

MULTICHANNEL IMAGING SPECTROMETER

S200-MF

S200-MF is a new-generation spectrometer with high spectral and spatial resolution across the entire area of commercially available 2D (array) image sensors.



FEATURES

- Ideal astigmatism compensation across the entire focal plane.
- Synchronous spectra imaging from two up to dozens optical fibers.
- Integrated CCD-array and custom software for multichannel optical spectroscopy.
- Embedded mechanical shutter synchronized with the detector for continuous signal processing.

Due to innovative optical bench and specially designed optics with aberration correction the S200-MF spectrometer features complete compensation of astigmatism both in the center of detector's sensitive area and at its edges. This allows connecting a multi-fiber optical bundle to the entrance slit of the spectrometer and acquiring spectra from several fibers simultaneously. Maximum number of optical fibers in the bundle depends on the height of sensor area and on fiber diameter. When using standard sensors as large as 6 mm tall a number of simultaneously analyzed fibers may reach several dozens.

APPLICATIONS

- Laser and LED analysis
- Multichannel spectroscopy
- Liquid analysis
- Plasma analysis

S200-MF has a fixed entrance slit and can operate either with optical fibers, or without them. At direct input of radiation into the spectrometer an image from the analyzed area is projected directly on the entrance slit, and the detector acquires spectral information from this area with high spatial resolution.

The S200-MF spectrometer ensures perfect flat field and high image quality at any point at the center of the detector and at its edges. Compact size and short-focal-length optical bench of S200-MF allow synchronous imaging of the wide spectral range which is limited only by the detector spectral sensitivity.



*S200-MF: Continuous spectrum recorded with 21-channel fiber bundle
Full astigmatism compensation and high spatial resolution.*

S200-MF SPECIFICATION

SPECTROMETER MODEL	S200-MF
Spectral range of detector sensitivity, nm	200 x 1100
Focal length, mm	191
F/Number	1 : 8.5
Entrance slit (one to choose)	Fixed width: 20, 30, 50 or 100 μ m
Spectral resolution	Depends on selected diffraction grating (see table below)
CCD-detector model	S10140-1109
Number of pixels	2068 x 512
Number of active pixels	2048 x 506
Pixel size, μ m	12 x 12
Active area size, mm	24.576 x 6.072
Maximum spectral response, nm	600
Maximum quantum efficiency, %	>90
Non-uniformity of spectral response, % ¹⁾	\pm 3
Antiblooming ²⁾	No
ADC	16 bit
Readout rate, kHz	250
Mean-square reading noise, ADC counts	< 12
Dynamic range	~ 5 400 : 1
Exposure time, s	0,0083 - 3 ³⁾
Frame processing time in the binning mode, ms	9.39
TE cooling	Her
Operating temperature	10 ÷ 30 °C
Computer interface	Full Speed USB
Triggering	IN/OUT
Requirements to External sync pulse	
Polarity	Positive
Amplitude, V	3-15
FWHM pulse duration, μ s	5-20
Triggering connector type	BNC-58
Triggering pulse parameters	
Polarity	Positive
Amplitude, V	3-5
FWHM pulse duration, μ s	10
Mechanical shutter for operation with continuous light source (option)	
Open/close time, ms	<15
Min time between openings	80
Optical input	- Multicore optical fiber (specification to be agreed) - Without fiber
Dimensions, Weight	283 x 129 x 123 mm, 4.4 kg

¹⁾ Signal level - 50% of saturation.

²⁾ Antiblooming - sensor feature eliminating overflow of charges from the over-exposed pixels to the neighbouring ones.

³⁾ Maximum storage time is deemed to be the time at which dark signal reaches 10% of the dynamic range at the ambient temperature +25 °C.

* Upon your request the S200-MF can be supplied without a detector with a special adapter for your detection system.

RECOMMENDATIONS FOR CHOOSING A DIFFRACTION GRATING

At the time of placing your order you should choose grating grooves density (i.e. spectral resolution of your instrument), as well as the spectral range for operation. For your convenience the table below lists the average values of grating dispersion, spectral resolution and multichannel array bandpass. Contact a Solar LS specialist for getting more precise parameters of your spectrometer.

Diffraction gratings, grooves/mm	200	300	400	600
Max. spectral range, nm	200 - 1100			
Multichannel array bandpass (average), nm	600	400	300	200
Reciprocal linear dispersion (average), nm/mm	25.3	16.8	12.7	8.4
Spectral resolution (average), nm*	1.2	0.9	0.6	0.45

*Spectral resolution is indicated for the entrance slit of 20 μ m width.

Example: if you are interested in 400-700nm spectral range (300nm multichannel array bandpass), you may choose 400 gr/mm diffraction grating and get the average spectral resolution of 0.6 nm.