optimized for the biological science teaching laboratory and for industrial, utility QC, and environmental testing situations. In addition to the basic modes of operation, the instrument has enhanced software and method storage functionality while menu options can be password-protected if required.

The instrument will output alphanumeric text to a standard parallel printer (not bi-directional) and connect to a PC using a custom, serial interface lead. It can be used in conjunction with SWIFT 1000 software, or made to download directly to a spreadsheet. The UV lamp on Ultrospec 1100 *pro* can be switched off when the required measurements are in the visible region only. The instrument is delivered with a single- cell holder. A range of accessories, including a test-tube holder, is available.



Fig 1. Ultrospec 1100 *pro* is compact, reliable, and easy to use, combining stylish design with good performance

Features	Benefits
Available in four colors; classic, yellow, plum and apple	Greater customer choice
Modes for nucleic acid quantitation, standard curve and kinetics	Ideal for modern teaching laboratories
Definition of nine stored methods	Ease of use in QC and production line situations
Multiple language software	Can be used in the native language of many countries
Modern, intuitive, and easy to use	Will appeal to the new generation of users
Flexible function soft keys	On-screen prompts make instrument easy to use
Basic measurement modes coupled with enhanced software functionality	Instrument can be used in many situations, now and in the future as laboratory needs change
Customization of menu with password-protected set up	Modes not currently required can be disabled by a supervisor
Easy lamp replacement	Low service cost, since users can do it themselves
Wide range of accessories	Use in a wide range of sample handling situations and applications

Display and keypad

The back-lit liquid crystal display has large characters that are easily visible—and useful if a group of students are gathered around for a demonstration. The keypad is a very hard-wearing spill-proof membrane. The instrument is easy to use, with function select/entry soft keys on the keypad (F1, F2, and F3) being situated directly below the corresponding option on the display. On the absorbance page for example, concise help text is available at the push of the F1 key, whereas Menu and Set-up are available using F2 and F3, respectively. On other displays, the function of the keys change, but this is clearly indicated; for example, F1 and F3 act as return and accept options on parameter entry displays. Pressing the red stop key acts as an escape mechanism in most situations. A rapid operation short form card is supplied, and this can be attached to the top of the instrument for reference, if required.

Software modes

Absorbance and % Transmission

To perform a sample absorbance or % transmittance measurement, key in the wavelength directly via the λ button on the keypad, insert reference, and press the Set Reference key. Then insert the sample and read the result.

Factor Concentration

Entry to the Factor Concentration mode presents wavelength and factor parameter entry displays, the conversion factor is used to obtain a concentration value directly from an absorbance reading. After setting reference, samples are inserted as required, and the corresponding concentration is shown.

Time intervals

Simple kinetics studies for teaching laboratory experiments can be readily performed. The wavelength of interest is entered together with the time interval at which absorbances are to be read (between 1 and 60 s); the option of having a reference reading prior to the run is available. A countdown facility indicates the time remaining until the next measurement. If required, data can be output continuously via the analog output to a chart recorder or to a spreadsheet on a PC (with the appropriate serial interface lead).

Wavescan

An absorbance spectrum for a sample is readily obtained. The start and end wavelengths are entered, and a reference scan is run to store a baseline. The sample itself is then scanned, with real time output to display. If required, data can be output continuously via the analog output to a chart recorder or to a spreadsheet on a PC (with the appropriate serial interface lead).



Fig 2. Display and keypad



Fig 3. Time intervals



Fig 4. Wavescan

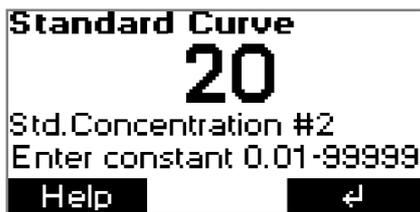


Fig 5. Standard Curve



Fig 6. Reaction Rate



Fig 7. Multi Wavelength



Fig 8. Nucleic Acids

Standard Curve

After selecting the curve fit (linear regression or cubic spline) and wavelength required, the number of standards to be used together with their concentrations is defined. The absorbance for each is measured in sequence, and the software constructs a concentration/absorbance calibration curve, which can be used to derive the concentrations of samples measured against it. An example is the determination of protein using a standard protocol.

Reaction Rate

The change in absorbance over a specified time period can be used to provide useful information when an appropriate factor, defined in the reagent kit protocol, is applied. These experiments are readily performed by entering the wavelength, delay, start, and end times, and the factor using the display window/function key combinations in Reaction Rate mode. The required result of absorbance change multiplied by the factor is displayed at the end of the experiment. A correlation coefficient is also calculated from 10 equally spaced absorbance/time points during the course of the experiment, and can be printed out with the result, if required.

Multi Wavelength

By using the equation entry facility, post-measurement calculations can be done automatically; the individual absorbance values and the final result of the computation are displayed and printed out, if required. The parameter entry window enables entry of equation operators, factors, and absorbance at wavelength values in any sequence. This makes it very easy for a supervisor to input a specific equation, and then save it as a method for later use.

