C101-E093B

Access to your success
SHIMADZU

BioSpec-mini

Shimadzu
UV-VIS Spectrophotometer
for Nucleic Acid & Protein Analysis

Compact, Easy-to-use, for Life Science
Sophisicated software functions and
the class-beyond spectral performance!

Features

[NEW Standard of Nucleic Acid & Protein Quantitation.]

Large LCD for Speedy Operation

BioSpec-mini

Nucleic Acid & Protein Spectrophotometer

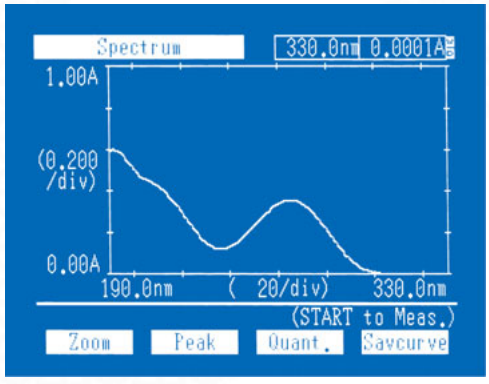
The set parameters are displayed together on the large LCD panel for stress-free input. In addition, anyone can use the system easily by following the messages to operate the keys.

Easy Quantitation

In DNA/RNA analysis mode the spectrum is measured and quantitative results can be obtained with one-touch operation.

Step1

Set the sample and press the START key.

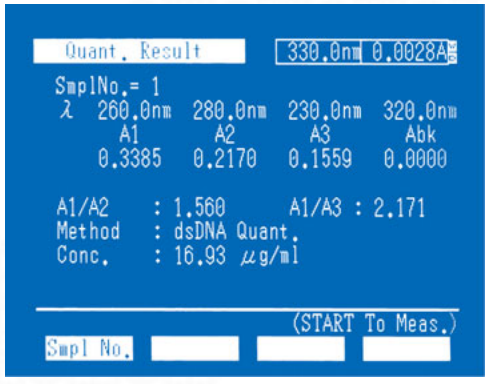


The spectrum is checked

One-touch Quantitation

Step2

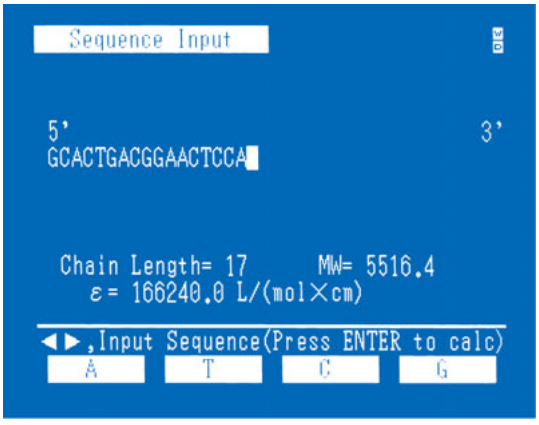
Quantitative results will be displayed directly upon pressing the F3 key.



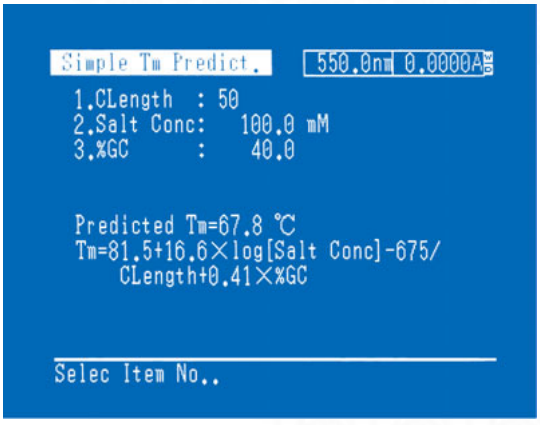
The absorbance ratio (A260/A280, A260/A230) is displayed together with the quantitative results.

Convenient Utility Programs are Installed

Utility software, such as the molecular weight of nucleic acids, the molar absorption coefficient (ε), and Tm prediction based on the nearest neighbor base pair model, is installed as standard.



