

SPECTRAL ANALYSIS / DATA SHEET

SM-2002B

Miniature Spectrometer

Business-card-sized spectrometer for portable spectral measurement, instrument integration and scientific research.

Overview

- A compact optical-mechanical platform with optimized optical design and high resolution up to approximately 0.35 nm.
- An upgraded circuit provides up to 10,000:1 dynamic range, 0.5 ms minimum integration time and improved sensitivity.
- RS232 communication and enhanced anti-interference performance support industrial and scientific research applications.



180–1100 nm OPTIONAL RANGE	~0.35 nm OPTIMAL RESOLUTION	600:1 SIGNAL-TO-NOISE	USB / RS232 COMMUNICATION
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Key Advantages

- Compact, portable, business-card-sized package.
- Crossed Czerny-Turner optical design with interference filter to suppress secondary diffraction spectrum.
- Standard SMA905 fiber connector and selectable wavelength range / optical resolution.
- USB 2.0 for data transmission and power supply; RS232 communication for system integration.
- Automatic peak-wavelength and FWHM display; SDK provided for development and customization.

Application Scenarios

- Emission and absorption spectrum measurement.
- Transmittance and absorbance testing.
- LED characterization and analysis.
- Solar energy spectrum testing.
- Fluorescence detection and color measurement.
- Laser spectrum analysis systems.

MEASUREMENT PRINCIPLE

Crossed Czerny-Turner Optical Design

The SM-2002B uses a crossed Czerny-Turner optical design with an interference filter to eliminate the secondary diffraction spectrum. The compact optical-mechanical platform uses a standard SMA905 fiber connector and a Hamamatsu S11639 2048-pixel linear CMOS array; wavelength range and optical resolution can be selected for the intended application.

OUTPUT & COMMUNICATION

Output and System Integration

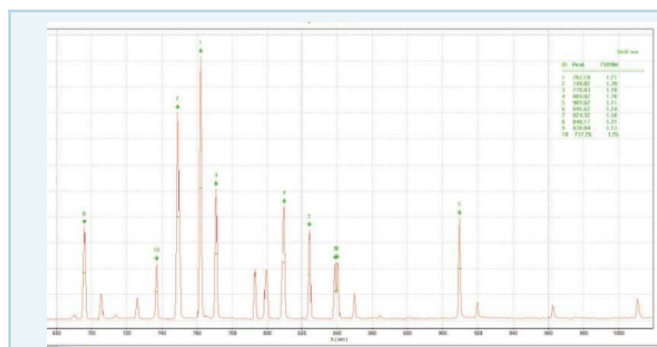
USB 2.0 provides data transmission and power supply, while RS232 provides serial communication. Normal, software, hardware and synchronization trigger modes support flexible operation and integration.

Interface / function	Source-supported specification
USB 2.0	12 Mbps data transmission and USB power supply

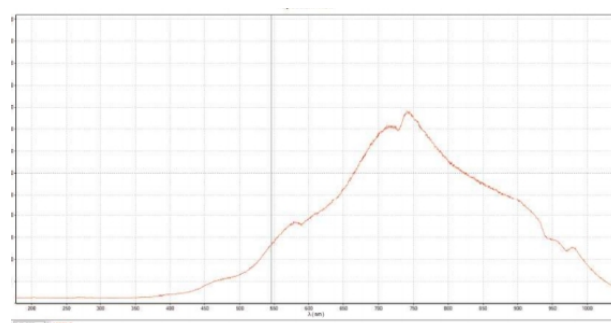
Interface / function	Source-supported specification
RS232	115200 bps serial communication
Triggering	Normal mode; software, hardware and synchronization trigger
Development	SDK provided for secondary development and customization
Display	Automatic display of peak wavelength and FWHM

Typical spectrum

Representative mercury-lamp and tungsten-halogen spectra are reproduced from the supplied source document.



Mercury (Hg) lamp spectrum



Tungsten-halogen lamp spectrum

SYSTEM DATA

Technical Specifications

Specifications below are compiled from the supplied SM-2002B source document. The optional wavelength range and selectable resolution depend on the ordered configuration.

