

# DOUBLE ADDITIVE/SUBTRACTIVE MONOCHROMATOR

## MSA-130

The MSA-130 is a compact double monochromator with enhanced functionality and low stray light.

Main feature of the MSA-130 is its capability to operate in the modes of both addition and subtraction of dispersions. It is “two in one” instrument capable to provide both modes without any additional alignment and calibration. Addition and Subtraction modes are exchanged by manual switching of a selector knob located on top of the monochromator.



### FEATURES

- Double Monochromator for Excellent Stray light Rejection
- Dispersion Subtraction & Addition Modes
- Compact & Cost-efficient
- High Throughput

In the Dispersion Addition Mode the MSA-130 has effective focal length of 260 nm. Extremely low stray light is determined by an intermediate slit and carefully calculated optical design.

In the Dispersion Subtraction Mode the MSA-130 serves as a tunable low-stray-light-filter with bandpass selectable by the user. Central wavelength is set from a computer by synchronous turning of two identical diffraction gratings. Being a scanning monochromator, the MSA-130 does not have a flat output field and hence cannot be operated as a spectrograph with a multi-channel detector mounted at the output port.

The software allows calculating the line width selected by the MSA-130 in the both Dispersion Addition and Subtraction modes depending on the set widths of entrance, intermediate and exit slits.

The MSA-130 entrance, intermediate and exit slits have manual control and smooth micrometrical adjustment of the opening width. Entrance and exit slits are placed at an angle of 66° to the vertical. Special support providing vertical slits position is also available at request.

Both the MSA-130 gratings are located at the same axis and are driven by the same step motor. This ensures complete synchronism of gratings' rotation and high precision of wavelength setting. The MSA-130 gratings are computer controlled via the USB interface.

In terms of design, the gratings are fixed in one holder, which is carefully aligned by our service-engineers. The holder with a working set of gratings is installed into the device. At your choice, the MSA-130 may be supplied with one or more additional sets of gratings in holders. Replacement of diffraction gratings in the MSA-130 is easy and fast.

The MSA-130 software provides possibility of real-time correction of factory calibration by the user.

The MSA-130 delivery set includes a viewing unit Sight, which is used to check the current monochromator calibration. The Sight contains an achromatic objective; it is placed on the entrance slit and is used to visually observe positions of the known spectral lines relative to the centre of exit slit. The spectral range of the Sight operation is 200nm-2000nm.

The MSA-130 exit slit contains two mounting holes M2.5 that allow fixing your own detector to the slit housing, if necessary. Two additional holes M3 are located on the housing close to the slit unit.

## MSA-130 SPECIFICATIONS

<b>Optical scheme</b>	Modified Czerny-Turner double monochromator supplemented with an optical matching unit providing either additive or subtractive dispersion		
<b>Focal length, mm</b>			
<b>the first monochromator:</b>			
collimating mirror	130		
focusing mirror	142		
<b>the second monochromator:</b>			
collimating mirror	142		
focusing mirror	130		
<b>Ports</b>	1 input, 1 output		
<b>F/Number</b>	1 : 4.5		
<b>Entrance&amp;Exit slits</b>	Micrometric		
Slit Width	adjustable from 0 to 2.0 mm		
Slit Height	12mm		
Parallelism	±1 μm		
Micrometer Reading Accuracy	±1 μm		
<b>Intermediate slit</b>	Micrometric		
Slit Width	adjustable from 0 to 5.0 mm		
Slit Height	12 mm		
Parallelism	±1 μm		
Micrometer Reading Accuracy	±1 μm		
<b>Gratings <sup>1)</sup></b>	Interchangeable one pair is supplied with instrument; other pair is an option		
Number of Lines per mm	1200	600	300
Grating Size, mm	25 x 25 x 8	25 x 25 x 8	25 x 25 x 8
Blazing Wavelength, nm	280	600	1500
Usable Wavelength Range, nm <sup>2)</sup>	190 - 650	385 - 1300	770-2600
Mechanical Range, nm	0 - 760	0 - 1500	0-3000
<b>Wavelength</b>			
Reciprocal linear dispersion (average) of the first monochromator, nm/mm	5.8	11.6	23.2
Wavelength Accuracy, nm	±0.15	±0.25	±0.5
Wavelength Repeatability, nm	±0.05	±0.01	±0.2
Wavelength Step Size, nm	0.01	0.02	0.04
Wavelength Scan Speed, nm/s	19	38	76
Wavelength Resolution, nm	0.07	0.14	0.28
<b>Dispersion Addition Mode</b>			
Reciprocal Linear Dispersion (average), nm/mm	3.0	6.0	12.0
Width of the Selected Spectral Range, nm	0.2-6	0.4-12	0.8-24
<b>Dispersion Subtraction Mode</b>			
Reciprocal Linear Dispersion, nm/mm	0	0	0
Width of the Selected Spectral Range, nm	0.2-40	0.4-80	0.8-160
Width of 25 μm Entrance Slit Image, μm			
with 2.5mm intermediate slit	32	32	32
with 5.0mm intermediate slit	43	43	43
<b>Stray Light</b>	10 <sup>-9</sup>		
<b>Achromatic lens (for system adjustment)</b>	Three-lens objective f=41.8mm supplied with the instrument		
<b>Computer interface</b>	Full Speed USB		
<b>Electrical Service Requirement</b>	Single phase main 85-264 VAC; 47-63 Hz		
<b>Dimensions, mm</b>	265 x 195 x 210		
<b>Weight, kg</b>	8		

<sup>1)</sup> Diffraction gratings with other lines per mm are available.

<sup>2)</sup> The usable wavelength range covers wavelength where the grating efficiency is more than 0.3.

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