Short Oligo DNA Mode



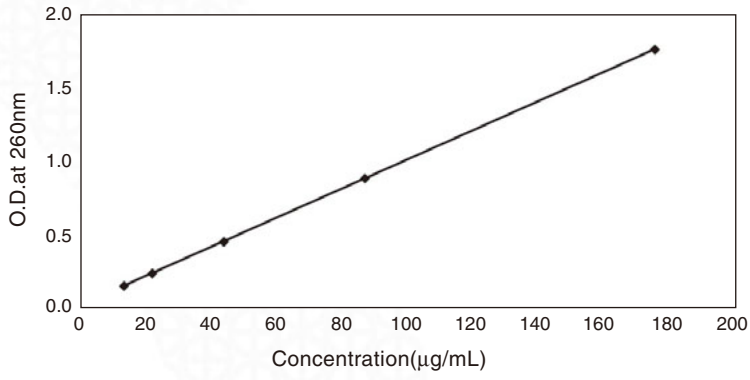
Simple Tm Prediction

Micro Measurement with the 5µL cell

Either the 5µL cell (5mm optical path) or the 10µL (10mm optical path) option cell can be used.
Minimum requirement of primer sample solution is possible. Less than 1µL of 10 O.D. primer

5µL cell

10µL cell



PCR Products (1024bp)
5µL micro cell (option path : 5mm)

Functions

[Packed full with long-awaited functions,from routine to high-end uses.]

Nucleic Acid Quantitation

Simple Quantitation Mode

The concentration is obtained by multiplying the absorbance at 260nm with a preset coefficient.
Preset factors for the dsDNA, ssDNA, RNA, OligoDNA quantitation are changeable.

Oligo Quantitation Mode

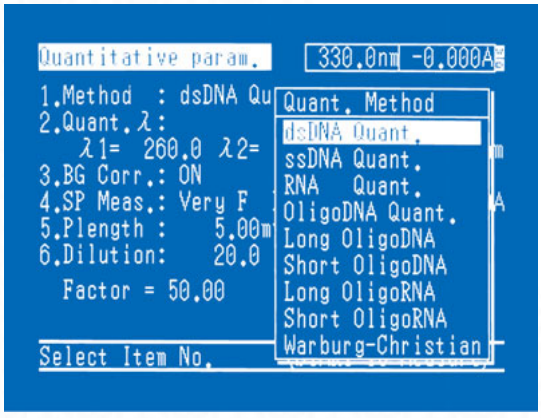
Performs quantitation of single-stranded OligoDNA, OligoRNA. Enter either the base composition (Long Oligo Mode) or the base sequence (Short Oligo Mode) to automatically calculate the molecular weight and molar absorption coefficient (ε), and calculate the concentration from the absorbance at 260nm.

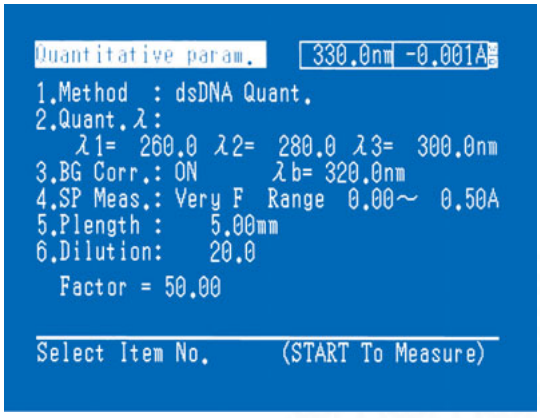
Warburg-Christian Quantitation Mode

Performs quantitation of either proteins or nucleic acids from the absorbance of two wavelengths, at either 260nm and 280nm, or 260nm and 230nm.

Spectrum Measurement

Contamination of the protein can be checked by measuring the spectrum (190nm to 330nm) before quantitative calculations.



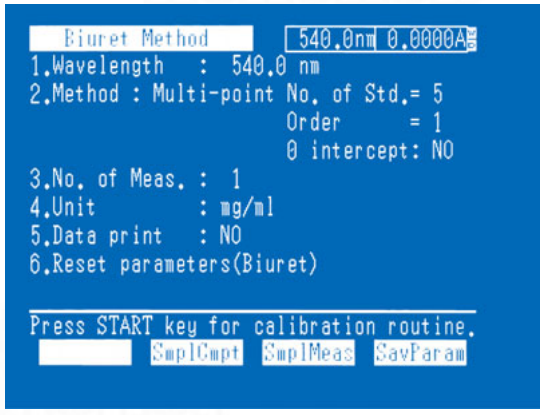


Protein Quantitation

4 types of quantitative methods that measure protein concentration using coloring reagents are supported, as well as the quantitative method that utilize UV absorption at 280nm.
Quantitative measurement using coloring reagents is carried out by creating calibration curves.

