

UV-VISIBLE SPECTROPHOTOMETER

PRODUCT BROCHURE

Analytical
Instruments
for
Science

Contents

	PAGE NO.
Introduction	4
T60 UV-Vis Spectrophotometer	6
T70 UV-Vis Spectrophotometer	10
T80 UV-Vis Spectrophotometer	14
T92+ UV-Vis Spectrophotometer	18
T110+ UV-Vis Spectrophotometer	22
UVWIN Software	25
Spectrophotometer Liquid IQ/OQ Qualification Package	29
C30/C30M Portable Spectrometer	31
Specifications	35
Accessories	38
Consumables	41

Analytical
Instruments
for Science



ACCURATE · RELIABLE · FLEXIBLE ·

Since its development in the 1950's the UV-Visible Spectrophotometer has evolved into an accurate and reliable analytical tool and it has become one of the most utilised instruments in today's scientific laboratory.

UV-Visible spectroscopy is a mature and well established analytical technique used extensively in many industry sectors including Environmental Analysis, Pharmaceutical Testing, Food and Beverage Production to name but a few. PG Instruments manufacture an extensive range of UV and Visible Spectroscopy instrumentation guaranteed to meet the needs of your application. Further information on the UV-Vis product line along with a brief introduction to UV-Vis Spectroscopy can be found in this brochure.

UV-Vis Spectroscopy

UV-Vis Spectroscopy is an analytical method used to measure the absorbance of ultra-violet or visible radiation through an analyte. The molecular

absorption of the analyte corresponds to both excitation of valence electrons and excitation of electrons in different atomic orbitals.

UV-Vis Spectroscopy is an effective technique for both qualitative and quantitative analysis of organic and inorganic compounds.

UV-Vis Spectroscopy is based on the Lambert-Beer principle which states that the Absorbance of a solution (A) is directly proportional to its pathlength (l) and its concentration (c) when the wavelength of the incidence light remains fixed.

This is summarized in the following equation, where ϵ is the molar absorptivity

$$A = \epsilon lc$$



ACCESSIBLE · ANALYSIS

UV-Vis Spectrophotometer

The UV-Vis Spectrophotometer is the analytical instrument used for the UV-Vis spectroscopic analysis. Spectrophotometers are available in different configurations however most can be categorized into either single beam, split beam or double beam types depending on the design of their optical system. Such types of instrument comprise the following components in their constructions:

- Light Source
- Monochromator
- Cell Compartment
- Detector
- Signal Processing System

Split Beam Spectroscopy

The Split beam approach to UV-Vis Spectroscopy uses a single beam of light separated into Sample and

Reference beams by means of a beam splitter using a separate detector for each. Split beam instruments have a reference detector housed inside the instrument optics offering the advantage of optical stability as in double beam spectroscopy whilst using the single beam measurement technique.

Double Beam Spectroscopy

The double beam approach to UV-Vis spectroscopy requires two beams of light, both having the same intensity to measure the Absorbance through sample and reference positions simultaneously. The Sample position is used for measurement of the analyte, whereas the reference position is used for the correction against a blank solution or sample matrix.

A clear advantage of the double beam optical system is the improvement in measurement stability and drift precision as a result of having a real-time feedback of both the reference and sample signals.

T60

UV-VIS SPECTROPHOTOMETER





The T60 is a high performance compact split beam spectrophotometer with a fixed 2nm spectral bandwidth.

The T60 range consists of two models:

T60U (UV-Visible) operating within a wavelength range of 190 - 1100nm. T60V (Visible) operating within a wavelength range of 325 - 1100nm.

The instrument has a switched mode power supply accepting voltages in the range of 95 - 240V AC and supplied with either universal pathlength 5 cell changer or fixed path length 8 cell changer as standard.

The T60 delivers the functionality and accuracy of an advanced instrument at an affordable price.

FEATURES & FUNCTIONS

- High performance fixed 2nm spectral bandwidth.
- Low stray light 0.05%T (T60U).
- Wavelength accuracy +/- 1nm (T60U).
- Holographic blazed grating 1200lines/mm.
- Local control software for photometric fixed wavelength measurement.
- Easily upgraded to include quantitative analysis, multi wavelength spectrum & kinetics.
- Built in cell holder storage.
- Robust modular design with a small footprint.
- Can be used with UV-WIN software (optional).



Fixed pathlength 8-cell changer

T60 continued

OPTICAL SYSTEM & COMPONENTS

High quality optical components ensure reliable analytical data with low stray light achieved using very low noise electronic circuits.

Deuterium and tungsten light sources deliver superior stability across the full wavelength range. Both types of lamp have self timers and are inexpensive and easy to replace when required.

The monochromator is completely sealed and the optical surfaces can be easily cleaned to maintain optimum reflectivity over the lifetime of the instrument.

A maintenance free high resolution direct stepper drive positions the grating precisely, which ensures reproducible wavelength scanning at different scan speeds, thus negating any wavelength peak shift.

The spectrophotometer shell is made from an environmentally friendly non corrosive material and a simple retaining mechanism on the base allows easy access for air filter changes and routine maintenance.



Specifications

	T60U (UV-Visible)	T60V (Visible)
Optical system	Split beam ratio	Split beam ratio
Scan speed	Selectable	Selectable
Wavelength range	190 - 1100nm	325 - 1100nm
Wavelength accuracy	±1nm	± 2nm
Wavelength reproducibility	≤ 0.2nm	≤ 0.4nm
Spectral bandwidth	2nm	2nm
Photometric mode	Transmittance, Absorbance, Energy	Transmittance, Absorbance, Concentration
Photometric range	-0.3 - 3.0Abs	-0.3 - 3.0Abs
Photometric accuracy	0.002A (0 - 0.5A), 0.004A (0.5 - 1A) 0.3%T (0 - 100%T)	0.002A (0 - 0.5A), 0.004A (0.5 - 1A) 0.3%T (0 - 100%T)
Photometric reproducibility	0.001A (0 - 0.5A), 0.002A (0.5 - 1A) 0.15%T (0 - 100%T)	0.001A (0 - 0.5A), 0.002A (0.5 - 1A) 0.15%T (0 - 100%T)
Photometric noise	0.001A (500nm) 30min warm-up	0.001A (500nm) 30min warm-up
Baseline flatness	0.002A (200 - 1000nm)	0.002A (325 - 1000nm)
Baseline stability	0.001A/h (500nm, 0Abs), 2hr warm-up	0.002A/h (500nm, 0Abs), 2hr warm-up
Stray light	≤ 0.05%T (220nm NaI, 340nm NaNO ₂)	≤ 1.0%T (340nm NaNO ₂)
Standard Functionality	Photometric Measurement (Quantitative, Multi-wavelength, Spectrum and Kinetic measurements with program cards)	Photometric & Quantitative Measurement
Detector	Silicon photo diode	Silicon photo diode
Light source	Tungsten Halogen and Deuterium arc lamps	Tungsten Halogen
Display	Digital LCD display	Digital LCD Display
Printer	Mini Printer	Mini Printer
PC Interface	RS232	RS232
Software support	Local and UV-Win	Local and UV-Win
Power supply	Switch mode 95 - 250VAC 50 - 60Hz	Switch mode 95 - 250VAC 50 - 60Hz
Weight	11kg	11kg
Dimensions (Width, Depth, Height)	476(mm), 362(mm), 225(mm)	476(mm), 362(mm), 225(mm)

Each Unit is supplied with the following as standard:

- | | |
|---|------------------------|
| 1 x Certificate of conformity | 1 x Power cord |
| 1 Pair of quartz cells (T60U), glass cells (T60V) | 1 x Instruction manual |
| 1 x Quantitative program card (T60U Only) | 1 x Dust cover |
| 1 x Black block for dark current correction | 1 x Packing list |
| 1 x Fuse (2A) | |

UV-VIS SPECTROPHOTOMETER

Press START to measure

Press START to measure

21:4



The T70 is a high performance split beam spectrophotometer available with a fixed (2nm) or variable (0.5, 1, 2, 5nm) spectral bandwidth, which is innovative in terms of instrument application, mechanical and optical design, electronic control and software whilst retaining features that are well established and accepted through the industry.

The T70 series of UV-Visible Spectrophotometers are able to carry out photometric measurement, spectrum scans, quantitative determination and DNA/Protein analysis. When interfaced to a PC using the UV-Win software, many more features are available including three dimensional spectrum, kinetic measurements, method and data storage, exportation of data in multiple formats and GLP administration features. Both instruments have a spectral range of 190-1100nm.

The T70 range consists of two models:

T70 UV-Vis instrument offering a fixed bandwidth of 2nm.

T70+ UV-Vis instrument offering a variable bandwidth of 0.5, 1, 2 or 5nm.

FEATURES & FUNCTIONS

- High performance fixed (2nm) or variable (0.5, 1, 2, 5nm) spectral bandwidth.
- Wavelength accuracy +/- 0.3nm.
- Supplied with a motorised 8 cell changer and pre-aligned Tungsten and Deuterium lamps.
- Holographic blazed grating 1200 lines /mm.
- High degree of automation requiring minimal key depressions to start analysis.
- A number of optional accessories available which increase the flexibility of the analysis.
- Analysis for photometric measurement, spectrum scans, quantitative determination and DNA/Protein analysis.
- UV-Win software gives additional functionality including 3D spectrum analysis and compliance with GLP protocol.
- Simple mechanical structure and modular electronics make routine maintenance very easy.

T70 continued



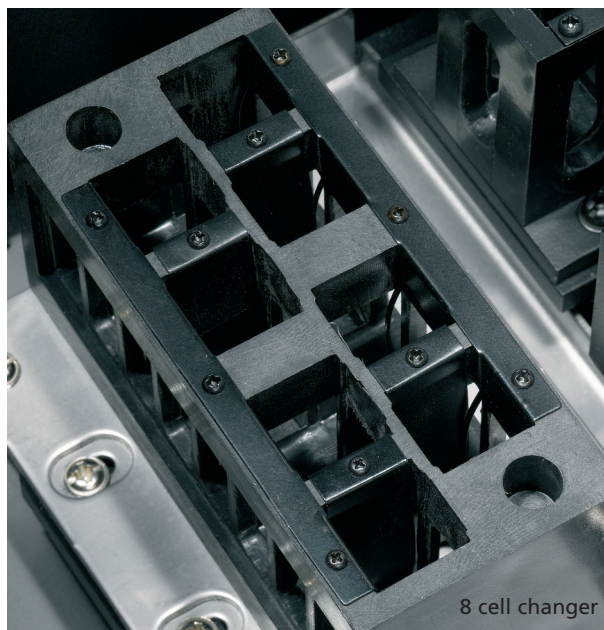
OPTICAL SYSTEM & COMPONENTS

High quality optical components ensure reliable analytical data with low stray light achieved using very low noise electronic circuits.

