

Applications

- Tunable monochromatic light source
- Spectroscopic systems:
- Emission and source characterization
- Absorbance, transmittance and reflectance measurement
- High dispersion or high power density spectral illumination system
- Electrochemical spectroscopy
- Fluorescence spectroscopy
- Scanning spectrophotometry
- Raman spectroscopy

Features

- Highly customizable modular design
- Two configurable input and output ports
- Interchangeable turret design to allow more than three grating options
- Configurable turret and grating options
- USB2.0 communication
- Fully integrated software and development libraries available
- Full line of input and output accessories
- CE compliant

TDB 41.3

Standard Series Monochromators Models 9055, 9057



Standard Series Monochromators

OVERVIEW

The Sciencetech standard series monochromators offer a flexible and customizable choice of monochromator with the full functionality afforded by motorized wavelength control and a multiple grating turret.

The design features asymmetric Czerny-Turner optical layout, using up to 3 plane-ruled gratings with an f/3.5 aperture. An adjustable slit is included for the input port. Additional slit options and several accessories are available. For applications requiring better signal to noise, reduced stray light and better resolution than the standard model, a double monochromator (9055DX) in double additive mode is available. For applications requiring a tunable bandpass or notch filter light source, the double subtractive mode is an ideal choice.

Specifications

Model	9055	9055F	9055DX	9057	9057F
Input Focal Length (mm)	200	200	200 × 2	457	457
Output Focal Length (mm)	250	250	250 × 2	457	457
Wavelength Selection	Motorized	Motorized	Motorized	Motorized	Motorized
Communication	USB 2.0	USB 2.0	USB 2.0	USB 2.0	USB 2.0
Readout Mechanics	Direct drive stepping motor	Direct drive stepping motor	Direct drive stepping motor	Direct drive stepping motor	Direct drive stepping motor
Spectral Range* (with 1200l/mm grating) ¹	0-1350 nm	0-1350 nm	0-1350 nm	0-1450 nm	0-1450 nm
Aperture	f/3.5	f/2.5	f/3.5	f/8	f/5.9
Maximum Grating Size (mm × mm)	50 × 50	64 × 64	50 × 50	50 × 50	64 × 64
Number of Gratings	3	2	3	3	2
Optical Resolution* (nm)	0.2	0.4	0.09	0.1	0.2
Stray Light**	4 × 10 ⁻⁶	4 × 10 ⁻⁶	1 × 10 ⁻⁷	3 × 10 ⁻⁶	3 × 10 ⁻⁶
Dispersion* (nm/mm)	4	4	1.7	1.79	1.79
Wavelength Accuracy (±nm)***	0.2	0.2	0.2	0.04	0.04
Wavelength Reproducibility (±nm)****	0.03	0.03	0.05	0.03	0.03
Flat Field Size (mm)	25	25	25	25	25
Flat Field Angle (°)	-1.69	-1.69	Call	-1.4	-1.4
Optical Axis Height (mm)	76.2	86.4	76.2	76.2	76.2
Dimensions (mm)	395 × 262 × 130	395 × 262 × 130	588 × 406 × 208	605 × 265 × 130	605 × 265 × 130
Weight (kg)	7.5	10	20	9	9

* With a 1200l/mm grating and minimum slit height, ranges vary with grating groove density.