Method of Quantitation

Lowry Method
BCA Method (Method employing Bicinchoninic Acid)
CBB Method (Bradford Method, method employing Coomassie Brilliant Blue G-250)
Biuret Method
UV Absorption Method (280nm)

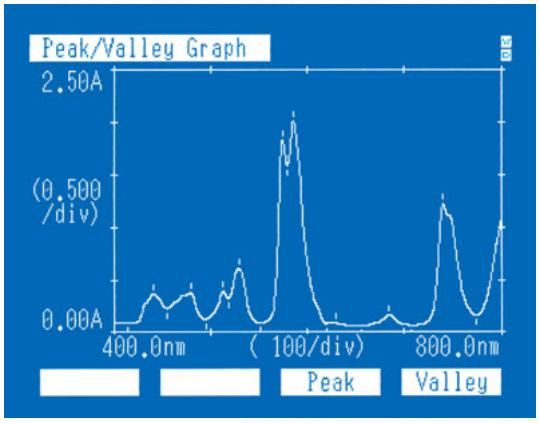


Cell Count

The absorbance at 600nm is measured to calculate the cell count from the entered coefficient and dilution ratio.

Spectrum Measurement

Wide-range spectrum measurement (190nm to 1,100nm) can be obtained.
Zoom in/ zoom out of the spectrum, and peak detection etc. are possible.

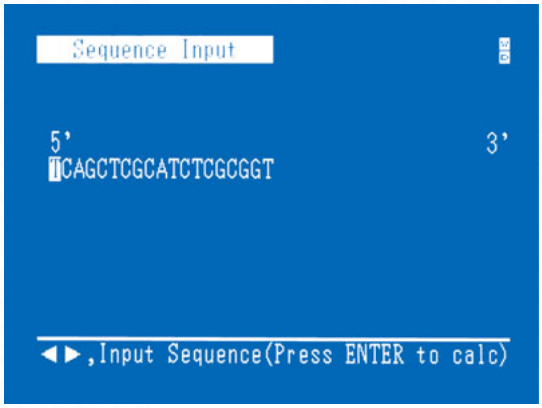


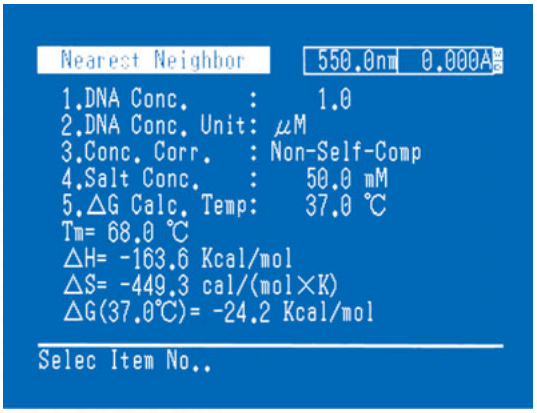
Tm Prediction

Nearest Neighbor Base Pair Model Calculation

Calculations of the Tm and thermodynamic parameters (ΔH, ΔS, ΔG) of double strand formation DNA/DNA and RNA/RNA duplexes that do not include mismatches are supported. The nearest neighbor base pair model allows to predict the more accurate values.

$\Delta H = \Delta Hinit + \sum \Delta Hpair + \Delta Hcorr$
$\Delta S = \Delta Sinit + \sum \Delta Spair + \Delta Scorr + \Delta Sself + 0.368 \times (Chain\ length-1) \times \ln [Salt\ conc.]$
$\Delta G = \Delta H - (T + 273.15) \times \Delta S$
$Tm = (\Delta H / (\Delta S + 1.987 \times \ln([Nucleic\ acid\ conc.] / \alpha))) - 273.15$





Simple Tm Prediction

Simple Tm Prediction with the inputting of chain length, salt conc., and GC content (%).
Estimated Tm value = 81.5 +16.6 x log[Salt conc.] -675 / Chain length+0.41 x %GC

Accessories

Micro cell for nucleic acid quantitation (5µL,10µL),Black micro cell (70µL)

- The optimal micro cell for quantitation of nucleic acids.
  Micro cell for nucleic acid quantitation (5µL, optical path 5mm) (Cat.No.046-25302-12)
  Micro cell for nucleic acid quantitation (10µL, optical path 10mm) (Cat.No.046-25302-02)
- Micro cell for protein quantitation.
  Black micro cell (70µL, optical path 10mm) (Cat. No.046-25302-11)

*Use with the standard cell holder provided. It cannot be used together with the multicell holder, the sample compartment unit, the thermoelectrically temperature-controlled cell holder TCC-240A, or the 6-cell type thermoelectrically temperature-controlled cell positioner CPS-240A.
*We recommend that these micro cells be used within the absorbance range of 0.2 to 1.0.
*As the quantity of light passing will be reduced when using the micro cell, the optical specifications of the system may not be met.
*Insert a cell containing the buffer before measuring samples, and carry out baseline correction.