The split beam ratio optics ensures good optical stability.

Pre-aligned Deuterium and tungsten light sources deliver superior stability across the full wavelength range. Both types of lamps are inexpensive and easy to replace when required.

The modular design allows easy access to all optical surfaces which can be easily cleaned to maintain optimum reflectivity over the lifetime of the instrument.



8 cell changer

Specifications

Instrument Type	T70	T70+
Optical System	Split beam ratio	Split beam ratio
Scan Speed	Selectable	Selectable
Wavelength Range	190 - 1100nm	190 - 1100nm
Wavelength Accuracy	$\pm 0.3\text{nm}$	$\pm 0.3\text{nm}$
Wavelength Reproducibility	$\leq 0.2\text{nm}$	$\leq 0.2\text{nm}$
Spectral Bandwidth	2nm	0.5, 1.0, 2.0, 5.0nm
Photometric Mode	Transmittance, Absorbance, Energy Concentration	Transmittance, Absorbance, Energy Concentration
Photometric Range	-0.3 - 3.0Abs	-0.3 - 3.0Abs
Photometric Accuracy	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)
Photometric Reproducibility	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)
Photometric Noise	0.001A (500nm) 30min warm-up	0.001A (500nm) 30min warm-up
Baseline Flatness	0.002A (200 - 1000nm)	0.002A (200 - 1000nm)
Baseline Stability	0.001A/h (500nm, 0Abs), 2hr warm-up	0.001A/h (500nm, 0Abs), 2hr warm-up
Stray light	$\leq 0.12\%T$ (220nm NaI, 340nm NaNO ₂)	$\leq 0.12\%T$ (220nm NaI, 340nm NaNO ₂)
Standard Functionality	Photometric, Quantitative, Spectrum and DNA measurements.	Photometric, Quantitative, Spectrum and DNA measurements.
Cell Holder	Automatic 8 Cell changer	Automatic 8 cell changer
Detector	Silicon photo diode	Silicon photo diode
Light Source	Tungsten Halogen and Deuterium arc lamps	Tungsten Halogen and Deuterium arc lamps
Display	Digital LCD display	Digital LCD display
Printer	Not available	Not available
PC Interface	RS232/USB	RS232/USB
Software Support	Local and UV Win	Local and UV Win
Power Supply	Switchable 120 - 230VAC 50 - 60Hz	Switchable 120 - 230VAC 50 - 60Hz
Weight	25Kg	25Kg
Dimensions (Width, Depth, Height)	520mm, 420mm, 230mm	520mm, 420mm, 230mm

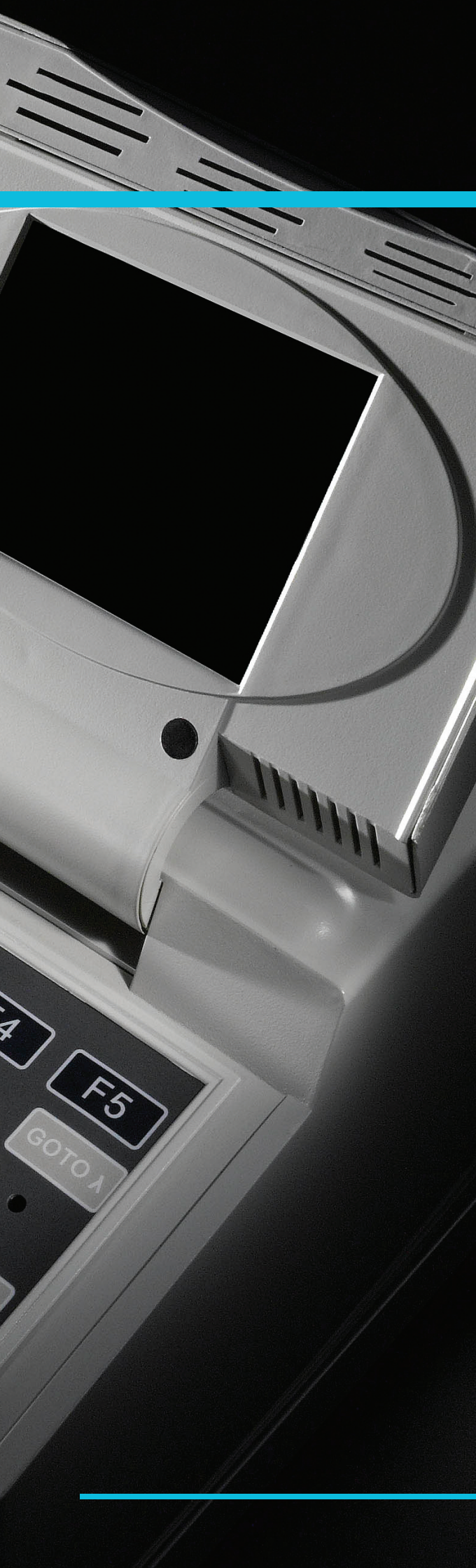
Each Unit is supplied with the following as standard:

1 x Certificate of conformity	1 x Power cord
1 x 8 position 10mm path length motorised cell holder	1 x Instruction manual
1 Pair 10mm Quartz cells	1 x Dust cover
1 x Black block for dark current correction	1 x Packing list
1 x Fuse (2A)	

T80

UV-VIS SPECTROPHOTOMETER





The T80 is a high performance double beam spectrophotometer available with a fixed (2nm) or variable (0.5, 1, 2, 5nm) spectral bandwidth, which is innovative in terms of instrument application, mechanical and optical design, electronic control and software whilst retaining features that are well established and accepted through the industry.

The T80 series of UV-Visible Spectrophotometers are able to carry out photometric measurement, spectrum scans, quantitative determination and DNA/Protein analysis. When interfaced to a PC using the UV-Win software, many more features are available including three dimensional spectrum, kinetic measurements, method and data storage, exportation of data in multiple formats and GLP administration features. Both instruments have a spectral range of 190-1100nm.

The T80 range consists of two models:

T80 UV-Vis instrument offering a fixed bandwidth of 2nm.

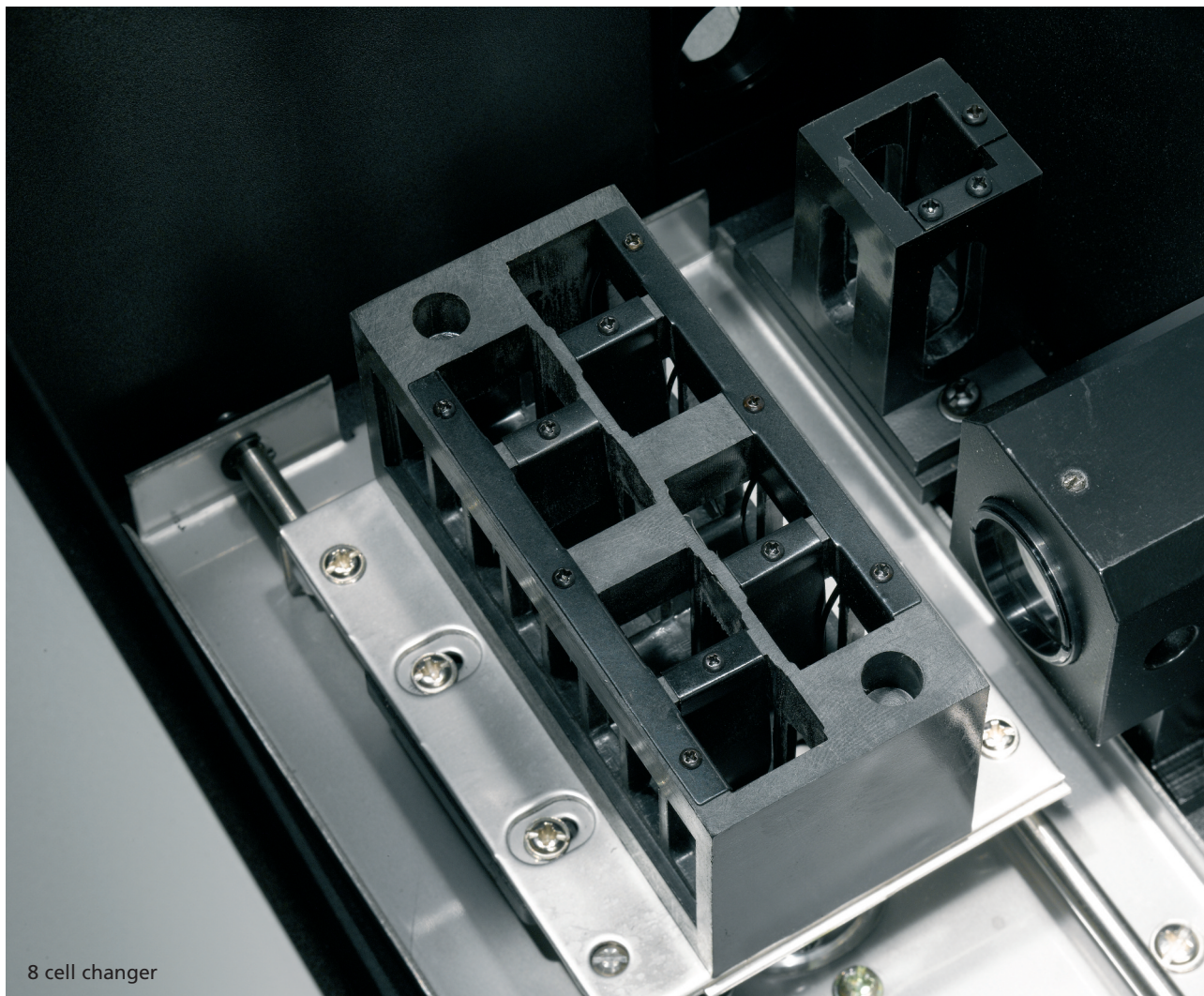
T80+ UV-Vis instrument offering a variable bandwidth of 0.5, 1, 2 or 5nm.

FEATURES & FUNCTIONS

- High performance fixed (2nm) or variable (0.5, 1, 2, 5nm) spectral bandwidth.
- Wavelength accuracy $\pm 0.3\text{nm}$.
- Supplied with a motorised 8 cell changer and pre-aligned Tungsten and Deuterium lamps.
- Holographic blazed grating 1200 lines /mm.
- High degree of automation requiring minimal key depressions to start analysis.
- A number of optional accessories available which increase the flexibility of the instrument.
- Analysis for photometric measurement, spectrum scans, quantitative determination and DNA/Protein analysis.
- UV-Win software gives additional functionality including 3D spectrum analysis and compliance with GLP protocol.
- Simple mechanical structure and modular electronics make routine maintenance very easy.

