Monochromators and Spectrographs

List of Sciencetech Monochromators and Spectrographs						
Model	**Focal Length(mm)**	**Aperture**	**Resolution (nm)**	**Dispersion (nm/mm)**	**Special Features**	**Pg.**
Small Series						
9030	100	f/3.2	1	8	Compact Monochromator	4-3
8030DC	61	f/2	8 -10	52.38	Dual Channel Compact Spectrograph	4-6
9030DA 9030DS	100	f/3.2	0.5	4	Double Additive and Double Subtractive	4-8
Standard Series						
8010	200	f/3.5	0.5	4	Manual Spectrograph	4-11
9010	200	f/3.5	0.4	4	Manual Monochromator	4-10
9010F	200	f/2.6	1	4	Manual Monochromator	4-10
9055	200/250	f/3.5	0.18	3.3	Computer Controlled Monochromator/Spectrograph	4-13
9055F	200/250	f/2.5	0.4	3.3	Computer Controlled Monochromator/Spectrograph	4-13
9060	200	f/3.5 f/2.7	0.15	3.3	Imaging Spectrograph	4-16
9057	500	f/8	0.1	1.79	Computer Controlled Monochromator/Spectrograph	4-18
9057F	500	f/5.9	0.1	1.79	Computer Controlled Monochromator/Spectrograph	4-18
Large Series						
9040	496	f/6.9 f/5.2 f/4	0.03	1.53	High Resolution Half Meter	4-28
9040DA 9040DS	500	f/6.9 f/5.2 f/4	0.02	0.76	Double Additive and Double Subtractive	4-32
9490	914/1000	f/10 f/7	0.017	0.83	High Resolution One Meter	4-33
9490SD	914 X2	f/10 f/7		0.42	Single and Double Pass	4-33
9150	1500	f/12	0.008	0.53	High Resolution 1.5 Meter	4-36
9150SD	1500 X2	f/12	0.005	1.25	Single and Double Pass	4-36

*** Resolution and Dispersion values measured with a 1200 lines/mm grating**

100mm Manual Seya-Namioka Monochromator

The Sciencetech 9030 monochromator is a compact single grating scanning monochromator with 100mm focal length. It has a manual wavelength selector dial with an optional external motor drive for computerized control. The compact design is made possible by its Seya-Namioka optical layout which uses a single holographic concave grating and f/3.2 aperture. A pair of removable, fixed width slits for its input and output ports are included. Several removable, fixed slit width sizes are available to choose from ranging from 100 µm to 3 mm widths. Additional removable slits and custom width slits can also be purchased separately. There are 5 grating choices available (also sold separately) covering UV, VIS, to near-IR. The 9030 cannot be used as a spectrograph and therefore only accepts single channel and PMT detectors at its output port. However, it can be used as an excitation wavelength tuneable light source.

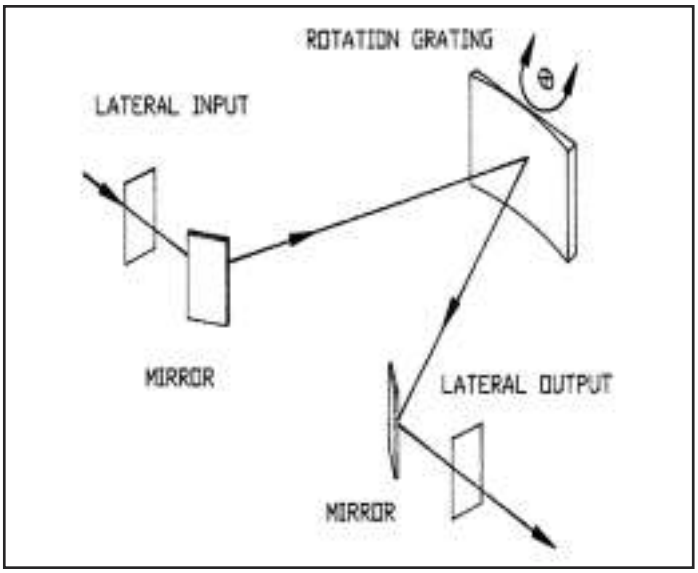
The 9030 is Sciencetech's most economical monochromator with a manual control wavelength selector and removable fixed width slits. The input and output ports are purposely placed optically in-line making it a simple addition to a straight-line beam in an optical system. Being a scanning monochromator, it 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.

Highlights

- 100 mm Compact Scanning Monochromator
- Greater than 1 nm Optical Resolution
- Seya-Namioka Optical Layout
- f/3.2 Aperture
- Single Holographic Concave Grating
- Manual Wavelength Selection Knob With Readout Counter
- Optional Computer Controlled Motorized Wavelength Selection
- Choice Of Removable Fixed Width Slits
- Light Tight Rugged Aluminum Body

Optics

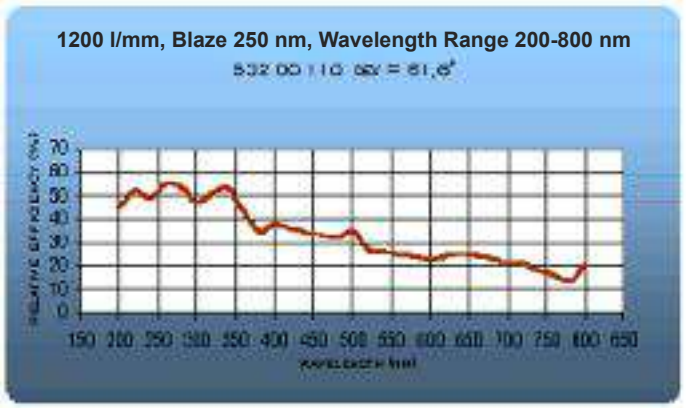
The 9030 follows the Seya-Namioka optical layout (see layout diagram), which utilizes a concave holographic grating. The focused spectrum is scanned across the output slit by rotating the grating with the manual control wavelength selector dial or optional computer controlled motor drive interface. To provide an optically in-line input and output port, two plane mirrors are used to reflect the beam from the grating to the ports. The gratings are aberration corrected so the instrument has no coma or astigmatism at the designated wavelength. This means the focus position at the output slit does not change as the grating rotates through the spectral range.

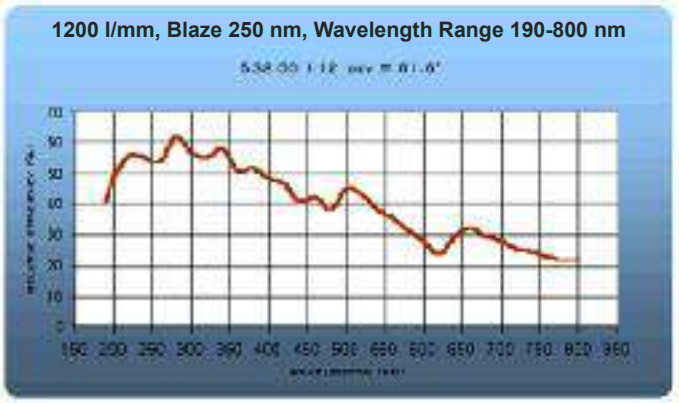


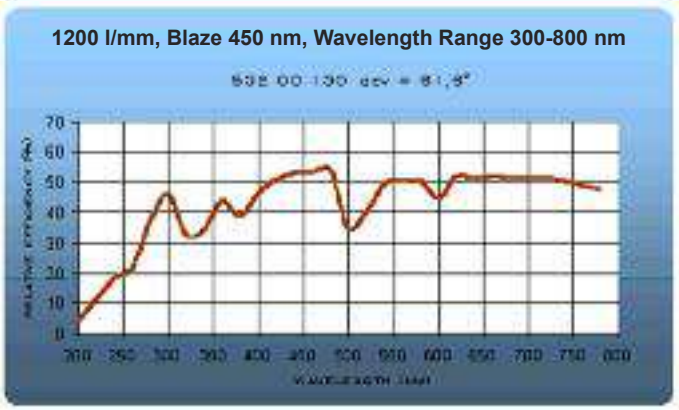
Version description	Version Code	Version Price (USD)
9030 body with 2 slits (grating sold separately)	- std	—

Gratings

The holographic concave grating is sold separately and is required for the 9030 monochromator to work. Please select one 32 x 32mm holographic concave grating from the list shown. The selected grating will be prealigned and premounted onto the 9030 monochromator at the factory, and cannot be removed. Sciencetech has 5 available gratings to choose from. They cover the wavelength region between ultraviolet (UV) and midinfrared (mid-IR). Our Applications Specialists (sales@sciencetech-inc.com) are available to assist in choosing the proper grating for your application. The price of the gratings shown includes installation cost.







Removable Fixed Width Slits

The 9030 monochromator accepts 8 mm high removable fixed width slits at its input and output ports. Simply slide the removable fixed width slits into the input and output port built-in slit holders. There are several standard size fixed width slits to choose from. If there are no suitable standard sizes, a custom size can be ordered. The 9030 price includes two standard size removable fixed width slits, one for the input port and the other for the output port. The prices shown in the removable fixed width slit page is for users who require more than one pair of slits. Both input and output slits should have the same slit width. If you are unsure of your slit width requirement, which affects both light throughput and optical resolution, please contact a Sciencetech Applications Specialist (sales@sciencetechinc.com) for assistance.

Removable 100 µm (0.1 mm) Fixed Width Slit
Removable 250 µm (0.25 mm) Fixed Width Slit
Removable 500 µm (0.5 mm) Fixed Width Slit
Removable 1 mm Fixed Width Slit
Removable 2 mm Fixed Width Slit
Removable 3 mm Fixed Width Slit
Custom Fixed Width Slits

Drive Mechanism

The 9030 utilizes a precision sine drive system to rotate the grating for wavelength selection. This sine drive maintains a linear correlation between wavelength selected and readout counter, which is essential in a manual control system. For the optional motor drive, the precision sine drive system is maintained as the rotation is then performed by the computer controlled stepper motor. A Windows based Active-X control module (Sci-Mono) is provided with the optional motor drive so that the wavelength can be selected through software.

The Active-X control module can be used as standalone control software or have its features incorporated into a larger software application. This latter case is useful if the motorized 9030 is incorporated into a larger motorized spectroscopic system with its own custom software control. Also available at additional cost is a full featured scanning monochromator software program called Sci-Spec which automatically coordinates the motorized wavelength scanning action of the motorized monochromator to the data acquisition of a Sciencetech based single channel detector mounted at the output port. Sci-Spec is currently only available as a Windows based application.

Other Similar Scanning Monochromator Models

For applications where stray light is a problem, a double 9030 monochromator model may be the solution. This applies to measurements of weak spectral signals against a strong background, such as in spectroradiometry, Raman spectroscopy, or UV measurements of solar radiation. Stray light in double monochromators is negligible and is further minimized by the 9030's holographic concave gratings. Sciencetech manufactures two double 9030 monochromators models where two single 9030 monochromators are connected in series.

In the "Double Additive" 9030DA monochromator, light is dispersed by the first monochromator and then again by the second monochromator in series. Both monochromator gratings are mechanically bound together so they rotate simultaneously. This means the dispersion is doubled and the bandpass is half compared to a regular single 9030 monochromator. In the "Double Subtractive" 9030DS monochromator, the dispersion is zero since the dispersion of the second monochromator cancels the dispersion of the first monochromator as its grating rotation direction is reversed. This leads to homogenized wavelengths at the output slit which makes the 9030DS resemble a tuneable filter. Like the 9030DA, the two monochromator grating mechanisms are mechanically bound together for simultaneous (but reverse direction) rotation.

ACCESSORIES

Computer Controlled Motor Drive
(9030-MD) $ 1,330 USD

This motor drive option allows the Sciencetech 9030 to be controlled through a computer. An external stepper motor module would be mated to the side of the 9030 at the factory allowing for computer controlled, motorized wavelength selection. The manual wavelength dial selector with readout counter remains. The stepper motor module would be driven by Sciencetech's external MD-100 stepper motor controller via an RS-232 serial or optional USB interface to the computer (see group accessories "Additional Upgrades to 9030 Motor Drive Option" for details). This computer controlled motor drive option includes the Windows based Sci-Mono Active-X control software. Please note that this option can only be pre-installed at the factory at the time of ordering and cannot be installed by the user after delivery.

Technical Specifications

- Seya-Namiokacompact scanning monochromator
- 100mm input and output focal lengths
- Manual wavelength selection knob with readout counter
- Optional computer controlled motorized wavelength selection
- Mechanics: sine drive grating control mechanism
- Scanning Range: factory calibrated 0 ~ 1000 nm with 0.02 nm readout division
- Aperture: f/3.2
- Grating: 32mm x 32mm concave holographic grating
- Optical Resolution: better than 1 nm
- Dispersion: 8 nm/mm
- Wavelength Accuracy: ± 0.3 nm
- Wavelength Reproducibility: ± 0.25 nm
- Slit Height: 8 mm
- Dimensions: 105 mm x 127 mm x 127 mm (4.1" x 5.1" x 5.1")
- Weight: ~ 2 kg

Customization

Sciencetech prides itself as a custom developer of optical spectroscopy instruments. If you require custom modifications to this monochromator or a special feature that is not shown, please inform our representative or Applications Specialist (sales@sciencetech-inc.com) of your specific requirements. We would be happy to quote a suitable customized version.

Group Accessories

Please check the appropriate sections in the catalogue for the following:

Fixed Width Slit Selection (1 pair included free)	(FixedSlits9030)
Grating Selections for 9030 (Mandatory)	(GR32)
9030 Compatible Detectors (Special Mount Required)	(9030detectors)
Additional Upgrades to Motor Drive Option	(9030motordrive)

8030DC Compact Dual Channel Spectrograph

Highlight

- Dual channel "side by side" optical configuration
- Small f/2 to match incoming light from NA 0.22 fibers
- UV Model 3 nm optical resolution
- Visible Model 8~10 nm optical resolution
- IR Model 15 nm optical resolution
- Master (1st generation) concave holographic grating
- Extremely low stray light (better than 0.25%) without off-axis scattering
- 61 mm focal length
- 256 pixel Linear Array Detector for both channels (128 pixels per channel)
- Designed for imaging on to Hamamatsu S3901-256/S3902-256 PDA detectors
- Accessible grating alignment screws for recalibration by service technician

The 8030-DC is a dual channel spectrograph with 62mm focal length. Its compact size is made possible through the use of a single master concave holographic grating for both channels. The input ports of both channels have SMA connectors for mating with 100µm single core fibres. The f/2 aperture of the Model 8030-DC matches with fibres that have a numerical aperture (NA) of 0.22. Three versions are available: a UV model with 190 nm~350 nm spectral range, a VIS model with 390 nm~800 nm spectral range, and a near-IR model with 600 nm~1100 nm spectral range. The output ports of the two channels are placed side by side so that they share a single 1/2" linear array detector for cost effectiveness. One side of the linear array detector is for the first channel output and the other side is for the second channel output. Sciencetech provides two photodiode linear array detector choices as optional accessories. Both are 256 pixels (128 pixels per channel) but one has taller 2.5 mm pixels for added sensitivity. The other standard detector has 0.5 mm tall pixels.

Body

The body of the 8030-DC is made from electroless nickel-plated aluminum. The outside dimensions are 42 mm in diameter by 70 mm in length, and it weighs only 5 ounces. The 8030-DC's optical system is prealigned for ease of integration in to OEM products.

Holographic Grating

The Sciencetech 8030-DC spectrograph uses master holographic concave gratings rather than replica gratings. Master concave gratings, or first generation gratings, have at least one order of magnitude improvement in stray light over replica gratings due to their superb groove reproducibility. Replica concave gratings are in fact third generation gratings as an intermediate convex grating is required for transferring the groove pattern to it.

The stray light improvement of master gratings is especially apparent towards the edge of the grating that affects off-axis rays. Due to the physical process of replicating gratings, the grooves at the outer edge of replica gratings are more likely to be distorted than at the centre and hence stray light and scattering are more pronounced for the off-axis rays.

Version Description	Version Code	Version Price (USD)
Ultraviolet Spectrum (190nm~350nm)	-VIS	
Visible Spectrum (390nm~800nm)	-UV	
Infrared Spectrum (600nm~1100nm)	-IR	

Linear Array Detector

The 8030-DC grating images both channels onto a 12.6 mm long flat field (or 6.3 mm per channel).
Please note the side-by-side channel layout of the focal plane. In the case of Channel 1, the UV end is at the bottom and the IR end is at the top.

For Channel 2, the UV end is at the top and the IR end is at the bottom. The overlap between the channels is in the low UV range with 390 nm the starting spectral end of both channels. Processing of the pixel data, including the reversal of spectral direction between channel 1 and channel 2 will have to be accounted for.

ACCESSORIES

Photo-Diode Array Detector (0.5mm Tall Pixel)
(LDA256-0.5mm) $ USD

A 256 pixel 1/2" photo-diode array sensor (128 pixels or 0.25" per channel) can be premounted to the output port of the 8030-DC dual channel spectrograph. This particular detector has 0.5 mm tall pixels. Included with this detector is a cable connector for connection to an external AD data acquisition module (sold separately).

Photo-Diode Array Detector (2.5mm Tall Pixel)
(LDA256-2.5mm) $ USD

A 256 pixel 1/2" photo-diode array sensor (128 pixels or 0.25" per channel) can be premounted to the output port of the 8030-DC dual channel spectrograph. This particular detector has 2.5 mm tall pixels. Included with this detector is a cable connector for connection to an external AD data acquisition module (sold separately).

Fibre Patch Cable Pair
(SF100SMA) $ USD

This is a single core fibre patch cable with SMA connectors on both ends. The fibre is a multi-mode type with 100µm diameter core and 140µm cladding. The "glass" core material is typically fused silica or quartz with a numerical aperture (NA) of 0.22. Standard length is 50cm.

Group Accessories

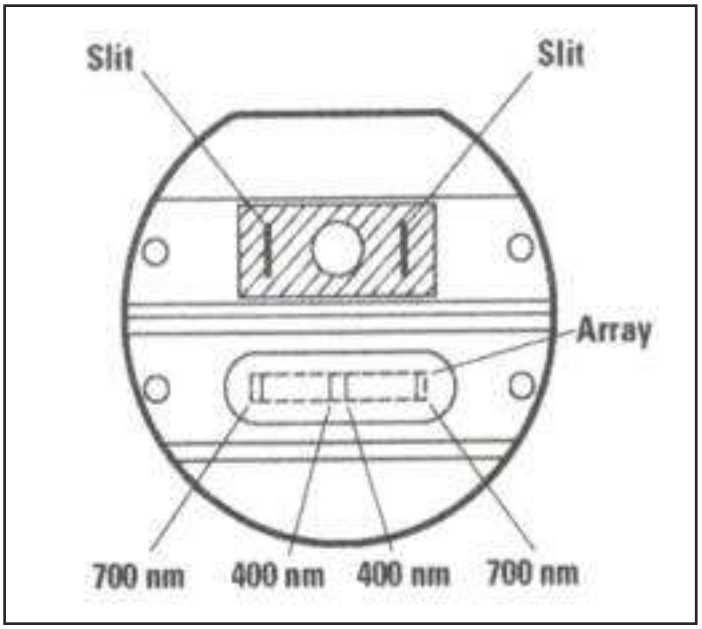
Please check the appropriate sections in the catalogue for the following:

Fixed Slit Selection for 8030 (Slits8030)

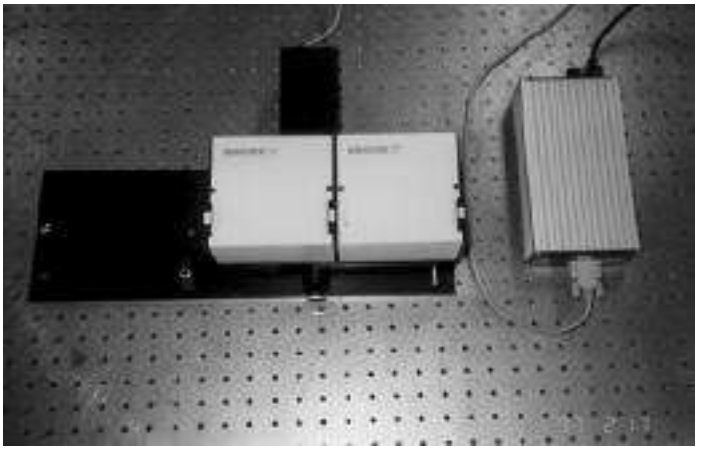
50 µm (w) x 2.5 mm (h) Slit
100 µm (w) x 2.5 mm (h) Slit
150 µm (w) x 2.5 mm (h) Slit

Technical Specifications

Type:	Dual “Side by side” Channel
f Number:	f/2
Focal Length:	61 mm
Detector:	Hamamatsu S3901-256, Hamamatsu S3902-256
Pixel Resolution:	128 pixels per channel
UV Model Optical Resolution:	3 nm
Visible Model Optical Resolution:	8~10 nm
IR Model Optical Resolution:	15 nm
Grating:	1st Gen Holographic Concave
Grating Alignment:	Adjustable
Wavelength Range:	390 – 720 nm
Fibre Connection:	Removable SMA Connection
Stray Light:	Better than 0.25%
Dimensions:	120mm Φ x 60mm



9030DA with MD100 Stepper Motor Drive



For applications where stray light is a problem, a double monochromator system is the solution. This applies to any measurement of a weak spectral signal with strong background, such as spectroradiometry, Raman, or UV measurements of solar radiation. Stray light of double monochromators is reduced to negligibility and is further minimized in the double 9030 due to the use of concave holographic gratings. In the double additive monochromator, light is dispersed by the first grating and again by the second. Since both gratings rotate simultaneously in the same direction, the dispersion is double that of a single monochromator. The bandpass is half of the corresponding single 9030 unit with the same slit. The resolution of the double 9030DA using a 100 µm slit is 0.4 nm. The double subtractive monochromator has a dispersion of zero since the dispersion of the second grating cancels the first by having a reverse direction of rotation. This leads to homogenized wavelengths at the output slit, thus making the double subtractive monochromator much like a tuneable filter. The 9030DA (double additive) is a fully integrated unit with the two diffraction gratings mechanically attached for accurate positioning. The standard setup of the monochromator includes 0.25 mm fixed, straight input and output slits and a 1 mm intermediate slit, as well as two gratings chosen to suit the customer's needs. A wide variety of slits are available. The 9030DA can be motorized with the Sciencetech MD100 stepper motor and drive system. Only one motor and drive unit are required, enabling control via user-friendly software provided by Sciencetech.