5µL cell

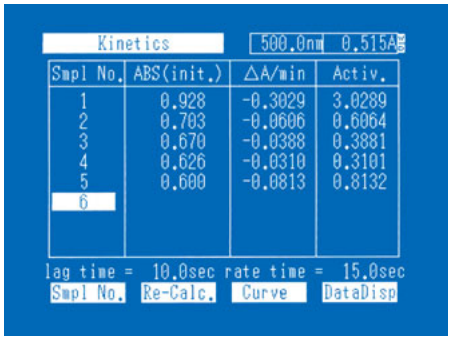

10µL cell


70µL cell

Kinetics Program Pack (Cat. No.206-89756-92)

This software is used for measuring change depending on the time absorbance at a constant wavelenth and calculatin enzyme activity values.

- Calculation and recalculation of the activity value is possible through linear regression using the least-squares method.
- The coefficients used in the activity value calculation can be set to a maximum of four types.
- The setting range for measuring is from 1 to 6550 seconds (minutes).
- Measuring of two wavelengths is possible. Absorbance time change can be recorded while absorbance at the background wavelength is being extracted from absorbance at the measured wavelength.
- Data processing function for reaction curves:
  Expansion and compression (Note that compression is possible only in the vertical axis.)
  Data readout with the cursor key
  Reaction curve storing and recall
- Measurement results (chart data) can be stored and recalled.



Data Pack (Cat. No. 206-80700)

Measurement conditions and data can be stored in the data pack.

- The maximum number of measurement condition files that can be stored in one data pack is 46.
- The maximum number of data files that can be stored in one data pack is 21.

DPU-414 Screen Copy Printer (Cat. No.206-55215-**)

Prints hard copies screens, including numeric data. A printout is made after each measurement.
spectra, kinetics reaction data, and quantitation calibration curves displayed on the screen are output in the screen print. A hard copy can be printed at any time, making it simple to record measurement parameters.

- Dimensions:W160 x D170 x H66.5mm
  Tharmal paper (10 rolls) : (Cat.No.088-58907-04)
  The printer cable is included with DPU-414.

Centronics interface Cable (Cat. No.088-50904-20)

This is a cable used to print out on commercially available printers (limited to ESC/P specification only).
Color printers: EPSON MJ-800C, MJ-810C, MJ-930C, EM-900C
Monochrome printers: EPSON LP-1600, LP-1700, LP-1800, LP-1900 compatible can be used.

*Output will be in monochrome even when a color printer is used.

RS-232C Cable(for DOS/V compatibles) (Cat. No.200-86408)

Software Specifictions

DNA/RNA analysis mode

❶ Quantitation function	
Quantitation wavelengths	3(preset wavelengths are 260.0nm, 280.0nm, 230.0nm)
Single-wavelength quantitation	λ1 absorbance (A1) used for quantitation calculation
Simple quantitation mode	dsDNA (50.0), ssDNA (37.0), RNA (40.0), OligoDNA (33.0); coefficients changeable (preset coefficients in parentheses)
Oligo quantitation mode	Long OligoDNA, Short OligoDNA, Long OligoRNA, Short OligoRNA Concentration calculated using A1, molecular weight and molar absorption coefficient (ε)
Dual-wavelength quantitation	λ1. λ2(λ3) absorbance used for quantitation calculation, coefficients changeable
Warburg-Christian quantitation mode	Protein 1(λ1 /λ2), protein 2(λ1 /λ3), nucleic acid 1 (λ1/λ2), nucleic acid 2 (λ1/ λ3)
Background correction	ON/OFF selectable, preset wavelength 320.0nm (changeable)
Optical path length correction	Possible, input range: (0.01 to 20.00mm)
Dilution factor correction	Possible, input range: (1.00 to 9999.9)
Absorption ratio calculation	Automatic calculation of A1/A2, A1/A3
Calculated concentration display	
Simple quantitation, Warburg-Christian quantitation mode	Automatic switching of units (μg/mL, ng/mL , mg/mL)
Oligo quantitation mode	Automatic switching of units (μg/mL, ng/mL, mg/mL) and units(pmol/μL, nmol/μL,fmol/μL)
One-touch quantitation	Execute quantitation calqulatjon from spectrum screen
❷ Molecular weight, molar absorption coefficient (ε) calculation	
Long OligoDNA, Long OligoRNA quantitation mode	Input base composition (number of A, T(U), C, G, X base pairs) to calculate molecular weight and ε. ε of A, T(U), C, G and X changeable
Short OligoDNA, Short OligoRNA quantitation mode	Input base sequence to calculate molecular weight and ε by nearest neighbor base pair model.
Molecular weight calculation	Molecular weight input possible for A, T(U), C, G and X
Counter ion calibration	Select Na^+ or H^+
End phosphate group number correction	Select 0.1 or 2
❸ Spectrum measurement	ON/OFF selectable, execution possible prior to quantitation, 190.0nm to 330.0nm (fixed)
Spectrum data processing function	Conforms to spectrum mode(note that data recall is not possible)

