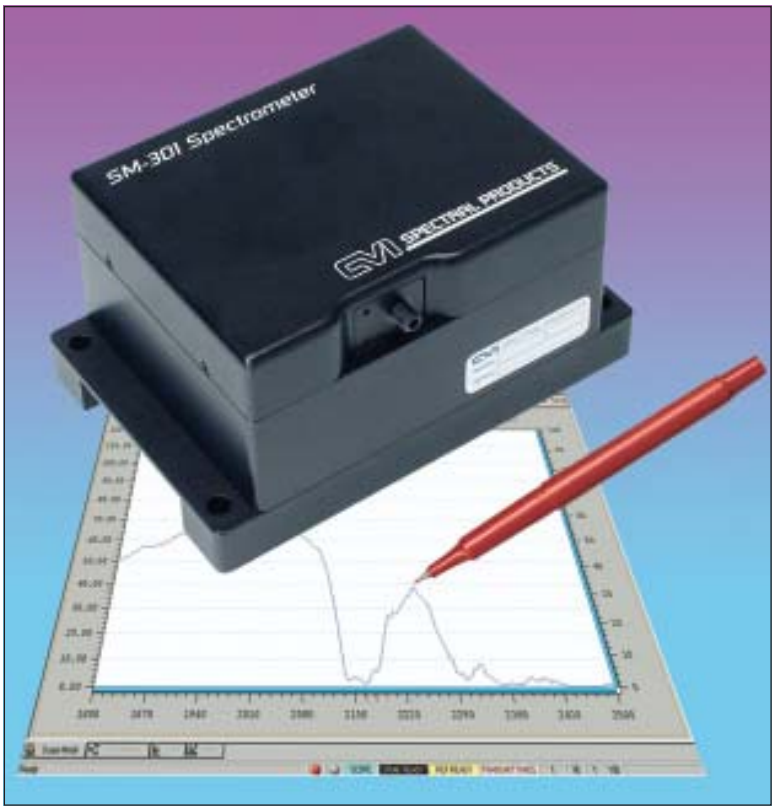
SM301

PbS Array Spectrometer

- *Low Noise*
- *Cooled, Stable Operation*
- *256 Detection Elements*
- *Accommodates spectral measurements in the 1 to 3 micron range.*
- *Optical input direct to slit or via fiber.*



The Choice for IR Spectral Applications

The SM301 is a versatile, high performance PbS array spectrometer. Its active components include a TE cooler and a 256-element PbS detector element array. Operation of the unit for research applications is easy with the included Windows based SM32Pro-based analysis software. The system is ideal for spectroscopic applications in the 1 to 3 micron region.

Available system options include a built-in high-speed shutter and optical blank pixels for setting dark current offsets. The SM301 includes thermoelectric cooling to guarantee long-term operational stability.

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General Description

The SM301 is a complete compact PbS array Spectrometer for use with a PC to perform spectral measurements in the region of 1 to 3 microns.

It consists of four parts: 1. an entrance mechanism with a built-in slit, a fiber coupling adapter, and an order sorting filter; 2. a spectrograph of a crossed Czerny-Turner arrangement using high quality optics; 3. a linear lead sulfite sensor array and driving circuitry; 4. a computer interface for data acquisition.

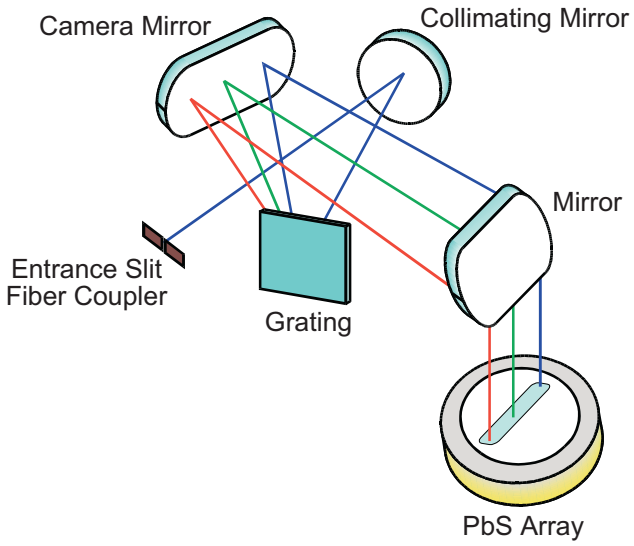
All the optical components and driving electronics are enclosed in an aluminum housing for stable operation. A thermal electric (TE) cooler is also included.

Application

The SM301 employs a multiplexed PbS array as its NIR detection element. The array is cooled and temperature stabilized at -10 ^{o}C which ensures a long-term operation stability. A built-in mechanical shutter mechanism is controlled by the system clock and is synchronized with the array readout operation. Dark signal can thus be automatically measured by the built-in electronics periodically and subtracted automatically. Compared with conventional scanning NIR spectrometers the SM301 provides the multichannel detection advantage, both in reducing the measurement time and enhancing measurement signal-to-noise ratio. The SM301 can operate at a readout rate of 100 kHz or faster allowing fast measurement and averaging operation to be performed in a short period of time.

A variety of accessories makes the SM301 versatile for process control, spectroscopy, environmental monitoring, and other applications. It can easily be configured for transmission, reflectance, absorbance, and other measurements. The wavelength range from 1 to 3 µm can be covered by one grating optimized for the wavelength range. The spectral range can also be factory configured to meet application needs.

The SM301 can accept light directly coupled through a built-in slit, from a fiber through an SMA coupler or both. The fiber coupling ability makes the unit flexible for remote and process control applications. Where high mobility is required, the SM301 can be used with just a slit to eliminate the light transfer variations caused by the changes in fiber bending curvatures. As a result, attenuation resulting from the use of optical fibers can also be avoided.



SM301 Optical Path

Specifications:

Number of pixels: 256
Pixel size: 45 by 450µm
Peak responsivity: 1x10^{6} V/watt
Spectral response range: 1000 to 3000nm
Spectral coverage: about 600nm in user specified region
Spectral Resolution: 20nm with standard module and slit option.
Light entrance:
Slit: 50µm to 400µm
Fiber: SMA 905 fiber coupler
50µm to 600µm core diameter
NA = 0.2
Grating: 75 to 1200 grooves per mm
Stray light rejection: better than 10^{-3}
Analog to digital: 12-bit resolution, PCMCIA standard
Dynamic range: >1000:1 for single scan
Dimensions: 5" x 4" x 2.5" (LxWxH)
Shutter: Built-in
Detector cooling: -10°C
Weight: 2 lbs.
Software: SM32Pro

Ordering Information: Please indicate product number plus description when ordering.

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