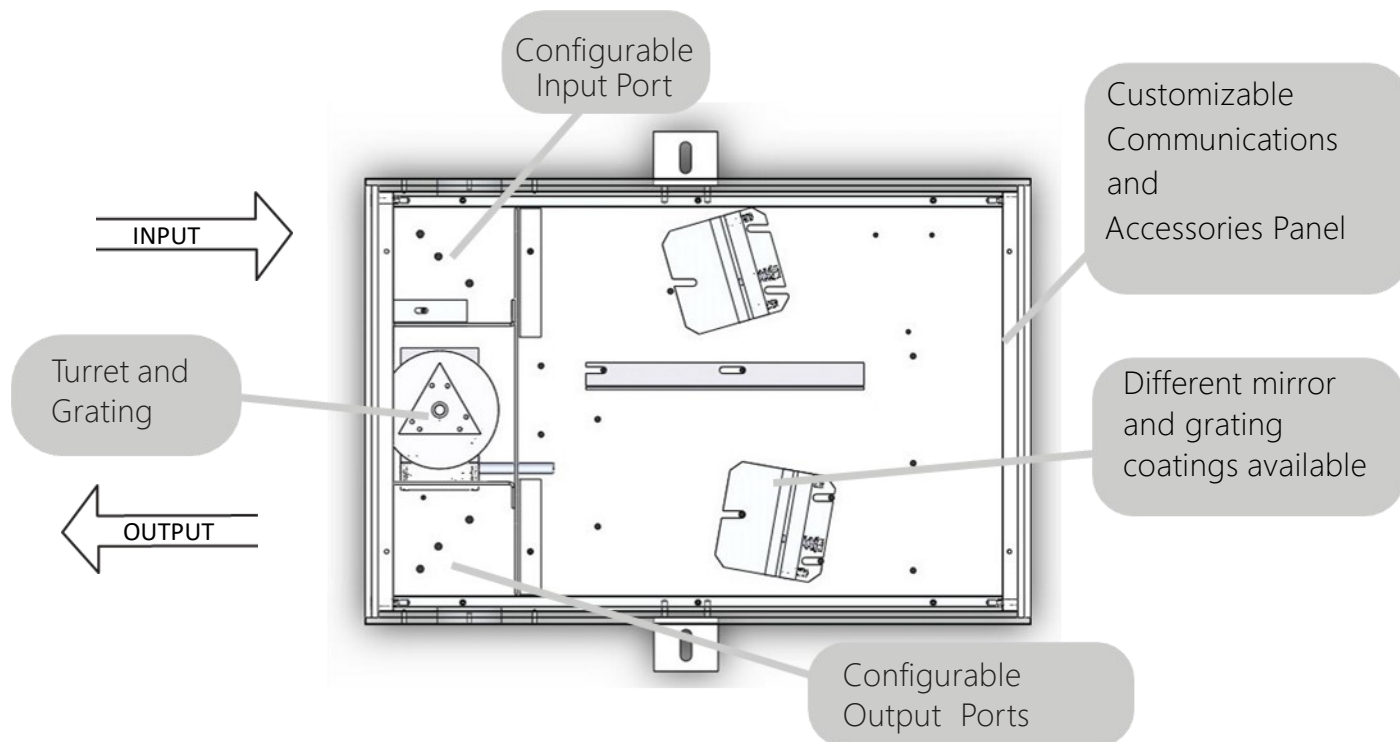
** Stray light values are with holographic gratings, ruled gratings produce worse stray light

1. UV region below 250 nm requires careful selection of grating, mirror and N2 purging and vacuum system for EUV



Standard Series Monochromators

CONFIGURATION



Step 1: Choose Chassis and F/#				
Part #	Model	F/#	Focal Length	Turret Configuration
120-9018	9055	F/3.5	200/250	Triple Grating
120-9023	9055F	F/2.5	200/250	Double Grating
120-9008	9057	F/8	500	Triple Grating
120-9042	9057F	F/5.9	500	Double Grating
120-9017	9055DX	F/3.5	200/250	Triple Grating



Step 2: Choose Input Port Configuration		
Part #	Model	Description
120-8042	9000-ST-IN	Side input port
120-8030	DPIN-ST-MAN	Dual input port
120-8072	DPIN-ST-MOT	Motorized input port

Step 3: Choose Output Port Configuration		
Part #	Model	Description
120-8043	9000-ST-OUT	Side output port
120-8031	DPOUT-ST- MAN	Dual output port
120-8073	DPOUT-ST- MOT	Motorized output port

Standard Series Monochromators

CONFIGURATION

Step 4: Grating Selection

There are three basic parameters to consider when choosing a grating for your standard series monochromator:

Required Wavelength Range

The wavelength range available to you is determined by the grating groove density chosen and the angular mechanical limitation of the monochromator.