Technical Specifications

All specifications are for 9030DA with 1200 l/mm grating.

Focal Length:	100 mm
Optical System:	Concave holographic gratings, aberration corrected
Wavelength Range:	0 - 1000 nm (mechanical)
Slits:	Fixed, straight, 250, 500 µm and 1 mm width standard
Resolution with 100 µm slits:	0.5 nm
Reciprocal Linear Dispersion:	4 nm/mm
Stray Light:	10-8
Aperture:	f/3.2
Dimensions:	10.2” x 5.1” x 4.1” (22.4 cm x 11.2 cm x 9 cm)
Weight:	4.0 kg

Options for 9030DA/9030DS

Stepping Motor

Motor drive unit includes stepping motor system, driver and software, RS232 cable.

Model	Description	Price(USD)
9030DA	Double additive 9030 with three fixed slits	.
9030DS	Double subtractive 9030 with three fixed slits	,
GR32/U	Concave holographic grating 1200 l/mm @ 250nm, mount	.
GR32	Other concave holographic gratings on page 4-09 with mount·	
	MD 100 Motor Drive Unit	.

Note: Monochromator prices do not include gratings. Grating information can be found on page 4-11. 9030DA and 9030DS require two gratings

Fixed Slits 9030 Selection

For Sciencetech Small Monochromator (Model 9030)

Removable Fixed Width Slits

The 9030 monochromator includes a pair of removable fixed width slits. Therefore, the first pair is available at no cost, and the cost indicated is only if the customer requires another pair. Please note the price shown is for one removable slit, so a pair would cost twice as much.

Removable Custom Fixed Width Slits

Sciencetech can create any removable fixed slit widths between 100 µm (0.1 mm) to 3 mm in steps of 100 µm (0.1 mm). Please specify width when ordering. Slits are made from steel blades mounted onto a removable aluminum bracket. A custom fixed width slit is not included in the 9030 standard body price and must be ordered separately. Price shown is per slit, so a pair would cost twice as much.

Model	Description	Price (USD)
SF01	Removable 100µm (0.1mm) Fixed Width Slit	
SF025	Removable 250µm (0.25mm) Fixed Width Slit	
SF05	Removable 500µm (0.5mm) Fixed Width Slit	
SF1	Removable 1mm Fixed Width Slit	
SF2	Removable 2mm Fixed Width Slit	
SF3	Removable 3mm Fixed Width Slit	
SFCustom	Removable Custom Fixed Width Slits	

200mm Manual Control Monochromator

Highlights

- Asymmetric Czerny-Turner optical layout
- 200 mm input/output focal lengths
- Scanning monochromator, not spectrograph
- f/3.5 standard version utilizing 50 x 50 mm gratings
- f/2.6 fast version utilizing 64 x 64 mm Gratings
- 0.4 nm (or better) optical resolution for 9010
- 1.0 nm optical resolution for 9010F
- Manual control grating and wavelength selection with readout
- Rugged aluminum body

The Sciencetech 9010 is a 200mm focal length asymmetric Czerny-Turner scanning monochromator. The standard model has an f/3.5 aperture. A "faster" model with larger optics for higher light throughput is also available as the Model 9010F with f/2.6 aperture. Both models utilize a manual selector dial with readout for grating and wavelength selection. Up to two gratings are supported on its sine drive rotating turret. A pair of bilaterally adjustable slits for its input and output ports is included and so is a wide selection of gratings (sold separately) to choose from.

The Sciencetech 9010 scanning monochromator and its fast version, the 9010F (formerly 9020), are 200 mm focal length instruments that offer optimum resolution for all spectral ranges and low stray light levels. These models have an asymmetric Czerny-Turner configuration. The optical layout has been optimized for minimum aberrations over the entire spectral range, consistent with low stray light. The asymmetry of the layout is optimized for coma correction over a wide range of grating angles and line separations. This allows for good overall resolution, not just at the nominal wavelength. Please note the 9010 and 9010F do not have a flat field output for spectrograph use, and therefore can only be used as a scanning monochromator.

Drive Mechanism

The 9010/9010F utilizes a manual sine drive mechanism to rotate its grating turret for grating and wavelength selection. A manual control knob with readout on the side of the monochromator allows the user to select one of two premounted gratings and a wavelength. The gratings are mounted back to back on a rotating turret. As the turret rotates, it sweeps the dispersed wavelengths of the forward facing grating across the stationary output port. After 180 degrees of rotation, the second grating becomes forward facing, and further rotation sweeps will its dispersed wavelengths across the stationary output port. The manual control knob essentially rotates the grating turret 360º allowing for both grating and wavelength selection.

Version Description	Version Code	Version Price (USD)
f/3.5 Standard Version (dual grating turret)	-std	
f/2.6 Fast Version (dual grating turret)	-F (9020)	
Spectrograph Mode	-8010	

Gratings

Gratings are sold separately and are required for the 9010/9010F scanning monochromators to work. Up to two gratings can be mounted in the monochromator's manual controlled rotating turret. For the standard f/3.5 9010 model, please select up to two 50 x 50mm gratings. For the "fast" f/2.6 9010F model, please select up to two 64 x 64mm gratings. The 64 x 64mm is the clear aperture measurement, as the physical size of the grating is actually 68 x 68mm.These gratings will be pre-aligned and premounted onto the monochromator turret at the factory, and afterwards they cannot be removed. Sciencetech has 20 standard grating choices for each 50mm and 64mm sizes to cover any wavelength region between ultraviolet (UV) to mid-infrared (IR). Other special gratings are also available but listed separately. By selecting two gratings, a larger spectral region can be covered. Please check the Grating Selection List (shown separately) for the spectral efficiency curves and characteristics of each grating. Our Applications Specialists (sales@sciencetech-inc.com) are available to assist in choosing the proper gratings for your application. The price of the gratings shown includes installation cost.

Bilaterally Adjustable Slits

The 9010/9010F monochromator includes two standard SS80 manual, bilaterally adjustable slits, premounted at the input and output ports. In most other Sciencetech monochromator/spectrograph models, only one standard slit at the input port is included. For these models, a second slit at the output port would cost extra whereas it is included for free in the 9010/9010F. Much of the Sciencetech accessories literature assume this second output slit needs to be purchased separately, as this case applies to most Sciencetech monochromator/spectrograph models. Therefore, be aware of accessories descriptions that require the purchase of an output slit as such a slit is already included in the 9010/9010F models.

Available Detectors

Sciencetech has a wide selection of single channel and PMT detectors for use with the 9010/9010F monochromator. This includes a large collection of silicon, germanium, InGaAs, PbS, and other room temperature and cooled detectors. A range of PMT detectors are also available for low light applications. Please remember to purchase a corresponding detector mount with the detector as shown in the group accessories list. See Sciencetech's detector section for details. Since the 9010/9010F cannot be used as a spectrograph, linear array detectors such as CCD's and Photodiode arrays cannot be used.

Similar Monochromator Models

The 9010 monochromator does not have a flat field output and therefore cannot be used as a spectrograph. Please consider the manual control 8010 spectrograph if the application demands a spectrograph configuration utilizing a linear array detector. For computer controlled motorized applications, please consider the 250mm computer controlled 9055 monochromator/spectrograph with a built-in motorized grating turret. A motorized version of the 9010/9010F with an external stepper motor is available upon special request, but not recommended due to the availability of the 9055.

Model 8010 Flat Field Spectrograph

The Sciencetech 8010 is the spectrograph version of the 9010 monochromator, with a 25 mm flat field. An optional unit with a flat field of 50 mm is available for the mounting of 50 mm wide multichannel detectors. The regular exit concave mirror of the 9010 is replaced by a large camera mirror. One adjustable straight slit assembly is provided with the unit.

The output comes with a standard mounting flange for the Sciencetech LDA2000 series of photodiode array detectors, but special flanges for CCD's or any other multichannel system can be supplied. The units are available with diode arrays of 256, 512, 1024, or 2056 elements to suit your particular requirements.

Two gratings in the turret are offered to increase the wavelength range of the 8010. A common configuration is to have a low resolution grating for a broad spectral coverage with the diode array, and a higher resolution for looking at details in a narrower band. A popular combination is a 300 l/mm and a 1200 l/mm. With our standard LDA of 1024 elements, the first grating gives a coverage of 400nm and the second 100nm. The centre of the spectrum can be carried by rotating the grating.

Customization Required?

Sciencetech prides itself as a custom developer of optical spectroscopy instruments. If you require custom modifications to this monochromator/spectrograph or a special feature that is not shown, please inform our representative or Applications Specialist (sales@sciencetech-inc .com) of your specific requirements. We would be happy to quote a suitable customized version.

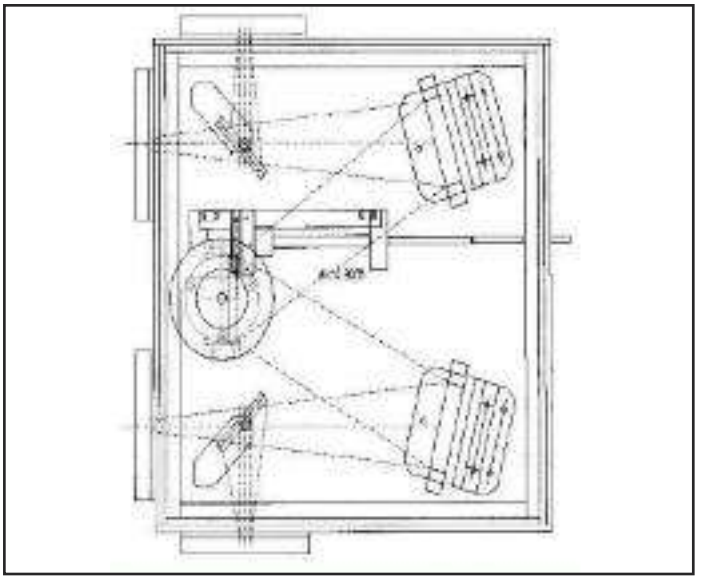
ACCESSORIES

Dual Input or Output Port
(9000-DP) $ USD

An additional input or output port can be added to the side of the monochromator/spectrograph (lateral position) with an added manual flipping mirror as a port selector. A manual knob at the top of the monochromator/spectrograph would allow the user to select which port to direct the light. If an additional input port is required, an additional slit such as the SS80 (sold separately) is typically required with it. If an additional output port is required, an additional output slit is only required if the detector mated to the output port is a single channel detector or PMT. Multi-Channel detectors such as PDAs, InGaAs arrays, and CCDs are advised to be mounted onto the front (axial) output port only without a slit.

Side (Lateral) Input Port Option
(9000-SidePort) $ USD

Both input and output ports are situated on the front faceplate of the monochromator/spectrograph. In certain circumstances, the proximity of these two ports prevents large modular components from being connected to them. For example, if the input port needs to be directly coupled to a light source and the output port needs to be directly coupled to a large detector, there may not be enough room between the ports to accommodate both connections. In this "Side Input Port" option, the input port is relocated to the side wall of the monochromator/spectrograph, thereby eliminating any space contention between the two ports. This is accomplished by a 45º flat mirror placed inside the monochromator/spectrograph just before the input port to divert the light from the front to the side. The optical path length of the monochromator/spectrograph does not change with this flat mirror.



Technical Specifications:

All specifications are for a 1200 l/mm grating except where stated otherwise.

- Asymmetric Czerny-Turner scanning monochromator
- 200mm input and output focal lengths
- Manual controlled grating and wavelength selection with readout
- Sine drive mechanism for grating turret
- Height of slit centre line: 76.2mm
- Distance between input and output slits: 161mm
- Number of gratings: Up To 2
- Grating size: 50 x 50mm for 9010 f/3.5
  64 x 64mm for 9010F f/2.6
  (formerly 9020)
- Optical Resolution: 0.4 nm for 9010, 1.0nm for 9010F
- Dispersion at Output Port: 4.0 nm/mm
- Wavelength Reproducibility: ± 0.1 nm
- Wavelength Accuracy: ± 0.2 nm
- Dimensions: 254 x 287 x 137mm
  (10" x 11.3" x 5.4")
- Weight: 6 kg

Technical Specifications for Model 8010:

Specifications are the same as the 9010, as well as the following:

- Flat Field Angle for Mounting of Camera
- Deflectors: -2.78° (CW from before)
- Flat Field Size: 1” (25 mm)
- Spectral coverage: 400 nm
  (with 1” array and 300l/mm grating)

Group Accessories

Please check the appropriate sections in the catalogue for the following:

Grating Selections for Standard Mode (50mm)	(GR50)
Grating Selections for Fast Mode (64mm)	(GR64)
Detector Mount Selections (for Detector Mating)	(DetMount9010)
Input Light Coupling Optics (Optional)	(input coupling)
Special Grating Selections (50mm)	(GR50S)

250mm Computer Controlled Monochromator / Spectrograph

Sciencetech's Most Popular Monochromator/Spectrograph!

The Sciencetech 9055 is a 250mm focal length modified Czerny-Turner monochromator, with a flat field output for spectrograph use. The standard model has an f/3.5 aperture. A "faster" model with larger optics for higher light throughput is also available as the 9055F with f/2.5 aperture. Both models use a computer controlled motorized turret for automatic grating and wavelength selection. The regular 9055 supports up to three 50 x 50mm gratings whereas the larger optics 9055F supports up to two 64 x 64mm (clear aperture) gratings.

Gratings are sold separately and are required for the monochromator/spectrograph to work. For the standard f/3.5 9055 model, please select up to three 50 x 50mm gratings. For the "fast" f/2.5 9055F, please select up to two 64 x 64mm gratings. Please note that the 64 x 64mm is the clear aperture measurement, and the physical size of the grating is actually 68 x 68mm. These gratings will be prealigned and premounted onto the spectrograph/monochromator turret at the factory, in which afterwards, they cannot be removed. Sciencetech has 20 standard grating choices for each 50mm and 64mm sizes to cover any wavelength region between ultraviolet (UV) to mid-infrared (IR). Some gratings are designed to cover a very narrow spectral band (usually used in monochromator mode), and some gratings are designed to cover a very wide spectral band (usually used in spectrograph mode).

By selecting several gratings, a larger spectral region can be covered or a particular spectral region can be divided into higher resolutions. Please check the Grating Selection List (shown separately) for the spectral efficiency curves and characteristics of each grating. Our Applications Specialists (sales@sciencetech-inc.com) are available to assist in choosing the proper gratings for your application. The price of the gratings shown includes installation cost.

Highlights

- Modified Czerny-Turner optical layout
- Unequal 200mm/250mm input/output focal lengths
- Flat field 1" wide output for spectrograph use
- f/3.5 triple grating turret version 9055
- f/2.5 dual grating turret version 9055F
- Better than 0.2 nm optical resolution for 9055
- Better than 0.4 nm optical resolution for 9055F
- Motorized grating and wavelength selection
- Serial or USB computer interface
- Rugged aluminum body

Bilaterally Adjustable Slits

The 9055/9055F comes with one SS80 manual bilaterally adjustable slit premounted at the input port. Another SS80 slit is required at the output port (sold separately) if the 9055/9055F is used as a monochromator with a single channel or PMT detector mounted at the output (or if it is used as a tuneable wavelength selector). Another SS80 slit is not required at the output port if the 9055/9055F is used as a spectrograph with a multi-channel detector such as a linear PDA, CCD, or InGaAs detector mounted at the output. Additional SS80 slits may also be required if the dual input or output ports option is selected to allow for multiple light source inputs, and/or multiple detector outputs. If the 9055/9055F is to be used in an OEM application, Sciencetech can replace the adjustable SS80 slit with a less expensive fixed width slit. Please contact a Sciencetech Applications Specialist for assistance in slit selection and requirements.

Electronics

The 9055/9055F utilizes a computer controlled motorized turret for grating and wavelength selection. The motorized turret is powered by a single stepper motor mechanically coupled through a direct worm and gear drive. Sciencetech's universal MD-100 stepper motor electronics is used to control the stepper motor. The MD-100 electronics is packaged inside the 9055/9055F housing and has an RS-232 interface to the computer. If USB interface is selected, a USB converter electronics module is then connected to the MD-100's RS-232 output inside the 9055 housing. The native RS-232 signals of the MD-100 are then converted into USB format for onward interface to the computer. Correspondingly, a USB converter Windows software driver needs to be loaded such that the USB interface is recognized as a virtual RS-232 serial port by the Windows operating system.

Version Description	Version Code	Version Price (USD)
f/3.5 Standard version (triple grating turret)	-std	
f/2.5 Fast Version (dual grating turret)	-F	

Software

A Windows based Active-X software module (Sci-Mono) for computerized grating and wavelength selection is provided with all Sciencetech motorized monochromators/spectrographs. This Sci-Mono Active-X software module can be used as a stand-alone Windows software application, or can be embedded into another custom Windows software application written in Visual C++, Visual Basic, or any other Active-X compliant language (including National Instrument's LabView). If the Sciencetech motorized monochromator/spectrograph is used as part of a larger spectrometer system made from many vendors' components, then embedding the Sci-Mono Active-X software module into custom software would allow coordinated and synchronized control of the Sciencetech monochromator/spectrograph with the other components in the system. If the Sciencetech monochromator/spectrograph is used as part of a larger spectrometer system made from only Sciencetech components, then Sciencetech's full featured Windows based Sci-Spec or Sci-LDA software application is recommended as an alternative. Sciencetech's Sci-Spec is a complete scanning monochromator software application that controls all Sciencetech motorized components and single channel detectors. It can coordinate the Sciencetech motorized monochromator scanning motion with data acquisition from Sciencetech's single channel and PMT detectors and display the spectral results on the screen or save to a file. Sciencetech Sci-LDA works similarly to Sci-Spec, but is designed for spectrograph use with multi-channel detectors such as CCD, PDA and InGaAs linear arrays. Sci-Spec and Sci-LDA full featured Windows applications are sold separately. Unfortunately, Sciencetech does not provide any non- Windows software (such as Linux, Unix or Mac) to control a Sciencetech motorized monochromator /spectrograph. However, Sciencetech does provide a low level RS-232 (Serial port) communications manual with sample source code for users to write their own RS-232 serial interface to such computers. Many customers have successfully interfaced their Sciencetech monochromators /spectrographs to Unix, Linux, and Mac based computers through this straight-forward and easy to understand RS-232 interface manual.

Other Similar Monochromator/Spectrograph Models

For high resolution applications, please consider the Sciencetech 9035 (350mm focal length) and 9057 (500mm focal length) monochromator/spectrograph. These models are extended versions of the 9055 and have similar features.

Customization

Sciencetech prides itself as a custom developer of optical spectroscopy instruments. If you require custom modifications to this monochromator/spectrograph or a special feature that is not shown, please inform our representative or Applications Specialist (sales@sciencetech-inc.com) of your specific requirements. We would be happy to quote a suitable customized version.

ACCESSORIES

220~240VAC Operation at 50 Hz(MD100-240VAC)

Please select this option if the instrument is to work in 220VAC or 240VAC @ 50Hz. Please specify exact voltage.

USB Interface

(MD100i-USB) $ USD

This option allows Sciencetech motorized monochromators/spectrographs to be controlled through a USB port instead of a RS-232 serial port of a computer. This option has an internal adapter that converts the native RS-232 electronics of the motorized monochromator /spectrograph into USB. A software driver must be loaded into the Windows based computer such that the USB interface is recognized as a virtual serial COM port for Sciencetech's SCI-LDA, SCI-SPEC or Active-X control software to communicate with it.

Manual Bilaterally Adjustable Slit

(SS80) $ USD

This is a manual controlled bilaterally adjustable slit for use in the input or output port. Most Sciencetech monochromators/spectrograph models already include one adjustable SS80 slit at the input port, but an additional one at the output port is usually required if the monochromator is mated to a single channel detector, PMT detector, or used as a tunable wavelength light source. If the dual input port option is selected, an additional SS80 slit for the second input port is also likely required. The slit width can be set between 0~6mm, in 10μm spacing using a micrometer thumb wheel. The height of the SS80 slit can also be adjusted between 0mm~20mm through a built-in manual curtain slider. The height adjustment slider can be changed to 0~30mm or 0~10mm at additional cost. Please specify at time of ordering.

Dual Input or Output Port

(9000-DP) $ USD

An additional input or output port can be added to the side of the monochromator/spectrograph (lateral position) with an added manual flipping mirror as a port selector. A manual knob at the top of the monochromator/spectrograph would allow the user to select which port to direct the light. If an additional input port is required, an additional slit such as the SS80 (sold separately) is typically required with it. If an additional output port is required, an additional output slit is only required if the detector mated to the output port is a single channel detector or PMT. Multi-Channel detectors such as PDAs, InGaAs arrays, and CCDs are advised to be mounted onto the front (axial) output port only, without a slit.

