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## *Molecular Devices SPECTRAmax 384 Plus*

UV/VIS Microplate Spectrophotometer with PathCheck™ Sensor



- Ultra-Fast Read Times for 96- and 384-Well Formats
- Monochromator Optical Design Provides One-Touch Wavelength Selection
- Patented PathCheck\* Sensor Corrects Well Volume Differences

Ideal for high throughput screening, research and assay development

### Key Specifications

#### Photometric Performance Specifications

**Wavelength Range** 190 - 1000 nm

**Wavelength Selection** Monochromator, tunable in 1 nm increments

**Wavelength Bandwidth** 2 nm

**Wavelength Accuracy**  $\pm 1.0$  nm

**Wavelength Repeatability**  $\pm 0.2$  nm

**Photometric Range** 0.0 to 4.0 OD

**Photometric Resolution** 0.001 OD

**Photometric Accuracy (microplate)**  $< \pm 0.006$  OD  $\pm 1.0\%$ , 0.0 to 2.0 OD

**Photometric Accuracy (cuvette)**  $< \pm 0.005$  OD  $\pm 1.0\%$ , 0.0 to 2.0 OD

**Photometric Precision**  $< \pm 0.003$  OD  $\pm 1.0\%$ , 0.0 to 2.0 OD

**Photometric Baseline Flatness**  $< 0.001$  OD

**Stray Light**  $\leq 0.05\%$  at 230 nm

**Light Source** Xenon flash lamp

#### Microplate Read Time:

**Normal Mode** 96 wells 9 seconds

384 wells 29 seconds

**Speed Read Mode** 96 wells 5 seconds

384 wells 16 seconds

### **Temperature Regulation Specifications**

**Temperature Range** Ambient + 4°C to 45°C

**Temperature Uniformity (drawer)**  $\pm 0.5^{\circ}\text{C}$  at 37°C

### **Complete UV/VIS Capability with High Throughput Performance**

- **Full Spectral Range:** 190 - 1000 nm, tunable in 1 nm increments
- **Superior Performance:** 2 nm bandwidth provides exceptional accuracy and linearity for the widest range of assays – just what you expect from your spectrophotometer
- **Speed Read Mode:** Reads 96-well microplates in just 5 seconds and 384-well microplates in 16 seconds for ultra fast sample throughput

### **Two instruments in one**

SPECTRAmax® PLUS384 is the only spectrophotometer with a built-in cuvette port and microplate drawer. Now you can run both standard spectrophotometer and microplate reader applications on the same instrument.

### **Flexible Throughput**

Read one sample or up to 384 at a time – it's your choice. Use any standard cuvette, 12 x 75 mm test tube, 96- or 384-well microplate. For even more samples, add a Twister™ microplate handler or put the SPECTRAmax PLUS384 into a full robotic system. The SPECTRAmax PLUS384 easily adapts to fit your sample processing requirements.

### **Minimize Sample Volume**

When you have limited sample available for analysis, the narrow light beam enables you to accurately read microcuvettes or half-area well microplates.

### **Convert your cuvette-based assays into a microplate format, quickly and easily**

The patented PathCheck™ sensor reports the microplate data as standard 1 cm cuvette values. Use UV transparent microplates for DNA or protein quantitation. And quartz microplates are available for low UV applications (below 250 nm).

### **The Best Performance by Design**

The SPECTRAmax optical system is the only multichannel design that truly mimics a dual-beam spectrophotometer. Each sample has a discrete sample beam and reference beam so that each well is measured directly, eliminating error due to variations in light output between the fibers. The 9 (8 for the microplate and 1 for the cuvette port) channel system, consisting of 9 sample beams and detectors and 9 reference beams and detectors, delivers both superior precision and speed of reading across the microplate, providing unmatched reading performance through 4.0 OD.

### **Powerful Data Handling: Software validation option**

- Software development and testing procedures, policies, and QA plan

- Softmax Pro specification
- Description of algorithms and calculations
- Results of SOFTmax PRO testing
- Instructions to run validation tests
- Instructions to customize tests

### **SOFTmax® PRO for Windows® 95/98/2000/NT or Mac™ OS**

The built-in spreadsheet, graphing, and word processing capabilities of SOFTmax PRO give you complete control over how to analyze, display, and report your data. Use the method files we provide or create your own protocols. For complex analyses, set up custom templates and data reduction formulas to use once or many times.