T80

continued



8 cell changer

OPTICAL SYSTEM & COMPONENTS

High quality optical components ensure reliable analytical data with low stray light achieved using very low noise electronic circuits.

The double beam optics ensure good optical stability. Pre-aligned Deuterium and Tungsten light sources deliver superior stability across the full wavelength range. Both types of lamps are inexpensive and easy to replace when required.

The modular design allows easy access to all optical surfaces which can be easily cleaned to maintain optimum reflectivity over the lifetime of the instrument.

Specifications


Instrument Type	T80	T80+
Optical System	Double beam	Double beam
Scan Speed	Selectable	Selectable
Wavelength Range	190 - 1100nm	190 - 1100nm
Wavelength Accuracy	± 0.3nm	± 0.3nm
Wavelength Reproducibility	≤ 0.2nm	≤ 0.2nm
Spectral Bandwidth	2nm	0.5, 1.0, 2.0, 5.0nm
Photometric Mode	Transmittance, Absorbance, Energy Concentration	Transmittance, Absorbance, Energy Concentration
Photometric Range	-0.3 - 3.0Abs	-0.3 - 3.0Abs
Photometric Accuracy	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)
Photometric Reproducibility	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)
Photometric Noise	0.001A (500nm) 30min warm-up	0.001A (500nm) 30min warm-up
Baseline Flatness	0.0015A (200 - 1000nm)	0.0015A (200 - 1000nm)
Baseline Stability	0.0008A/h (500nm, 0Abs), 2hr warm-up	0.0008A/h (500nm, 0Abs), 2hr warm-up
Stray light	≤ 0.12%T (220nm NaI, 340nm NaNO ₂)	≤ 0.12%T (220nm NaI, 340nm NaNO ₂)
Standard Functionality	Photometric, Quantitative, Spectrum and DNA measurements.	Photometric, Quantitative, Spectrum and DNA measurements.
Cell Holder	Automatic 8 Cell changer	Automatic 8 cell changer
Detector	Silicon photo diode	Silicon photo diode
Light Source	Tungsten Halogen and Deuterium arc lamps	Tungsten Halogen and Deuterium arc lamps
Display	Digital LCD display	Digital LCD display
Printer	Not available	Not available
PC Interface	RS232/USB	RS232/USB
Software Support	Local and UV Win	Local and UV Win
Power Supply	Switchable 120 - 230VAC 50 - 60Hz	Switchable 120 - 230VAC 50 - 60Hz
Weight	25Kg	25Kg
Dimensions (Width, Depth, Height)	520mm, 420mm, 230mm	520mm, 420mm, 230mm

Each Unit is supplied with the following as standard:

1 x Certificate of conformity	1 x Fuse (2A)
1 x 8 position 10mm path length motorised cell holder	1 x Power cord
1 Pair 10mm Quartz cells	1 x Instruction manual
1 x Black block for dark current correction	1 x Packing list

T92+

UV-VIS SPECTROPHOTOMETER



The T92+ is a high performance double beam spectrophotometer with a variable spectral bandwidth from 0.1-5nm, selected by a continuous variable slit.

The Czerny-Turner monochromator with a holographic grating keeps stray light to a minimum and offers excellent optical resolution. The use of a photomultiplier tube as a detector offers exceptional sensitivity.

The T92+'s true double beam optical system coupled with an efficient and well proven electronic control system ensures high stability and low background noise.

FEATURES & FUNCTIONS

- Photomultiplier tube detection provides exceptional sensitivity.
- Wavelength accuracy $\pm 0.3\text{nm}$ (Automatic Wavelength Correction).
- User selectable spectral bandwidth between 0.1 - 5nm.
- User friendly design allows easy light source replacement and routine maintenance.
- Sample compartment design enables use of a wide range of optional accessories.
- UV-WIN software offers many operational and data processing capabilities and is supplied as standard with the T92+.

The instrument can be fitted with an embedded PC as an option for extensive local functionality via the UVWin Software.

EMBEDDED PC SPECIFICATION (optional)

- CPU - Intel® Atom™ processor Z510 1.1 GHz and Z530 1.6 GHz onboard with FSB 400/533 MHz
- Hard Disk – 250GB, ● Memory – 2GB DDR2
- USB – 2 x External USB
- Ethernet – 1 port as 10/100/1000Mbps supports Wake-on-LAN, RPL/PXE Boot ROM with Realtek RTL8111B
- 19" LCD Display – VGA Output with Intel® GMA 500 Graphics Core
- Peripheral – Supplied with USB mini Keyboard Mouse combination.

T92+ continued



OPTICAL SYSTEM & COMPONENTS

The T92+ features an advanced continuous variable bandwidth feature making it the instrument of choice for applications with a demand for precise and accurate control of wavelength resolution. This feature allows the user to specify exactly what bandpass is required in the range of 0.1-5nm.

The double beam optical design combined with a high specification holographic grating gives excellent wavelength separation allowing the user to measure close adjacent wavelengths with excellent sensitivity.

The modular design of the sample compartment allows for ease of use of a wide range of optional accessories ensuring accurate analysis of various sample types including liquids, thin films and powders.

The user friendly design of the lamp compartment allows easy replacement and simplified routine maintenance of the Deuterium and Tungsten lamps.

The optional Embedded PC in the T92+ provides, full instrument control, data acquisition and processing of measurement data. This is made possible by means of the UV-Win software. For more information please refer to the UV-Win section of this brochure.

Specifications

Specifications	T92+
Optical System	Double beam
Scan Speed	Selectable
Wavelength Range	190 - 900nm
Wavelength Accuracy	$\pm 0.3\text{nm}$
Wavelength Reproducibility	$\leq 0.1\text{nm}$
Spectral Bandwidth	Continuous slit 0.1 - 5.0nm with 0.1nm interval
Photometric Mode	Transmittance, Absorbance, Energy Concentration, All Using UVWin Software
Photometric Range	-4.0 - 4.0Abs
Photometric Accuracy	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)
Photometric Reproducibility	0.001A (0 - 0.5A)
Photometric Noise	0.0004A (500nm) 30min warm-up
Baseline Flatness	0.001A (200 - 850nm)
Baseline Stability	0.0008A/h (500nm, 0Abs), 2hr warm-up
Stray light	$\leq 0.01\%T$ (220nm NaI, 340nm NaNO ₂)
Standard Functionality	No stand alone function
Cell Holder	Fixed position sample and reference
Detector	Photo multiplier tube
Light Source	Tungsten Halogen and Deuterium arc lamps
Display	No display
Printer	Not available
PC Interface	RS232/USB
Software Support	UV Win
Power Supply	Switchable 120 - 230VAC 50 - 60Hz
Weight	43Kg
Dimensions (Width, Depth, Height)	545mm, 580mm, 270mm

Each Unit is supplied with the following as standard:

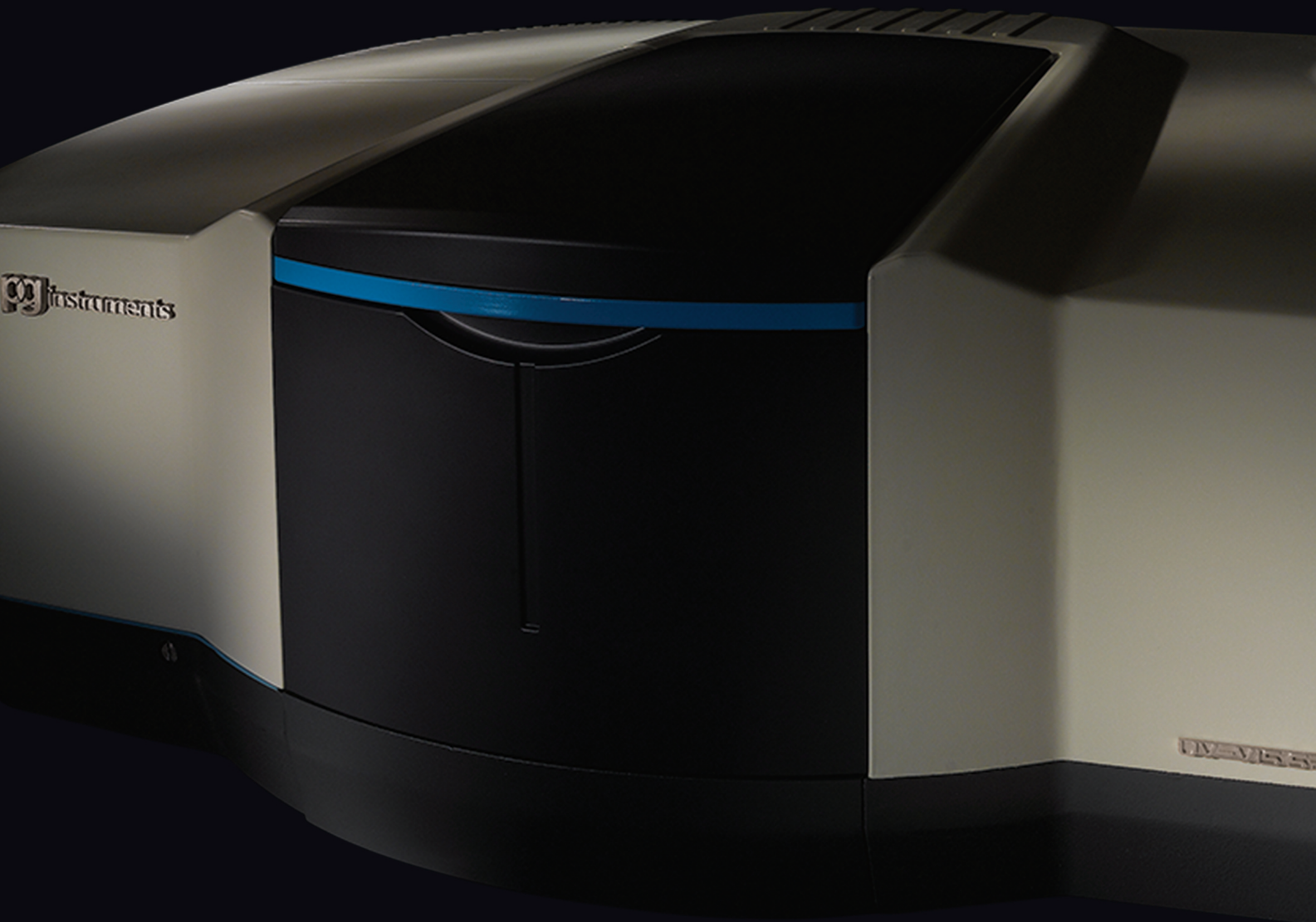
1 x Certificate of conformity	1 x Fuse (2A)
1 x Standard fixed position cell holder (sample and reference)	1 x Power cord
1 x Pair Quartz cells	1 x Instruction manual
1 x Black block for dark current correction	1 x Dust cover
1 x UV Win Software disk	1 x Packing list

Embedded PC only:

1 x 19" LCD Display
1 x USB Mini Keyboard Mouse combination

T110+

UV-VIS SPECTROPHOTOMETER





Wireless instrument control and data acquisition can be achieved from a Tablet PC using Wi-Fi technology allowing the analyst to move freely around the laboratory whilst also keeping track of sample measurements.