Technical Specifications:

- Modified Czerny-Turner monochromator/spectrograph
- 200mm/250mm unequal input and output focal lengths
- Computer controlled grating and wavelength selection
- Motorized stepper motor direct drive mechanism
- RS-232 serial or optional USB computer interface
- Standard MS-Windows Active-X software interface
- Available low level RS-232 interface manual for other OS
- Available full featured Sci-Spec and Sci-LDA Windows application
- Scanning Range: typically 0~1000nm, depending on grating(s).
- Grating Size: 50 x 50mm for 9055 f/3.5
  64 x 64mm for 9055F f/2.5
- Optical Resolution: Better than 0.2 nm for 9055
  Better than 0.4nm for 9055FS
- Dispersion at output port: 4.0 nm/mm for 9055
  3.3nm for 9055F
- Wavelength accuracy: ± 0.3 nm
- Wavelength reproducibility: ± 0.1nm
- Dimensions: 394mm x 262mm x 129mm
  (15.5" x 10.3" x 5")
- Weight: 7.5kg for 9055
  15kg for 9055F

Group Accessories

Please check the appropriate sections in the catalogue for the following:

Grating Selections for Standard Mode (50mm)	(GR50)
Software Control Options (Mandatory)	(SoftwareGroup1)
Input Light Coupling Optics (Optional)	(input coupling)
Detector Mount Selections (For Detector Mating)	(DETMOUNT)
Grating Selections for Fast Mode (64mm)	(GR64)

Imaging Monochromator/Spectrograph Model 9060

The Sciencetech 9060 monochromator/spectrograph is a high quality instrument with features usually present only in more expensive units. It has been designed for point to point imaging applications. Special astigmatism correction provides superior image quality over an area 25 mm wide and 12 mm high. The 9060 is optimized to work in the spectral range 300 nm to 1200 nm with a 1200 lines/mm grating. It has a resolution of 0.15 nm at 600 nm. The unique layout with mirrors of unequal input and output focal lengths of 200 and 250 mm is optimized for minimum coma while allowing high throughput and minimum stray light and vignetting. The resolution deteriorates minimally as the grating rotates. A turret assembly to accommodate an optional second grating is included. The user can select slit or fibre flange in the input port, and similarly, slit, fibre adapter or CCD/PDA flange at the exit. Side or front ports are available for both input and exit. Optional two-port versions allow port selection with flipping mirrors, controllable from the outside of the instrument. Mounting flanges for a 1" linear diode array detector or CCD can be set in the front exit port. Standard units come with bilaterally adjustable slits with micrometer control of width and height. External adjustments allow focal optimization without having to open the instrument. The 9060 is a computerized instrument, with motor and driver electronics included inside the housing. The 9060 is an imaging version of the 9055. Standard configuration features a double grating turret with automatic switching. Triple and quadruple turrets are optional. The microprocessor controller allows the selection of two stepping modes: micro-stepping or half-stepping. In the micro-stepping mode high scanning resolution is achievable. With a standard motor of 400 steps per revolution, maximum speeds as high as 100 nm/sec with a 1200 l/mm grating are possible in the half-stepping mode. The very smooth drive allows reproducibility of results within less than 1 micro-step. The microprocessor communicates with the host computer using an RS-232 interface.

Technical Specifications

Optical System: Optimized asymmetrical Czerny-Turner with toroidal optics. Astigmatism correction for imaging applications
Drive: Manual and computer controlled sine drive
Number of Gratings: 1, 2 or 3 in turret with manual change, double or triple turret
(9060F flat field allows only double turret)

Grating Size:	Standard: 50 mm Fast: 64 mm
Focal Length:	*Input:* 200 mm *Output:* 250 mm
Spectral Range:	0-1200 nm
Aperture:	*Standard:* f/3.5 (50 mm square grating) *Fast:* f/2.7 (64 mm square grating)
Resolution:	0.18 nm at 600 nm
Dispersion:	3.3 nm/mm
Slits:	straight, adjustable
Reproducibility:	±0.01 nm
Wavelength Accuracy:	±0.1 nm
Grating Change Reproducibility:	±0.1 nm
Flat Field Size:	30 mm(w) x 12 mm(h)
Image Magnification:	1.2 x
Maximum Scanning speed:	
***400 step/rev motor*:**	microstep mode: 40 nm/s *half-step mode:* 100 nm/s
***200 step/rev motor*:**	microstep mode: 80 nm/s half-step mode: 200 nm/s

Scanning Resolution: 0.0625 nm in half-step mode
0.0125 nm in microstep mode
(10 microstep/full step) with 8 bitD/A

Electronics:	Microprocessor controller included in instrument enclosure, RS232 communication, 100/120 V operation
Dimensions:	5.18” x 10” x 15.5” (12.95 x 25.1 x 38.7 cm)
Weight:	7.5 kg

Version Description	Version Code	Version Price (USD)
Imaging Monochromator	9060	
50 mm^2 grating for 9060 300, 600, 1200 l/mm	GR50	
Holographic grating for 9060 300, 600, 1200 l/mm	GRH50	
50 mm^2 grating for 9060 1800, 2400, 3600 l/mm	GRUV50	

ACCESSORIES

220~240VAC Operation at 50Hz (MD100-240VAC)

Please select this option if the instrument is to work in 220VAC or 240VAC at 50Hz. Please specify exact voltage.

USB Interface (MD100i-USB)

This option allows Sciencetech motorized monochromators/spectrographs to be controlled through a USB port instead of a RS-232 serial port of a computer. This option utilizes an internal adapter that converts the native RS-232 electronics of the motorized monochromator/spectrograph into USB. A software driver must be loaded into the Windows based computer such that the USB interface is recognized as a virtual serial COM port for Sciencetech's SCI-LDA, SCISPEC or Active-X control software to communicate with it.

Manual Bilaterally Adjustable Slit (SS80)

This is a manual controlled bilaterally adjustable slit for use in the input or output port. Most Sciencetech monochromators/spectrograph models already include one adjustable SS80 slit at the input port, but an additional one at the output port is usually required if the monochromator is mated to a single channel detector, PMT detector, or used as a tunable wavelength light source. If the dual input port option is selected, an additional SS80 slit for the second input port is also likely required. The slit width can be set between 0~6mm, in 10µm spacing using a micrometer thumb wheel. The height of the SS80 slit can also be adjusted between 0mm~20mm through a built-in manual curtain slider. The height adjustment slider can be changed to 0~30mm or 0~10mm at additional cost. Please specify at time of ordering.

Dual Input or Output Port (9000-DP)

An additional input or output port can be added to the side of the monochromator/spectrograph (lateral position) with an added manual flipping mirror as a port selector. A manual knob at the top of the monochromator/spectrograph would allow the user to select which port to direct the light. If an additional input port is required, an additional slit such as the SS80 (sold separately) is typically required with it. If an additional output port is required, an additional output slit is only required if the detector mated to the output port is a single channel detector or PMT. Multi-Channel detectors such as PDAs, InGaAs arrays, and CCDs are advised to be mounted onto the front (axial) output port only without a slit.

Group Accessories

Please check the appropriate sections in the catalogue for the following:

Grating Selections for Standard Mode (50mm)	(GR50)
Software Control Options (Mandatory)	(SoftwareGroup1)
Input Light Coupling Optics (Optional)	(input coupling)
Detector Mount Selections (For Detector Mating)	(DETMOUNT)
Grating Selections for Fast Mode (64mm)	(GR64)

500mm Computer Controlled Monochromator/Spectrograph

The Sciencetech 9057 is a half meter motorized Czerny-Turner monochromator (and spectrograph) with an f/8 aperture. A "faster" model with larger optics for higher light throughput is also available as the 9057Fwith f/5.9 aperture. Both models have a computer controlled motorized turret for automatic grating and wavelength selection. The regular 9057 model supports up to three 50 x 50mm gratings whereas the larger optics 9057F model supports up to two 64 x 64mm (clear aperture) gratings.

Gratings

Gratings are sold separately and are required for the monochromator/spectrograph to work. For the standard f/8 9057 model, please select up to three 50 x 50mm gratings. For the "fast" f/5.9 9057F model, please select up to two 64 x 64mm gratings. Please note that the 64 x 64mm is the clear aperture measurement, and the physical size of the grating is actually 68 x 68mm. These gratings will be prealigned and premounted onto the spectrograph/monochromator turret at the factory, and cannot be removed afterward. Sciencetech has over 18 standard grating choices for each 50mm and 64mm sizes to cover any wavelength region between ultraviolet (UV) to mid infrared (IR). Some gratings are designed to cover a very narrow spectral band (usually used in monochromator mode), and some gratings are designed to cover a very wide spectral band (usually used in spectrograph mode). By selecting several gratings, a larger spectral region can be covered, or a particular spectral region can be divided into higher resolutions. Please check the Grating Selection List (shown separately) for the spectral efficiency curves and characteristics of each grating. Our Applications Specialists (sales@sciencetech-inc.com) are available to assist in choosing the proper gratings for your application. The price of the gratings shown includes installation cost.

HIGHLIGHTS

- 457 mm focal length
- Spectrograph/Monochromator
- Greater than 0.1 nm optical resolution
- Modified Czerny-Turner optical layout
- f/8 triple grating turret version
- f/5.9 Dual grating turret version
- Motorized grating and wavelength selection
- Serial or USB computer interface
- Rugged aluminum body

Bilaterally Adjustable Slits

The 9057/9057F comes with one SS80 manual bilaterally adjustable slit premounted at the input port. Another SS80 slit is required at the output port (sold separately) if the 9057/9057F is used as a monochromator with a single channel or PMT detector mounted at the output (or if it is used as a tunable wavelength selector). Another SS80 slit is not required at the output port if the 9057/9057F is used as a spectrograph with a multi-channel detector such as a linear PDA, CCD, or InGaAs detector mounted at the output. Additional SS80 slits may also be required if the dual input or output ports option is selected to allow for multiple light source inputs and/or multiple detector puts. If the 9057/9057F is to be used in an OEM application, Sciencetech can replace the adjustable SS80 slit with a cheaper, fixed width slit. Please contact a Sciencetech Applications Specialist for assistance in slit selection and requirements.

Electronics

The 9057/9057F has a computer controlled motorized turret for grating and wavelength selection. The motorized turret is powered by a single stepper motor mechanically coupled through a direct worm and gear drive. Sciencetech's universal MD-100 stepper motor electronics is used to control the stepper motor. The MD-100 electronics is packaged inside the 9057/9057F housing and has an RS-232 interface to the computer. If USB interface is selected, a USB converter electronics module is then connected to the MD-100's RS-232 output inside the 9057 housing. The native RS-232 signals of the MD-100 is then converted into USB format for onward interface to the computer. Correspondingly, a USB converter Windows software driver needs to be loaded such that the USB interface is recognized as a virtual RS-232 serial port by the Windows operating system.

Version Description	Version Code	Version Price (USD)
f/8 Standard version (triple grating turret)	-std	
f/5.9 Fast Version (dual grating turret)	-F	

Software

A Windows based Active-X software module (Sci-Mono) for computerized grating and wavelength selection is provided with all of Sciencetech's motorized monochromators/spectrographs. This Sci-Mono Active-X software module can be used as a stand-alone Windows software application or can be embedded into another custom Windows software application written in Visual C++, Visual Basic, or any other Active-X compliant language (including National Instrument's LabView). If the Sciencetech motorized monochromator/spectrograph is used as part of a larger spectrometer system made from many vendors' components, then embedding the Sci-Mono Active-X software module into a custom software would allow coordinated and synchronized control of the Sciencetech monochromator /spectrograph with the other components in the system. If the Sciencetech monochromator/spectrograph is used as part of a larger spectrometer system made from only Sciencetech components, then Sciencetech's fully featured Windows based Sci-Spec or Sci-LDA software application is recommended as an alternative. Sciencetech's Sci-Spec is a complete scanning monochromator software application that controls all Sciencetech motorized components and single channel detectors. It can coordinate the Sciencetech motorized monochromator scanning motion with data acquisition from Sciencetech's single channel and PMT detectors and display the spectral results on the screen or save them to a file. Sciencetech Sci-LDA works similarly to Sci-Spec, but is designed for spectrograph use with multichannel detectors such as CCD, PDA, and InGaAs linear arrays.

Sci-Spec and Sci-LDA fully featured Windows applications are sold separately. Unfortunately, Sciencetech does not provide any non- Windows software (such as Linux, Unix, or Mac) to control a Sciencetech motorized monochromator /spectrograph. However, Sciencetech does provide a low level RS-232 (serial port) communications manual with sample source code for users to write their own RS-232 serial interface to such computers. Many customers have successfully interfaced their Sciencetech monochromators /spectrographs to Unix, Linux, and Mac based computers through this straight forward and easy to understand RS-232 interface manual.

Other Similar Spectrograph Models

For high resolution spectrograph applications, please also consider the Sciencetech 9040 Spectrograph. It also has a half metre focal length, but can achieve higher light throughput due to its larger grating size of 84mm or 110mm. The drawback of the 9040 is its higher price, and it does not have a multi-grating turret. For spectrograph applications, this should not matter.

Customization

Sciencetech prides itself as a custom developer of optical spectroscopy instruments. If you require custom modifications to this monochromator/spectrograph or a special feature that is not shown, please inform our representative or Applications Specialist (sales@sciencetech-inc .com) of your specific requirements. We would be happy to quote a suitable customized version.

ACCESSORIES

220~240VAC Operation at 50 Hz
(MD100- 240VAC)

Please select this option if the instrument is to work in 220VAC or 240VAC at 50Hz. Please specify exact voltage.

USB Interface
(MD100i-USB) $ USD

This option allows Sciencetech motorized monochromators/spectrographs to be controlled through a USB port instead of a RS-232 serial port of a computer. This option uses an internal adapter to convert the native RS-232 electronics of the motorized monochromator /spectrograph into USB. A software driver must be loaded into the Windows based computer such that the USB interface is recognized as a virtual serial COM port for Sciencetech's SCI-LDA, SCI-SPEC, or Active-X control software to communicate with it.

Manual Bilaterally Adjustable Slit
(SS80) $ USD

This is a manually controlled bilaterally adjustable slit for use in the input or output port. Most Sciencetech monochromators/spectrograph models already include one adjustable SS80 slit at the input port, but an additional one at the output port is usually required if the monochromator is mated to a single channel detector or PMT detector, or if it is used as a tuneable wavelength light source. If the dual input port option is selected, an additional SS80 slit for the second input port is also likely required. The slit width can be set between 0~6mm, in 10µm spacing using a micrometer thumb wheel. The height of the SS80 slit can also be adjusted between 0mm~20mm through a built-in manual curtain slider. The height adjustment slider can be changed to 0~30mm or 0~10mm at additional cost. Please specify at time of ordering.

Dual Input or Output Port
(9000-DP) $ USD

An additional input or output port can be added to the side of the monochromator/spectrograph (lateral position) with an added manual flipping mirror as a port selector. A manual knob at the top of the monochromator/spectrograph would allow the user to select which port to direct the light. If an additional input port is required, an additional slit such as the SS80 (sold separately) is typically required with

it. If an additional output port is required, an additional output slit is only required if the detector mated to the output port is a single channel detector or PMT. Multi-Channel detectors such as PDAs, InGaAs arrays, and CCDs are advised to be mounted onto the front (axial) output port only, without a slit.

9057 Imaging Option (Coming Soon!) (9057i)

This option only applies to the f/8 triple turret 50 x 50mm grating model. With this option, multiple spectral channels can be obtained using an area detector mounted at the output port and multiple fibres at the input port (one fibre per channel). A multi-fibre connector at the input port is required in addition to this option. Please speak to our Applications Specialists for details.

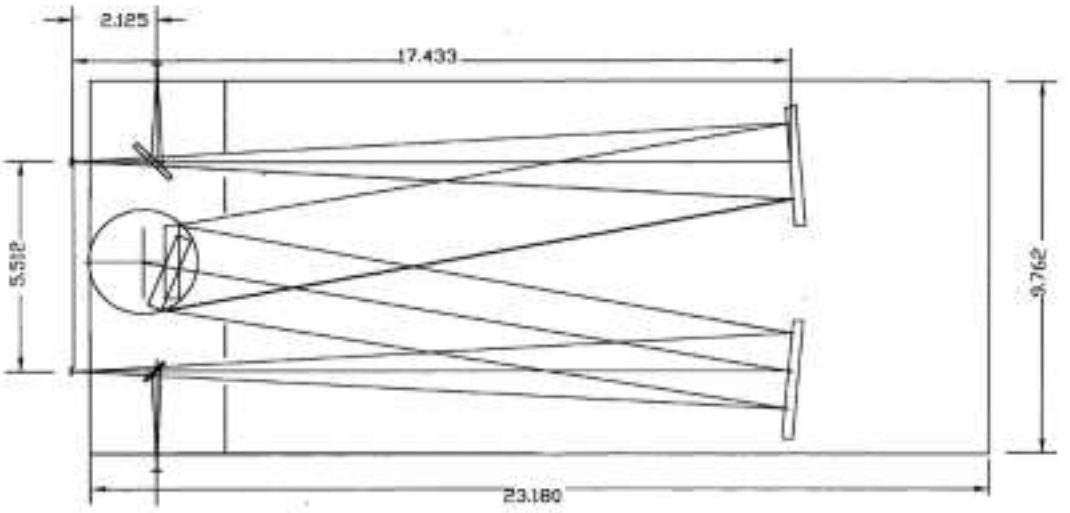
Group Accessories

Please check the appropriate sections in the catalogue for the following:

Grating Selections for Standard Mode (50mm)	(GR50)
Software Control Options (Mandatory)	(SoftwareGroup1)
Input Light Coupling Optics (Optional)	(input coupling)
Detector Mount Selections (For Detector Mating)	(DETMOUNT)
Grating Selections for Fast Mode (64mm)	(GR64)

Technical Specifications

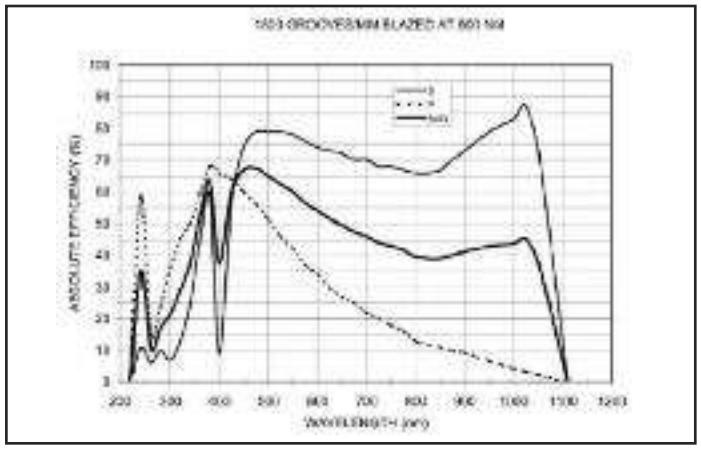
- Modified Czerny-Turner monochromator and spectrograph
- 457mm input and output focal lengths
- Motorize turret for automatic grating and wavelength selection
- Computer controlled turret utilizing stepper motor with worm and wheel gear drive mechanism
- RS-232 serial or optional USB computer interface
- MS-Windows Active-X interface software included. For other operating systems, a low level RS-232 serial interface manual and sample source code is available for software developers to write their own interface.
- **Scanning Range:** 0~1200nm (1200 l/mm grating), 0~2400nm (600 l/mm grating). Can use multiple gratings to cover broader spectral range
- **Grating Size:** 50 x 50mm for 9057 f/8, 64 x 64mm for 9057F f/5.9
- **Optical Resolution:** Greater than 0.1 nm with 1200 l/mm grating
- **Dispersion at output port:** 1.79 nm/mm with 1200 l/mm grating. Designed for 25mm (1") wide linear array sensors in spectrograph mode
- **Wavelength accuracy:** ± 0.1 nm
- **Wavelength reproducibility:** ± 0.1nm

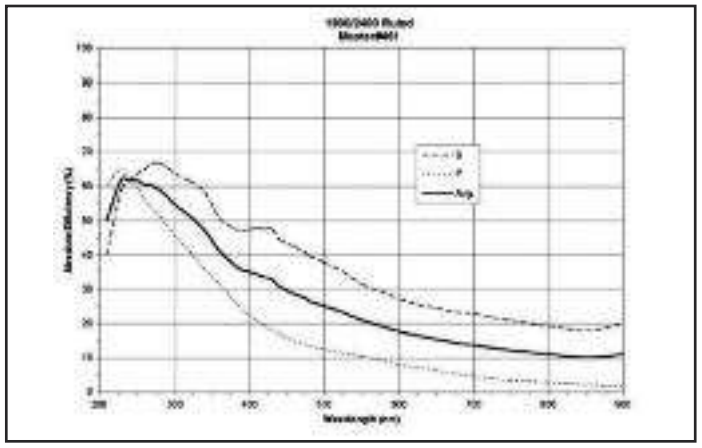


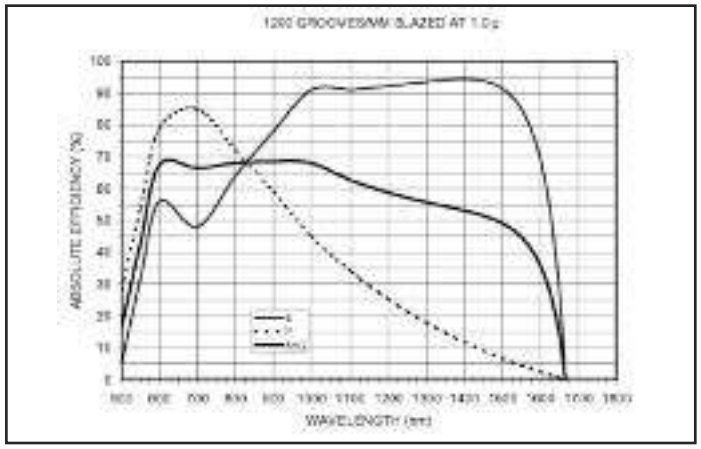
STANDARD GRATING EFFICIENCY CURVES

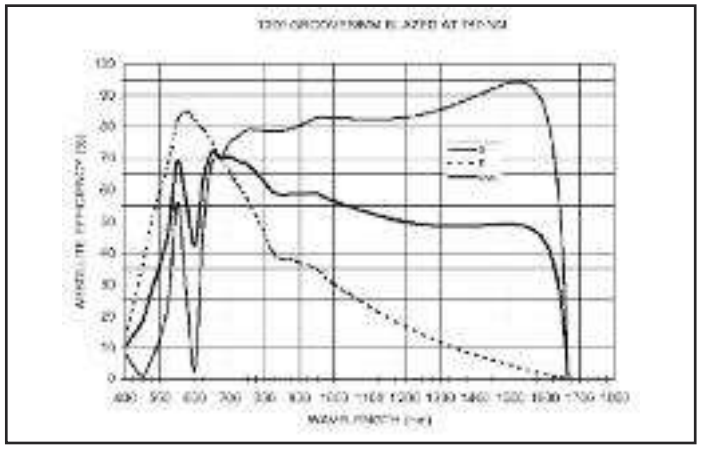
The following selection of gratings are available for Sciencetech's STANDARD size monochromators: 8010, 9010, 9010F, 9055, 9055F, 9057, 9060

