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

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

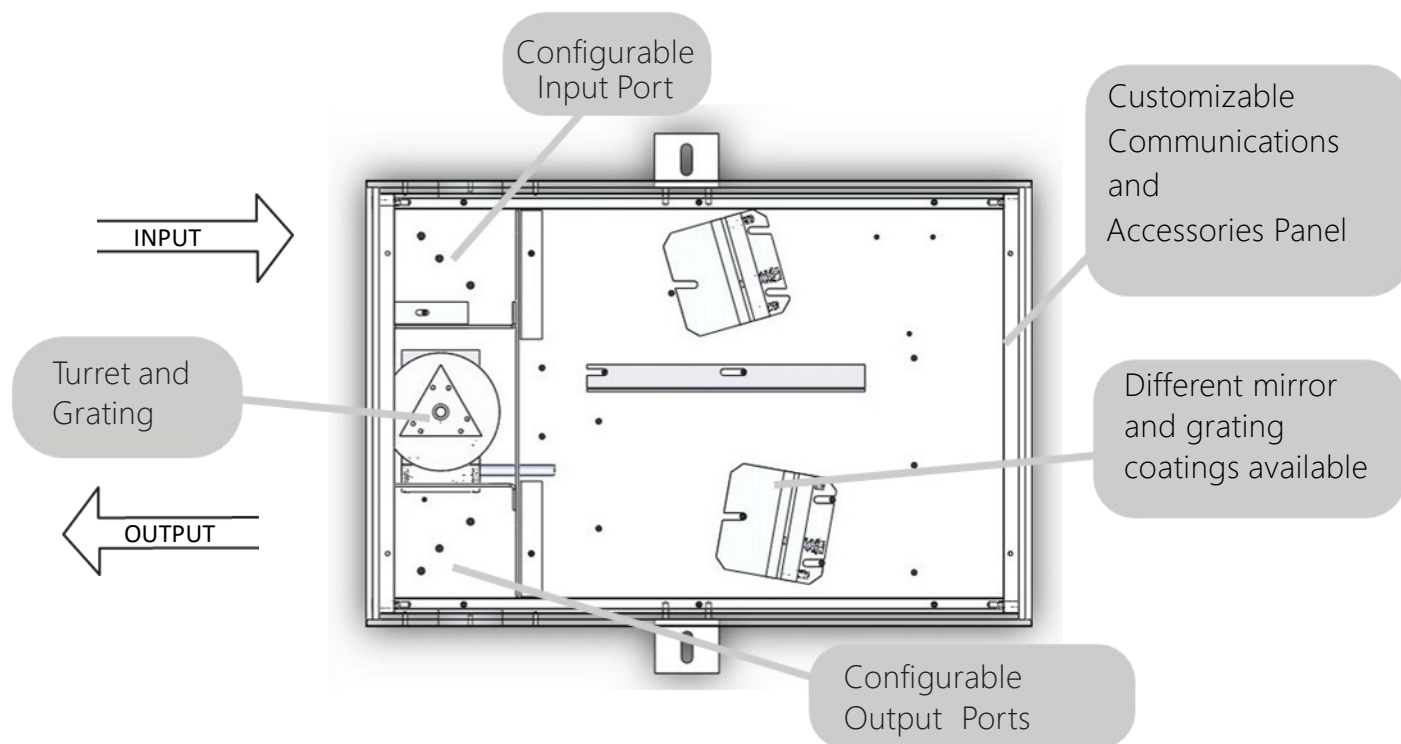| Model	9055	9055F	9055DA	9055DS	9057	9057F
Input Focal Length (mm)	200				457	
Output Focal Length (mm)	250				457	
Wavelength Selection	Motorized					
Communication	USB					
Readout Mechanics	Direct drive stepping motor					
Aperture	f/3.5	f/2.5	f/3.5		f/8	f/5.9
Maximum Grating Size (mm × mm)	50 × 50	64 × 64	50 × 50			64 × 64
Number of Gratings	3	2	3			2
Optical Resolution (nm) [1]	0.2	0.4	0.09	0.2	0.1	0.2
Stray Light [2]	4 × 10^{-5}		1 × 10^{-5}		3 × 10^{-5}	
Dispersion (nm/mm) [1]	4		1.7	0	1.79	
Wavelength Accuracy (±nm) [1]	0.2	0.4	0.2	0.2	0.1	0.2
Wavelength Reproducibility (±nm) [1]	0.1	0.1	0.1	0.1	0.1	0.1
Flat Field Size (mm)	25	25	25	N/A	25	25
Flat Field Angle (°)	-1.69	-1.69	Call	Call	-1.4	-1.4
Optical Axis Height (mm)	76.2	86.4	76.2			
Dimensions (mm)	391 × 255 × 156		588 × 406 × 165		624 × 318 × 168	
Weight (kg)	7.5	10	20		9	