The T110+ Series Spectrophotometer incorporates dual monochromator technology making it well suited to even the most demanding of applications in all areas of UV-Visible Spectroscopy including:

- Pharmaceutical
- Material Science
- Metrological Verification
- Biotechnology
- Food Safety
- Research

OPTICAL SYSTEM & COMPONENTS

The T110+ offers extremely low stray light characteristics ($\leq 0.00004\%T$ NaI, 220 nm) which allows for an extensive photometric range (-8.0 – 8.0Abs). Measurements at deep ultra-violet wavelengths can also be achieved with use of Nitrogen purged optics.

The instrument can be optically configured to suit the needs of the sample by means of a continually adjustable slit for precise control of spectral resolution and beam size adjustment by means of an attenuating wheel.

Precise wavelength accuracy is ensured by the integrated Mercury Emissions Lamp used for automatic correction of spectral deviation.

SPECIALISED ACCESSORIES

Available to suit the specific requirement of the sample, including:

- Both 60mm and 150mm Integrating Sphere for Diffuse reflectance measurements.
- Absolute, and Specular reflectance measurements accessories.
- Polarizing Optics.
- Thermostatic Cell Holders for temperature control.
- Various long and short pathlength cell holders.
- Automated cell changers for both sample and reference beams.
- Tablet dissolution accessory for pharmaceutical quality control.

Specifications

Specifications	T110+
Optical System	Dual Monochromator Double Beam
Light Source	D2 Lamp – UV Region W Lamp – Visible Region Hg Lamp – Wavelength Correction
Wavelength Range	185 900nm
Wavelength Accuracy	±0.2nm
Wavelength Reproducibility	≤0.1nm (D2 lamp)
Spectral Bandwidth	0.1 – 50.nm Continually Adjustable
Stray Light	≤0.0001%T (NaNO ₃ , 360 nm) ≤0.00002%T (NaNO ₃ , 360 nm)
Photometric Range	-8.0Abs 8.0Abs
Photometric Accuracy	±0.004A @2.0 A ±0.003A @1.0A ±0.002A @0.5 A ±0.3%
Photometric Reproducibility	≤0.002A @2.0 A ≤0.0008A / 1.0A ≤0.0004A/ 0.5A ≤0.1%
Baseline Flatness	±0.0005Abs
Noise	0% Noise ≤0.01%; 100% T Noise ≤0.1%;
Communication port	RS232C USB Wifi

UVWin

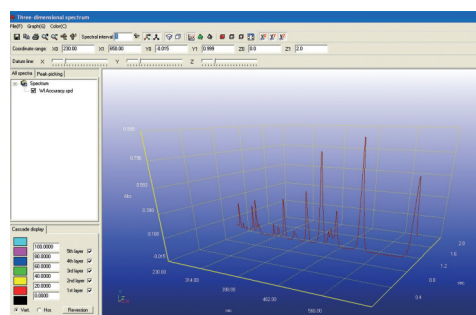
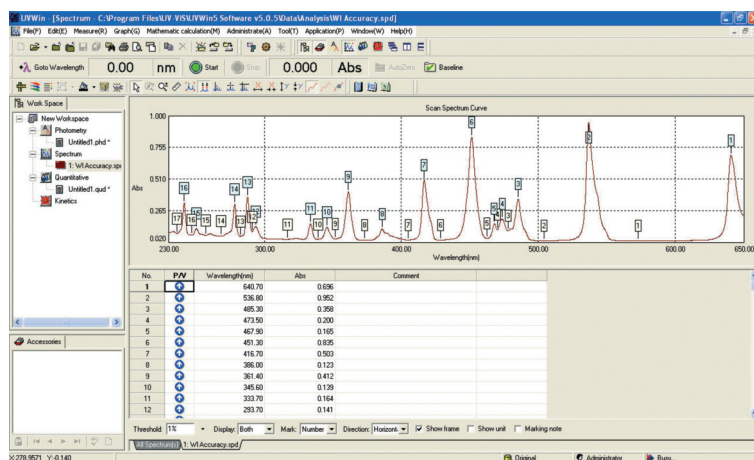
UVWin is a powerful, intuitive Software product used for connectivity to the PG Instruments range of bench top UV-Vis Spectrophotometers.

The UVWin software offers complete instrument control along with data acquisition and a whole host of mathematical tools for interpretation of measurement results. The UVWin software is separated into four key workspaces:

- Spectral Analysis
- Quantitative Analysis
- Kinetic Analysis
- Photometric Analysis

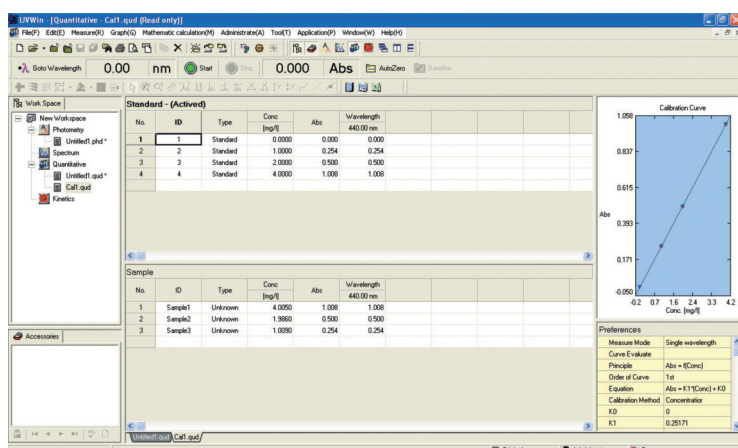
SPECTRUM WORKSPACE

- Use the spectrum workspace to scan across a user-defined spectral range measuring in either absorbance or transmission.
- Use the “Peak Pick” tool to determine the wave-length at which peaks and valleys have occurred whilst also being able to determine their amplitude.
- View spectral overlay in the 3D display mode.
- Perform 1st, 2nd, 3rd and 4th order differentiation on sample scans for Derivative Spectroscopy.
- Export measurement data into Word, Excel, CSV and ASCII formats.
- Create method files for routine analysis whilst also being able to save measurement data.



QUANTITATIVE WORKSPACE

- Use the Quantitative workspace to determine the concentration of unknown samples.
- Create a calibration curve using a series of standard solution or by directly entering the coefficients for the calibration curve equation.
- Specify 1st, 2nd, 3rd and 4th order correlation for the best calibration curve fit.
- Set Quality Control monitors to take user specified action in the event of measurement results falling outside user defined limits.
- Export measurement data into Word, Excel, CSV and ASCII formats.
- Create method files for routine analysis whilst also being able to save measurement data.



The 'Set quantitation parameters' dialog box is shown. It has tabs for 'Accessories', 'Quality control', 'Simple Calculation', 'Measurement', 'Calibration curve', and 'Instrument'. The 'Calibration curve' tab is active.

Curve equation: $Abs = K1 * Conc + K0$ Equation Order: 1st

Input Type: ☒ Conc ☐ Volum

Conc. unit: mg/l

Curve evaluation: None

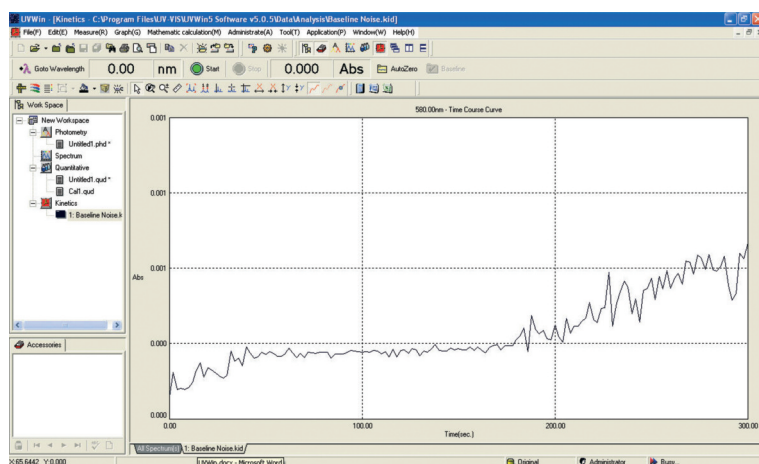
Calibration method: ☒ Concentration method ☐ Coefficient method

K0 = 0 K1 = 1 K2 = 2 K3 = 3 K4 = 4

Buttons: OK, Cancel, Help

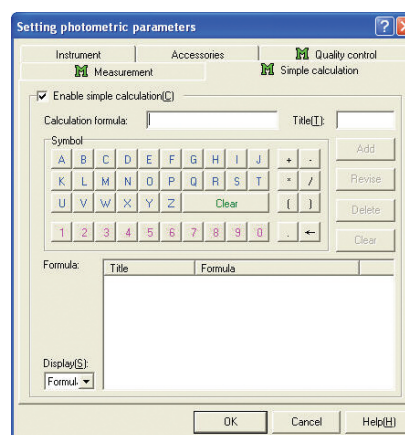
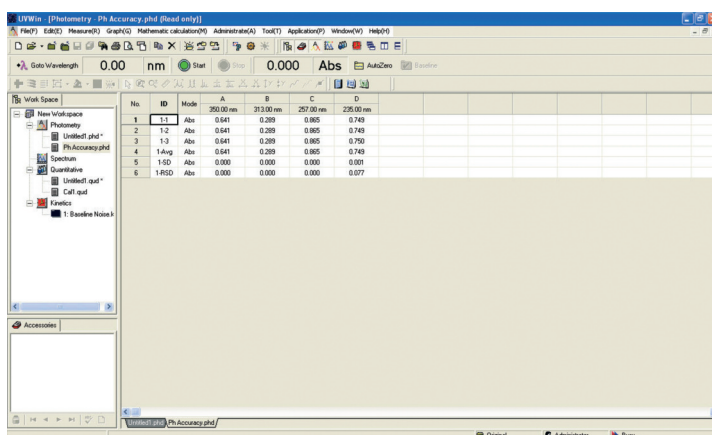
KINETIC WORKSPACE

- Monitor the change of Absorbance or Transmission as a function of time for Enzyme type reactions.
- Use in conjunction with a Flowcell for sample introduction or Peltier water circulator for temperature control.
- Specify data intervals and acquisition time for up to 24 hour reactions.
- Export measurement data into Word, Excel, CSV and ASCII formats.
- Create method files for routine analysis whilst also being able to save measurement data.



