Monochromators

Double Monochromator MSHD-300 with variable slit

- Focal length: 600 mm
- Fully automated
- USB 2.0 interface
- 190 nm - 24 µm (grating dependent)
- Control software
- Software development kit with code examples C, C++, Delphi, VBA and LabView

For those applications where the scattered light performance of a single monochromator is not sufficient, the MSHD-300 double monochromators are available. These devices are supplied with either **additive** or **subtractive** dispersion. An optional swing away mirror allows instant change from double to single operation - a useful feature in UV-VIS-NIR systems.

An order sorting filter wheel, essential for accurate measurement of continuous spectra, motorized slits and our various light sources are amongst the wide range of accessories available to complement the MSHD-300. As with the MSH-300, these monochromators control grating position using precision gears and a microprocessor-controlled microstepping drive. Up to three gratings are mounted on a turret which can be rotated through 360° allowing software selection of grating type and position.

An optional programmable detector changeover mirror with software selectable dual inputs allow spectral scans over wide wavelength ranges without manual intervention.The advantages of this drive include constant wavelength accuracy at all grating angles, very fast wavelength acquisition and zero backlash.

Optical layout

The optical Czerny-Turner layout has been developed to minimize scattered light and maximize throughput. Effective internal baffling reduces general scatter while the novel mirror arrangement avoids rediffracted light which is often a problem at shorter wavelengths.

The use of large rectangular gratings (size 68 mm x 84 mm) improves the light throughput and maintains a constant f/number of 4.1 at all grating angles.

Motorized filter wheel

If a detector is sensitive to shorter wavelengths than those diffracted in the first order you'll need to block them before they hit the detector. Also, using the system as monochromatic light source with broadband light at the entrance requires the use of long pass filters. For handling convenience, the MSHD-300 can be equipped with a motorized 6-position filter wheel holding standard 25 mm diameter order sorting filters. Its position inside the casting allows full access to the external slit assemblies for mounting detectors, fibers or other accessories. Position 6 holds a blind plate for dark current measurements.

Find a list of available order sorting filters on www.lot-qd.com/monochromators

Specifications		
Configuration	**MSHD-300A** Double Czerny-Turner **additive** dispersion	**MSHD-300S** Double Czerny-Turner **subtractive** dispersion
Slits	10 µm to 10 mm variable, manual or motorized	
Slit height	20 mm	
No of gratings	1,2 or 3	
Grating size	68 mm x 84 mm	
Aperture ratio	f/4.1 (at all grating angles)	
Resolution	0.05 nm at reduced slit height, 0.15 nm with full slit height of 20 mm*	0.1 nm at reduced slit height, 0.3 nm with full slit height of 20 mm*
Wavelength acquisition speed	1000 nm/s	
Wavelength accuracy	±0.2 nm over full range*	
Wavelength reproducibility	±0.05 nm*	
Weight	30 kg	

*measured with a 1200 l/mm grating; 10 µm slit

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Motorized wavelength drive

The MSHD-300 control grating position uses precision gears and a microprocessor-controlled microstepping drive. This enables wavelength acquisition speeds up to 1000 nm/s. The software control allows automated scans with grating, mirror and filter change without manual intervention.
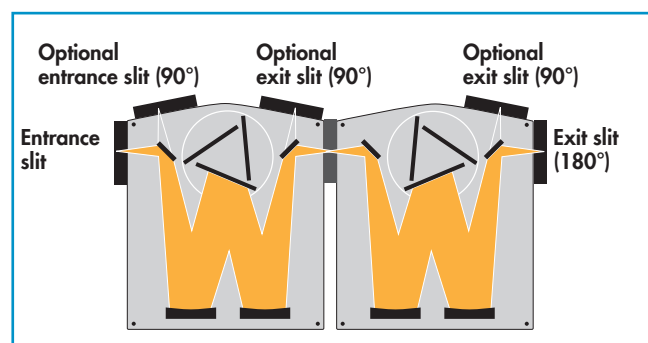
Instrument control and software

The USB interface uses Windows native drivers providing plug and play connectivity to all Windows computers with either 32 or 64 bit OS systems.
The software offers a user-friendly control of all relevant parameters like center wavelength, grating selection, calibration values, etc. as well as optional filter position and others.

For those who need to integrate the monochromator in larger setups the software development kit (SDK) features code examples for C, C++, Delphi, VBA and LabView for individual programming needs.

Slit assemblies

Slit assemblies use a precision micrometer drive to adjust the slit width. They are continuously adjustable from 10 µm to 10 mm at a height of 20 mm. An optional computer-controlled motorized version is available. All slits are equipped with the LOT 35 mm flange system which allows convenient interfacing to our wide range of accessories. The grating table shows theoretical bandwidths for a 1 mm slit.

Optical configuration: MSHD-300 double monochromator

Ordering information monochromator	
MSHD-300A	Double monochromator system; **additiv configuration**, consisting of 2x 300 mm monochromators, 3 manual variable slit assembly, USB interface, 180° configuration, software and SDK
MSHD-300S	Double monochromator system; **subtractive configuration**, consisting of 2x 300 mm monochromators, 3 manual variable slit assembly, USB interface, 180° configuration, software and SDK
MSZ-FW/2	Programmable 6 position filter wheel for diameter 25 mm filters, inside mounted. Position 6 holds a blind plate.
MSZ-SAW	Remote operated swing away mirror with 1 manual variable slit assembly for additional entrance or exit slit. (Order sorting filter wheel MSZ-FW cannot be implemented at the same side.)
MSZ-MVSS-3	Three motorized slit assemblies 10 µm -10 mm incl. compact micro stepping drive unit (replaces the manual micrometer slits).

Ordering information gratings				
Part number	Lines per mm (l/mm)	Blaze wavelength (nm)	Theoretical resolution for 1 mm slit (nm)	
			Additive configuration	Subtractive configuration
High-resolution UV gratings				
MSG-T-2400-250	2400	250	0.75	1.5
MSG-T-1800-250	1800	250	1	2
MSG-T-1800-500	1800	500	1	2
1200 l/mm gratings				
MSG-T-1200-250	1200	250	1.25	2,5
MSG-T-1200-300	1200	300	1.25	2.5
MSG-T-1200-500	1200	500	1.25	2.5
MSG-T-1200-750	1200	750	1.25	2.5
830 l/mm gratings				
MSG-T-830-1200	830	1200	2	4
600 l/mm gratings				
MSG-T-600-300	600	300	2.5	5
MSG-T-600-500	600	500	2.5	5
MSG-T-600-750	600	750	2.5	5
MSG-T-600-1000	600	1000	2.5	5
MSG-T-600-1200	600	1200	2.5	5
MSG-T-600-1600	600	1600	2.5	5
Extended IR gratings				
MSG-T-300-3000	300	300	5	10
MSG-T-150-4000	150	4000	10	20
MSG-T-100-9000	100	9000	15	30
MSG-T-75-12000	75	12000	20	40
MSG-T-50-18000	50	18000	25	50