Item	Specification
Wavelength range	180–1100 nm, optional
Optical resolution	Approx. 0.35 nm (optimal)
Fiber connector	SMA905
Detector	Hamamatsu S11639 linear CMOS array (2048-pixel)
Detector pixels	2048 pixels; each pixel 14 μm $\times$ 200 μm
Signal-to-noise ratio	600:1
A/D resolution	16 bit
Integration time	0.5 ms–65 s
Dynamic range	10,000:1
Trigger modes	Normal mode; software, hardware and synchronization trigger
Power consumption	250 mA at 5 V DC
Operating temperature	5–35°C (25°C recommended)
Communication interface	USB 2.0 (12 Mbps); RS232 (115200 bps)
Operating system	Win XP, Win 7, Win 8, Win 10

Item	Specification
Mounting holes	4 × M3 threaded holes at bottom; 2 × M3 threaded holes at side
Power supply	USB
Dimensions	94 × 60 × 34.5 mm
Weight	0.3 kg

ORDERING INFORMATION

Product Selection

The following ordering codes retain the supplied configuration suffixes while using the SpeSense SM-2002B family name throughout.

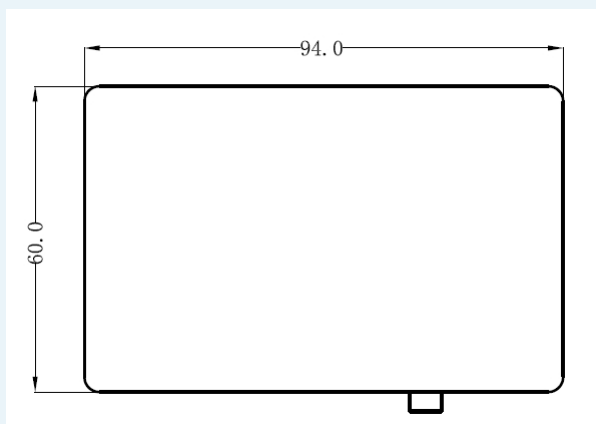
Model code	Wavelength range	Resolution
SM-2002B-01-S03L00F06G01	200–900 nm	~1 nm
SM-2002B-01-S03L02F06G01	200–900 nm	~1 nm
SM-2002B-01-S04L00F06G01	200–900 nm	~2 nm
SM-2002B-01-S04L02F06G01	200–900 nm	~2 nm
SM-2002B-01-S04L02F06G17	200–900 nm	~2 nm
SM-2002B-01-S04L02F06G02	200–900 nm	~2 nm
SM-2002B-01-S05L02F06G01	200–900 nm	~5 nm
SM-2002B-02-S03L00F00G03	200–550 nm	~0.6 nm
SM-2002B-03-S03L00F00G06	200–433 nm	~0.4 nm
SM-2002B-04-S02L00F08G05	750–1100 nm	~0.5 nm
SM-2002B-04-S04L01F08G05	750–1100 nm	~1 nm
SM-2002B-04-S03L01F08G05	750–1100 nm	~0.6 nm
SM-2002B-05-S03L00F05G02	350–1000 nm	~1 nm
SM-2002B-05-S03L01F05G02	350–1000 nm	~1 nm
SM-2002B-05-S04L00F05G02	350–1000 nm	~2 nm
SM-2002B-05-S04L01F05G02	350–1000 nm	~2 nm
SM-2002B-05-S04L01F05G18	350–1000 nm	~2 nm
SM-2002B-05-S05L01F05G02	350–1000 nm	~5 nm
SM-2002B-05-S05L01F05G18	350–1000 nm	~5 nm
SM-2002B-06-S03L00F00G04	260–493 nm	~0.4 nm
SM-2002B-07-S03L00F00G03	500–850 nm	~0.6 nm
SM-2002B-08-S03L00F00G06	180–413 nm	~0.4 nm
SM-2002B-08-S04L00F00G06	180–413 nm	~0.7 nm
SM-2002B-08-S05L00F00G06	180–413 nm	~1.4 nm

