

SPECTRAL ANALYSIS / DATA SHEET

SM-4001B-I

NIR High-Sensitivity Spectrometer

Compact NIR spectrometer with selectable wavelength range and optical resolution for spectral measurement, industrial systems and research applications.

Overview

- High-resolution optical-mechanical structure in a compact and portable package.
- Interchangeable gratings provide selectable wavelength ranges and optical resolutions.
- 50000:1 dynamic range, 0.5 ms minimum integration time and 600:1 signal-to-noise ratio for weak-signal detection.
- USB 2.0 provides data transfer and power; RS232 communication supports system integration.



800–1100 nm OPTIONAL RANGE	0.35 nm OPTICAL RESOLUTION	50000:1 DYNAMIC RANGE	USB / RS232 COMMUNICATION
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Key Advantages

- Handy and compact; the source describes the package as small as a name card.
- Crossed Czerny-Turner optical design with an interference filter to eliminate secondary diffraction spectrum.
- Standard SMA905 fiber connector and selectable wavelength range/resolution.
- Multiple trigger modes, automatic peak-wavelength and FWHM display, and fixed mounting holes for integration.
- SDK provided for secondary 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.

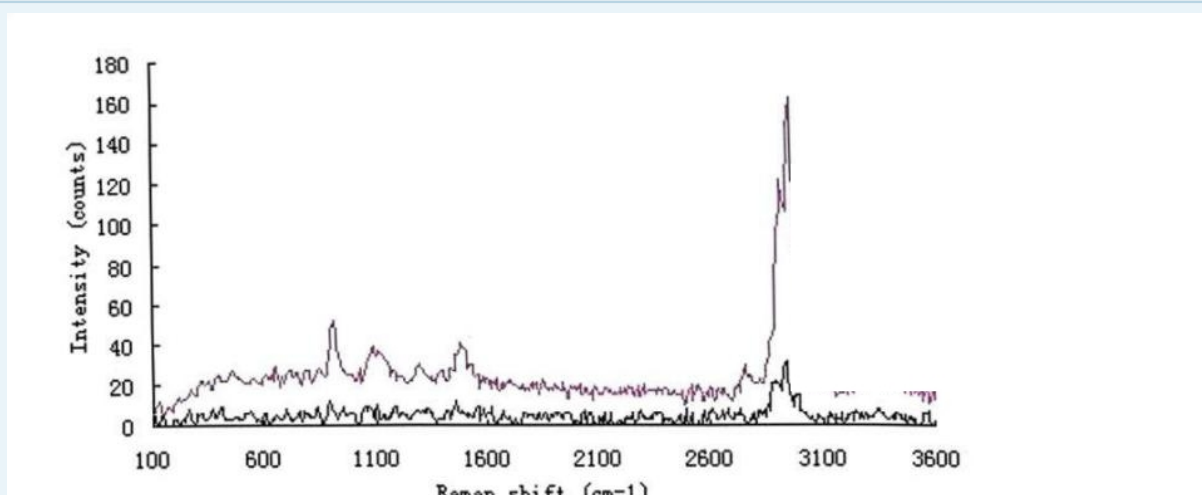
MEASUREMENT PRINCIPLE

Crossed Czerny-Turner Optical Design

The SM-4001B-I uses a crossed Czerny-Turner optical design with interchangeable gratings for selectable spectral ranges and resolutions. Light is coupled through a standard SMA905 fiber connector and detected by a Hamamatsu S16010 series area-array back-illuminated CCD detector. An interference filter is used to eliminate the secondary diffraction spectrum.

Typical spectrum

Representative Raman spectrum comparison reproduced from the supplied source document.



Representative Raman spectrum comparison

SYSTEM DATA

Technical Specifications

Specifications are compiled from the supplied SM-4001B-I source document. The dimension drawing is presented separately because its drawing references include additional values beyond the specification-table envelope dimensions.

Item	Specification
Model number	SM-4001B-I
Detector wavelength range	200–1100 nm
Detector sensitivity range	500–1100 nm
Resolution	0.35 nm
Fiber connector	SMA905
Detector	Hamamatsu S16010 series area-array back-illuminated CCD
Pixels	2048 × 64 pixels; each pixel 14 μm × 14 μm
Signal-to-noise ratio	800:1
A/D resolution	16 bit
Integration time	1 ms–10 s
Dynamic range	50000:1 typical
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
Linearity	>99%

Item	Specification
Power supply	USB
Dimension	165 × 110 × 38 mm
Weight	0.7 kg

OUTPUT & COMMUNICATION

Output and System Integration

USB 2.0 provides power and data transfer, while RS232 provides serial communication. Multiple trigger modes support flexible operation and system integration; the supplied SDK supports secondary development and customization.