Grating Efficiency

Ruled gratings may be blazed to increase their efficiency over a specific wavelength band. Holographic gratings can be modulated such that they are more efficient at some wavelengths than at others. Grating efficiency curves are the best tool for determining the most efficient grating available for your application. It is important to note that grating efficiency curves do not represent the exact efficiency that should be expected when the grating is used in a monochromator as grating efficiency curves are taken at Littrow angle.

Required Resolution and Bandwidth

Resolution is a measure of an instrument's ability to separate adjacent spectral lines. Resolution is generally given in nm. The bandwidth (or bandpass) is the wavelength range that falls on the output port at any one time and is also given in nm. This is an important parameter when integrating a camera such as a linear array or CCD on the output port of the monochromator.

Application Note: For Raman systems and when using a laser, ensure you choose a holographic grating.

Grating Selection Table for 200/250mm Focal Length Monochromators							
Grating (l / mm)	75	150	300	600	1200	1800	2400
Dispersion (nm/mm)	66.6	33.3	16.7	8.3	4	2.8	2.1
Resolution (nm)*	3.75	1.6	0.8	0.4	0.2	0.134	0.1
Bandwidth (nm)*	1650	840	420	210	105	73	52
Maximum Suggested** Wavelength (nm)	13900	6950	3475	1737	868	579	434
Maximum Realistic ** Wavelength (nm)	21891	10945	5472	2736	1368	912	684
Maximum Attainable ** Wavelength (nm)	25377	12688	6344	3172	1586	1057	793

*Bandwidth based on: Dispersion x 25.4mm wide array (important if using a LDA or CCD)

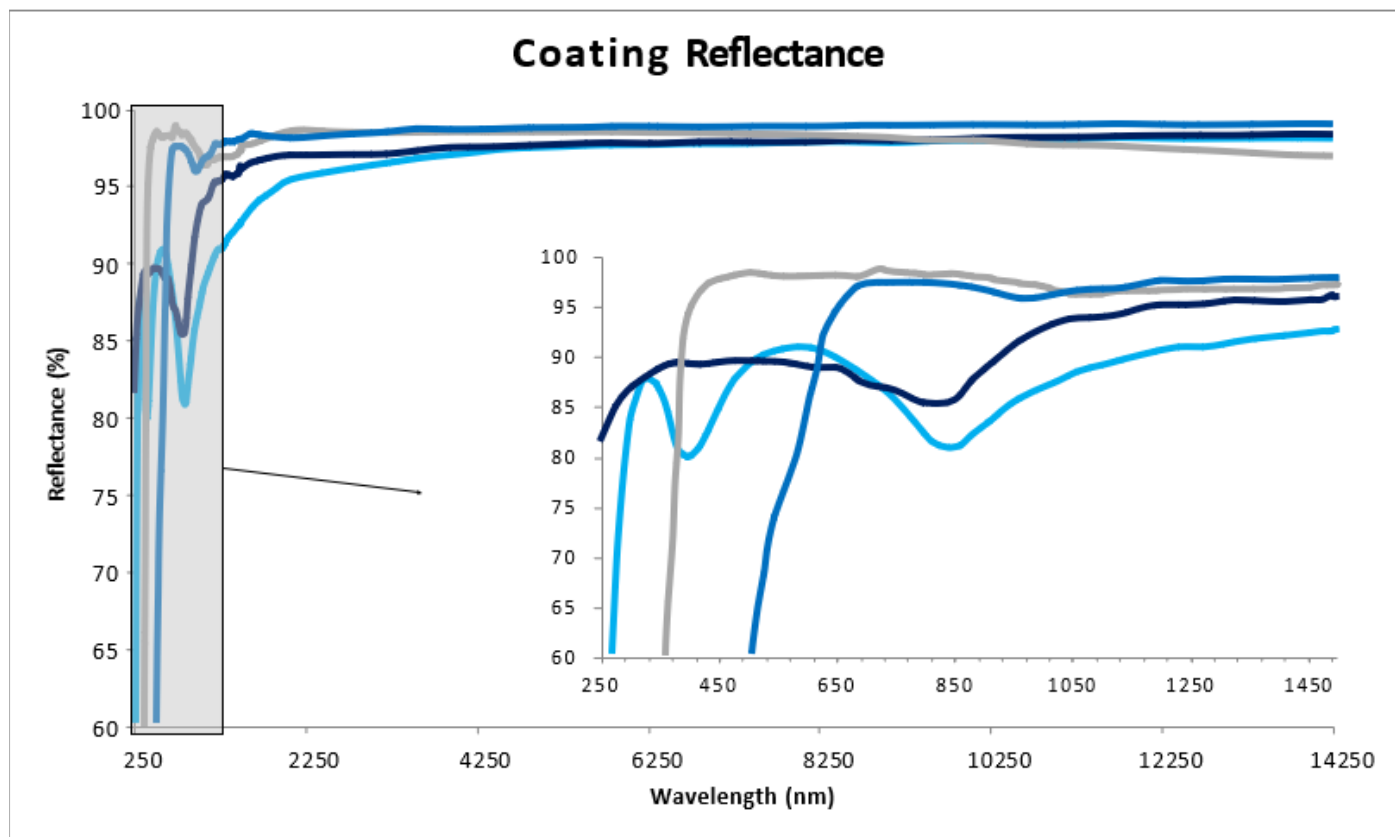
*Resolution based on: 50um wide input slit * Dispersion