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

2. Stray light values are reported using holographic gratings, ruled gratings produce worse stray light

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Standard Series Monochromators
CONFIGURATION

Configurable Input Port

Customizable Communications and Accessories Panel

INPUT

Turret and Grating

Different mirror and grating coatings available

OUTPUT

Configurable Output Ports

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
120-9041	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

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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 then 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)[1]	3.75	1.6	0.8	0.4	0.2	0.134	0.1
Bandwidth (nm)[2]	1650	840	420	210	105	73	52
Maximum Suggested Wavelength (nm)[3]	13900	6950	3475	1737	868	579	434
Maximum Realistic Wavelength (nm)[3]	19200	9600	4800	2400	1200	800	600

1. 50um wide input slit

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

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

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Standard Series Monochromators
CONFIGURATION

Coating Reflectance
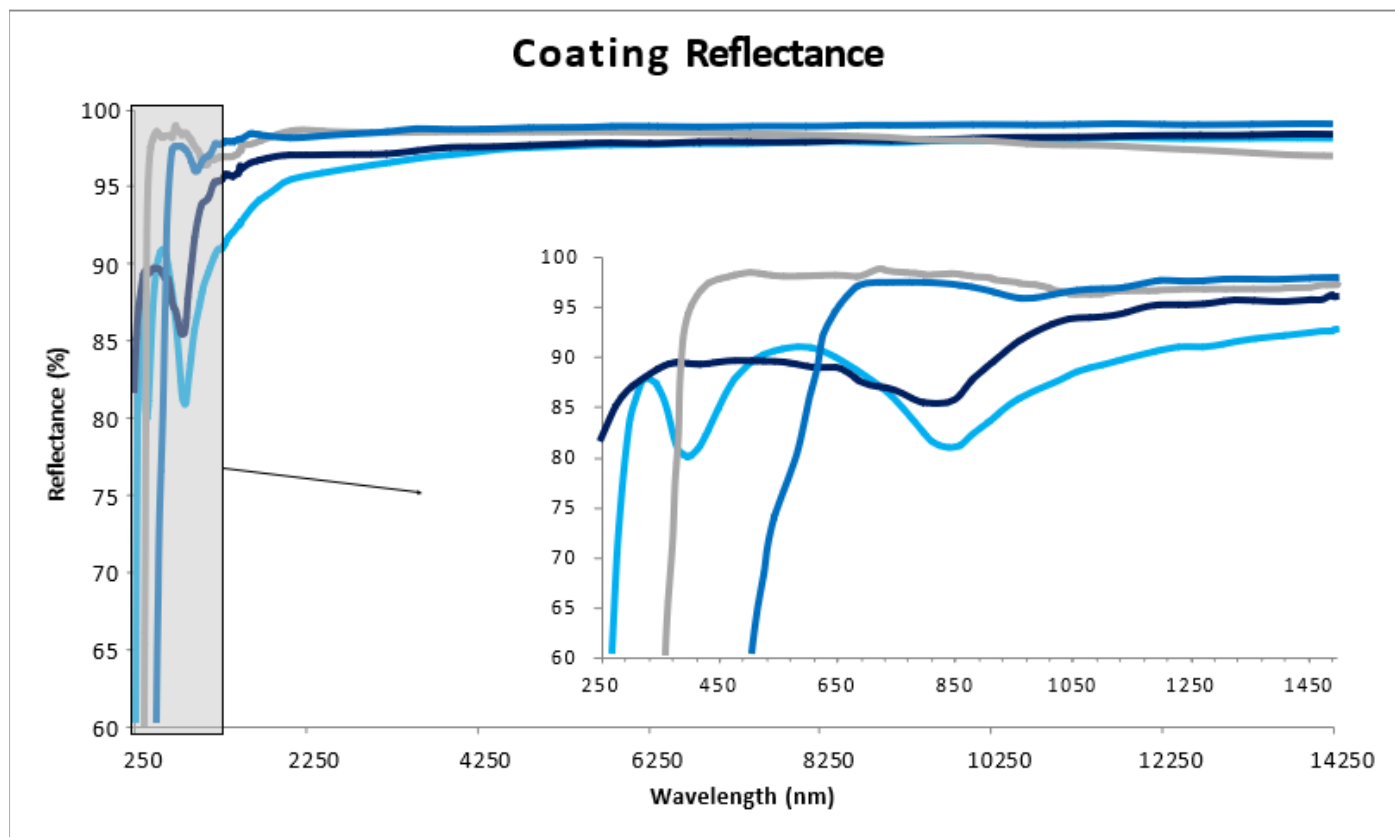
Mirror or Grating Coating		Useful Range	Code
Aluminum (MgF$_2$)		350 nm+	-
UV-enhanced Aluminum		250 nm+	-UV
Silver		400 nm+	-S
Gold		600 nm+	-G
VUV Aluminum	Not Shown	190nm+	- VUV