Interface / function	Source-supported specification
USB 2.0	12 Mbps data transfer and USB power supply
RS232	115200 bps serial communication
Triggering	Normal, mode, software, hardware and synchronization trigger
Display	Automatic display of peak wavelength and FWHM
Development	SDK provided for secondary development and customization

ORDERING INFORMATION

Product Selection

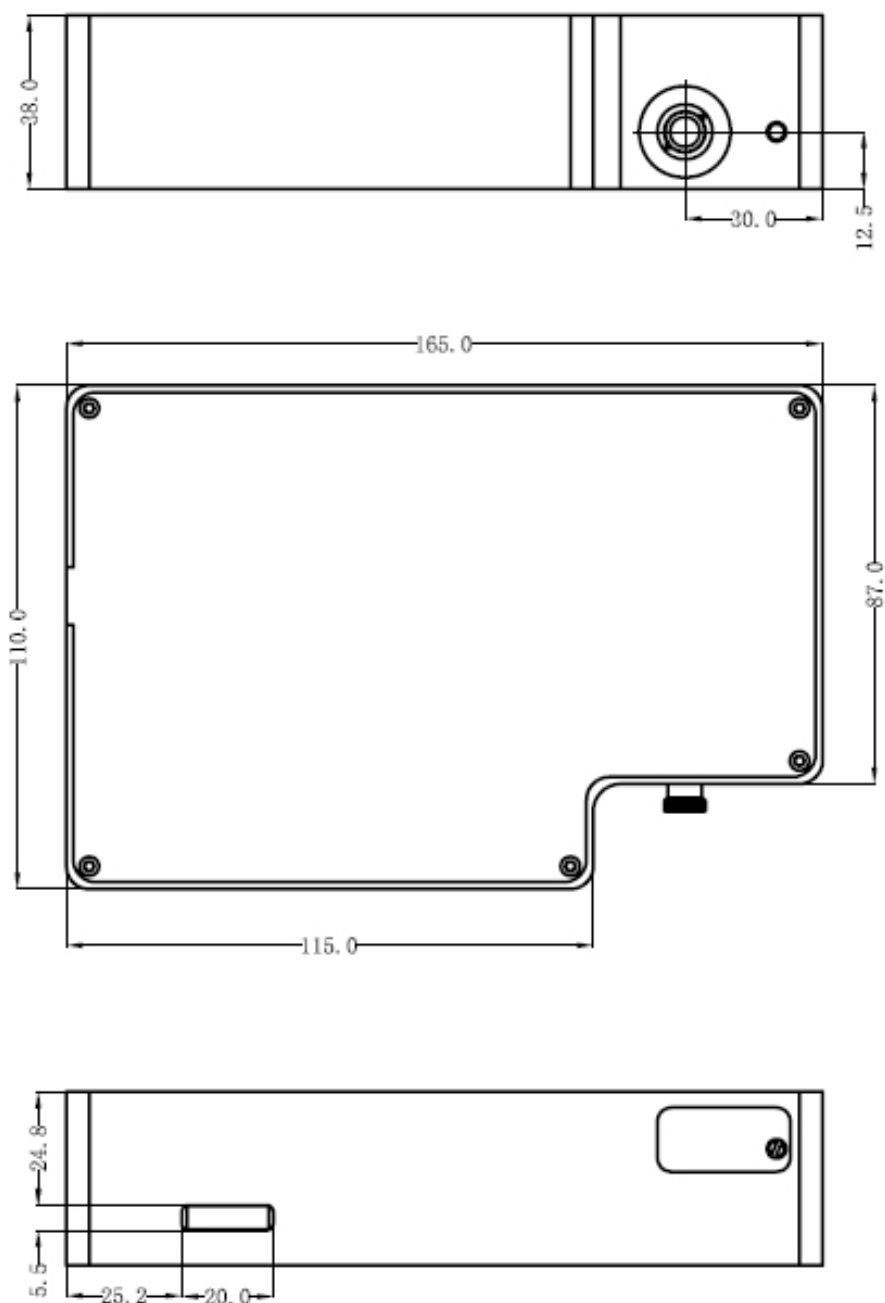
The following configuration codes retain the supplied suffix structure while using the SpeSense SM-4001B-I family name throughout.

Model code	Wavelength range	Resolution
SM-4001B-I-01-S03L01F05G02	350–1050 nm	~1 nm
SM-4001B-I-02-S04L01F08G05	750–1100 nm	~1 nm
SM-4001B-I-02-S02L01F08G05	750–1100 nm	~0.5 nm
SM-4001B-I-03-S04L01F05G31	535–760 nm	~0.7 nm
SM-4001B-I-04-S04L01F08G31	640–850 nm	~0.7 nm

MECHANICAL DATA

Mechanical Dimensions & Mounting

The supplied outline and mounting drawings are reproduced for mechanical reference. The specification table lists 165 × 110 × 38 mm, while the drawings carry additional references including 165 mm, 110 mm, 87 mm, 115 mm and 38 mm. Confirm the applicable dimensional references before mechanical integration.



Outline dimensions

Drawing references: 165 mm, 110 mm, 87 mm, 115 mm and 38 mm

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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