** At the maximum suggested, realistic, and attainable wavelengths the approximate throughput corresponding to these wavelengths is >50%, ~15%, and ~0% of the maximum throughput, respectively.

Turret and Grating Size	
Turret Configuration	Maximum Grating Size
Triple Turret	50 mm x 50 mm
Double Turret	64 mm x 64 mm

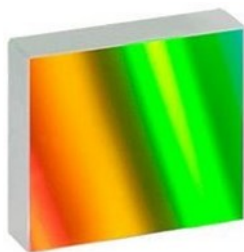
Standard Series Monochromators

CONFIGURATION



Mirror or Grating Coating		Useful Range	Code
Aluminum (MgF ₂)		350 nm+	-
UV-enhanced Aluminum		250 nm+	-UV
Silver		400 nm+	-S
Gold		600 nm+	-G
VUV Aluminum	Not Shown	190nm+	- VUV

Standard mirror coatings are aluminum with a MgF₂ protective layer. Standard gratings have an aluminum coating. If your application would benefit from different mirror or grating coatings please refer to the codes above at the time of order.



Need something you don't see here?

Sciencetech has built a reputation on custom solutions. Whether you need a small modification to an existing system, or a completely novel design built from the ground up to meet your technical specifications, Sciencetech's engineering and optical design teams are ready to help.

Standard Series Monochromators

SOFTWARE

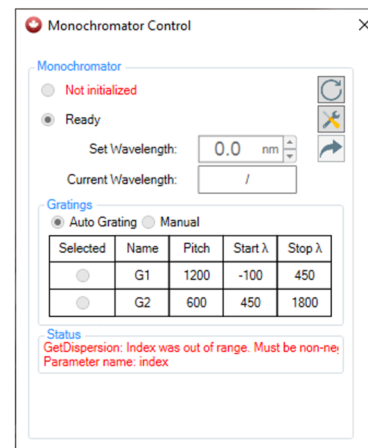
Sci-Mono Software

A Windows based software module with a simple graphical user interface for controlling Sciencetech stepping monochromator wavelength selection. SciMono is provided free of charge with a Sciencetech motorized monochromator when SciSpec software has not been purchased.