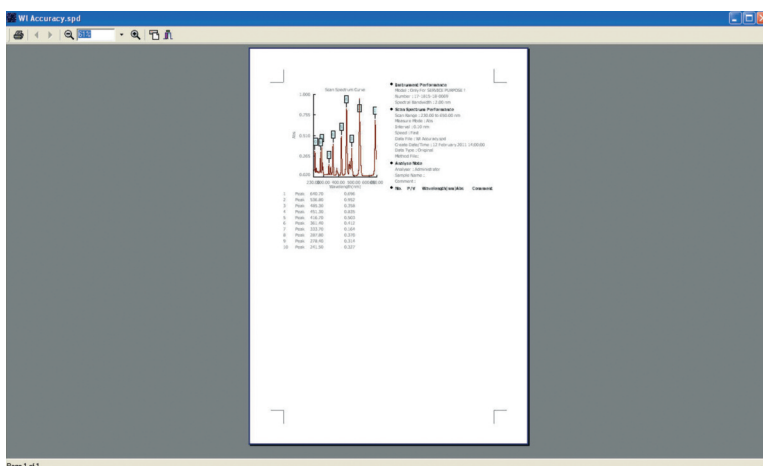
PHOTOMETRIC WORKSPACE

- Perform a series of sequential fixed wavelength measurements in either Absorbance or Transmission.
- Automate sample measurements by configuring the instrument cell changer.
- Calculate concentration of unknown samples quickly using the "Simple Calculation" option where complete calibration is not required.
- Automatically calculate statistics like standard deviation, relative standard deviation, and averages.
- Export measurement data into Word, Excel, CSV and ASCII formats.
- Create method files for routine analysis whilst also being able to save measurement data.



REPORTING

- Produce reports for photometric, spectrum, kinetic and quantitative measurement data.
- Include or remove spectra, calibration curves along with samples measurement tables.

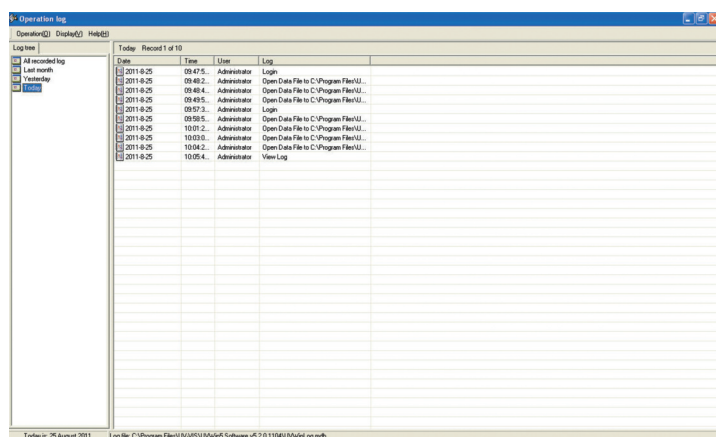


UVWin GLP

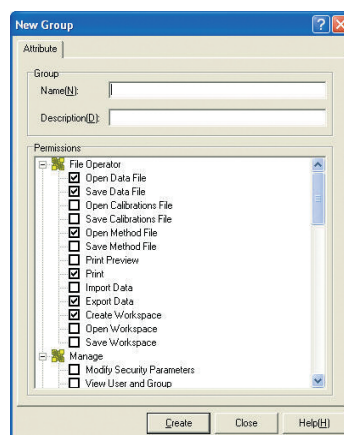
UVWin GLP offers all of the features and functionality of UVWin whilst also offering extensive Administrative capabilities along with a detailed audit trail.

ADMINISTRATION

- Administrative settings can be made where Analysts may require conformity to GLP/GMP/GRP.
- Create User groups specifying exactly what actions they are able to perform.
- Add New Users to custom User Groups to determine their privilege settings.
- Automatically log software activity in an Audit Trail.
- Use Password control to ensure Users are logged in for instrument usage.



Date	Time	User	Log
2011-8-25	09:47.5	Administrator	Login
2011-8-25	09:48.2	Administrator	Open Data File to C:\Program Files\U...
2011-8-25	09:48.4	Administrator	Open Data File to C:\Program Files\U...
2011-8-25	09:49.5	Administrator	Open Data File to C:\Program Files\U...
2011-8-25	09:52.3	Administrator	Login
2011-8-25	09:58.5	Administrator	Open Data File to C:\Program Files\U...
2011-8-25	10:01.2	Administrator	Open Data File to C:\Program Files\U...
2011-8-25	10:03.0	Administrator	Open Data File to C:\Program Files\U...
2011-8-25	10:04.2	Administrator	Open Data File to C:\Program Files\U...
2011-8-25	10:05.4	Administrator	View Log



New Group

Attribute

Group Name(N):

Description(D):

Permissions:

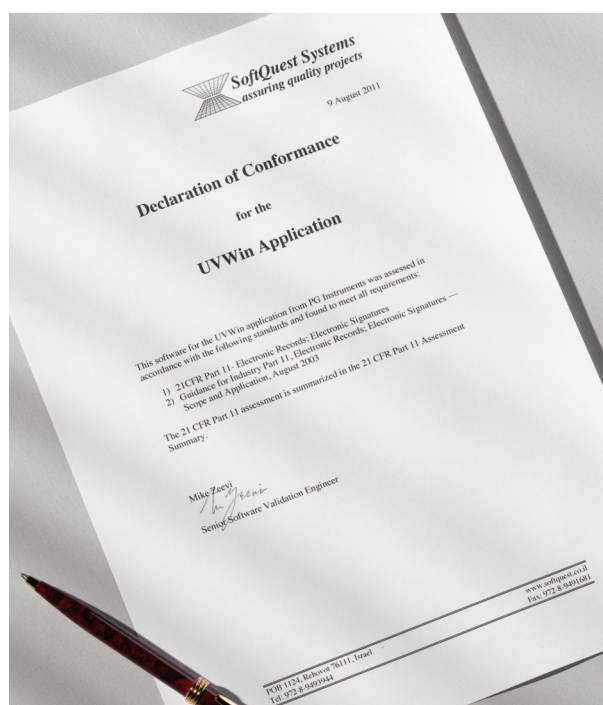
- ☒ File Operator
- ☒ Open Data File
- ☒ Save Data File
- ☒ Open Calibrations File
- ☒ Save Calibrations File
- ☒ Open Method File
- ☒ Save Method File
- ☒ Print Preview
- ☒ Print
- ☒ Import Data
- ☒ Export Data
- ☒ Create Workspace
- ☒ Open Workspace
- ☒ Save Workspace
- ☒ Manage
- ☐ Modify Security Parameters
- ☐ View User and Group

Create Close Help(H)

CERTIFICATION

UVWin GLP has been evaluated and tested by a third party software validation specialist. As a result it was found that UVWin GLP offers all of the features and functions required for use in compliance with the guidance specified in:

- 21CFR Part 11- Electronic Records; Electronic Signatures
- Guidance for Industry Part 11, Electronic Records; Electronic Signatures — Scope and Application, August 2003



UV-Vis Spectrophotometer Qualification Kit



pg instruments

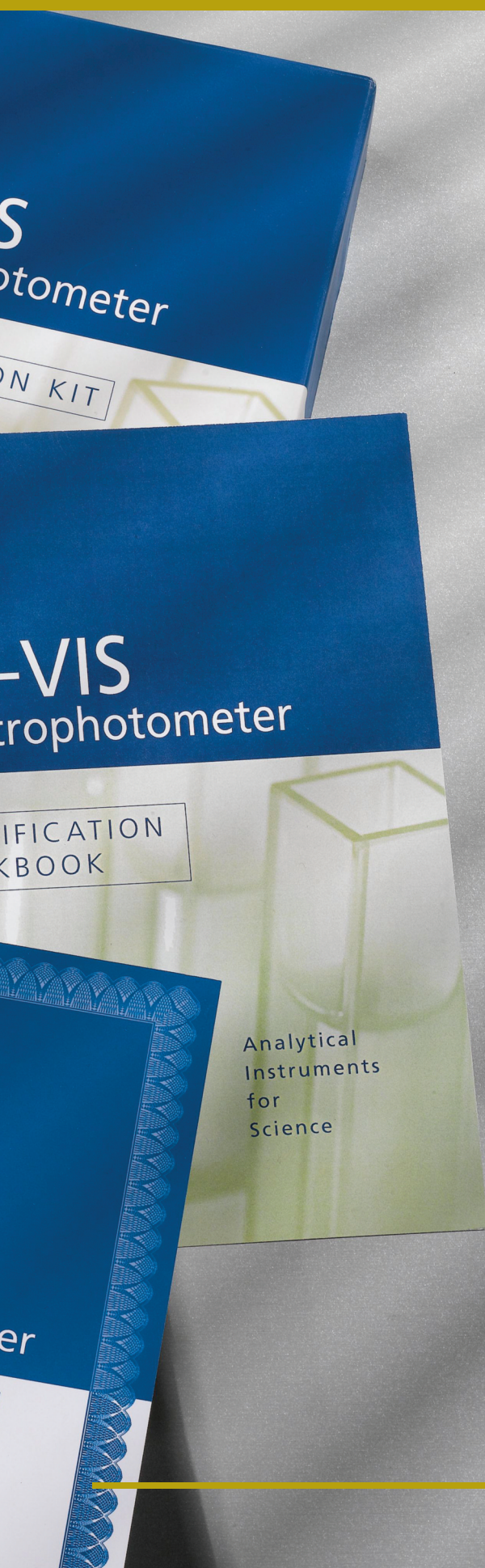
Certificate of traceability

UV-VIS Spectrophotometer

QUALIFICATION SOLUTIONS

Solution:	Certified Concentration:	Lot No:
Holmium Perchlorate	40.0 g/L	
Potassium Dichromate	60.0 mg/L	
Potassium Chloride	1.2% w/v	
Sodium Iodide		

All solutions in this Qualification Reference Material



The purpose of the Qualification Kit is to offer both laboratory analysts and regional distributors the flexibility to perform a full installation and operational qualification on the range of PG Instruments spectrophotometers.

The work instructions within the qualification workbook have been written with considerations of the requirements of the European Pharmacopoeia to ensure compliance with good laboratory practice.

The documentation supplied with the kit guides the user through the qualification as it offers detailed instructions on how to carry out the tests, document and record results, and perform any necessary corrective action. The kit is comprehensive and offers all the materials required to complete the qualification.

The contents of the package are as follows:

- Holmium Oxide Solution – For measuring wavelength accuracy (NIST srm 2034).
- Potassium Dichromate Solution – For measuring photometric accuracy (NIST srm 935a).
- Potassium Chloride – For measuring stray light @ 200nm.
- Blank solution.
- Two 10mm path length Quartz Cuvettes – To perform the validation.
- Certificate for traceability.
- Flash drive containing printable Qualification Workbook and Worksheets.