Protein analysis mode

❶ Quantitation	method Lowry, BCA, CBB (Bradford), Biuret, UV absorption
❷ Functions related to calibration curve	Creates calibration curves except for UV absorption method
❸ Calculation method	Automatic calculation by K factor, single-point calibration curve and multiple-point calibration curve methods
Number of standard samples	2 to 10
Calibration curve	linear, quadratic and cubic regression calibration curves, choice of zero or non-zero intercept
Repeated measurement of standard	sample 1 to 10
❹ Measurement	
Repeated measurement	1 to 10
❺ Saving and recalling tabular data	Possible
❻ Automatic printout of data, automatic output to RS-232C port	Possible
❼ Multi cell measurement support	measurement of up to 6 cells possible (when optional CPS-240 is used)

Spectrum mode

❶ Spectrum measurement	
Wavelength range	190.0nm to 1100.0nm
Measuring mode	ABS, T%, E
Scan speed	Ultra fast, fast, medium, low, or ultra low
Number of repeat scan	1 to 99
Spectrum display	Overlay or sequential selectable
❷ Spectrum data processing function	
Peak/valley detection	Up to 20 for each
Zoom in & out	Possible Zoom out in vertical axis only
Readout of data using cursor keys	Possible
Data saving and recalling	Main unit: 6, Data pack: 21
❸ Spectrum data transfer	Via RS232C

Cell count mode

	Bacteria number calculated from preset wavelength 600.0nm (changeable), coefficient and dilution ratio

Tm prediction mode

❶ Simple Tm prediction	Input chain length, salt level and %GC to predict Tm of dsDNA
❷ Calculation by nearest neighbor base pair model (DNA and RNA duplex)	Tm, ΔG, ΔH and ΔS for formation of DNA/DNA (RNA/RNA) double strand excluding mismatches calculated by nearest neighbor base pair model. Input base sequence, nucleic acid concentration, concentration calibration, salt concentration and ΔG calculated temperature.

Hardware Specifications

Item	BioSpec-mini Specifications
Spectral Bandwidth	5nm
Wavelength Range	190.0 to 1100.0nm
Wavelength Settings	0.1nm increments (1nm increments when setting the wavelength scanning range)
Wavelength Accuracy	±1.0nm
Scan Speed	Change: Approx. 3800nm/min
	Wavelength Scan: Approx.24 to 1400nm/min
Stray Light	Less than 0.05% (220.0nm NaI, 340.0nm $NaNO_2$ and UV-39)
Photometric System	Single beam optics
Recording Range	Absorbance: -3.99 to 3.99Abs
	Transmittance: -399 to 399%
Photometric Accuracy	±0.005Abs (at 1.0Abs), using the NIST 930D filter
	±0.003Abs (at 0.5Abs), using the NIST 930D filter
Noise Level	Less than 0.002Abs, Peak to Peak
	Less than 0.0005Abs, RMS, Air Blank
Light Source	20W Halogen lamp (2000H long life model)
	Deuterium lamp (socket type), with built-in automatic adjustment of maximum sensitivity.
Monochromator	Aberration-correcting concave holographic grating is used.
Detector Device	Silicon photodiode
Display	6 inch LCD (320 x 240 dots), with backlight and contrast adjustment.
Power Supply	100 to 120V, 50/60Hz, 160VA (Cat.No.241-06250-92)
	220 to 240V, 50/60Hz, 160A (Cat.No.241-06250-38)
Size	W416xD379xH274mm
Weight	11kg
Ambient Temperature, Humidity Requirments	Room temperature 15°C to 35°C, Humidity 45% to 80%.
	The humidity should be less than 70% if it is over 30 °C.

*Make sure to always use a 3 wire plug (with an earth wire).
Use only dedicated Shimadzu repair parts and consumables for this inst rument.
* Specifications are subject to change for reasons of improvement without notice.

JQA-0376

Founded in 1875, Shimadzu Corporation, a leader in the development of advanced technologies, has a distinguished history of innovation built on the foundation of contributing to society through science and technology. We maintain a global network of sales, service, technical support and applications centers on six continents, and have established long-term relationships with a host of highly trained distributors located in over 100 countries. For information about Shimadzu, and to contact your local office, please visit our Web site at **www.shimadzu.com**

SHIMADZU

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