Standard mirror coatings are aluminum with a MgF$_2$ 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.
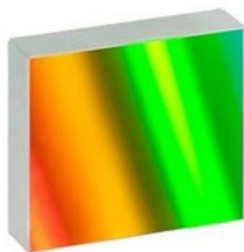
Need something you don't see here?
Sciencetech has built a reputation on custom solutions. Whether you need a small modification to an existing system, or a completely novel design built from the ground up to meet your technical specifications, Sciencetech's engineering and optical design teams are ready to help.

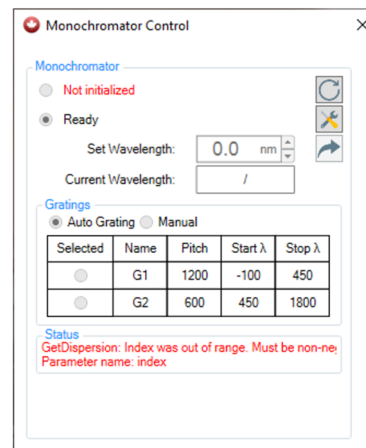**SCIENCETECH**

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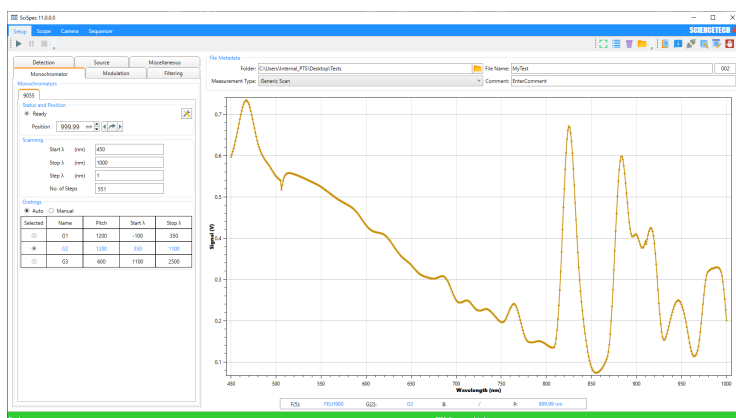
Generally, all the components in a modular spectroscopy system must be configured by wavelength to optimize the system operation. SciSpec stores and reads system configurations to provide an optimized system operation and user experience.

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.

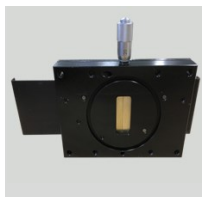SCIENCETECH

Standard Series Monochromators
ACCESSORIES

Imaging Option

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	Code
9055i	120-9060
9057i	120-9061
9055DX-i	120-9062

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

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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

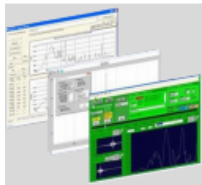Visit our web www.sciencetech-inc.com/all-products/modular-spectroscopy/data-acquisition-equipment.html