NOTE: UVWin software is a mandatory requirement for performing instrument qualification

C30/C30M continued

PORTABLE SPECTROMETER



The C30 Portable Spectrometer is a compact portable instrument based on advanced CCD detection technology. Whilst being highly compact the instrument boasts all of the features of a conventional bench-top Spectrophotometer including Spectrum Scanning, Photometric, Quantitative and Kinetic Methods.

A Windows CE embedded operating system and touch screen TFT interface allow for ease of use and extensive data storage. Field measurement data can be transferred from internal instrument storage to a PC via USB connection and the C30 Data Viewer Software which offers an extensive tool set for data interpretation and reporting. The C30 Spectrometer is supplied with a rugged carry case and a wide range of accessories suited to your sampling requirements. The C30M differentiates itself from the standard C30 by means of pre-programmed test methods for the Spectroquant® series of reagent test kits from Merck Chemicals.

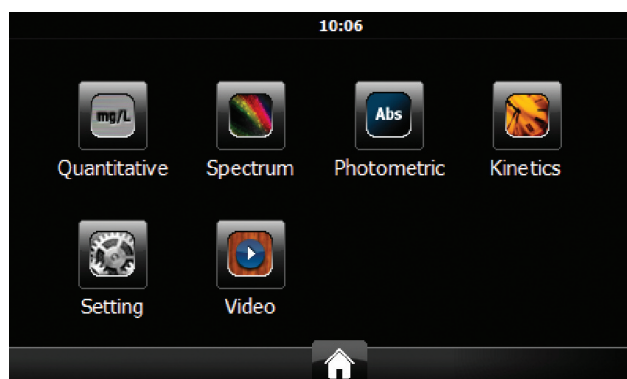
PG Instruments have selected the Spectroquant® Test Kits from Merck Chemicals as a partner in order to offer an application specific instrument, targeted specifically for environmental measurements. The C30M Spectrometer is supplied pre-programmed with calibration data for each of the Spectroquant® test methods.



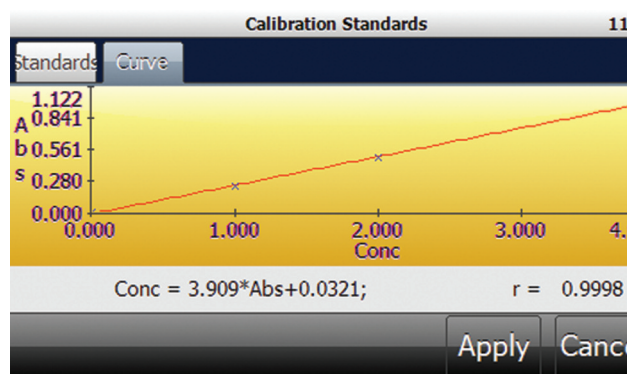
Spectroquant® test kits can offer an analytical solution for the following parameters by means of 130 different test kits:

- Drinking water
- Surface water
- Process water
- Municipal or industrial wastewater
- Beverages
- Disinfectant control

Note: Spectroquant is a registered trademark of Merck Chemicals, Germany.



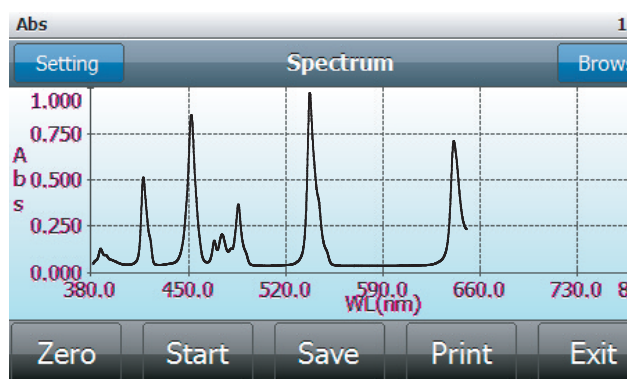
Windows CE Based Operating System with 320 x 240 touch screen TFT Interface.



Use the Quantitative workspace to construct calibration curves, and measure concentration of unknown samples. Curves can be constructed in 1st – 4th order, whilst both methods and measurement data can be saved to instrument memory.

Sel	Name	Conc.	Abs	Measure Time	Sample Info
	sample 1	2.93mg/L	0.117	03/02/2012 10:11	;
	sample 2	2.31mg/L	0.409	10/02/2012 10:58	;
	sample 3	2.39mg/L	0.372	10/02/2012 10:58	;

Buttons: Delete, Print, All, Export

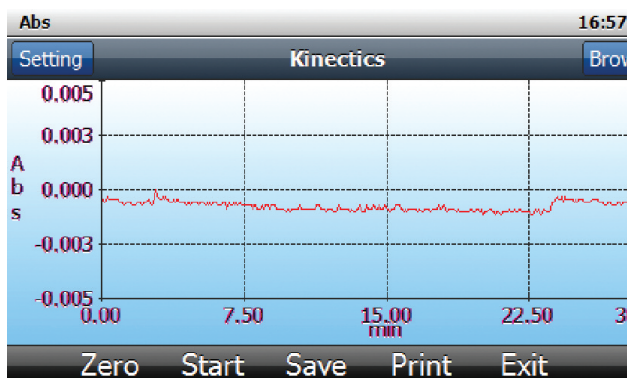


The Spectrum workspace allows high speed spectral scanning, with zoom and peak identification tools. Spectral Scans can be performed in the field, stored to instrument memory and later transferred to the C30 Data Viewer Software for further inspection and reporting.

Setting	Photometry (unsaved)				Brows
Sel.	ID	Mode	500.0nm	K ²	
	1	Abs	22.000	44.000	
	2	Abs	51.000	102.000	
	3	Abs	36.000	72.000	
	4	Abs	10.000	20.000	
	5	Abs	72.000	144.000	

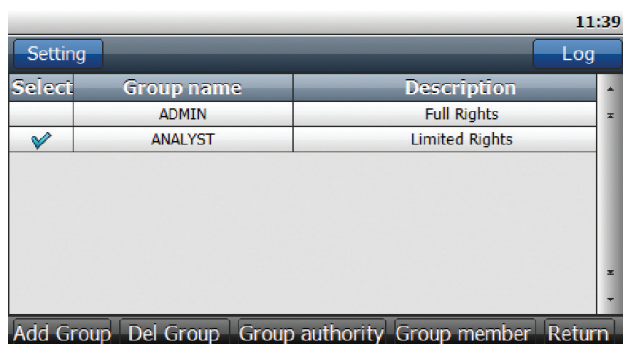
Buttons: Zero, Start, All, Save, Print, Del., Exit

Use the Photometric workspace to quickly and easily perform fixed wavelength measurements in either Absorbance or Transmission. Set a K factor where multiplications are required to determine sample concentration. Once the measurement is complete store to instrument memory for future recall.

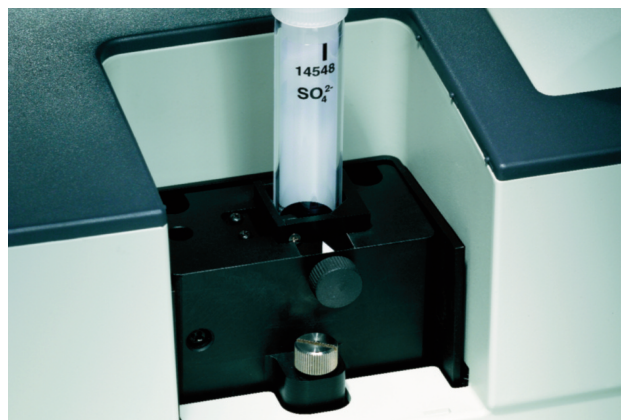


The Kinetic workspace enables the measurement of Absorbance or Transmission as a function of time. Use the zoom and peak pick features to obtain a better view of the Kinetic curve. Measurement data can be saved and recalled at any time.

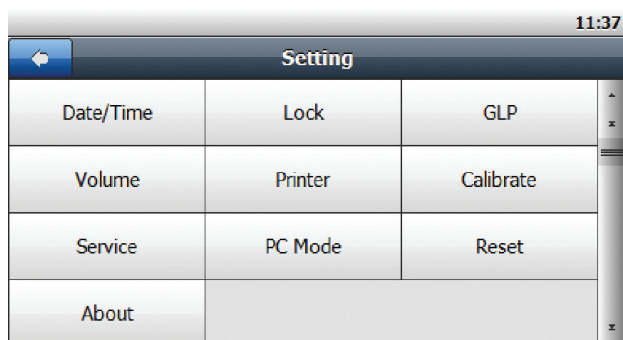
C30/C30M



User and admin rights are easily controlled from the GLP feature in the settings menu. Create user groups and specify their privilege level then add new users to a specified group.



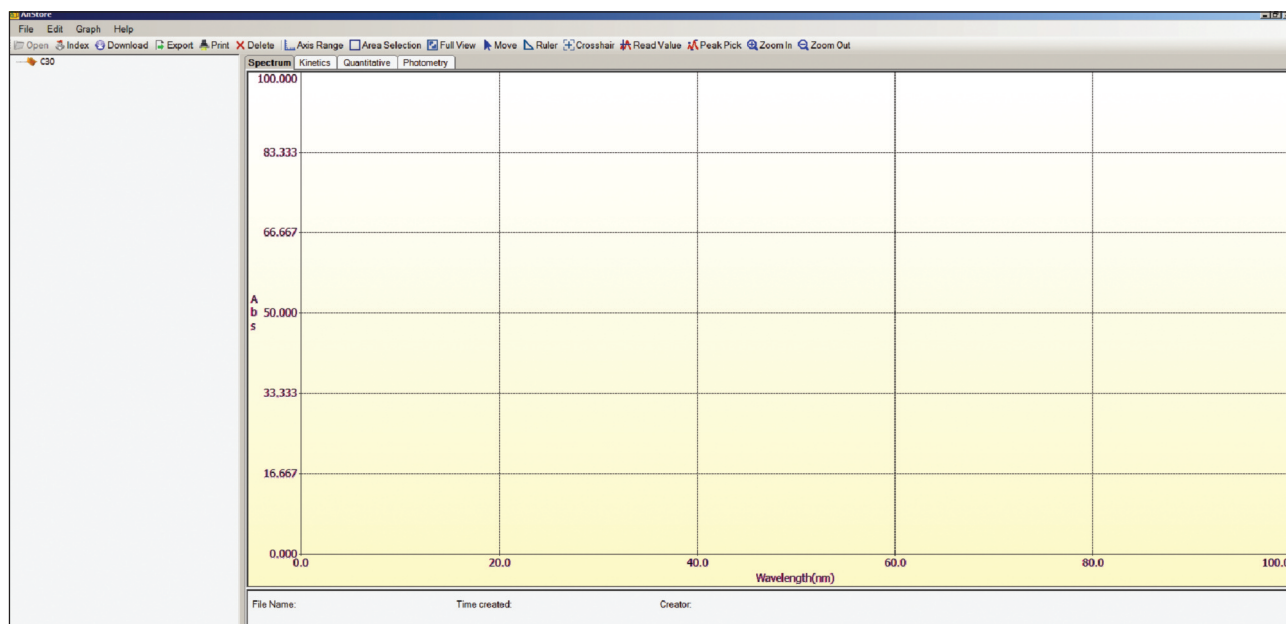
Use the universal cell holder to measure various pathlength rectangular cells and rounds test tubes accommodating all of your sampling requirements.