For a fully featured desktop application see SciSpec.

For embedded applications in LabView see SciAX control modules

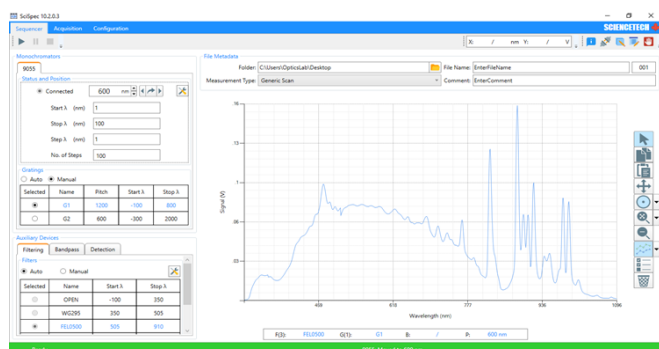
For C++ and Python API's see SciencetechCOM software



Sci-Spec Software

SciSpec is a fully featured Windows application specifically designed to control Sciencetech stepping monochromators. SciSpec is designed to control and coordinate the operation of Sciencetech modular spectroscopy components. These include:

- Stepping monochromators
- Motorized filter wheels for long pass, bandpass, short pass or neutral density filtering
- Motorized beam path selection mirrors
- Beam line modulators such as motorized iris or chopper
- Detectors and data acquisition components such as A/D boards, lock-in amplifiers and source meters.
- Linear diode arrays
- Sources such as research arc lamp, LED and incandescent light sources



Generally all the components in a modular spectroscopy system must be configured by wavelength to optimize the system operation. SciSpec stores and reads system configurations to provide an optimized system operation and user experience.

SciSpec can operate in sequencer/scanning mode as a stepping monochromator. In this mode a wavelength range is selected and detection and data acquisition parameters are specified to perform a step by step measurement sequence. This mode is usually used to measure relative or absolute intensity of light entering the monochromator. In this mode the modular spectroscopy system components move to their optimal locations as each new wavelength position is reached. If the system is equipped with detectors and data acquisition components SciSpec can plot the resultant data and perform some basic analysis.

SciSpec can be operated in manual mode to statically set the systems emitted wavelength. In this mode SciSpec can turn modular spectroscopy instruments into tunable light sources.

SciSpec can be operated in camera mode to control diode array cameras (if equipped). In camera mode SciSpec turns the modular spectroscopy instrument into a spectrograph.

Standard Series Monochromators

ACCESSORIES

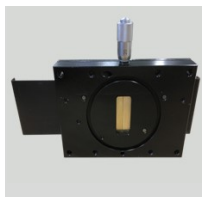
Grating Selection

Standard Czerny-Turner type monochromators suffer from astigmatism in the output beam due to the use of off-axis spherical mirrors. Often the astigmatism is not an issue. For imaging applications a toroidal mirror is used to compensate for the inherent astigmatism in the optical system produce a direct image of the input slit at the output port. This is an important option for studying phenomena such as fast kinetics.

Imaging Option	Note	Code
9055-i	For 120-9018	120-9060
Monochromator	Chassis only	
9057-i	For 120-9008	120-9061
Monochromator	Chassis only	
9055DX-i Double Monochromator	For 120-9017	120-9062
	Chassis only	

Accessories

Sciencetech manufactures and integrates a full line of input and output couplings as well as a selection of beam line connections. We offer a selection below, but visit our website to look at all the possibilities!