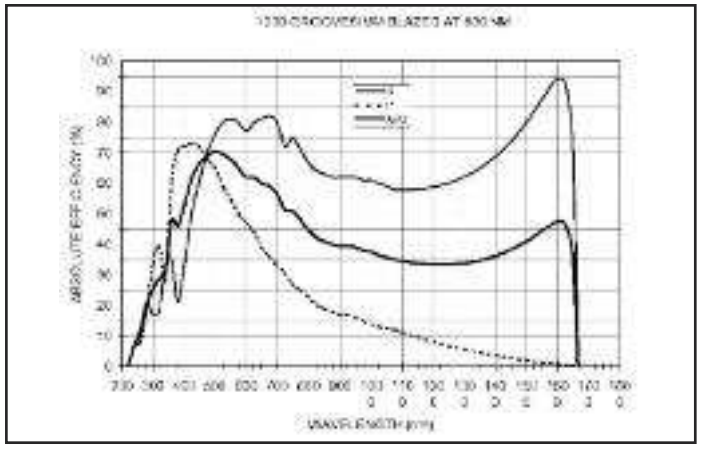
Ruled Gratings	
50 x 50 mm	$ USD
64 x 64 mm	$ USD

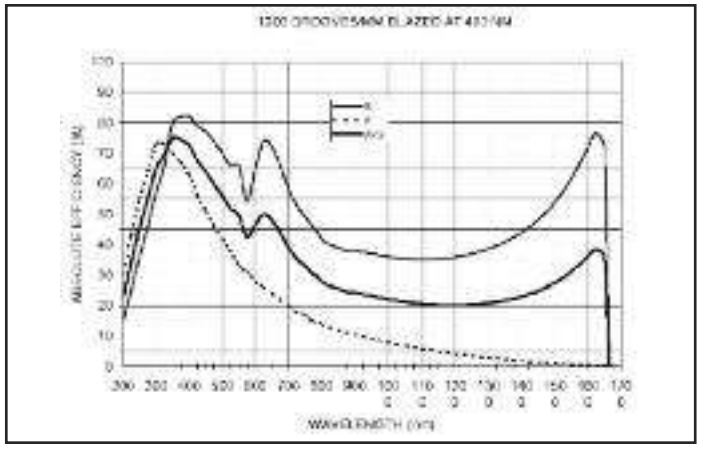




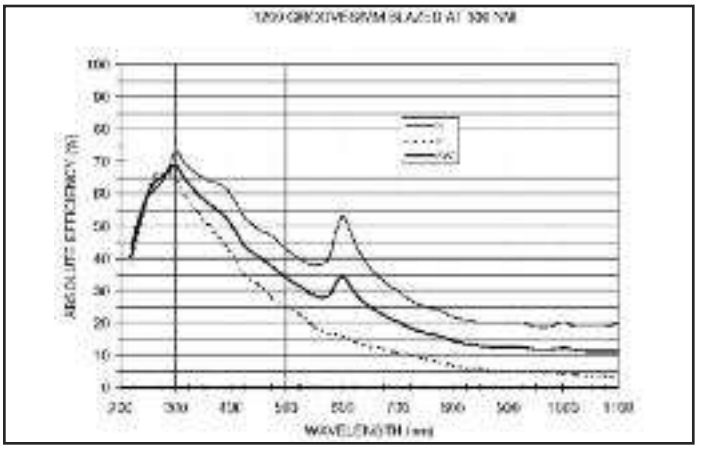


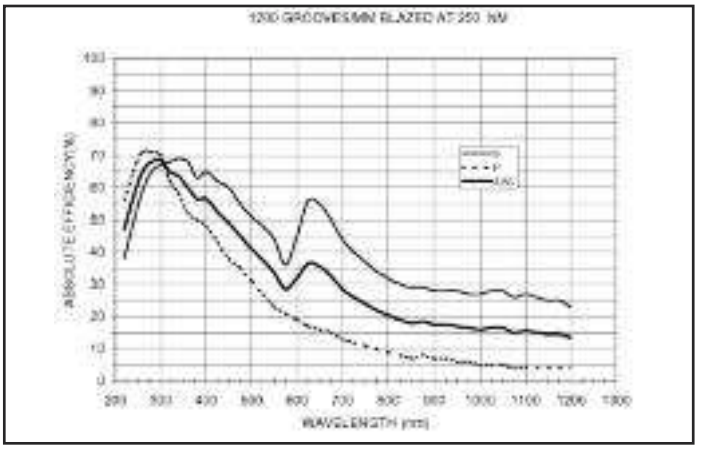


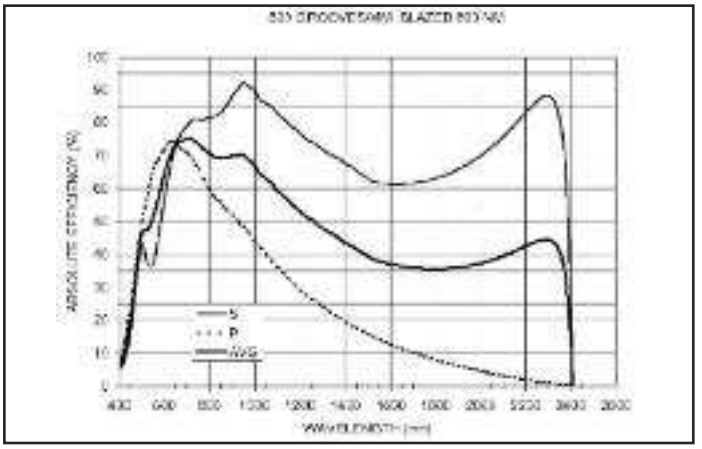


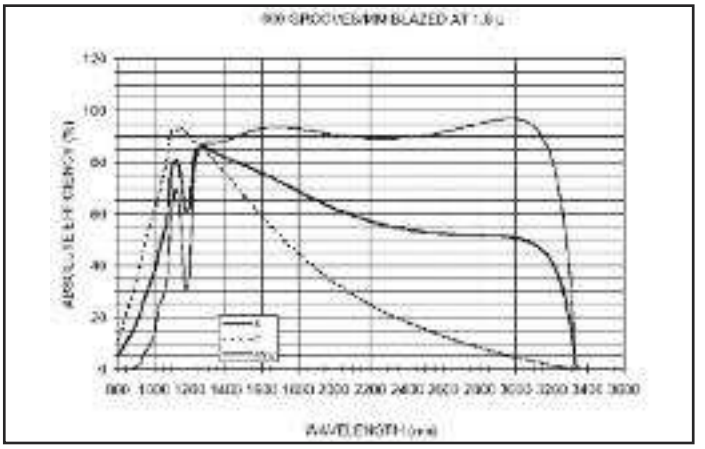


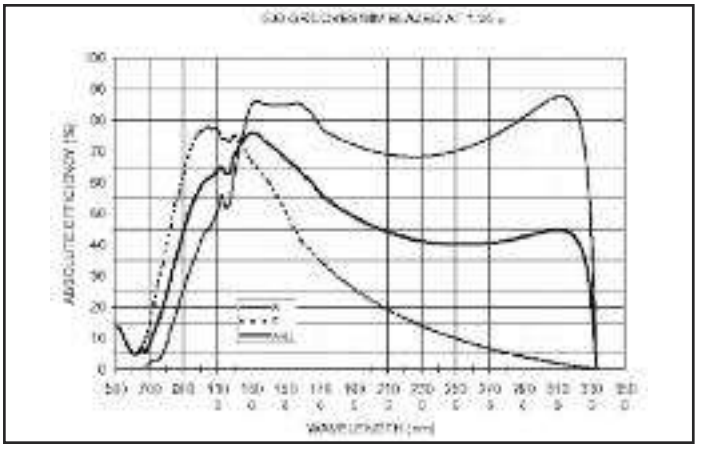
STANDARD MONOCHROMATORS

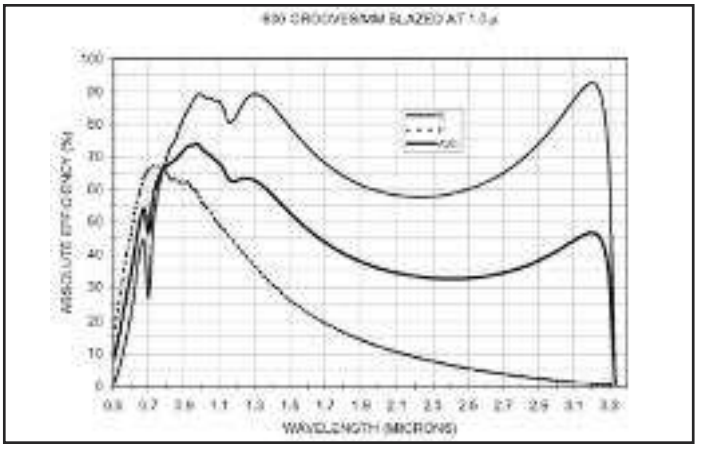


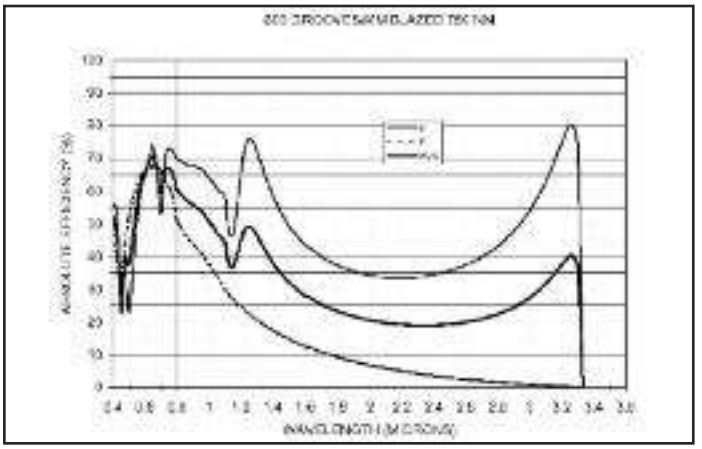


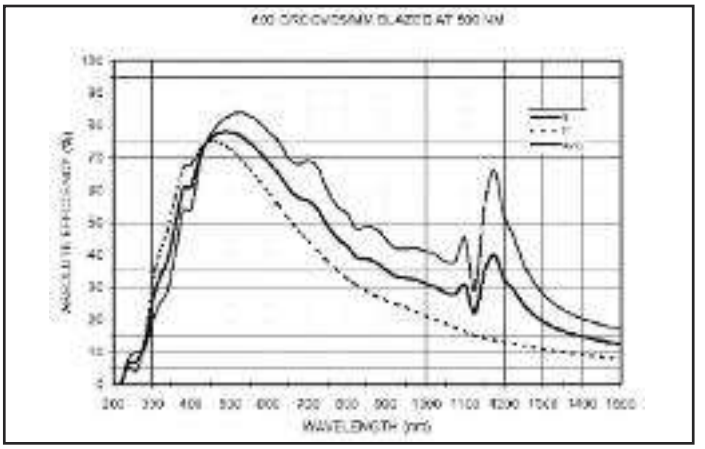




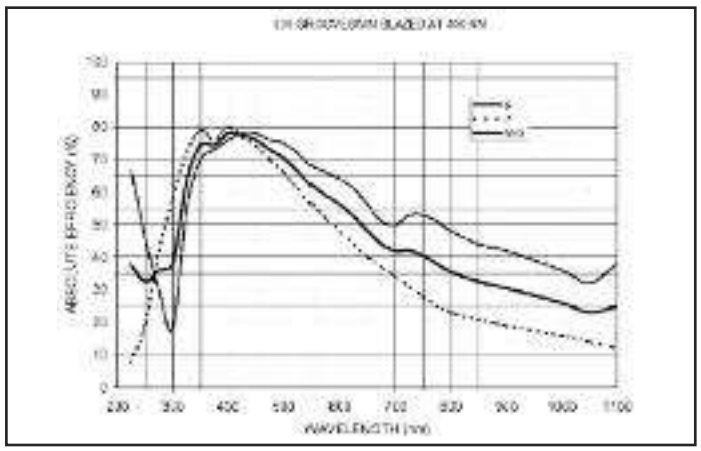


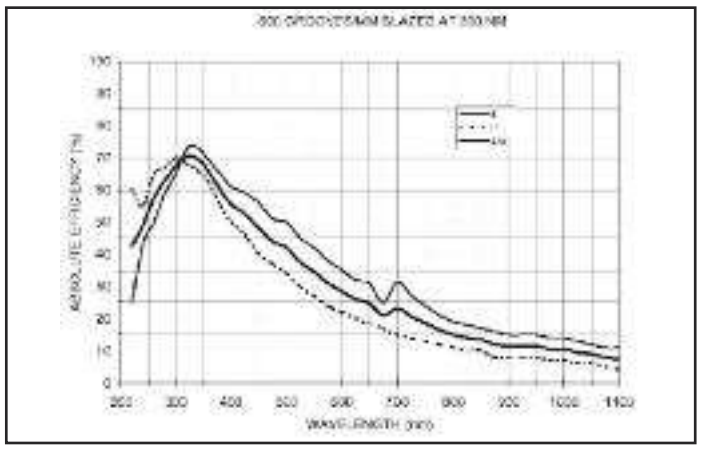




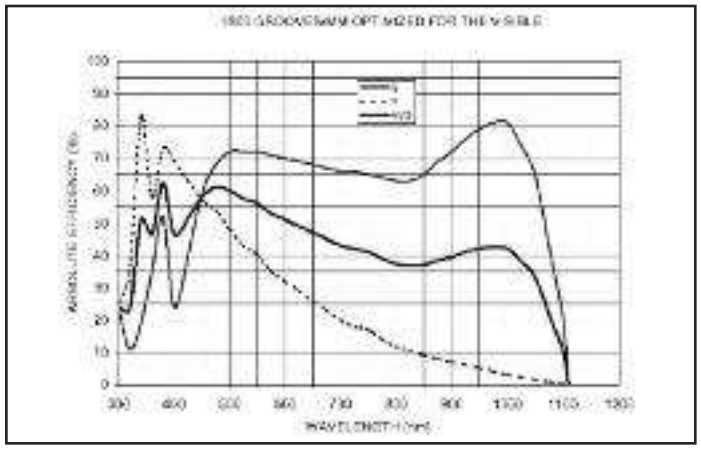


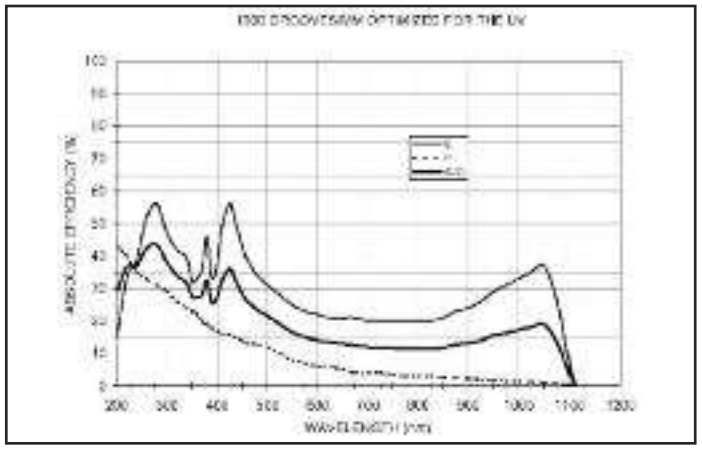
STANDARD MONOCHROMATORS

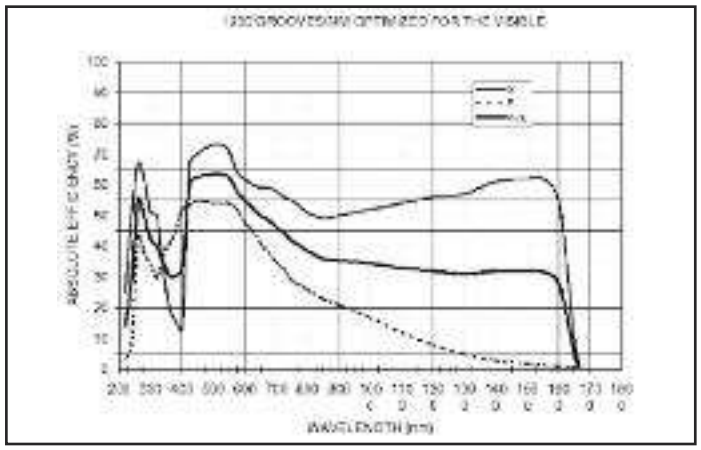


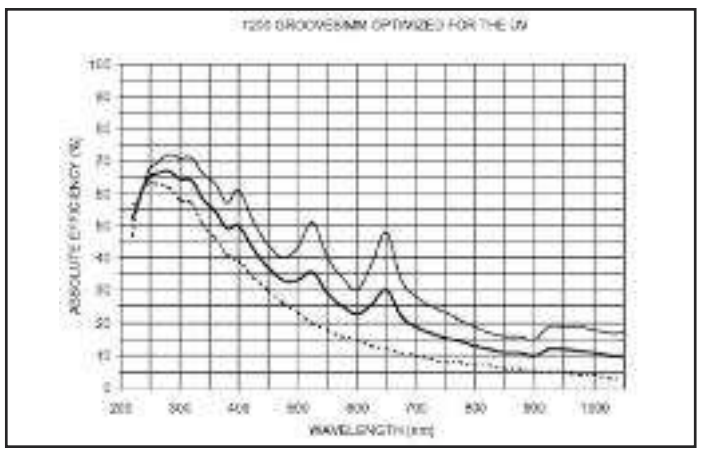


Holographic Gratings	
50 x 50 mm	$ 940 USD
64 x 64 mm	$ 1,181 USD









Input Coupling Selection for Sciencetech Standard Monochromators

(Models 9010, 8010, 9055, 9035, 9057)

Sciencetech manufactures various components that couple onto the input port of a monochromator or spectrograph. Most of these components relate to the coupling of light sources into the input port. In general, light sources can be directly coupled to the input port using optical lens in a collimating tube, or indirectly coupled via a fibre optic bundle. Quite often, the incoming light also needs to be filtered before entering the monochromator or spectrograph. The following is a list of the most common input coupling components that Sciencetech offers. Please also see the Accessories section for a more comprehensive list.

Manual Bilaterally Adjustable Slit
(code: SS80) $ USD

This is a manual controlled bilaterally adjustable slit for use in the input or output port. Most Sciencetech monochromators/spectrograph models already include one adjustable SS80 slit at the input port, but an additional one at the output port is usually required if the monochromator is mated to a single channel detector or PMT detector, or if it is used as a tunable wavelength light source. If the dual input port option is selected, an additional SS80 slit for the second input port is also likely required. The slit width can be set between 0~6mm, in 10µm spacing using a micrometer thumb wheel. The height of the SS80 slit can also be adjusted between 0mm~20mm through a built-in manual curtain slider. The height adjustment slider can be changed to 0~30mm or 0~10mm at additional cost. Please specify at time of ordering. (See Pg. 4-26)

Filter Holder, Holds up to 2 Filters
(code: FH) $ USD

This is an aluminum filter holder box that can accommodate up to 2 filters in series. Each filter is mounted on a removable slide that is screwed into the filter holder box. The filters can be individually removed by unscrewing the slide from the holder. The filter holder and slides accepts both 1" and 2" filters which are sold separately. Additional coupling optics maybe required to secure the filter holder onto the input slit of a monochromator or spectrograph.

200-1K Arc Lamp Housing Output Optical Coupling Unit
(code: 200-1K-OCU) $ USD

This is a coupling unit that mates the 200-1K arc lamp housing to the input port of the 9055 monochromator. Its purpose is to assure the focal point of the arc lamp housing light source (approx 9mm diameter for a 1000W lamp) is geometrically positioned at the input port of the 9055 monochromator and that the light beam is contained inside. This coupling unit has a removable extension center piece in the middle of its beam path so that it can be replaced with either Sciencetech FW-6 motorized filter-wheel or Sciencetech FH air-cooled filter holder for mounting in between the arc lamp housing and monochromator. Please note that an IR filter is necessary if the input slit is smaller than the 9mm focal spot beam of a 1000W Xenon lamp, or otherwise the input slit could become damaged by the excessive heat.