#### **Customize your experiment and analysis**

- Choose endpoint, kinetic, or spectral scans
- Read multiple wavelengths
- Assign samples, standards, controls, or blanks in any well
- Analyze data from multiple plates using the same standard curve, and view results in the same group table
- View kinetic runs and spectral runs in real time
- Zoom in to one or more wells simultaneously
- Have multiple plates, cuvettes, graphs, analysis tables, and notes sections in the same data file
- Display raw OD, reduced OD, grayscale, threshold, or ranged values in the plate section
- Use multiple wavelengths and multiple formulas in the calculations
- Use conditional formulas to report text or numbers
- Access curve fit parameters in formulas
- Choose from 9 curve fitting routines
- Export and import data, templates, and graphs
- Graph any group defined in a template

#### **Automate your processes**

- Interprocess messaging feature allows communication with robotic systems
- Export and import data and template information to and from your LIMS system (ASCII format)
- Open SOFTmax PRO from within Microsoft Excel® software

## **Breakthrough Technology**

**The patented PathCheck™ Sensor eliminates the last major difference between microplate readers and spectrophotometers – optical pathlength.**

**PathCheck Sensor provides a powerful new tool for microplate analysis.**

- **Eliminate the standard curve.** For compounds with a known extinction coefficient, concentration can be calculated directly from absorbance.
- **Pipetting does not have to be accurate.** With the PathCheck Sensor, it's acceptable to have different volumes in the wells. Just put 100 - 300 µl of sample or standard into each well and read the plate. The PathCheck Sensor will correct for the volume differences in all 96 or 384 wells, and report 1 cm absorbance values.

- **Extend the dynamic range to 6+ OD.** If a well reads out of range (> 4 OD), decrease the volume (100 µl of sample can be used with excellent precision) in that well and reread the plate using the PathCheck Sensor. A 100 µl sample (optical pathlength ≈0.3 cm) that reads 2.8 OD will be corrected to ~9.2 OD.
- **Detect pipetting errors in 96- or 384-well microplates.** The PathCheck Sensor measures differences in volume between the wells, so you can identify and eliminate sources of error from your data or correct your absorbance values.
- **Quickly and easily test multichannel dispensers and pipettors<sup>2-3</sup>.** By measuring the depth of the liquid in the well, you can determine the volume of liquid dispensed. Even 96- or 384-channel dispensers can be tested in a matter of minutes. No need for dyes. Detect volumes as low as 100 µl in standard microplates, 30 µl in half-area or 384-well microplates, and 4 µl using a liquid addition method in half-area well microplates.

**SPECTRAMax PLUS384 gives you the power and performance of a spectrophotometer, the flexibility and throughput of a microplate reader, and so much more...**

## Applications

Essentially, all UV / VIS spectrophotometric assays read in a conventional spectrophotometer or microplate reader can be read in the SPECTRAMax PLUS384: colorimetric assays, ELISAs/EIAs, immunoassays, drug dissolution profiles, enzyme kinetics (e.g.,  $K_i$ ,  $K_m$ , etc.), kinetic turbidimetric, etc. Some of the specific assays referenced by our customers include:

- DNA/RNA Concentration
- Microbial Growth
- Bacterial Toxins
- Respiratory Burst Oxidase
- Nitric Oxide
- Serum Nitrate and Nitrite
- Platelet Aggregation
- $\alpha$ -Lipoprotein Cholesterol
- Photopigments
- Acetylcholinesterase
- Cell Surface Antigens
- Viral RNA
- Oligonucleotide
- Endotoxin
- Protein (Bradford, Lowry, A 280)
- Cytotoxicity/Cytoproliferation (MTT, XTT, MTS, Crystal Violet)
- Spectral Interference
- Neutrophil Activation
- Myeloperoxidase
- Coagulation/Anticoagulation Agents
- Recombinant Retroviruses
- Monoclonal Antibody Levels

- Bacterial Identification
- Cell Death by Apoptosis
- Paraoxonase Polymorphism
- Transcription Factor Binding
- Phosphate
- Cell Proliferation
- Sulfites
- IC 50s/LD 50s
- Nucleic Acids
- Chlorophyll
- EDTA
- Cytokine
- Lipoxyases
- Kinetic Turbidimetric
- Phage Adsorption
- TNF Activity
- Substrate Cleavage
- NAD(P)H
- β-Galactosidase

## **Streamline GLP/GMP Compliance**

### **Optical Performance**

SPECTRAtest™ Validation Package provides a complete NISTtraceable solution for validating optical performance of the SPECTRAMax PLUS384 and does it automatically. All 9 test measurements and calculations are handled by SOFTmax PRO software and summarized in one report. A NIST-traceable cuvette set is also available to validate the cuvette port. SPECTRAtest makes it easy for you to be GLP/GM-compliant.

### **Software Validation**

SOFTmax PRO Validation Package provides comprehensive documentation and extensive data sets in CD-ROM format to enable you to validate SOFTmax PRO software.



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