Control instrument configuration from the settings menu.



Use the fibre dip probe for in-situ sample measurements.



Once all of the required field analysis has been performed and measurement data stored to instrument memory the Spectrometer can be connected to the C30 Data Viewer Software via USB for transfer of analysis data from all of the instrument workspaces. Use the Data Viewer Software to further interpret analysis results, export data into a wide variety of formats and produce analysis reports for storage or printing.

Specifications

Light Source	Convergent tungsten lamp with 7000hr lifespan.	
Measurement Workspaces	Spectrum Quantitative Kinetics Photometric	
Optical System	Polychromatic with concave holographic grating	
Detector	CCD Sony ILX511 2048 Pixels	
Sampling Accessories	Fibre Dip Probe with 10mm and 20mm pathlength tips (optical accessory) Rectangular Cuvette Holder Cylindrical Test Tube Holder	
Power supply	Built-in re-chargeable battery with 5 hr usage	
Printer	Micro printer (optional)	
Operating system	Windows Embedded CE 6.0 with 2GB Flash Memory	
Input/display	320 x 240 True Colour TFT Touch Screen	
Specifications	Wavelength range Wavelength resolution Spectral bandwidth Wavelength accuracy Wavelength repeatability Baseline flatness Noise Drift Stray light Photometric accuracy Photometric repeatability	380nm – 800nm 0.4nm 4±0.8nm ±1.0 nm ≤ 0.1nm ±0.005Abs ≤ 0.5% ≤ 1.0% ≤ 0.5% ±1.0% ≤ 0.3%
Dimension	280 x 170 x 110mm	
Environmental temperature	Operating environment 5-30°C Storage environment -20-55°C	

Specifications

	T60U (UV-Visible)	T60V (Visible)	T70
Optical System	Split beam ratio	Split beam ratio	Split beam ratio
Scan Speed	Selectable	Selectable	Selectable
Wavelength Range	190 - 1100nm	325 - 1100nm	190 - 1100nm
Wavelength Accuracy	± 1nm	± 2nm	± 0.3nm
Wavelength Reproducibility	≤ 0.2nm	≤ 0.4nm	≤ 0.2nm
Spectral Bandwidth	2nm	2nm	2nm
Photometric Mode	Transmittance, Absorbance, Energy	Transmittance, Absorbance, Concentration	Transmittance, Absorbance, Energy and Concentration
Photometric Range	-0.3 - 3.0Abs	-0.3 - 3.0Abs	-0.3 - 3.0Abs
Photometric Accuracy	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)
Photometric Reproducibility	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)
Photometric Noise	0.001A (500nm) 30min warm-up	0.002A (500nm) 30min warm-up	0.001A (500nm) 30min warm-up
Baseline Flatness	0.002A (200 - 1000nm)	0.002A (325 - 1000nm)	0.002A (200 - 1000nm)
Baseline Stability	0.001A/h (500nm, 0Abs), 2hr warm-up	0.002A (500nm, 0Abs), 2hr warm-up	0.001A/h (500nm, 0Abs), 2hr warm-up
Stray light	≤ 0.05%T (220nm NaI, 340nm NaNO ₂)	≤ 1.0%T (340nm NaNO ₂)	≤ 0.12%T (220nm NaI, 340nm NaNO ₂)
Integration Time	N/A	N/A	N/A
Standard Functionality	Photometric Measurement. (Quantitative, Multi-wavelength, Spectrum and Kinetic measurements with program cards)	Photometric and Quantitative measurements.	Photometric, Quantitative, Spectrum and DNA measurements.
Cell Holder	Automatic 8 Cell Changer	Automatic 8 Cell Changer	Automatic 8 Cell changer
Detector	Silicon photo diode	Silicon photo diode	Silicon photo diode
Light Source	Tungsten Halogen and Deuterium arc lamps	Tungsten Halogen lamps	Tungsten Halogen and Deuterium arc lamps
Display	Digital LCD display	Digital LCD display	Digital LCD display
Printer	Mini printer	Mini printer	N/A
PC Interface	RS232	RS232	RS232/USB
Software Support	Local and UV Win	Local and UV Win	Local and UV Win
Power Supply	Switch mode 95 - 250VAC 50 - 60Hz	Switch mode 95 - 250VAC 50 - 60Hz	Switchable 120 – 230VAC 560Hz
Weight	11Kg	11Kg	25Kg
Dimensions (Width, Depth, Height)	476mm, 362mm, 225mm	476mm, 362mm, 225mm	520mm, 420mm, 230mm

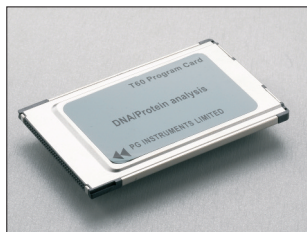
T70+	T80	T80+	T92+
Split beam ratio	Double beam	Double beam	Double beam
Selectable	Selectable	Selectable	Selectable
190 - 1100nm	190 - 1100nm	190 - 1100nm	190 - 900nm
± 0.3nm	± 0.3nm	± 0.3nm	± 0.3nm
≤ 0.2nm	≤ 0.2nm	≤ 0.2nm	≤ 0.1nm
0.5, 1.0, 2.0, 5.0nm	2nm	0.5, 1.0, 2.0, 5.0nm	Continuous slit 0.1 - 5.0nm (0.1nm interval)
Transmittance, Absorbance, Energy and Concentration	Transmittance, Absorbance, Energy and Concentration	Transmittance, Absorbance, Energy and Concentration	Transmittance, Absorbance, Energy and Concentration
-0.3 - 3.0Abs	-0.3 - 3.0Abs	-0.3 - 3.0Abs	-4.0 - 4.0Abs
0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)	0.002A (0 - 0.5A), 0.004A (0.5 - 1.0A), 0.3%T (0 - 100%T)
0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)	0.001A (0 - 0.5A), 0.002A (0.5 - 1.0A), 0.15%T (0 - 100%T)	0.001A (0 - 0.5A)
0.001A (500nm) 30min warm-up	0.001A (500nm) 30min warm-up	0.001A (500nm) 30min warm-up	0.0004A (500nm) 30min warm-up
0.002A (200 – 1000nm)	0.0015A (200 - 1000nm)	0.0015A (200 - 1000nm)	0.001A (200 - 850nm)
0.001A/h (500nm, 0Abs), 2hr warm-up	0.0008A/h (500nm, 0Abs), 2hr warm-up	0.0008A/h (500nm, 0Abs), 2hr warm-up	0.0008A/h (500nm, 0Abs), 2hr warm-up
≤ 0.12%T (220nm NaI, 340nm NaNO ₂)	≤ 0.12%T (220nm NaI, 340nm NaNO ₂)	≤ 0.12%T (220nm NaI, 340nm NaNO ₂)	≤ 0.01%T (220nm NaI, 340nm NaNO ₂)
N/A	N/A	N/A	N/A
Photometric, Quantitative, Spectrum and DNA measurements.	Photometric, Quantitative, Spectrum and DNA measurements.	Photometric, Quantitative, Spectrum and DNA measurements.	No stand alone function
Automatic 8 cell changer	Automatic 8 Cell changer	Automatic 8 cell changer	Fixed position sample and reference
Silicon photo diode	Silicon photo diode	Silicon photo diode	Photo multiplier tube
Tungsten Halogen and Deuterium arc lamps	Tungsten Halogen and Deuterium arc lamps	Tungsten Halogen and Deuterium arc lamps	Tungsten Halogen and Deuterium arc lamps
Digital LCD display	Digital LCD display	Digital LCD display	No display
N/A	N/A	N/A	N/A
RS232/USB	RS232/USB	RS232/USB	RS232/USB
Local and UV Win	Local and UV Win	Local and UV Win	UV Win
Switchable 120 – 230VAC 50 – 60Hz	Switchable 120 - 230VAC 50 - 60Hz	Switchable 120 - 230VAC 50 - 60Hz	Switchable 120 - 230VAC 50 - 60Hz
25Kg	25Kg	25Kg	43Kg
520mm, 420mm, 230mm	520mm, 420mm, 230mm	520mm, 420mm, 230mm	545mm, 580mm, 270mm

Specifications

	C30/C30M
Optical System	Polychromatic with concave holographic grating
Scan Speed	-
Wavelength Range	380 - 800nm
Wavelength Accuracy	$\pm 1.0\text{nm}$
Wavelength Reproducibility	$\leq 0.1\text{nm}$
Spectral Bandwidth	$4\text{nm} \pm 0.8\text{nm}$
Photometric Mode	Transmittance, Absorbance, Energy and Concentration
Photometric Range	-
Photometric Accuracy	$\pm 1.0\%$
Photometric Reproducibility	$\leq 0.3\%$
Photometric Noise	-
Baseline Flatness	$\pm 0.005\text{Abs}$
Baseline Stability	-
Stray light	$\leq 0.5\%$
Integration Time	-
Standard Functionality	Spectrum, Quantitative, Kinetics, Photometric
Cell Holder	-
Detector	CCD Sony ILX511 2048 Pixels
Light Source	Convergent tungsten lamp with 7000hr lifespan
Display	320 x 240 True Colour TFT Touch Screen
Printer	Micro printer (optional)
PC Interface	-
Software Support	-
Power Supply	Built-in re-chargeable battery with 5 hr usage
Weight	-
Dimensions (Width, Depth, Height)	280mm, 170mm, 110mm

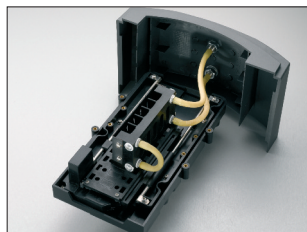
Accessories

T60



Available Program cards include:

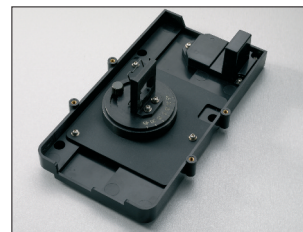
- Quantitative card 21602-2801-00
- Spectrum scanning/Kinetics card 21604-2801-00
- Multi wavelength card 21605-2801-00
- Palm Oil Analysis Card (DOBI)