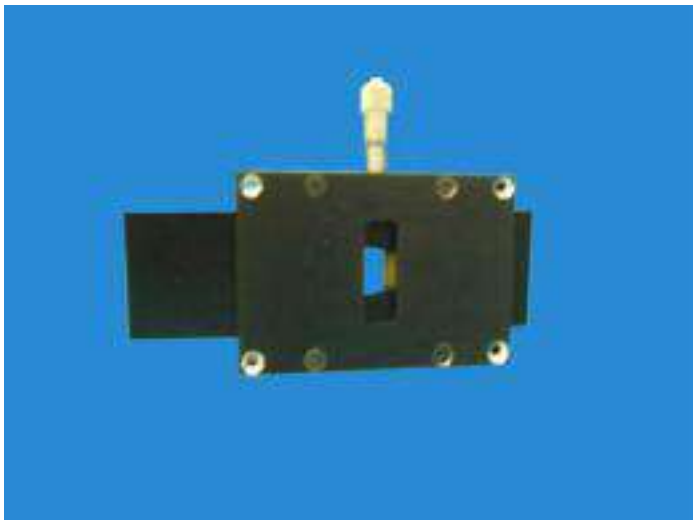
Fibre Coupler to Monochromator
(code: FIBRE2MONO)

Sciencetech Fibre2Mono couples light from a fibre into a monochromator/spectrograph input port. It includes a fibre holder, a collimating lens, a filter box, and a condensing lens. These optical components are held together inside a 1” diameter tube. The fibre holders and lenses are chosen based on the fibre's dimensions and numerical aperture (NA), as well as the monochromator f number, slit size, and application wavelength range. This unit is not a stock item. It is custom made based on the parameters provided. The fibre must also have a outside diameter (OD) larger than 80 µm.

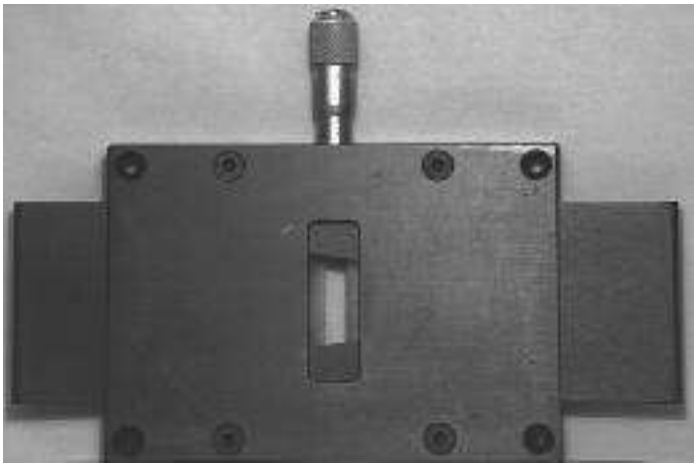
Motorized Filter Wheel
(code: FWG-6) $ USD

Sciencetech standard filter-wheel is a six position, computer controlled, motorized filter-wheel that supports 1" diameter filters. Other filter-wheels, such as 8 positions, 2" diameter filters, and manual filter-wheels are also available (See the Accessories section for details). This standard filter-wheel is enclosed in a light tight housing with a built-in shutter. Individual filters and solid blanks are sold separately. The filter-wheel is powered by an external stepper motor controller that interfaces to the RS-232 port of a computer. Active-X control software is included. If the filter-wheel is mated to a monochromator or spectrograph, an additional systems integration fee will be levied.

Manual Bilaterally Adjustable Slit



The Model SS80 is a manually controlled bilaterally adjustable slit for the input or output port. Most Sciencetech monochromators and spectrograph models already include one SS80 slit at the input port but an additional one at the output port is usually required if the monochromator is mated to a single channel detector or PMT detector, or if it is used as a tunable wavelength light source. If the dual port option is selected, an additional SS80 slit for the second port may also be required. The slit width can be adjusted between 0~6mm, in 10µm spacing using a micrometer thumb wheel. The height of the SS80 slit can also be adjusted between 0mm~20mm through a built-in manual curtain slider. The height adjustment slider can be changed to 0~30mm or 0~10mm, or to stepwise adjustable slider at additional cost. Please specify at time of ordering.



Sciencetech SS80

Technical Specifications

- The standard unit is not vacuum compatible, but Sciencetech can manufacture the slit in a custom vacuum housing.
- Black anodized aluminum housing, brass jaws
- Slit housing thickness: 0.5"
- Slit opening range 0~6mm
- Adjustable increments: 10µm

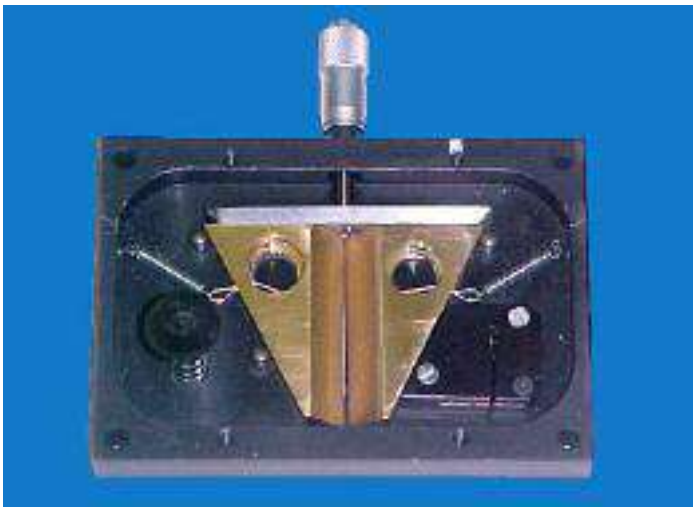
Model 9010 Monochromator

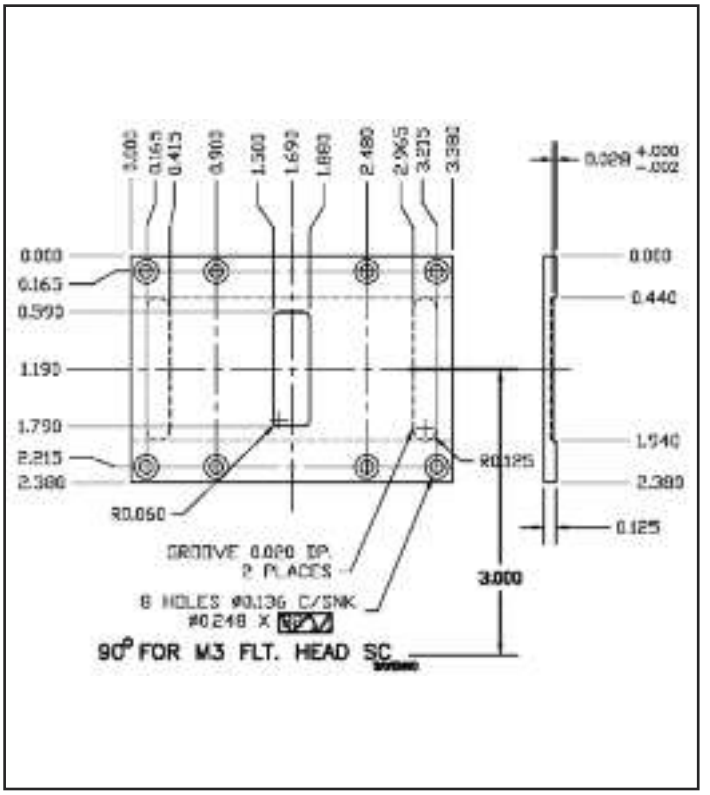
Please note that the 9010 Monochromator already includes two slits for both input and output ports. Therefore, an additional SS80 slit is only required if the dual port option is selected and assuming that additional port requires an additional slit. See Dual Port Option for details.

Dual Input Port Option

If the dual input port option is chosen, an additional SS80 slit is likely required if directly coupled to a light source. An additional SS80 slit is likely not required if the input port is mated to an incoming illumination fibre bundle. In consideration of the many possibilities, please ask our Applications Specialists for details pertaining to your particular requirements.

Version Description	Version Code	Version Price(USD)
With height adjustment slider 10~20mm	-H20	
With height adjustment slider 20~30mm	-H30	
With height adjustment slider 0~10mm	-H10	
With height adjustment slider 10~20mm Vacuum Version	-H20Vac	
With height adjustment slider 20~30mm Vacuum Version	-H30Vac	
With height adjustment slider 0~10mm Vacuum Version	-H10Vac	
With stepwise adjustable height	-SH	





Dual Output Port Option

If the dual output port option is chosen, an additional SS80 slit is likely required if the output port is to be mated to single channel or PMT detector. In addition to this slit, these detectors also require a specific detector mount. An additional SS80 slit is also likely required at the output port if the monochromator is to be used as a tunable light source. An additional SS80 slit is not required if the output port is mated to a multi-channel detector such as a CCD, photo-diode array or linear InGaAs detector. For such detectors, please check our selection of multi-channel detector mounts. An additional SS80 slit is not required if an output fibre is attached to the output port. In consideration of the many possibilities, please ask our Applications Specialists for details pertaining to your particular requirements.

Vacuum Versions

The vacuum versions are baked out and cleaned in a Class 1,000 clean room environment to meet vacuum conditions up to 10^{-7} Torr.

Detector Mount Selection for Sciencetech Standard Monochromators
(Models 9010 8010, 9055, 9035, 9057)

Sciencetech CCD Detector Mount
(code: 9000M-CCD-H) $ USD

This mount is required if a Sciencetech CCD Detector is to be mounted to the output port. This is a fully adjustable mount with back/forward, left/right, and tilt controls to align the 1" wide CCD sensor to the focal plane of any Sciencetech spectrographs except for the 8030. If this option is selected, a slit at the output port is not required. The cost of this mount includes the tedious but necessary detector focal plane alignment procedure performed at the factory before shipping.

Andor Technology CCD Detector Mount
(code: 9000M-CCD-A) USD

This mount is required for mating an Andor Technology CCD Detector (such as DV-401) to the output port. This is a manually adjustable mount that allows the Andor Technology detector to be moved forward and backwards, and left to right, such that the sensor can be aligned to the spectrograph's focal plane. This mount can be mated to any Sciencetech spectrograph except for the 8030 which does not support Andor Technology Detectors. A slit at the output port is not required for this option. This cost includes the tedious but necessary detector plane alignment procedure performed at the factory before shipping.

Sciencetech Single Channel Detector Mount
(code: 9000M-SC) USD

This mount is required if a Sciencetech single channel detector such as Si, Ge, InGaAs detector is mounted to the output port. This mount is compatible with all Sciencetech monochromators and spectrograph models. Please note that an output slit is required with this option.

Sciencetech PMT Detector Quick Release Mount
(code: 9000M-PMT) USD

This mount is required to mate Sciencetech PMH Series PMT detectors to the output port. It can be mounted to any Sciencetech monochromator models. The 9030 scanning monochromator requires a special version. This mount has a two side screw quick release mechanisms to disconnect the PMT Detector from the monochromator. The PMT can be remounted without performing a realignment procedure. Please note that an output slit is required with this option.

Manual Bilaterally Adjustable Slit
(code: SS80) $ USD

This is a manually controlled bilaterally adjustable slit for use in the input or output port. Most Sciencetech monochromators/spectrograph models already include one adjustable SS80 slit at the input port, but an additional one at the output port is usually required if the monochromator is mated to a single channel detector or PMT detector, or if it is used as a tunable wavelength light source. If the dual input port option is selected, an additional SS80 slit for the second input port is also likely required. The slit width can be set between 0~6mm, in 10μm spacing using a micrometer thumb wheel. The height of the SS80 slit can also be adjusted between 0mm~20mm through a built-in manual curtain slider. The height adjustment slider can be changed to 0~30mm or 0~10mm at additional cost. Please specify at time of ordering.

For Model 9010

Sciencetech Single Channel Detector Mount
(code: 9000M-SC)

Sciencetech PMT Detector Quick Release Mount
(code: 9000M-PMT)

500mm High Performance Monochromator/Spectrograph

Highlights

- Czerny-Turner Optical Configuration
- Unequal 500mm/550mm Input/Output Focal Lengths
- Flat field output for spectrograph use
  Computer Control Motorized Wavelength Selection
- Single Grating, With Removable Kinematic Mount
- f/6.9 Version with 64mm x 64mm Grating
- f/5.2 Version with 84mm x 84mm Grating
- f/4.0 Version with 102mm x 102mm Grating
- Greater than 0.03nm Optical Resolution
  (f/6.9, 1200l/mm)
- Serial or USB Computer Interface
- Rugged Aluminum Body

The Sciencetech Model 9040 is a true half metre high performance monochromator (and spectrograph). It supports large size gratings for high light throughput. Three grating sizes are available ranging from 64mm x 64mm to 102mm x 102mm which allows it to achieve an aperture of f/6.9 to f/4. The Model 9040 is based on the Czerny-Turner optical configuration and supports a single large size grating mounted on a rotating turret for wavelength selection. The grating is installed on a removable kinematic mount and can be manually swapped with other gratings without disruption of its optical alignment. The Model 9040 is also available in double additive and double subtractive versions to obtain even higher resolutions or to minimize stray light. These versions utilize two Model 9040s mated back to back. Please see Sciencetech Model 9040DA (Double Additive) and 9040DS (Double Subtractive) for details.

Optics

The Sciencetech Model 9040 optical layout has been optimized for symmetrical coma correction. Its unequal input and output focal lengths (500mm input, 550mm output) allow it to obtain high resolutions with low stray light levels and high light collection efficiency.

Versions Available

The Model 9040 is available in 3 grating size versions depending on light throughput requirement as measured by aperture. The larger the grating size, the greater the light throughput as supported by its f number. For example, the 64mm x 64mm is the smallest grating size version, and therefore has the lowest light throughput aperture of f/6.9. The 102mm x 102mm grating is the largest grating size version available and therefore has the greatest light throughput aperture of f/4. Please note that a Model 9040 is manufactured for a particular grating size version. For example, if a customer selects a Model 9040 with 64mm x 64mm size grating, it will not be able to accept larger gratings of 84mm x 84mm or 102mm x 102m min the future.

Grating Selections

Sciencetech offers a large selection of ruled and holographic gratings in each grating size to span the UV-VIS-IR range. Gold and aluminum coated gratings are also available on some gratings for IR applications. Please see the grating selection list for details. If assistance is required, our Applications Specialists (sales@sciencetech-inc.com) are available to help in the grating selection process. Please note that more than one grating (of the same size) can be purchased as the gratings are mounted on a removable kinematic mount that can be manually swapped in and out by the user. The kinematic mount assures consistent optical alignment each time a grating is swapped. Please note that the price of the gratings includes the aluminum grating back bracket (one required for each grating) for interfacing with the kinematic mount. The grating price also includes the optical pre-alignment cost for adhering each grating on its back bracket.

Version Description	Version Code	Version Price (USD)
f/6.9 (64mm x 64mm grating sold separately)	-64	
f/5.2 (84mm x 84mm grating sold separately)	-84	
f/4.0 (102mm x 102mm grating sold separately)	-102	

High Resolution Slits

The Model 9040 uses the high resolution Model SS82-HR bilaterally adjustable slits reserved for Sciencetech large monochromator series. The standard Model SS80 slit do not meet the tight tolerance requirement of the Model 9040 at these higher resolutions. Included with the Model 9040 is one Model SS82-HR high resolution bilaterally adjustable slit at the input port. An additional high resolution slit is required for the output port if the Model 9040 is used as a monochromator with a single-channel or PMT detector mounted at the output (the slit is mounted to the output port first, and then the detector). An additional slit is not required if the Model 9040 is used as a spectrograph with a multi-channel linear array detector mounted directly to the output port. The high resolution slit is manually adjustable with a micrometer thumb wheel from 0mm ~ 6mm width. The maximum slit height is 38mm (limited by the port diameter of the Model 9040), but can be reduced through an optional height adjustable stepwise cover. A computer-controlled motorized version of the high resolution bilaterally adjustable slit is available as an option.

Monochromator Operation

The Model 9040 can be used as a wavelength scanning monochromator by mounting a single-channel detector at the output port to capture one wavelength at a time. Sciencetech provides a wide range of single channel detectors including photo diodes, InGaAs, PbS, and other exotic sensors that cover the UV-VIS-IR spectrum. Nitrogen cooled versions for a better signal-to-noise ratio and motorized choppers with lock-in-amplifiers for IR applications are also available. For photon-starved and low light applications, Sciencetech recommends its highly sensitive PMT and photon counting PMT detectors. All detectors are available with 12-bit or 16-bit data acquisition hardware and Active-X software for interfacing with Windows 98/ME/NT/2000/XP computers. An additional high resolution slit for the output port is required for use with single-channel detectors. Also available is Sci- Spec, an optional full-featured scanning monochromator software application that synchronizes the monochromator and detector operations. Sci-Spec is only available as a Windows based application.

Spectrograph Operation

The Model 9040 has a flat field output which allows it to operate as a spectrograph by mounting a linear array multi-channel detector at the output port to capture the entire spectral dispersion. Sciencetech provides a selection of 1" wide CCD and photo-diode linear array multi-channel detectors. All multi-channel detectors are available with 12-bit or 16-bit data acquisition hardware and Active-X software for interfacing with Windows 98/ME/NT/2000/XP PC computers. Also available is Sci-LDA, an optional full-featured spectrograph software application that controls both the monochromator's grating movement and detector data acquisition. Sci-LDA is only available as a Windows based application.

Manual Control for Spectrograph Operation

The grating wavelength selection is typically computer controlled through a precision motorized sine drive. However, a manual control version utilizing a mechanical knob with readout is also available for those using the Model 9040 in spectrograph mode and do not require constant changes to its wavelength region. This manual operation option results in a cost saving compared to the regular computer-controlled version as the motor mechanism and computer interface is removed. If the Model 9040 is to be used as a scanning monochromator, this manual control version is not recommended as Sci- Spec can only be used with motorized Sciencetech monochromators.

Computer Control

All Sciencetech computer controlled monochromators and motorized accessories such as motorized slits, dual port flipping mirrors, and filterwheels are connected to the computer via serial (RS-232) or optional USB interface. For serial (RS-232) interface, Sciencetech has developed a proprietary addressing system such that one serial (RS-232) port can control up to 4 motorized devices. A Sciencetech RS-232 four-way splitter is required if more than one RS-232 motorized device is used. Each computer controlled motorized device requires its own Sciencetech MD-100 universal stepper motor controller. Many Sciencetech motorized monochromators, including the Model 9040, has a built-in MD-100 universal stepper motor controller to control its motorized grating. An Active-X component software library is included with each motorized device such that its control features can be incorporated into any Visual Basic, C++, J++, or LabView application. The Active-X library is designed for use in Microsoft Windows 98/ME/2000/XP computers only. However, users can write their own software interface for other operating systems by purchasing the optional RS-232 ASCII command interface manual. Also available as an option are two fully featured Windows applications (Sci-Spec and Sci-LDA) to control the Model 9040 in scanning monochromator or spectrograph mode respectively.

Body Construction

The Model 9040 body panels and optical mounts are made of precision machined anodized aluminum.

Need Customization?

Sciencetech can customize the Model 9040 to meet particular applications. If the listed versions, options and accessories do not meet your requirements, please do not hesitate to contact our Applications Specialist to discuss your needs. Sciencetech has sold many modified and custom versions of the Model 9040 to customers in the past.

Examples include:

- specialty optical coupling at input port for use as a tuneable light source
- specialty optical coupling at output port for connection to specific sample chambers and microscopes
- motorized multiple grating turret
- vacuum version operating at 10-7 Torr for ultra-violet applications
- motorized flipping mirror for dual port option
- curved bilaterally adjustable slits

ACCESSORIES

220~240VAC Operation at 50 Hz (MD100-240VAC)

Please select this option if the instrument is to work in 220VAC or 240VA at 50Hz. Please specify exact voltage.

USB Interface
(MD100i-USB) $ USD

This option allows Sciencetech motorized monochromators/spectrographs to be controlled through a USB port instead of a RS-232 serial port of a computer. This option utilizes an internal adapter that converts the native RS-232 electronics of the motorized monochromator/spectrograoph into USB. A software driver must be loaded into the Windows based computer such that the USB interface is recognized as a virtual serial COM port for Sciencetech's SCI-LDA, SCI-SPEC or Active-X control software to communicate with it.

Dual Input or Output Port
(9000-dp) $ AD

An additional input or output port can be added to the side of the monochromator/spectrograph (lateral position) with an added manual flipping mirror as a port selector. A manual knob at the top of the monochromator/spectrograph would allow the user to select which port to direct the light. If an additional input port is required, an additional slit such as the Model SS80 or SS82HR (sold separately) is typically required with it. If an additional output port is required, an additional output slit is only required if the detector mated to the output port is a single channel detector or PMT. Multi-Channel linear array detectors such as PDAs, InGaAs arrays, and CCDs do not require a slit. They are also advised to be mounted onto the front output port only.

Manual Control Wavelength Selection
(MAN9040) $ USD

The Model 9040 is equipped with a motorized grating turret for computer controlled wavelength selection. However, if the Model 9040 is used as a spectrograph, where the wavelength region of interest remains fairly consistent, a manual control version utilizeing a knob with readout maybe sufficient. This option replaces the motorized mechanism and electronics resulting in a cost savings credit.

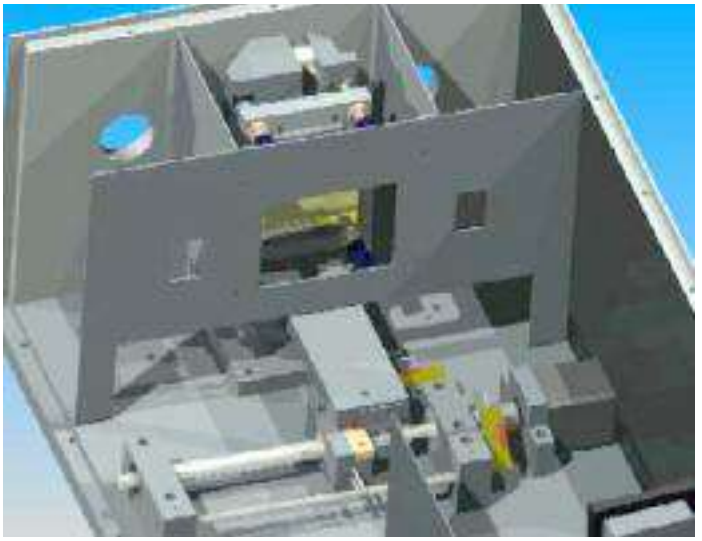
Manual Bilaterally Adjustable Slit - High Resolution
(SS82-HR) $ USD

The Model SS82-HR is a high resolution bilaterally adjustable slit designed specifically for Sciencetech's large monochromators (models 9040, 9490, and 9150) due to their high resolution tolerance requirements. The slit has a manual micrometer knob for fine slit width adjustment between 0mm~6mm. The slit height can also be adjusted between 0mm~40mm through a manual metal curtain slider. However, the maximum slit height is limited by the 38mm port diameter of Sciencetech's large monochromators. Most Sciencetech large monochromators such as the Model 9040 already include one Model SS82-HR slit at the input port. Purchase an additional slit only if a single-channel or PMT detector is to be mated to the output port. Multi-channel linear array detectors such as CCDs and Photo-diode arrays do not require a slit at the output port. Additional slits may also be required if a dual input or output port is selected. Please contact a Sciencetech Applications Specialist at sales@sciencetech-inc.com if you are unsure whether an additional slit is required in your application.