Slit Assemblies

Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/opto-mechanical/slit-assemblies.html



Adapters and Connectors

Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/opto-mechanical/adapters-and-connectors.html



Optical Choppers

Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/opto-mechanical/optical-choppers.html



Detectors and Data Acquisition

Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/detectors.html

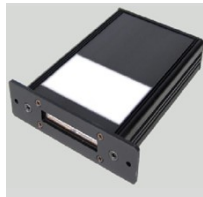


Sample Chambers

Visit our web : www.sciencetech-inc.com/all-products/modular-spectroscopy/sample-chambers.html

Standard Series Monochromators

ACCESSORIES



Line and Area Detectors

Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/detectors/line-detectors.html



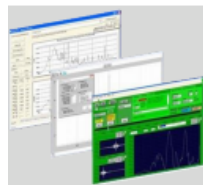
Data Acquisition Equipment

Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/data-acquisition-equipment.html



Manual and Motorized Filter Wheels

Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/opto-mechanical/filter-wheels.html



Software

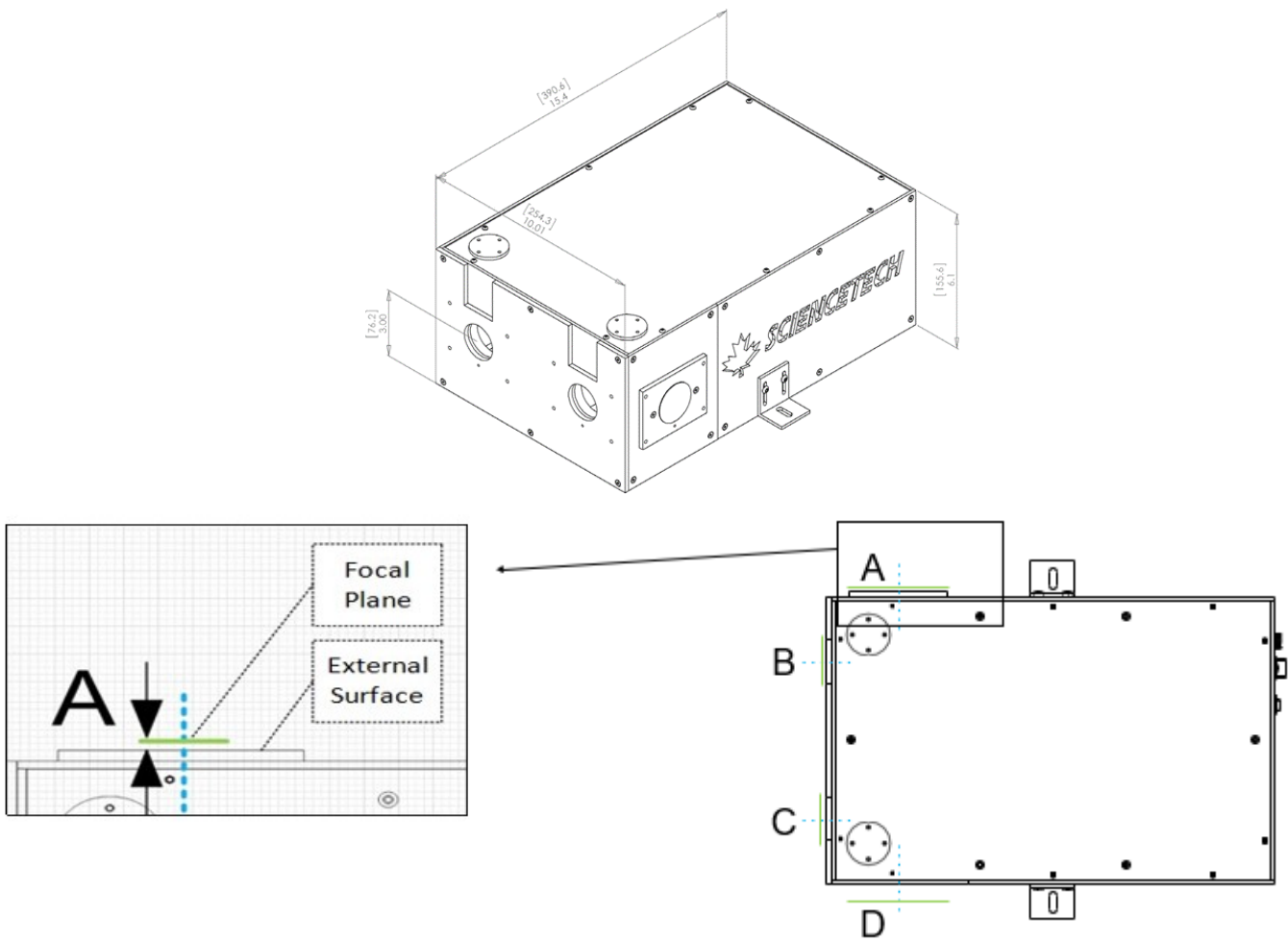
Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/software.html