Model code	Wavelength range	Resolution
SM-2002B-09-S03L00F00G07	180–530 nm	~0.6 nm
SM-2002B-10-S03L00F06G02	300–1000 nm	~1 nm
SM-2002B-10-S03L02F06G02	300–1000 nm	~1 nm
SM-2002B-10-S04L02F06G01	300–1000 nm	~2 nm
SM-2002B-11-S03L00F06G13	200–1000 nm	~1.8 nm
SM-2002B-11-S03L02F06G13	200–1000 nm	~1.8 nm
SM-2002B-11-S04L02F06G16	200–1000 nm	~4 nm
SM-2002B-12-S03L00F00G03	350–700 nm	~0.6 nm
SM-2002B-12-S04L00F00G03	350–700 nm	~1 nm
SM-2002B-13-S03L00F05G02	400–1100 nm	~1 nm
SM-2002B-13-S03L01F05G02	400–1100 nm	~1 nm
SM-2002B-13-S04L01F05G02	400–1100 nm	~2 nm
SM-2002B-14-S03L01F08G15	650–1000 nm	~0.6 nm
SM-2002B-15-S03L00F00G03	300–650 nm	~0.6 nm
SM-2002B-16-S03L00F08G05	700–1050 nm	~0.6 nm
SM-2002B-17-S04L02F06G01	260–960 nm	~2 nm
SM-2002B-18-S03L02F06G16	300–1100 nm	~1.8 nm
SM-2002B-18-S05L02F06G16	300–1100 nm	~6 nm
SM-2002B-19-S07L01F00G20	450–800 nm	~4 nm
SM-2002B-20-S04L01F05G31	535–760 nm	~0.7 nm
SM-2002B-20-S03L01F05G31	535–760 nm	~0.4 nm
SM-2002B-21-S03L00F05G19	400–850 nm	~0.8 nm
SM-2002B-24-S03L00F00G20	430–780 nm	~0.6 nm
SM-2002B-25-S03L02F06G17	180–880 nm	~1 nm
SM-2002B-26-S01L00F00G03	380–730 nm	~0.4 nm
SM-2002B-27-S02L00F00G31	460–683 nm	~0.3 nm
SM-2002B-27-S03L00F00G31	460–683 nm	~0.4 nm
SM-2002B-28-S03L00F00G20	330–680 nm	~0.6 nm

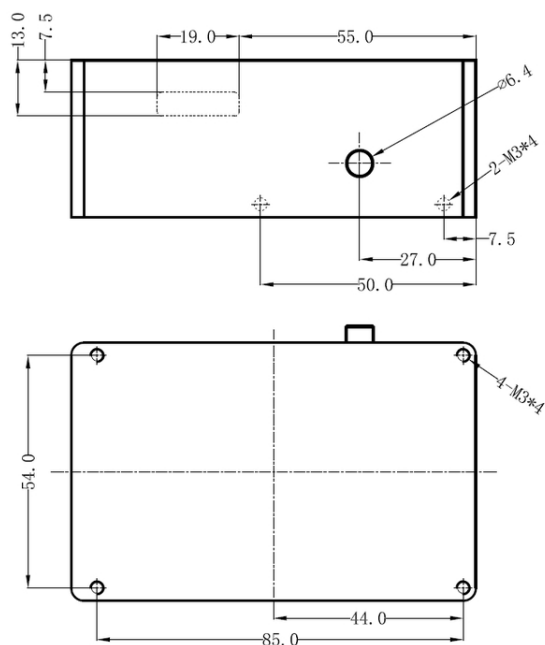
MECHANICAL DATA

Mechanical Dimensions & Mounting

The supplied outline and mounting drawings are reproduced for mechanical reference. Overall dimensions are 94 × 60 × 34.5 mm, with M3 threaded mounting holes at the bottom and side.



Outline dimensions
94 × 60 × 34.5 mm



Mounting hole configuration
4 × M3 bottom; 2 × M3 side

Configuration List

No.	Component	Qty.
1	Spectrometer	1
2	USB cable	1
3	Calibration report (software and user manual)	1
4	Suitcase	1

Optional Accessories

- Cooled halogen-tungsten light source.
- Straight-through quartz double-clad fiber, 200–1100 nm.
- Spectrum software.

CONTACT / SUPPORT

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