Nucleic Acids

The quantitation and purity check for DNA, RNA, oligos, and primers has assumed great importance in modern teaching laboratories, and instruments now need to have UV capability. These measurements can be done easily using Ultrospec 1100 *pro*, and user-prompts appear for background correction at 320 nm, units of choice (μg/ml, ng/μl or μg/μl), dilution factor, and pathlength of cell used (10, 5, or 2 mm). The results for concentration, the absorbance values at 230, 260, 280 and 320 nm, and the $A_{260/280}$ and $A_{260/230}$ ratios are all shown on one display after the measurement.

Method storage

After defining parameters in any of the modes, and prior to measuring a sample; entry to Set-up using the F3 function key provides the opportunity to store the parameters currently loaded as a method. This option is password-protected, and up to nine methods can be saved. A stored method can be enabled as an option directly on the instrument menu, so that it is possible for an operator to switch the instrument on and have a specified method available straight away.

Instrument set-up pages

Pressing the F3 function key on the Absorbance page provides access to basic information such as lamp usage hours and EPROM version; an option to re-calibrate is also available. It is then possible for authorized personnel to go further via a password-protected routine to customize the instrument menu by disabling menu options (including stored methods) that are not currently required. Facilities for lamp control parameters, setting display contrast, and enabling serial output are also present.

Sample compartment area

The instrument is supplied complete with a single cell holder that can accommodate standard 10 mm pathlength cells (disposable, glass, or UV silica); a range of other accessories is also available. To clean the sample compartment, simply pull it out and wipe it clean.

Presentation of results

Ultrospec 1100 *pro* has a multipurpose output connector on the rear panel, and will output alphanumeric results via a Centronics cable to a standard parallel printer (not bi-directional) if connected. The time intervals and scan modes will output to a chart recorder if the appropriate interface lead is used. The use of the custom serial interface cable, and the spreadsheet interface software included with it, means that results can be downloaded directly to Excel; these in turn can be filed via a Laboratory Information Management System (LIMS) for project/manufacture archiving purposes. A Windows™ based applications software package comprising modules for Wavelength Scanning, Enzyme Kinetics, and Quantitation is also available (SWIFT 1000 software).

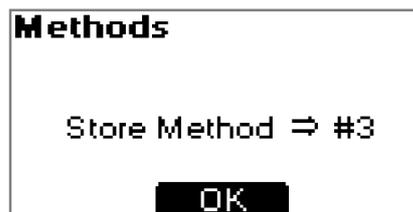


Fig 9. Method Storage



Fig 10. Set-up



Fig 11. Sample compartment area



Fig 12. Printing out to a standard parallel printer

Summary of software modes

Basic measurement modes

Absorbance and % Transmission	Make basic sample measurements
Factor Concentration	Calculate concentration from a known factor
Time intervals	Use for simple kinetics studies
Wavescan	Record a sample spectrum
Standard Concentration	Compare sample concentrations with that of a known standard
Standard Curve	Store multi-point calibration curves in memory for subsequent use with samples
Reaction Rate	Apply a factor to an absorbance change over a specified time interval for use with reagent test kits
Multi-wavelength	Use absorbance values in equations specified by you for direct output of results, saving post run calculation
Nucleic Acids	A_{230} , A_{260} , A_{280} , A_{320} , Concentration and $A_{260/280}$, $A_{260/230}$ ratios
Methods	Store up to nine methods, in any combination of the above modes, in the memory for ease of use

Absorbance	= 1
Std. Concentration	= 2
Standard Curve	= 3
Reaction Rate	= 4

Fig 13. Customization



Fig 14. Lamp change is easy

Customization of menu

The customization of the instrument menu to suit laboratory needs is an important feature of the instrument. This facility is password-protected so that only authorized personnel are able to set-up, or change the instrument settings.

In a teaching laboratory, for example, a laboratory technician might choose to have only the modes of Absorbance, Factor Concentration and Time intervals available. In the QC lab, the supervisor may choose to have Absorbance, Standard Concentration, Multi-point Standard Curve entry and Reaction Rate slope calculation. Similarly, a production line might have Absorbance, and method 1 and method 2 as the instrument start up. In this case methods 1 and 2 could both be multi-wavelength equations involving factors, and set-up in the analytical laboratory for subsequent use by the process operators.

The advantages of customization, and the ability to conform to standard operating procedures, make this the instrument of choice for routine use in many environments.

Lamp change

To change the lamp, simply unscrew and remove the lamp cover at the back of the instrument, slide out the lamp assembly and replace it with a new one. No lamp alignment is necessary because the lamps are pre-aligned during manufacture.