Standard Series Monochromators

DIMENSIONS

Dimensions - 9055 Single Monochromator

Dimensions are in millimeters [inches].



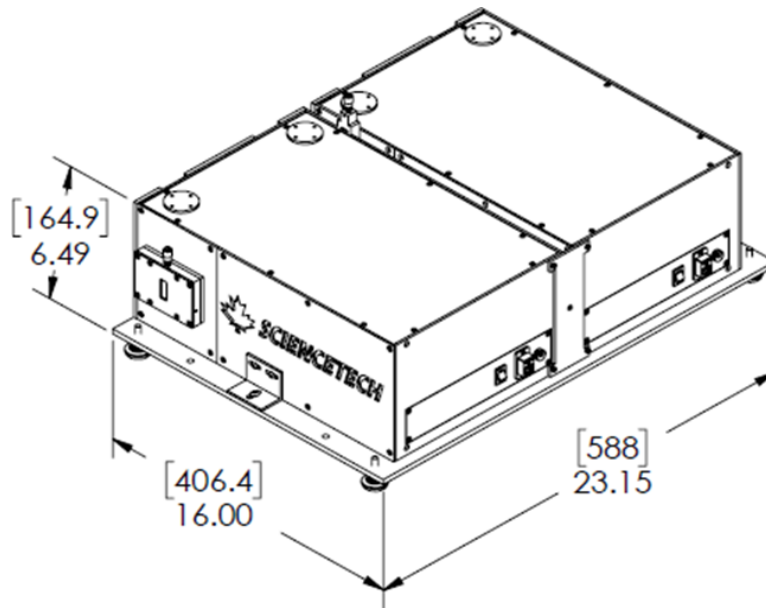
Location	Description	Nominal distance to focal	Maximum distance to focal	Maximum distance configuration
A	Side input port	3.2	7.9	Removal of spacer plate
B	Front input port	3.2	3.2	None
C	Front output port	3.2	3.2	None
D	Side output port	3.2	11.1	Removal of spacer and fascia plates

Standard Series Monochromators

DIMENSIONS

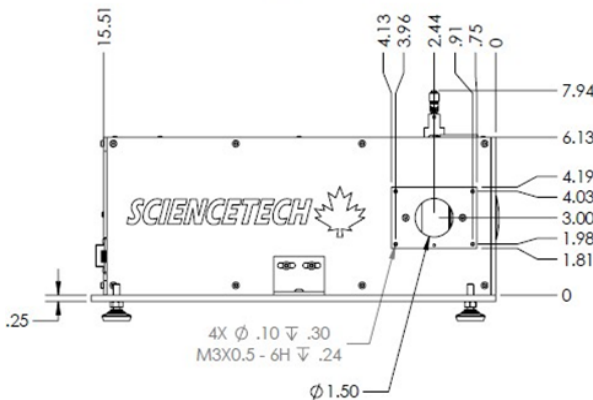
Dimensions - 9055 Double Monochromator

Dimensions are in millimeters [inches].



Hole pattern information for mounting to the monochromator (without the slit in place).

Side Input/Output



Front Input/Output