Computer Control Bilaterally Adjustable Slit - High Resolution (SS83-HR) $USD

This is a computer control motorized version of Sciencetech Model SS82-HR high resolution bilaterally adjustable slit. Like the Model SS82-HR, it is also designed for Sciencetech's large monochromators due to their high resolution tolerance requirements. The computer control Model SS83-HR has a maximum adjustable slit width of 0~6mm. The slit height is also adjustable, but remains to be a manual sliding metal curtain like the manual control Model SS82-HR slit. Therefore, the slit height cannot be computer controlled. Although the maximum height of the slit adjustment is 40mm, most Sciencetech large monochromators such as the Model 9040 has a port diameter of 38mm which becomes the limiting factor in slit height. The motorized slit width is controlled via USB or RS-232 serial interface with a MS-Windows 98/ME/NT/200/XP computer. An Active-X software module is included such that the slit width can be controlled through any Visual Basic, C++, J++, or LabView application. Or alternatively, the Active- X software can be used as a stand-alone software to control the slit width.

Since many Sciencetech large monochromator models already include one manual adjustable Model SS82-HR slit, there is both an "upgrade" price for the first slit and a "new" price for consecutive slits. Please check versions for details.



Group Accessories

Please check the appropriate sections in the catalogue for the following:

Grating Selections for Fast Mode (64mm)	(GR64)
Special Grating Selections (64mm)	(GR64S)
Detector Mount Selection (for detector mating)	(DetMount9040)
Input Light Coupling Optics	(LightCouplingLrg)
Large 102mm Gratings Selection	(GR102)

Technical Specifications

- **Optical System:** Czerny-Turner configuration
- **Drive:** Computer Control Motorized Sine Drive
- **Optional Manual Control Sine Drive With Readout**
- **Number of Gratings**: 1, On Removable Kinematic Mount
- **Grating Size:** 64mm2, 84mm2, 102mm2
- **Focal Length:** Input:500mm, Output:550mm
- **Spectral Range:** 0~1,200nm
- **Aperture:** F/6.9 (64mm2), F/5.2 (84mm2), F/4(102mm2)
- **Optical Resolution:** Greater than 0.03nm (F/6.9, 1200l/mm, 10µm slits)
- **Dispersion:** 1.53nm/mm (1200 l/mm grating)
- **Slit:** Hi-Resolution manual bilaterally adjustable
- **Wavelength Reproducibility:** ±0.025
- **Wavelength Accuracy:** ±0.05
- **Communications:** RS-232 or Optional USB
- **Dimensions:** 711mm x 381mm x 254mm (28” x 15” x 10”)
- **Weight:** 35 kg
- **Input and Output Ports**: 38mm diameter
- **Optical Center Line (Slit Center Height):** 76.2mm (3")

9040DA Double Additive Monochromator

The 9040DA double additive half metre spectrometer has been specially designed for Raman applications. Like the 9030DA, special care has been taken to eliminate stray light. The 9040DA includes a light tight enclosure, a special wall between the two monochromator sections, and special baffles, gaskets, and mounts for mirrors and gratings. Input, intermediate, and output slits are available to 30 mm in height. All slits are micrometer-activated to adjust width and height. Holographic gratings are mounted in kinematic mounts for easy replacement. Stepper motor with a microprocessor controller is included. Only a motorized version of 9040DA is available. Scanning is user-selectable, done linearly in energy (cm^{-1}, eV etc.) or wavelengths (nm, mm, A).The 9040DA can also be fitted with one of Sciencetech's photodiode array detectors or cooled CCD's.

Stray Light Rejection for 9040DA

Stray Light Rejection of the 9040DA is better than 10^{-7}.

Experimental Results:

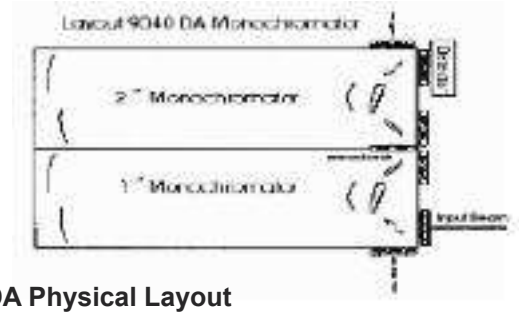
• Measurements made at 254 nm using an Hg light source using holographic grating and taking the ratio of the signal with glass and without glass show a stray light level < $1x10^{7}$.

• Measurements made with an Argon laser and an 1800 l/mm holographic grating obtained the rotational Raman spectra of air as close as 30 to 100 cm^{-1} of the Rayleigh line of the Argon laser, with no filters used and a good signal to noise ratio. Measurements were obtained as close as 1 nm, from the 488 nm laser line , which are 4 to 5 orders of magnitude weaker than the Rayleigh line. The Rayleigh background was approximately 10^{-7}, 5 nm away from the line position.

Technical Specifications

All specifications are for 1800 l/mm holographic grating and argon laser at 488nm, except where stated otherwise

- **Drive:** Manual and computer controlled sine drive
- **Gratings:** Holographic, 1800 l/mm (for std Raman apps)
- **Focal Length:** **Input:** 500mm
  Output: 550 mm
  (both input and output are the same in each section of 9040DA, other flat gratings available)
- **Input Aperture:**
  Standard: f/6.9 (square 64 mm gratings)
  Fast: f/5.2 or better (square 84 mm gratings)
- **Dispersion:** 0.76 nm/mm w/ 1200 l/mm grating
  0.51 nm/mm w/ 1800 l/mm grating
- **Optical Resolution:**
  Limit: Better than 0.02 nm (for f/6.9 operation)
  Bandpass: 0.05 nm (2 cm-1) (with 100 mm slits)
- **Slits:**
  Standard: Straight, bilaterally adjustable
  Height: 0 to 25 mm with step adjustment
  Width: 10 µm to 3 mm
- **Wavelength Range:** 185 nm to 900 nm
- **Scanning Resolution:** 0.005 nm in microstep mode
- **Wavelength Accuracy:** ± 0.05 nm
- **Wavelength Reproducibility:** ±0.025 nm
- **Motor Scanning Range:**
  180 -1500 nm w/ 1200 l/mm grating
  180-1000 nm w/ 1800 l/mm grating
- **Flat Fill:** 30 mm x 12 mm
- **Dimensions:** 9" x 30.4" x 30"
  (22.6 cm x 76 cm x 74 cm)
- **Weight:** 85 kg



9040DA Physical Layout

Version Description	Version Code	Version Price (USD)
Double half-meter monochromator	9040DA	——
High throughput 9040DA, f/4.5, uses 110 mm^2 gratings	9040DA/H	

1 Meter High Resolution Monochromator/Spectrograph

The Model 9490 is Sciencetech's second highest resolution monochromator with 1m focal length. It can achieve resolutions better than 0.01nm in its standard "single pass" configuration, and even higher resolutions in an optional "double pass" configuration that effectively doubles the focal length to 2m. The standard version utilizes 84mm x 84mm gratings for an aperture of f/9.7 whereas the high throughput “Fast” version utilizes 102mm x 102mm gratings for an aperture of f/7.4. Both versions accommodate one grating at a time on a removable kinematic mount. Users can manually swap one grating for another without losing alignment. An optional 4 grating turret for automatic grating selection without manual service is available. Gratings are sold separately.

The Model 9490 is Sciencetech’s second largest monochromator/spectrograph with a 914mm/1000mm input/output focal lengths and flat field output. It can achieve resolutions better than 0.01nm in its standard "single pass" configuration. The standard Model 9490 with f/9.7 aperture uses 84mm x 84mm gratings whereas the higher light throughput "Fast" model with f/7.4 aperture uses 102mm x 102mm gratings. These models accommodate one grating installed on a removable kinematic mount so that it can be manually exchanged for another without the need of re-alignment. An optional motorized four grating turret is also available allowing for automatic selection of up to four gratings without manual intervention. The Model 9490 has a flat field output allowing it to operate as a spectrograph using a linear array multi-channel detector to capture the entire output spectrum instantaneously. Sciencetech provides a selection of 1" wide CCD and photo-diode linear array detectors mounted on a multi-axis adjustable focusing platform for use with the Model 9490.

Highlights

- Czerny-Turner Optical Configuration
- High Light Throughput Using Large Optics
- Standard f/9.7 Version With 84mm x 84mm Grating
- Available Fast f/7.4 Version With 102mm x 102mm Grating
- Available Double Pass Configuration
- Low Stray Light
- Long Scanning Range
- Grating On Kinematic Mount For Easy Removal
- Available 4 Grating Turret
- Wide Selection Of Standard Gratings
- High Precision Motorized Sine Drive For Wavelength Selection
- Active-X Library For Easy Software Integration
- Serial (RS232) or Optional USB Interface
- High Resolution Bilaterally Adjustable Slit
- Rugged Anodized Aluminum Body Construction

High Resolution Slits

One high resolution bilaterally adjustable slit for the input port is standard. An additional slit is required for the output port if the Model 9490 is used as a monochromator with a single-channel detector mounted at the output port. An additional slit is not required if the Model 9490 is used as a spectrograph with a multichannel detector mounted at the output port. The slit is manually adjustable with a micrometer thumb wheel from 0mm~6mm width. The maximum slit height is 38mm, but can be reduced through an optional height adjustable stepwise cover. A computer controlled motorized version of the high resolution bilaterally adjustable slit is available as an option.

Version Description	Version Code	Version Price (USD)
Single Pass f/9.7 Version	-S-f/9,7	
Single Pass f/7.4 Version	-S-f/7.4	
Single & Double Pass f/9.7 Version	-SD-f/9.7	Please Call for Price.
Single & Double Pass f/7.4 Version	-SD-f/7.4	Please Call for Price.

Double Pass Configuration

In the Double Pass configuration, the light beam essentially repeats the Czerny-Turner optical path twice inside the monochromator before exiting the output port. The first pass is identical to the standard single pass configuration where the light would enter the input slit, gets collimated by the input mirror, and then sent to the grating. The dispersed light from the grating would then get condensed by the output mirror, but instead of being focusing to the output port, a special return mirror system would redirect it back to the input mirror for a second pass. On the second pass, the light beam is now in-line with the output port placed beneath the special return mirror system. Please note that light beam height is only half that of the single pass configuration due to the shared vertical placement of the special return mirror system and output port.

Computer Interface

All Sciencetech computer controlled monochromators and motorized accessories such as motorized slits, dual port flipping mirrors, and filter-wheels are connected to the computer via serial (RS-232) or optional USB interface. For serial (RS-232) interface, Sciencetech has developed a proprietary addressing system such that one serial (RS-232) port can control up to 4 motorized devices. A Sciencetech RS-232 four-way splitter is required if more than one RS-232 motorized device is used.

Each computer-controlled motorized device requires its own Sciencetech MD-100 universal stepper motor controller. Many Sciencetech motorized monochromators, including the Model 9490, has one built-in MD-100 universal stepper motor controller to control its motorized grating. An Active-X component software library is included with each motorized device such that its control features can be incorporated into any Visual Basic, C++, J++, or LabView application.

The Active-X library is designed for use in Microsoft Windows 98/ME/2000/XP computers only. However, users can write their own software interface for other operating systems by referencing the RS-232 ASCII command interface manual provided. Also available as an option are two fully featured Windows applications (Sci-Spec and Sci-LDA) to control the Model 9490 in monochromator or spectrograph mode respectively.

ACCESSORIES

220~240VAC Operation at 50 Hz (MD100-240VAC)

Please select this option if the instrument is to work in 220VAC or 240VAC at 50Hz. Please specify exact voltage.

USB Interface
(MD100i-USB) $ USD

This option allows Sciencetech motorized monochromators/spectrographs to be controlled through a USB port instead of a RS-232 serial port of a computer. This option utilizes an internal adapter that converts the native RS-232 electronics of the motorized monochromator/spectrograph into USB. A software driver must be loaded into the Windows based computer such that the USB interface is recognized as a virtual serial COM port for Sciencetech's SCI-LDA, SCISPEC or Active-X control software to communicate with it.

Dual Input or Output Port
(9000-dp) USD

An additional input or output port can be added to the side of the monochromator/spectrograph (lateral position) with an added manual flipping mirror as a port selector. A manual knob at the top of the monochromator/spectrograph would allow the user to select which port to direct the light. If an additional input port is required, an additional slit such as the Model SS80 or SS82HR (sold separately) is typically required with it. If an additional output port is required, an additional output slit is only required if the detector mated to the output port is a single channel detector or PMT. Multi-Channel linear array detectors such as PDAs, InGaAs arrays, and CCDs do not require a slit. They are also advised to be mounted onto the front output port only.

Vacuum Operation (VO)

A vacuum version that allows it to operate in a 10^{-7} Torr environment is available for UV applications.

Four Grating Turret (4GT)

A computer controlled motorized four grating turret is available in place of the single kinematic mounted removable grating. This option is not available on the Model 9150-SD.

Manual Bilaterally Adjustable Slit - High Resolution
(SS82-HR) $ USD

The Model SS82-HR is a high resolution bilaterally adjustable slit designed specifically for Sciencetech's large monochromators (models 9040, 9490, and 9150) due to their high resolution tolerance requirements. The slit has a manual micrometer knob for fine slit width adjustment between 0mm~6mm. The slit height can also be adjusted between 0mm~40mm through a manual metal curtain slider. However, the maximum slit height is limited by the 38mm port diameter of Sciencetech's large monochromators. Most Sciencetech large monochromators such as the Model 9040

already includes one Model SS82-HR slit at the input port. Purchase an additional slit only if a single-channel or PMT detector is to be mated to the output port. Multichannel linear array detectors such as CCDs and Photodiode arrays do not require a slit at the output port. Additional slits may also be required if a dual input or output port is selected. Please contact a Sciencetech Applications Specialist at sales@sciencetech-inc.com if you are unsure whether an additional slit is required in your application.

Computer-Controlled Bilaterally Adjustable Slit - High Resolution (SS83-HR) $ USD

This is a computer-controlled motorized version of Sciencetech Model SS82-HR high resolution bilaterally adjustable slit. Like the Model SS82-HR, it is also designed for Sciencetech's large monochromators due to their high resolution tolerance requirements. The computer-controlled Model SS83-HR has a maximum adjustable slit width of 0~6mm. The slit height is also adjustable, but remains to be a manual sliding metal curtain like the manual control Model SS82-HR slit. Therefore, the slit height cannot be computer controlled. Although the maximum height of the slit adjustment is 40mm, most Sciencetech large monochromators such as the Model 9040 have a port diameter of 38mm which becomes the limiting factor in slit height. The motorized slit width is controlled via USB or RS-232 serial interface with a MS-Windows 98/ME/NT/200/XP computer. An Active-X software module is included such that the slit width can be controlled through any Visual Basic, C++, J++, or LabView application. Or alternatively, the Active-X software can be used as stand-alone software to control the slit width.

Since many Sciencetech large monochromator models already include one manual adjustable Model SS82-HR slit, there is both an "upgrade" price for the first slit and a "new" price for consecutive slits. Please check versions for details.

Technical Specifications

All specifications are for 1200 l/mm grating, except where stated

- **Configuration:** Czerny-Turner Single/Double pass
- **Focal Length:** 914mm input, 1000mm output, Multiply by 2 for double pass mode
- **Aperture:** f/7.4 (102mm x 102mm grating) f/9.7 (84mm x 84mm grating)
- **Scanning Range:** 0 - 1200 nm (1200 l/mm grating)
- **Spectral Range:** 180 nm to 50 µm, depending on grating
- **Dispersion (1200 l/mm grating):**
  - **Single Pass:** 0.83 nm/mm
  - **Double Pass:** 0.42 nm/mm
- **Gratings:** Ruled or Holographic
- **Standard size:** 102mm x 102mm (clear aperture)
- **Optical Resolution:** Greater than 0.01nm (single pass mode, 102mm gratings using 10µm slits)
- **Wavelength Accuracy:** ±0.03 nm
- **Wavelength Reproducibility:** ±0.01 nm
- **Drive Step Size:** 0.02 nm (1200 l/mm grating)
- **Height of Optical Line:** 76.2mm
- **Dimensions:** 711 mm x 381 mm x 254 mm
- **Weight:** 35kg
- **Handling:** Grab Handles on all four sides

Group Accessories

Please check the appropriate sections in the catalogue for the following:

Detector Mount Selection (for detector mating)	(DetMount9040)
84mm x 84mm Grating Selection	(GR84)
102mm x 102mm Gratings Selection	(GR102)
Input Light Coupling Optics	(LightCouplingLrg)
Software Control Options (Mandatory)	(SoftwareGroup1)

1.5m High Resolution Monochromator/Spectrograph

The Model 9150 is Sciencetech's highest resolution monochromator with a 1.5m focal length. It can achieve a resolution of 0.004 nm in single pass mode (under optimum conditions), and 0.002 nm in double pass mode (under optimum conditions) configuration that effectively doubles the focal length to 3m. It utilizes large 102mm x 102mm gratings for high light throughput (f/12 aperture). The standard model accommodates one grating on a removable kinematic mount. Users can manually swap one grating for another without losing alignment. An optional model utilizes a 4 grating turret for automatic grating selection without manual service. The Model 9150 has a flat field output allowing it to operate as a spectrograph using a linear array multichannel detector to capture the entire output spectrum instantaneously. Sciencetech provides a selection of 1" wide CCD and photodiode linear array detectors mounted on a multi-axis adjustable focusing platform for use with the Model 9150.

Vacuum Operation

For Ultraviolet light applications, it is best to operate the monochromator in a vacuum environment to eliminate water vapor absorption. An optional vacuum version allows the Sciencetech Model 9150 to operate in a 10^{-7} Torr environment for ultra-violet applications. Please note this option only allows the entire Model 9150 to be placed inside a vacuum environment, and does not imply its housing is capable of maintaining a vacuum condition inside.

High Resolution Slits

One manual high resolution bilaterally adjustable slit for the input port is standard. An additional slit is required for the output port if the Model 9150 is used as a monochromator with a single-channel detector mounted at the output. An additional slit is not required if the Model 9150 is used as a spectrograph with a multi-channel detector mounted at the output port. The slit is manually adjustable with a micrometer thumb wheel from 0mm~6mm width. The maximum slit height is 38mm, but can be reduced through an optional height adjustable stepwise cover. A computer controlled motorized version of the high resolution bilaterally adjustable slit is available as an option.

HIGHLIGHTS

- High Light Throughput with F/12 aperture
- Available Double Pass Mode
- Low stray light
- Long scanning range
- Grating in kinematic mount for easy removal
- Available 4 grating turret model
- Wide selection of standard gratings, including ruled, holographic, gold or aluminum coated
- High precision motorized sine drive for wavelength selection
- Active-X library for easy software integration
- Serial port (RS-232) or optional USB interface for computer-controlled motorized grating and accessories
- High resolution manual bilaterally adjustable slit at input port
- Rugged anodized aluminum body construction

Double Pass Configuration

In the Double Pass configuration, the light beam essentially repeats the Czerny-Turner optical path twice inside the monochromator before exiting the output port. The first pass is identical to the standard single pass configuration where the light would enter the input slit, get collimated by the input mirror, and then get sent to the grating. The dispersed light from the grating would then get condensed by the output mirror, but instead of being focusing to the output port, a special return mirror system would redirect it back to the input mirror for a second pass. On the second pass, the light beam is now in-line with the output port placed beneath the special returnmirror system. Please note that light beam height is only half that of the single pass configuration due to the shared vertical placement of the special return mirror system and output port.

Version Description	Version Code	Version Price (USD)
9040 Single Pass (1.5m)	-S	
9040 Single & Double Pass(1.5m, 3m selectable)	-SD	.

Gratings Choices

A wide selection of 102mm x 102mm gratings are available. These include ruled gratings (150 l/mm, 300 l/mm, 600 l/mm, and 1200 l/mm) and holographic gratings (1800 l/mm, 2400 l/mm). Selected gratings are also available gold or aluminum coated.

Computer Interface

All Sciencetech computer controlled monochromators and motorized accessories such as motorized slits, dual port flipping mirrors, and filter-wheels are connected to the computer via a serial (RS-232) or optional USB interface. For a serial (RS-232) interface, Sciencetech has developed a proprietary addressing system such that one serial (RS-232) port can control up to 4 motorized devices. A Sciencetech RS-232 four-way splitter is required if more than one RS-232 motorized device is used. Each computer controlled motorized device requires its own Sciencetech MD-100 universal stepper motor controller. Many Sciencetech motorized monochromators, including the Model 9150, has one built-in MD-100 universal stepper motor controller to control its motorized grating. An Active-X component software library is included with each motorized device such that its control features can be incorporated into any Visual Basic, C++, J++, or LabView application. The Active-X library is designed for use in Microsoft Windows 98/ME /2000/XP computers only. However, users can write their own software interface for other operating systems by referencing the RS-232 ASCII command interface manual provided. Also available as an option are two fully featured Windows applications (Sci-Spec and Sci-LDA) to control the Model 9150 in monochromator or spectrograph mode respectively.