- CH16-1**
Constant temperature cell holder
- Cell Pathlength: 10mm
 - Number of Cells: 5
 - Requires PTC-2 Peltier Water Circulator



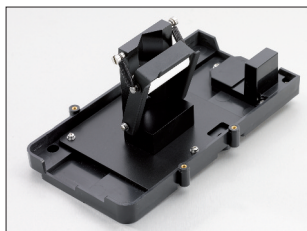
- PS16-2**
Sipper Pump
- Pump Speed: 0.1 - 250 RPM
 - Speed resolution: 0.1 RPM less than 30 RPM Speed and 1 RPM above 30 RPM Speed



- DS16-1**
Angle adjustable sample holder
- Maximum angle: 45 Degrees
 - Minimum Sample Size: 4mm (Width)
 - Maximum Sample Size: 80 x 55 x 5mm



- PTC-2**
Peltier
- Temperature range: 5 - 75°C
 - Use in conjunction with CH16-1



- TR16-1**
Test tube holder
- Test Tube Diameter: 15 - 25mm
 - Test Tube Height: 90 - 120mm

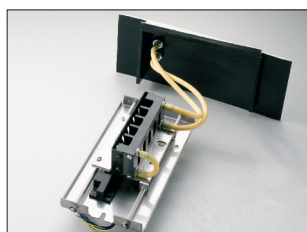


- USB Printer driver P2U**
- Connect the T60 to specific USB printers

T70



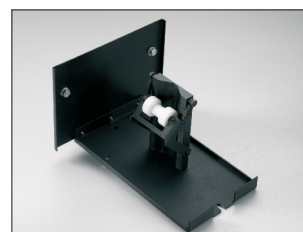
- LS181-1**
5 cell holder
- Cell Pathlength: 5 - 50mm (adjustable)
 - Number of Cells: 5



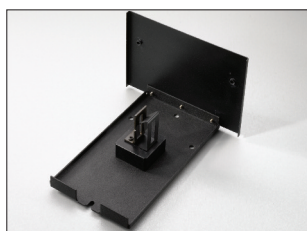
- CH181-1**
Constant temperature sample holder
- Cell Pathlength: 10mm
 - Number of Cells: 5
 - Requires PTC-2 Peltier Water Circulator



- DS181-1**
Angle adjustable holder
- Maximum angle: 45 Degrees
 - Minimum Sample Size: 4mm (Width)
 - Maximum Sample Size: 80x55xmm



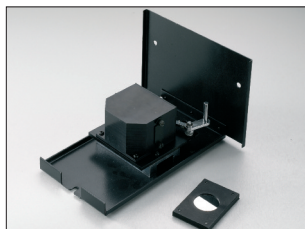
- TR181-1**
Test tube holder
- Test Tube Diameter: 15 - 25mm
 - Test Tube Height: 90 - 120mm



- S181-1**
Solid Sample Holder
- Maximum sample size: 80mm x 55mm x 5mm

PG Instruments offer a complete range of cuvettes
please visit our website for further information, www.pg instruments.com

T70 continued



MR181-1

Specular Reflection

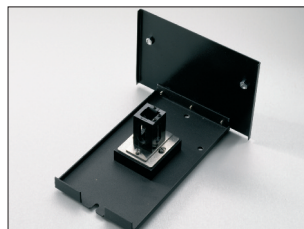
- Incidence angle: 5°
- Size of Sample Area Measured: 11 × 9mm to 60 × 40mm
- Spectral Range: 200 - 1100nm



PS181-2

Sipper Pump

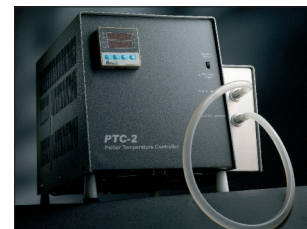
- Pump Speed: 0.1 - 250 RPM
- Speed resolution: 0.1 RPM less than 30 RPM Speed and 1 RPM above 30 RPM Speed



MH181-1

Micro cell holder

- Pathlength: 10mm
- Minimum Cell Window Width: 2mm
- Minimum Cell Window Height: 10mm

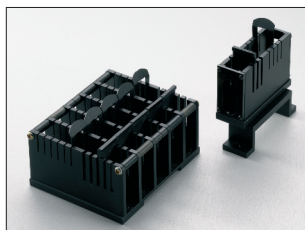


PTC-2

Peltier

- Temperature range: 5 - 75°C
- Use in conjunction with CH181-1

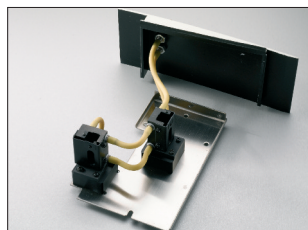
T80



LS188-1

5 cell holder

- Cell Pathlength: 5-50mm (adjustable)
- Number of Cells: 5



CH188-1

Constant temperature holder

- Cell Pathlength: 10mm
- Number of Cells: 2 Cells (one for Sample and one for Reference)
- Requires PTC-2 Peltier Water Circulator



PS181-2

Sipper Pump

- Pump Speed: 0.1 - 250 RPM
- Speed resolution: 0.1 RPM less than 30 RPM Speed and 1 RPM above 30 RPM Speed



PTC-2

Peltier

- Temperature range: 5 - 75°C
- Use in conjunction with CH188-1

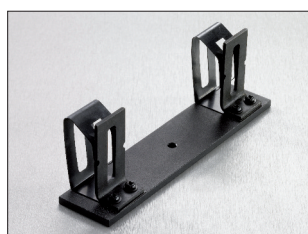
NOTE: All T70 Accessories can be used in the T80 but only single beam measurements can be performed.

T92+

CH92

Constant temperature holder

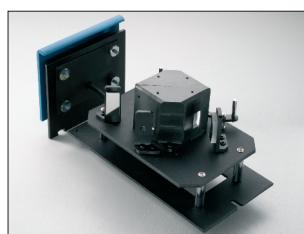
- Cell Pathlength: 10mm
- Number of Cells: 2 Cells (one for Sample and one for Reference)
- Requires PTC-2 Peltier Water Circulator



S19-1

Solid Sample Holder

- Maximum Sample Size: 80mm × 55mm × 5mm
- Sample and reference beams



IS92

Integrating Sphere

- Incidence angle: Sample 0° reference 8°
- Minimum Sample Size for Diffuse Reflectance: 15mm × 25mm
- Minimum Sample Size for Transmission: 20mm Diameter
- Wavelength Range: 230-850nm with a 5nm Bandpass
- Sphere Diameter: 58mm



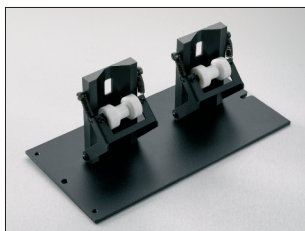
DS19-1

Angle adjustable cell holder

- Maximum angle: 45 Degrees
- Minimum Sample Size: 4mm (Width)
- Maximum Sample Size: 80 × 55 × 5mm

PG Instruments offer a complete range of cuvettes
please visit our website for further information, www.pg instruments.com

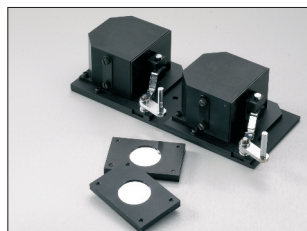
T92+ continued



TR19-1

Test tube holder

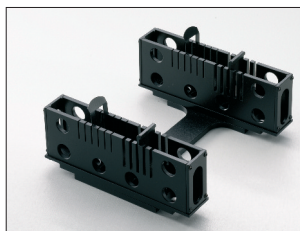
- Test Tube Diameter: 15 - 25mm
- Test Tube Height: 90 - 120mm



MR19-1

Specular reflection

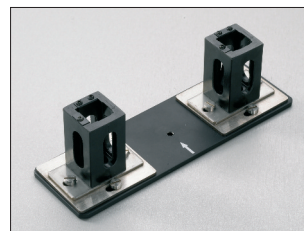
- Incidence angle: 5°
- Size of Sample Area Measured: 30 x 15mm
- Spectral Range: 200 - 900nm



LS19-1

Long path-length holder

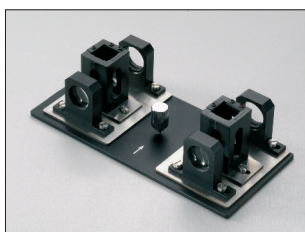
- Pathlength: 5, 10, 20, 30, 40, 50, 100mm
- Number of Cells: 2 Cells (one for Sample and one for Reference)



MH19-1

Micro cell holder

- Pathlength: 10mm
- Minimum Cell Window Width: 2mm
- Minimum Cell Window Height: 10mm



MH19-2

Ultra micro cell holder

- Pathlength: 10mm
- Minimum Cell Window Width: 2mm
- Minimum Cell Window Height: 5mm



PS92

Sipper Pump

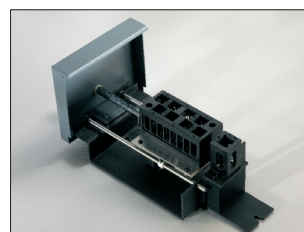
- Pump Speed: 0.1 - 250 RPM
- Speed resolution: 0.1 RPM less than 30 RPM Speed and 1 RPM above 30 RPM Speed



PTC-2

Peltier

- Temperature range: 5 - 75°C
- Use in conjunction with CH19-1



AS91

8 Cell Changer

- 8 position cell changer
- Pathlength: 10mm

C30/C30M

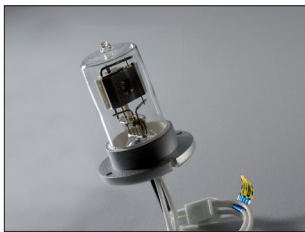


30-010

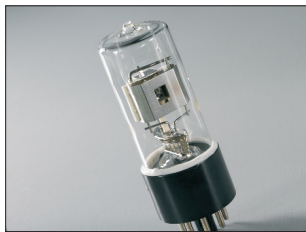
Fibre Dip Probe

- 10mm and 20mm pathlength tips

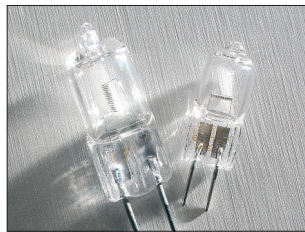
Consumables



D2 lamp D2-100 (T60U)



D2 lamp D2-200 (T70, T80, T90, T92)



W lamp W-100 (T60V, T60U)
W lamp W-200 (T70, T80, T90, T92)



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