Technical Specification

Wavelength range	200–900 nm
Monochromator	Plane grating with 1200 lines/mm
Wavelength calibration	automatic upon switch on
Spectral bandwidth	5 nm
Wavelength accuracy	± 2 nm
Wavelength reproducibility	± 0.5 nm
Light sources	tungsten halogen (both) and deuterium arc
Detector	single solid state silicon photodiode
Photometric range	- 0.300 to 3.000A, 0.01 to 99999 concentration units, 0.1 to 200 %T
Photometric linearity	± 0.5% or ± 0.005A to 2.000A at 546 nm, whichever is the greater
Photometric reproducibility	0.5% of absorbance value to 2.000A at 546 nm
Stray Light	typically <0.2%T at 220 nm using NaI and <0.2%T at 340 nm using NaNO ₂ according to ANSI/ASTM E387-72
Stability	± 0.002A/h at 0A after warm-up
Noise	± 0.001A near 0A and ± 0.002A near 2A at 600 nm
Analog output	100 mV per 1.000A via interface lead
Digital output	Centronics parallel (not bi-directional) as standard, 9-pin serial via interface lead
Dimensions	345 x 435 x 140 mm
Weight	6.5 kg
Power requirements	90–265 V, 50/60 Hz, 100 VA

Specifications are measured after the instrument has warmed up at constant ambient temperature and are typical of a production unit. As part of our policy of continuous product development we reserve the right to alter specifications without notice. We supply support agreements that help you to fulfil demands of regulatory guidelines concerning GLP/GMP. These include calibration and certification using filters traceable to international standards by certificated engineers using calibrated test tools. The choice of agreement apart from break down coverage can include both preventative maintenance and certification. The manufacturer of these products designs and manufactures in accordance with an ISO 9001 approved quality system. The products are CE compliant.

Ordering Information

Ultrospec 1100 pro UV/Visible Spectrophotometer	
Classic	80-2112-00
Yellow	80-2112-01
Plum	80-2112-02
Apple	80-2112-03
Accessories	
SWIFT 1000 software	80-2110-00
Manual 2-position cell changer	80-2109-04
10–50 mm cell holder	80-2109-05
Water heated cell holder (requires circulation bath)	80-2109-06
Peltier heated cell holder (25, 30, 37 °C) (requires Temperature Controller)	80-2109-07
Temperature Controller	80-2109-01
Fitting kit for external sample delivery (requires pump and 10 mm flow cell)	80-2109-08
Test tube holder (8–26 mm diameter, up to 180 mm tall)	80-2109-33
Spare single cell holder	80-2109-09
Interface adaptor for serial connection (includes spreadsheet interface software)	80-2109-02
Chart Recorder Lead	80-2109-03



Fig 15. Manual 2-position cell changer



Fig 16. Test tube holder

Product information

for further details:

Asia Pacific Tel: +852 2811 8693 Fax: +852 2811 5251 Australasia Tel: +61 2 9899 0999 Fax: +61 2 9899 7511 Austria Tel: 01 576 0616 23 Fax: 01 576 0616 27 Belgium Tel: 0800 73 888 Fax: 03 272 1637 Canada Tel: 1 800 463 5800 Fax: 1 800 567 1008 Central, East, South East Europe Tel: +43 1 982 3826 Fax: +43 1 985 8327 Denmark Tel: 45 16 2400 Fax: 45 16 2424 Finland & Baltics Tel: +358-(0)9-512 39 40 Fax: +358-(0)9-512 17 10 France Tel: 01 6935 6700 Fax: 01 6941 9677 Germany Tel: 0761 4903 403 Fax: 0761 4903 405 Italy Tel: 02 27322 1 Fax: 02 27302 212 Japan Tel: +81 3 5331 9336 Fax: +81 3 5331 9370 Latin America Tel: +55 11 3667 5700 Fax: +55 11 3667 8799 Middle East and Africa Tel: +30 (1) 96 00 687 Fax: +30 (1) 96 00 693 Netherlands Tel: 0165 580 410 Fax: 0165 580 401 Norway Tel: 2318 5800 Fax: 2318 6800 Portugal Tel: 21 417 7035 Fax: 21 417 3184 Russia & other C.I.S. & N.I.S Tel: +7 (095) 232 0250, 956 1137 Fax: +7 (095) 230 6377 South East Asia Tel: 60 3 8024 2090 Fax: 60 3 8024 2090 Spain Tel: 93 594 49 50 Fax: 93 594 49 55 Sweden Tel: 018 612 1900 Fax: 018 612 1910 Switzerland Tel: 01 802 81 50 Fax: 01 802 81 51 UK Tel: 0800 616928 Fax: 0800 616927 USA Tel: +1 800 526 3593 Fax: +1 877 295 8102

or visit our Web site: WWW.amershambiosciences.com

Drop Design is a trademark of Amersham Biosciences Limited. Amersham and Amersham Biosciences are trademarks of Amersham plc. Ultrospec is a trademark of Biochrom Limited. Windows is a trademark of Microsoft Corporation. © Amersham Biosciences 2001 - All rights reserved. All goods and services are sold subject to the terms and conditions of sale of the company within the Amersham Biosciences group which supplies them. A copy of these terms and conditions is available on request. Amersham Biosciences AB, Björkgatan 30, SE-751 84 Uppsala, Sweden. Amersham Biosciences Corp., 800 Centennial Avenue, PO Box 1327, Piscataway, NJ 08855, USA. Amersham Biosciences GmbH, Munzinger Strasse 9, D-79111, Freiburg, Germany.