

HIGH-APERTURE MULTIPURPOSE SPECTROMETERS

SDH

High-aperture spectrometers of the SDH series were designed as a low-price fixed-grating alternative to scanning monochromator-spectrographs. Since detectors are usually fixed from outside, SDH spectrometers are ready to accept any CCD or CMOS detectors including TE- or LN-cooled ones.



The SDH-series are available in two versions: the SDH-I model containing one fixed diffraction grating and the SDH-IV model with a four-position manually switchable turret of diffraction gratings.

All the spectrometers are supplied with an eight-position manually switched filter wheel containing three standard order-sorting filters, a UV silica two-lens condenser and SMA-905 fiber adapter. With all these accessories, the user is able to select the most convenient method of delivering the analyzed radiation to the spectrometer either with the use of the optical fiber only or via the fiber, condenser and order separation filter.

FEATURES

- **Wide choice of detectors to be installed, including cooled detectors**
- **Adapter manufacture for you detector**
- **High resolution - up to 0.06 nm.**
- **High throughput - F/Number of 4.4.**
- **Wide choice of methods to input radiation into the spectrometer.**

The standard SDH optics comprise Al+MgF₂ coating optimized for high UV efficiency. Optionally the spectrometer may contain optics with Ag+SiO₂ or Au coating for high efficiency in the infrared spectral range.

The SDH Imaging version (Optional) includes an astigmatism compensator installed after the entrance slit instead of a flat folding mirror. Astigmatism compensation allows to correct astigmatism to residual value less than 50 μm. Astigmatism compensation is a popular way to enlarge the system sensitivity in case of operating with linear image sensors. This fact must be considered when calculating expected optical resolution of the SDH with a specific grating.

APPLICATIONS

- **Registration of laser radiation**
- **Plasma monitoring**
- **Analysis of any light sources within range 190-1100 nm**

The SDH-IV specifications contain recommended combinations of diffraction gratings and multichannel detectors answering the most popular customers' demands.

The SDH can be triggered from your light source with standard TTL trigger pulses via the BNC-58 connector. The SDH is also able to produce TTL trigger pulses.

The spectral range and resolution (i.e. grating lines density) are chosen at the time of placing your order. For your convenience the specifications lists the average values of grating dispersion, spectral resolution and multichannel array bandpass of the CCD detector corresponding to a certain grating. Contact a SOLAR LS specialist for more precise calculation of parameters for your spectrometer.

SDH SPECIFICATIONS

Focal length, mm	150
F/Number	1: 4.4
Entrance slit, mm	0.016 x 3 ¹⁾ or 0.04 x 3 ²⁾³⁾ or 0.08 x 3 ⁴⁾
Computer interface	Full-Speed or High-Speed USB
Overall size, weight	(242 x 280 x 113) mm; 4.85 kg

SDH-I Spectrometer							
Diffraction grating, lines/mm	300	400	600	1200	1800	100	50
Spectral range, nm	200-1100	200-1100	200-1100	200-1000	200-650	870-1700 ²⁾	900-2560 ³⁾
Width of the concurrently measured spectral range (average), nm	620 ¹⁾	460 ¹⁾	300 ¹⁾	130 ¹⁾	80 ¹⁾	830 ²⁾	1660 ³⁾
Reciprocal linear dispersion (average), nm/mm	21,3	15,8	10,2	4,0	3,0	65	131
Spectral resolution (FWHM, average), nm	0,42 ¹⁾	0,32 ¹⁾	0,22 ¹⁾	0,09 ¹⁾	0,06 ¹⁾	4,0 ²⁾	12 ³⁾

SDH-IV Spectrometer												
Spectral range, nm	200-1100				200-1100				870-1700*			
Linear image sensor	TCD1304 Toshiba				S10420-1106 Hamamatsu				G9212-512S – G9214-512S Hamamatsu			
Active area	29.1 mm, 3648 pixels 0.008 mm x 0.5 mm				28.672 x 0.896 mm, 2068 x 70 pixels, 14 x 14 µm				12.8 mm, 512 pixels, 0.025 mm x 0.5 mm (0.25 mm)			
Diffraction gratings, lines/mm	900	600	400	300	900	600	400	300	400	300	200	100
Detectable spectral range, nm	200-390	300-600	450-900	600-1100	200-375	300-570	450-855	600-1140	900-1100	1065-1330	1300-1700	900-1700
Reciprocal linear dispersion (average), nm/mm	7.0	10.5	15.8	21.1	7.0	10.5	15.8	21.1	15.5	20.9	31.7	65
Spectral resolution (FWHM, average), nm	0.18	0.28	0.42	0.54	0.3	0.45	0.7	0.9	0.95	1.3	2.0	4.5

1) For 29.1mm long linear image sensor with pixel size of 8µm (TCD1304AP, Toshiba).

2) For 12.8mm long linear image sensor with pixel size of 25 µm (G9214-512S or G9212-512S, Hamamatsu).

3) For 12.8mm long linear image sensor with pixel size of 50 µm (G9205-256W or G9208-256W, Hamamatsu).

4) Available option: SDH-IV modification for whole operating spectral range of 900-2560 nm with detectors based of Hamamatsu sensors G9205/G9208-256W.