ACCESSORIES

220~240VAC Operation at 50 Hz (MD100-240VAC)

Please select this option if the instrument is to work in 220VAC or 240VAC at 50Hz. Please specify exact voltage.

USB Interface for MD100 Universal Controller (MD100-USB) $ USD

This adapter allows the MD-100 Universal Controller to be plugged into a standard USB port rather than an RS-232 port of a computer. It is actually an adapter that converts the RS-232 cable of the MD-100 Universal controller into a USB cable. A software driver has to be loaded into the Windows based computer, and the configuration file of Sci-Spec or Sci-LDA has to be modified. However, no special software coding is required as standard RS-232 commands will operate the MD-100 despite it is being routed through this USB adapter. The MD100 is simply referenced through a virtual COM port number.

Four Grating Turret (4GT)

A computer controlled motorized four grating turret is available in place of the single kinematic mounted removable grating. This option is not available on the Model 9150-SD.

Vacuum Operation (VO)

A vacuum version that allows it to operate in a 10^{-7} Torr environment is available for UV applications.

Dual Port Option (9150-DP)

Dual input and dual output ports are available for the Model 9150-S only. In the Model 9150-SD, the front (axial) ports are strictly reserved for double pass mode and the side (lateral) ports are strictly reserved for single pass mode.

Computer Control Bilaterally Adjustable Slit - High Resolution (SS83-HR) $ USD

This is a computer-controlled motorized version of Sciencetech Model SS82-HR high resolution bilaterally adjustable slit. Like the Model SS82-HR, it is also designed for Sciencetech's large monochromators due to their high resolution tolerance requirements. The computer-controlled Model SS83-HR has a maximum adjustable slit width of 0~6mm. The slit height is also adjustable, but remains to be a manual sliding metal curtain like the manual control Model SS82-HR slit. Therefore, the slit height cannot be computer controlled. Although the maximum height of the slit adjustment is 40mm, most Sciencetech large monochromators such as the Model 9040 has a port diameter of 38mm which becomes the limiting factor in slit height. The motorized slit width is controlled via USB or RS-232 serial interface with a MS-Windows 98/ME/NT/200/XP computer. An Active-X software module is included such that the slit width can be controlled through any Visual Basic, C++, J++, or LabView application. Or alternatively, the Active- X software can be used as a stand-alone software to control the slit width.

Since many Sciencetech large monochromator models already include one manual adjustable Model SS82-HR slit, there is both an "upgrade" price for the first slit and a "new" price for consecutive slits. Please check versions for details.

Manual Bilaterally Adjustable Slit - High Resolution (SS82-HR) $ USD

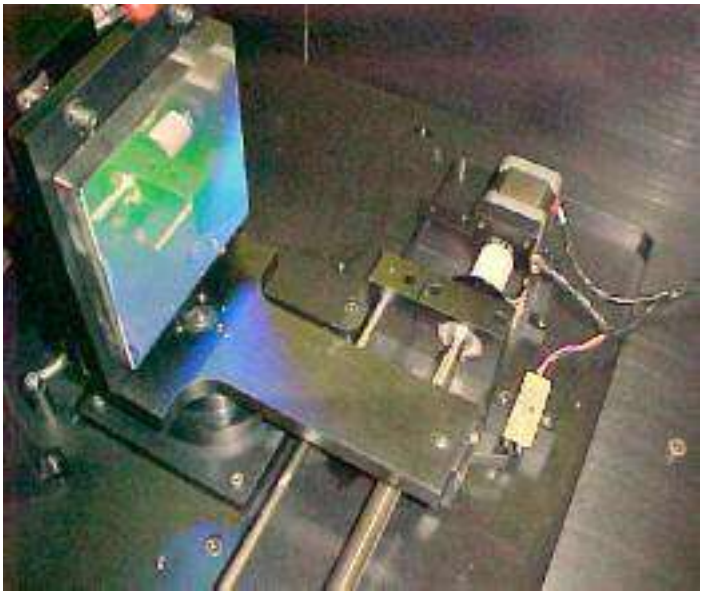
The Model SS82-HR is a high resolution bilaterally adjustable slit designed specifically for Sciencetech's large monochromators (models 9040, 9490, and 9150), due to their high resolution tolerance requirements. The slit has a manual micrometer knob for fine slit width adjustment between 0mm~6mm. The slit height can also be adjusted between 0mm~40mm through a manual metal curtain slider. However, the maximum slit height is limited by the 38mm port diameter of Sciencetech's large monochromators. Most

Sciencetech large monochromators such as the Model 9040 already include one Model SS82-HR slit at the input port. Purchase an additional slit only if a single-channel or PMT detector is to be mated to the output port. Multi-channel linear array detectors such as CCDs and Photo-diode arrays do not require a slit at the output port. Additional slits may also be required if a dual input or output port is selected. Please contact a Sciencetech Applications Specialist at sales@sciencetech-inc.com if you are unsure whether an additional slit is required in your application.

Technical Specifications

All specifications are for 1200 l/mm grating, except where stated

- **Configuration:** Czerny-Turner Single/Double pass
- **Focal Length:** 1,500 mm (3,000 mm in double pass)
- **Aperture:** f/12
- **Scanning Range:** 0 - 1500 nm (1200 l/mm grating)
- **Spectral Range:** 180 nm to 50 µm, depending on grating
- **Dispersion (1200 l/mm grating):**
  - **Single pass:** 0.53 nm/mm
  - **Double pass:** 0.26 nm/mm
- **Dispersion (2400 l/mm grating):**
  - **Single pass:** 0.26 nm/mm
  - **Double pass:** 0.13 nm/mm
- **Gratings:** Ruled or Holographic
- **Standard size:** 102mm x 102mm (clear aperture)
- **Optical Resolution (2400 l/mm grating):** 0.004nm in single pass mode, 0.002nm in double pass mode (under optimum conditions)
- **Wavelength Accuracy:** ±0.02 nm
- **Wavelength Reproducibility:** ±0.002 nm
- **Drive Step Size:** 0.0025 nm (1200 l/mm grating)
- **Dimensions:** 660 mm x 1700 mm x 380 mm
- **Weight:** 150 kg
- **Handling:** Grab Handles on all four sides



Group Accessories

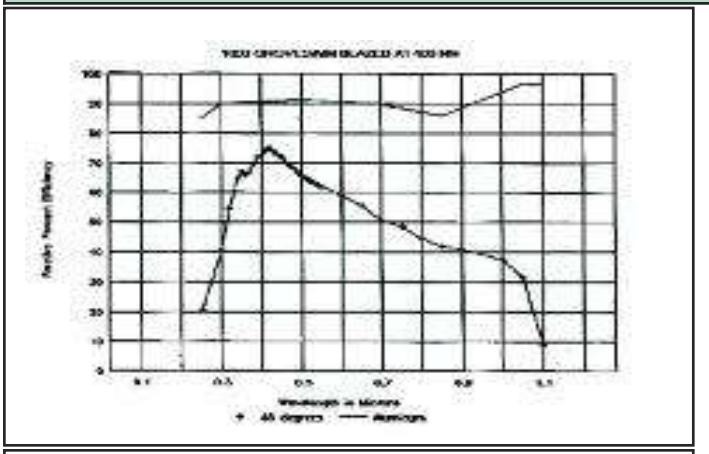
Please check the appropriate sections in the catalogue for the following:

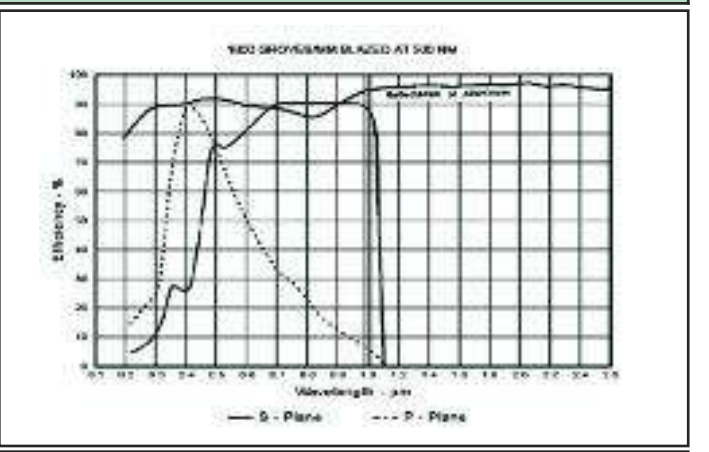
Grating Selections for Standard Mode (50mm)	(GR50)
Software Control Options (Mandatory)	(SoftwareGroup1)
Input Light Coupling Optics (Optional)	(input coupling)
Detector Mount Selections (For Detector Mating)	(DETMOUNT)
Grating Selections for Fast Mode (64mm)	(GR64)

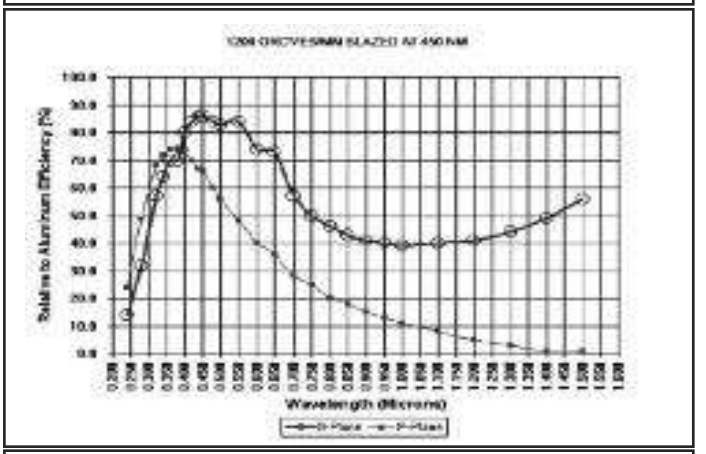
LARGE GRATING EFFICIENCY CURVES

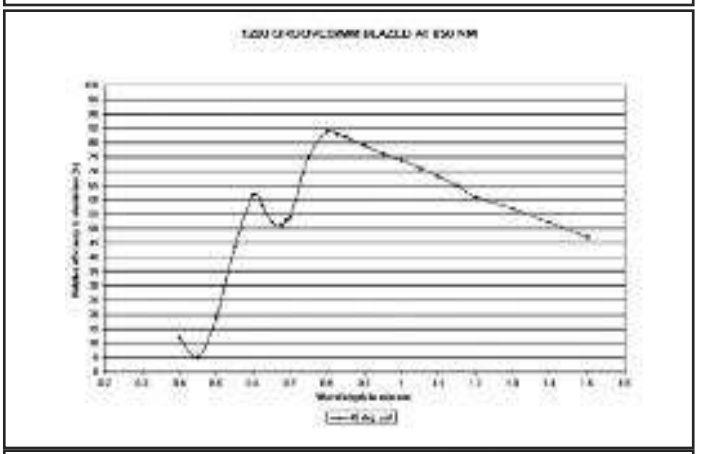
The following selection of gratings are available for Sciencetech's LARGE size monochromators: 9040, 9040DA, 9490, 9150, 9150SD

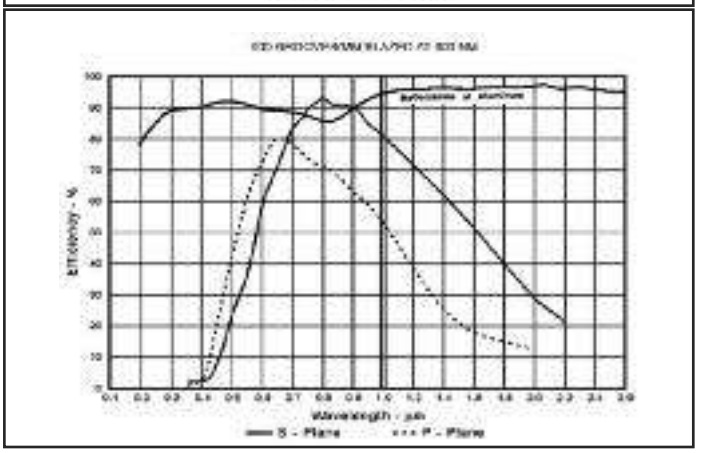
Ruled Gratings	
84 mm x 84 mm	$ USD
102 mm x 102 mm	$ USD

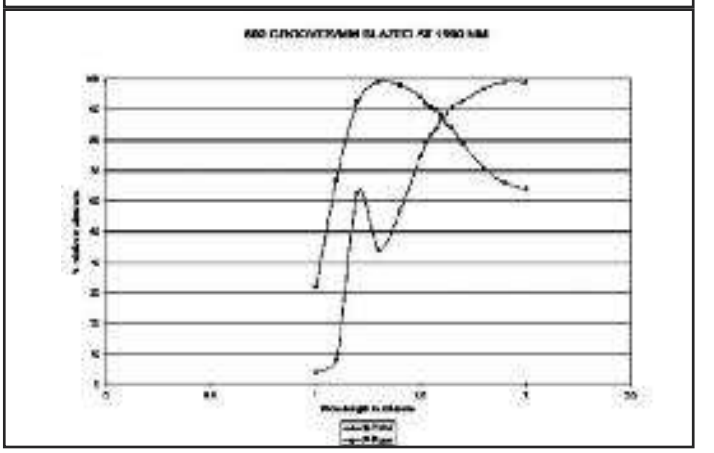


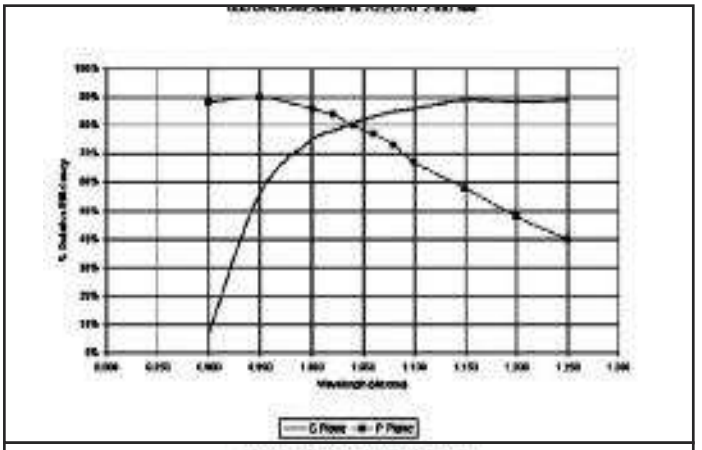


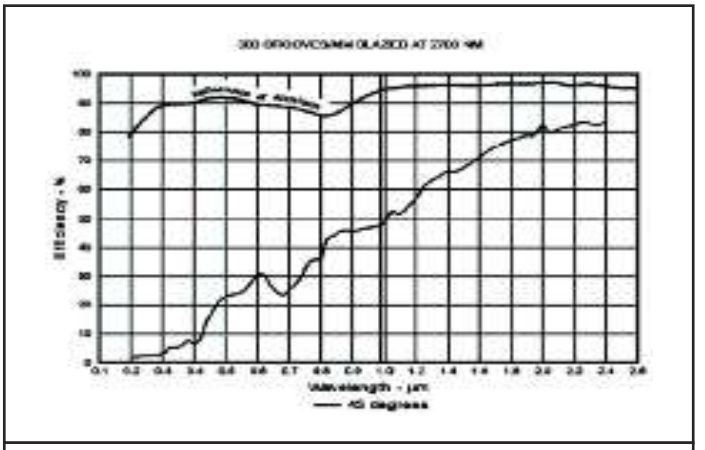


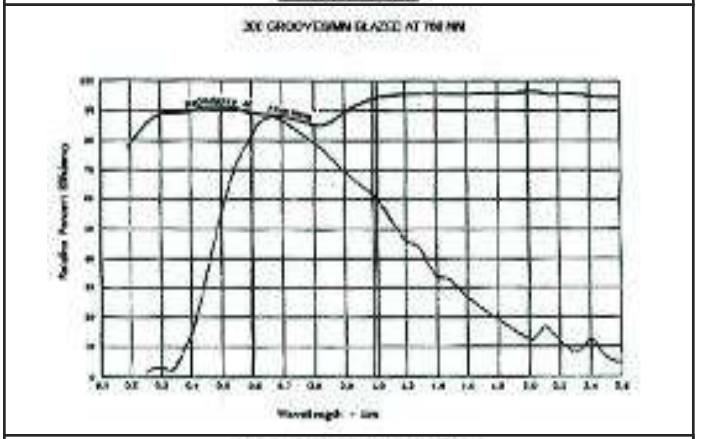


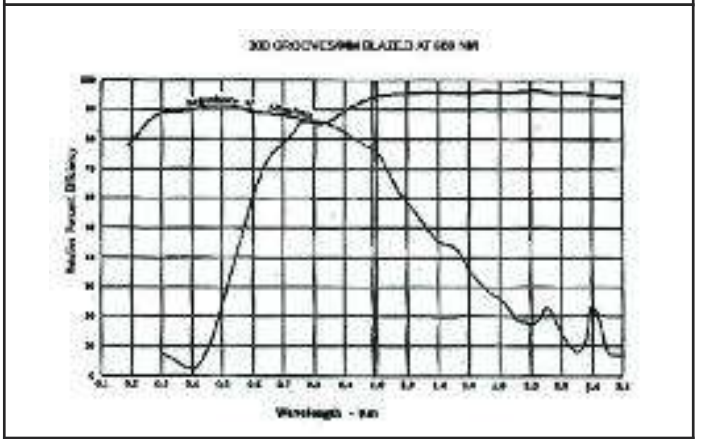


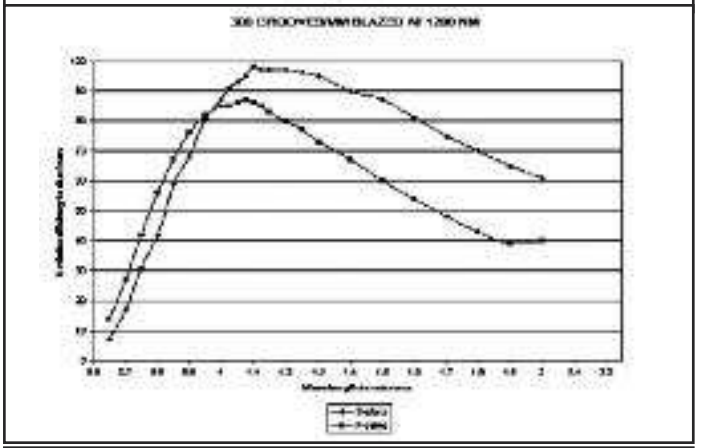


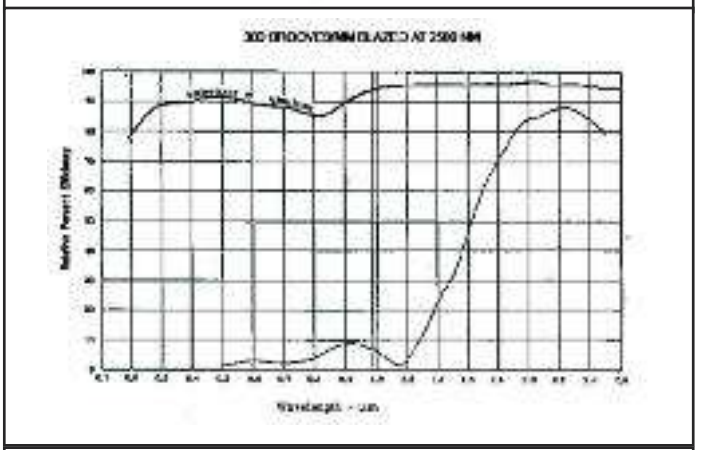


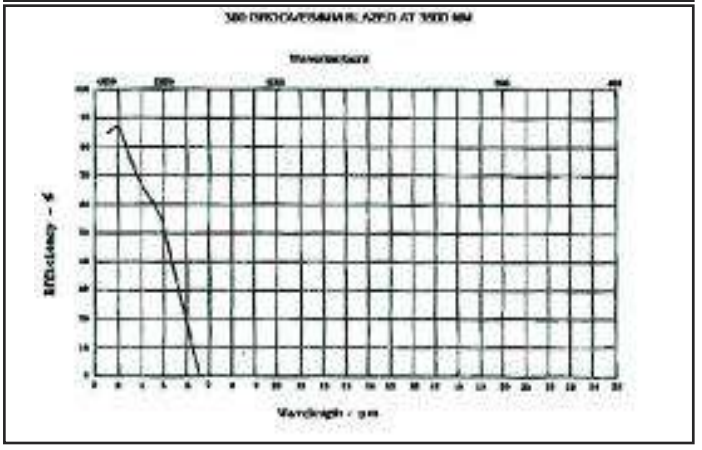


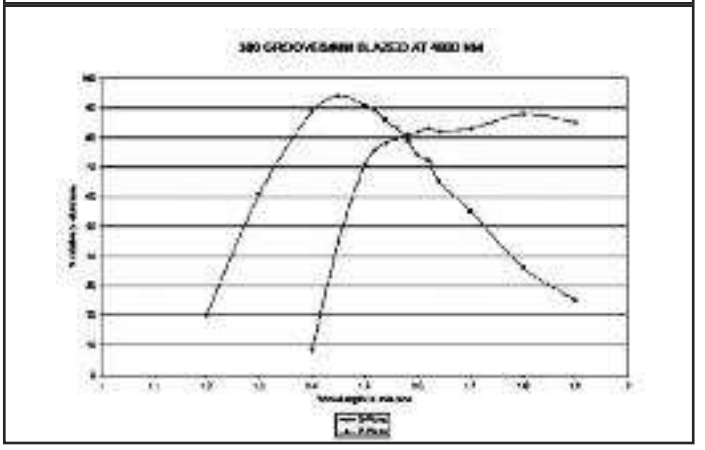


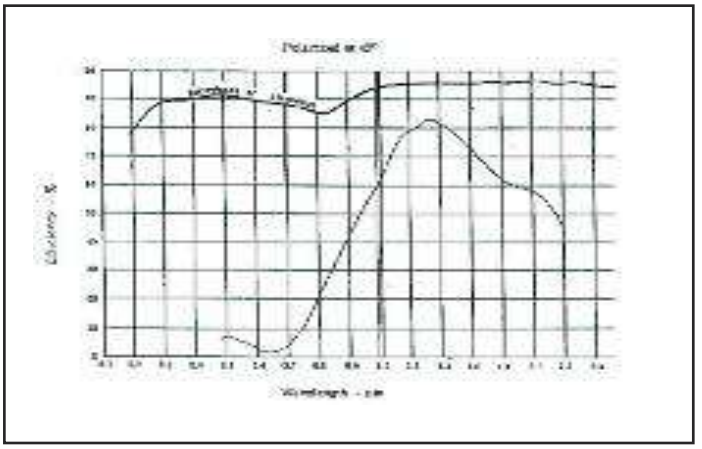




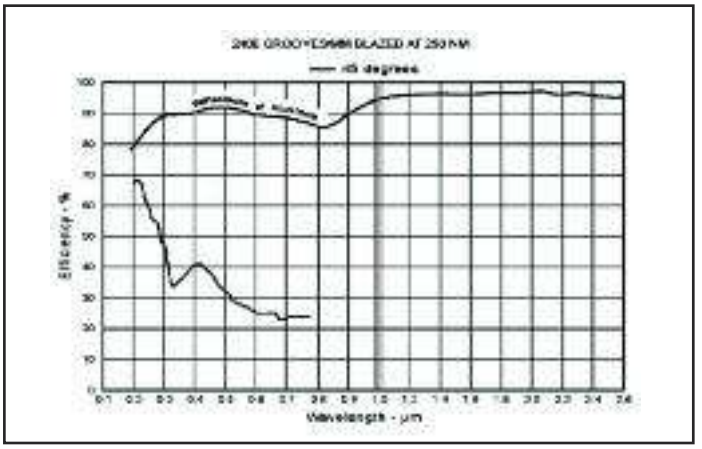


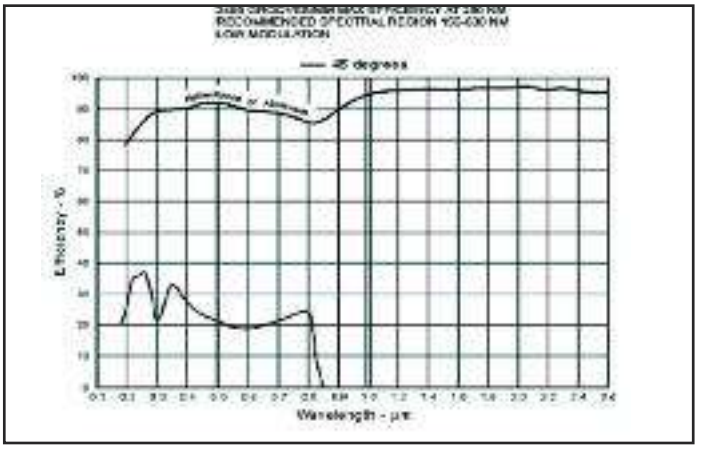


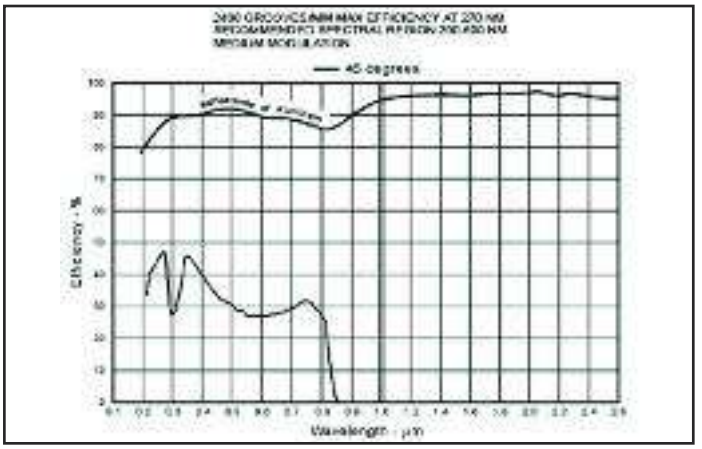


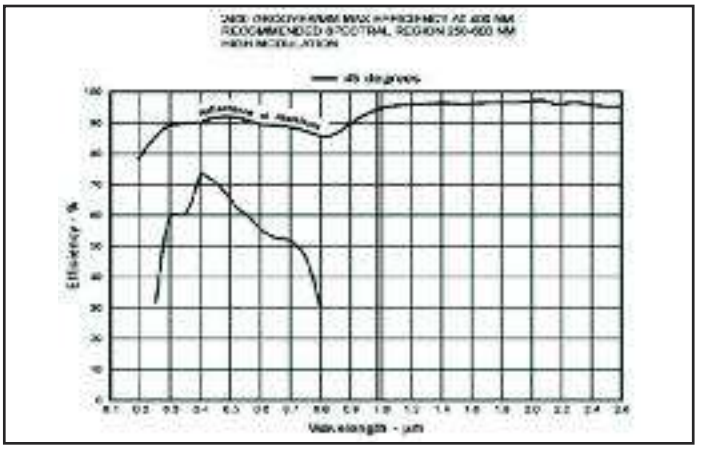


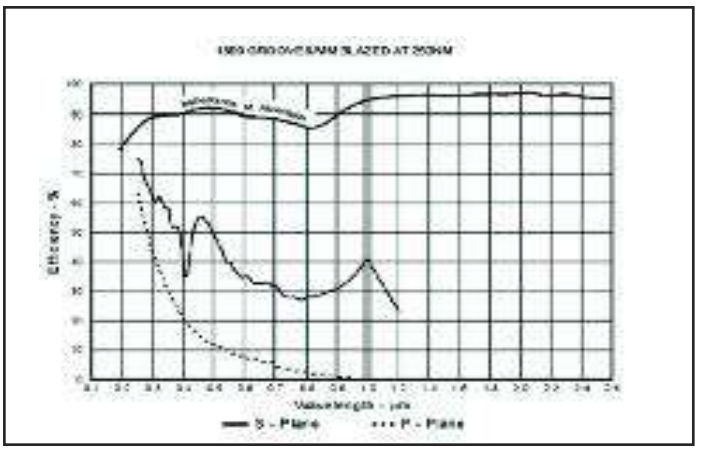
Holographic Gratings	
84 mm x 84 mm	$ USD
102 mm x 102 mm	$ USD

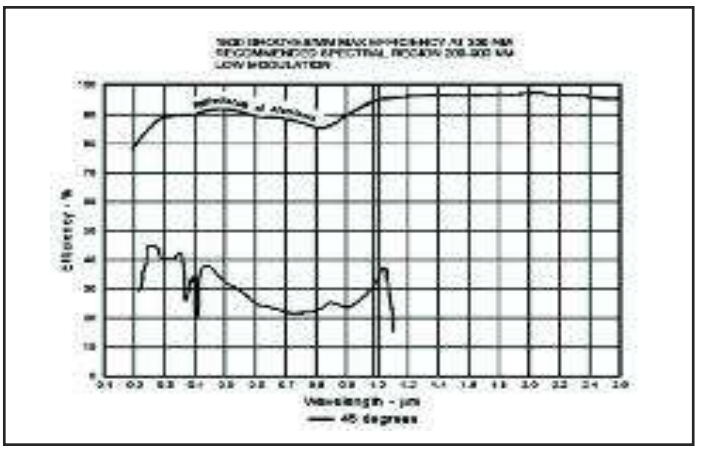


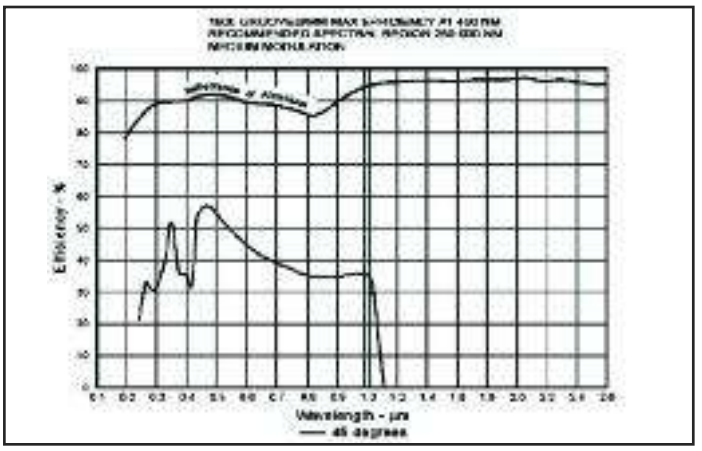


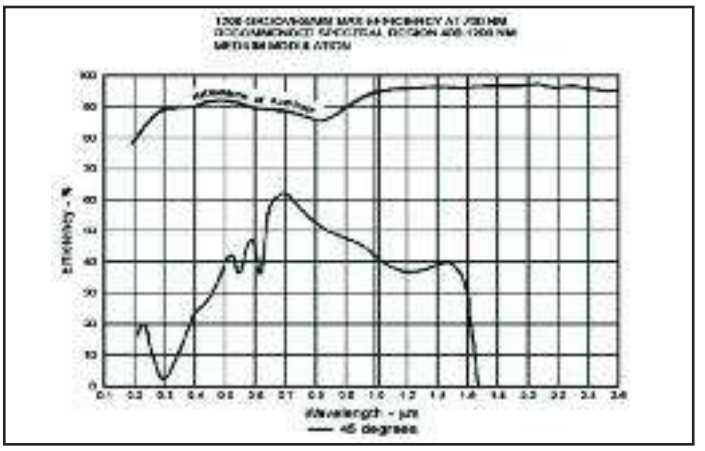


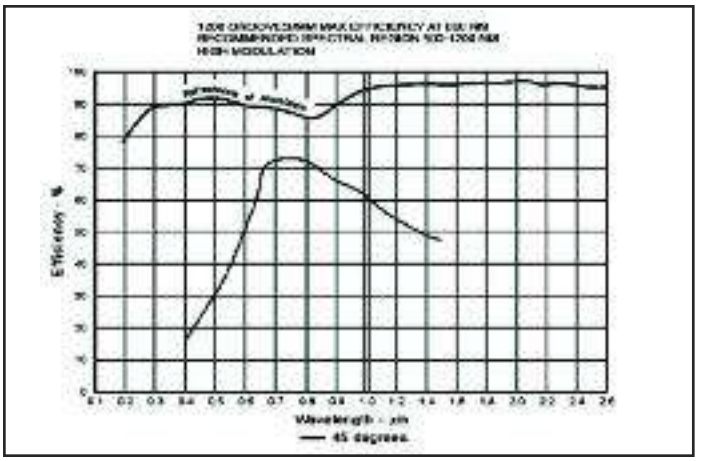



Efficiency - %
Wavelength - µm
S - Plane
P - Plane


Efficiency - %
Wavelength - µm
45 degrees


Efficiency - %
Wavelength - µm
45 degrees


Efficiency - %
Wavelength - µm
45 degrees


Efficiency - %
Wavelength - µm
45 degrees

Detector Mount Selection for Sciencetech Large Monochromators/Spectrographs
(Model 9040, 9490, 9150)

Sciencetech CCD Detector Mount
(code: 9000M-CCD-H) $ USD

This mount is required if a Sciencetech CCD Detector is to be mounted to the output port. This is a fully adjustable mount with back/forward, left/right, and tilt controls to align the 1" wide CCD sensor to the focal plane of any Sciencetech spectrographs except for the Model 8030. If this option is selected, a slit at the output port is not required. The cost of this mount includes the tedious but necessary detector focal plane alignment procedure performed at the factory before shipping.

Andor Technology CCD Detector Mount
(code: 9000M-CCD-A) USD

This mount is required for mating an Andor Technology CCD Detector (such as DV-401) to the output port. This is a manually adjustable mount that allows the Andor Technology detector to be moved forward and backwards and left to right such that the sensor can be aligned to the spectrograph's focal plane. This mount can be mated to any Sciencetech spectrograph except for the 8030 which does not support Andor Technology Detectors. A slit at the output port is not required for this option. This cost includes the tedious but necessary detector plane alignment procedure performed at the factory before shipping.

Sciencetech Single Channel Detector Mount
(code: 9000M-SC) USD

This mount is required if a Sciencetech single channel detector such as a Si, Ge, or InGaAs detector is mounted to the output port. This mount is compatible with all Sciencetech monochromators and spectrograph models. Please note that an output slit is required with this option.

Sciencetech PMT Detector Quick Release Mount
(code: 9000M-PMT) USD

This mount is required to mate Sciencetech PMH Series PMT detectors to the output port. It can be mounted to any Sciencetech monochromator models. The Model 9030 scanning monochromator requires a special version. This mount has a two side screw quick release mechanism to disconnect the PMT Detector from the monochromator. The PMT can be remounted without performing a realignment procedure. Please note that an output slit is required with this option.

Manual Bilaterally Adjustable Slit - High Resolution
(code: SS82-HR) $ USD

The Model SS82-HR is a high resolution bilaterally adjustable slit designed specifically for Sciencetech's large monochromators (models 9040, 9490, and 9150,) due to their high resolution tolerance requirements. The slit has a manual micrometer knob for fine slit width adjustment between 0mm~6mm. The slit height can also be adjusted between 0mm~40mm through a manual metal curtain slider. However, the maximum slit height is limited by the 38mm port diameter of Sciencetech's large monochromators. Most Sciencetech large monochromators such as the Model 9040 already include one Model SS82-HR slit at the input port. Purchase an additional slit only if a single-channel or PMT detector is to be mated to the output port. Multi-channel linear array detectors such as CCDs and Photo-diode arrays do not require a slit at the output port. Additional slits may also be required if a dual input or output port is selected. Please contact a Sciencetech Applications Specialist at sales@sciencetech-inc.com if you are unsure whether an additional slit is required in your application.

Computer-Controlled Bilaterally Adjustable Slit - High Resolution

This is a compute-controlled motorized version of Sciencetech Model SS82-HR high resolution bilaterally adjustable slit. Like the Model SS82-HR, it is also designed for Sciencetech's large monochromators due to their high resolution tolerance requirements. The computer-controlled Model SS83-HR has a maximum adjustable slit width of 0~6mm. The slit height is also adjustable, but remains to be a manual sliding metal curtain like the manual control Model SS82-HR slit. Therefore, the slit height cannot be computer controlled. Although the maximum height of the slit adjustment is 40mm, most Sciencetech large monochromators such as the Model 9040 have a port diameter of 38mm which becomes the limiting factor in slit height. The motorized slit width is controlled via a PCI controller card interface with a Windows 98/ME/NT/200/XP computer. An Active-X software module is included such that the slit width can be controlled through any Visual Basic, C++, J++, or LabView application. Or alternatively, the Active-X software can be used as stand-alone software to control the slit width.

Since many Sciencetech large monochromator models already include one manual adjustable Model SS82-HR slit, there is both an "upgrade" price for the first slit and a "new" price for consecutive slits. Please check versions for details.

Version Description	Version Code	Version Price (USD)
New	-std	P.O.R
Upgrade	-upgrade	P.O.R
Vacuum Version	-Vac	P.O.R

HIGHLIGHTS

- Bilaterally adjustable jaws 0-6mm
- 40mm slit height
- Manual curtain slider for slit height adjustment 0~40mm
- Servo motor actuator with 0.05um increments
- 8 micron backlash
- Includes cable to dedicated servo motor PCI controller board
- Servo motor PCI controller board sold separately

Where To Use A Slit

Most Sciencetech large monochromators such as the Model 9040 already include one manual Model SS82-HR slit at the input port. Only purchase an additional slit for the output port if a single channel or PMT detector is to be mated to the output. Multi-channel linear array detectors such as CCDs and Photo-diode arrays do not require a slit at the output port. Additional slits may also be required if a dual input or output port is selected. Please contact a Sciencetech Applications Specialist at sales@sciencetech-inc.com if you are unsure whether an additional slit is required in your application. Please also note that there is an upgrade price available if you want to upgrade the existing manual Model SS82-Hr slit at the input port for a computer-controlled Model SS83-HR slit version.

Electronics Controller

Please note that an actuator controller (sold separately) is required to operate the slit. This actuator controller provides power and position commands to the motorized slit and interfaces it to the computer via a dedicated PCI controller card.

Standard vs High Resolution

The manual control Model SS80 slit and computer-controlled Model SS83 slit are both standard resolution slits designed for Sciencetech's regular line of monochromators /spectrographs such as the Model 9010, 8010, 9055, 9035, and 9057. These monochromators and spectrographs have focal lengths between 200mm to 457mm. The manual control Model SS82-HR slit and computer-controlled SS83-HR slit are both high resolution slits designed for Sciencetech's large line of monochromators/spectrographs such as the Model 9040, 9490 and 9150. These monochromators and spectrographs have focal lengths between 500mm ~1.5m. It is not recommended to cross use the slits between the different classes of monochromators. Using a standard resolution slit on a large size monochromator/spectrograph will degrade its optical resolution. Using a high resolution slit on regular size monochromator/spectrograph will not improve its optical resolution.

Software

The slit is controlled by Software. Sciencetech provides "Sci-Slit", a Windows based Active-X component library that controls the slit through the Windows operating system. The Active-X software is available free of charge and can be used by itself as a stand-alone application or imbedded into another application written in Visual Basic, Visual C++, Java, Excel, etc. It can even be used inside a LabView environment now that LabView supports Active-X components.

Accessories

Motorized Slit SS83-HR Controller (MD-SS83HR)

The Sciencetech motorized SS83-HR slit requires a PCI servo motor controller board and a daughter card for interfacing with a Windows-based computer. This PCI servo motor controller provides power to the motorized slit and commands for precision movement of the bilateral jaws. The PCI servo motor controller board can control up to eight motorized slits, but each motorized slit requires its own daughter card on this board. The price is therefore structured such that the first motorized slit controller is more expensive to include on the PCI motor controller board, and the consecutive slit controllers are less expensive as only the daughter card is necessary. The price of cable is included in the SS83-HR slit whereas the price of the Sci-Slit Active- X software is included here.

Active-X Software for Motorized Slits (Sci-Slit)

This interfacing software is included with the purchase of a motorized standard resolution or high resolution slit controller. This software allows the user to select the bilaterally adjustable jaw position of the slit through an Active-X component library. The software can be used as a stand-alone application or imbedded into a larger Visual C++, Visual Basic, Java, Excel, or even LabView application.

Software for Monochromators / Spectrographs

Active-X Software for Motorized Monochromators (code: Sci-Mono)

A Windows based Active-X software module for controlling the motorized grating turret is now standard on all Sciencetech motorized monochromators and spectrographs. This Active-X software module allows the user to select wavelength position and active grating (multi-grating turret systems only) via software commands on a Windows computer. Being an Active-X module, it can be used as a stand-alone software application or have its control functionality incorporated into other Active-X compliant Windows software applications written in C, Visual C++, Visual Basic or even National Instrument's LabView.

Sci-Spec Scanning Monochromator Software (code: SciSpec) $ USD

Sci-Spec is a fully featured scanning monochromator software application. It is specifically designed for Sciencetech spectrometer systems that utilize a Sciencetech motorized monochromator and Sciencetech single channel or PMT detector. Sci-Spec coordinates the scanning action and data acquisition between a Sciencetech motorized monochromator and Sciencetech single channel or PMT detector (via an A/D acquisition board sold separately). The scanned spectral data is both displayed and saved to file for analysis. Sci-Spec can also control and coordinate other Sciencetech motorized accessories such as filter-wheels, flipping mirrors, light sources, and choppers. Sci-Spec is a complete Windows-based application designed only to work with Sciencetech components. It cannot be used to control scanning monochromator/spectrometer systems that utilize components from other vendors. For Sciencetech spectrograph based spectrometer systems, please purchase Sci-LDA Spectrograph Software instead.

Sci-LDA Spectrograph Software (code: SciLDA) $ USD

Sci-LDA is a fully featured spectrograph application. It is specifically designed for Sciencetech spectrometer systems that utilize a Sciencetech spectrograph and Sciencetech multi-channel detector such as PDA, CCD, or InGaAs linear/area arrays. Sci-LDA coordinates the grating selection and data acquisition between a Sciencetech motorized spectrograph and Sciencetech multi-channel detector (via an A/D acquisition board sold separately). The captured spectral data is both displayed and saved to file for analysis. Sci-LDA can also control and coordinate other Sciencetech motorized accessories such as filter-wheels, flipping mirrors, light sources, and choppers. Sci-LDA is a complete Windows based application designed only to work with Sciencetech components including Andor Technology CCD detectors and Hamamatsu linear CCD and PDA detectors. It cannot be used to control spectrograph-base spectrometer systems that utilizes components from other vendors. For Sciencetech imaging spectrographs, a slightly more expensive Sci-LDA-area CCD version is required (approx. $400 more). For Sciencetech scanning monochromator based spectrometer systems, please purchase Sci-Spec Scanning Monochromator Software instead.

Active-X Developer's Toolkit (code: Sci-DevKit) $ USD

A complete Active-X Developer's Toolkit is available for customers who want to develop their own Windows application to control a customized spectrometer system made from Sciencetech components. This toolkit contains Sci-Mono and all other Active-X component modules for various Sciencetech accessories like filterwheels, choppers, flipping mirrors, motorized slits, and detectors (single and multi-channel).

Interface Manual for Non-Windows OS (code: MD100manual) $ USD

Sciencetech's Sci-Mono Active-X Control Module, Sci-Spec and Sci-LDA software are designed for the Windows operating system. If a customer would like to control a Sciencetech monochromator/spectrograph or any Sciencetech motorized components with Mac OS, Unix, Linux, or any other operating system, Sciencetech publishes an interface manual and sample source code showing how to communicate with it via low level serial RS-232 commands. This interface manual also includes a simple Windows-based test program with open source code to demonstrate the low level RS-232 interface commands.