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

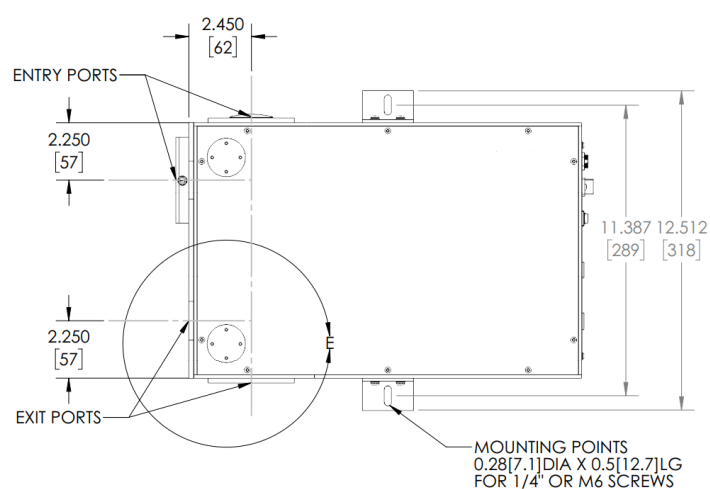Photonic Solutions Ltd
Edinburgh
EH14 4AP
+44 131 664 8122
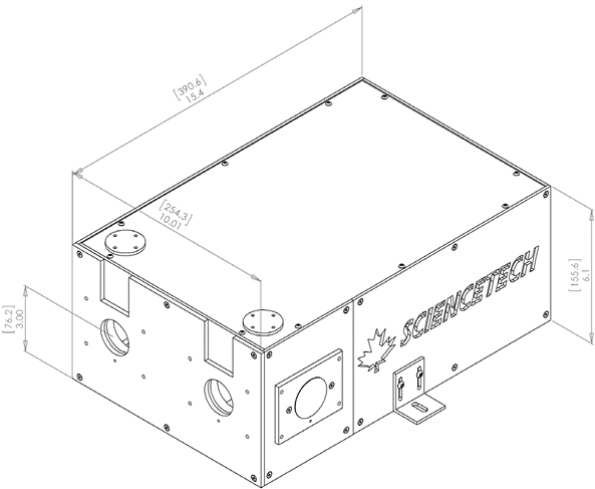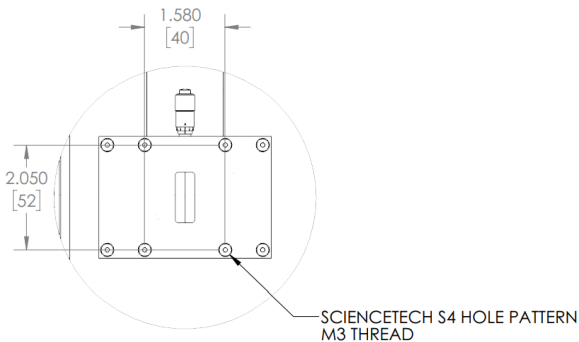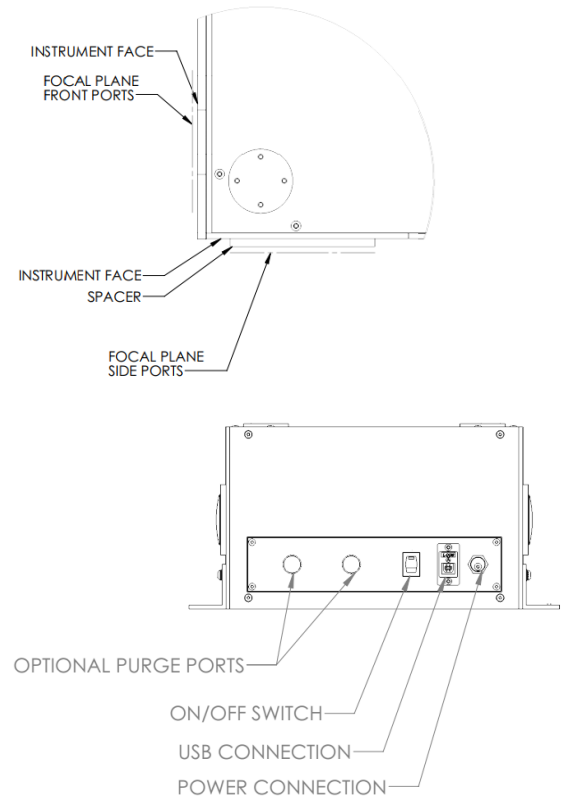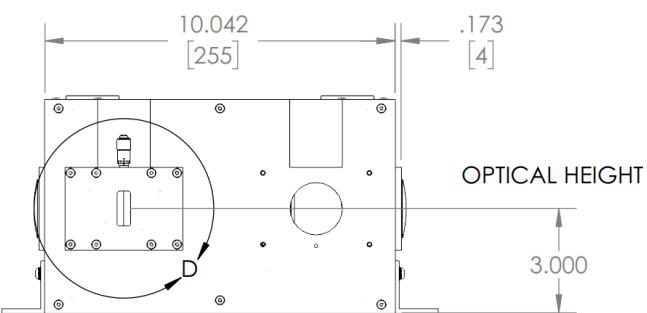www.photonicsolutions.co.uk

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Standard Series Monochromators
DIMENSIONS

Dimensions - 9055 Single Monochromator

Dimensions are in inches [mm].

Distance to Focal Plane (inches)	From Surface
0.125 [3 mm]	Instrument Face (Front)
0.3125 [8 mm]	Instrument Face (Side)
0.125 [3 mm]	Spacer (Side)
0.4375 [11 mm]	Camera Configuration (Side)

ENTRY PORTS

EXIT PORTS

MOUNTING POINTS
0.28[7.1]DIA X 0.5[12.7]LG
FOR 1/4" OR M6 SCREWS

INSTRUMENT FACE
FOCAL PLANE FRONT PORTS
INSTRUMENT FACE
SPACER
FOCAL PLANE SIDE PORTS

OPTICAL HEIGHT
3.000

OPTIONAL PURGE PORTS
ON/OFF SWITCH
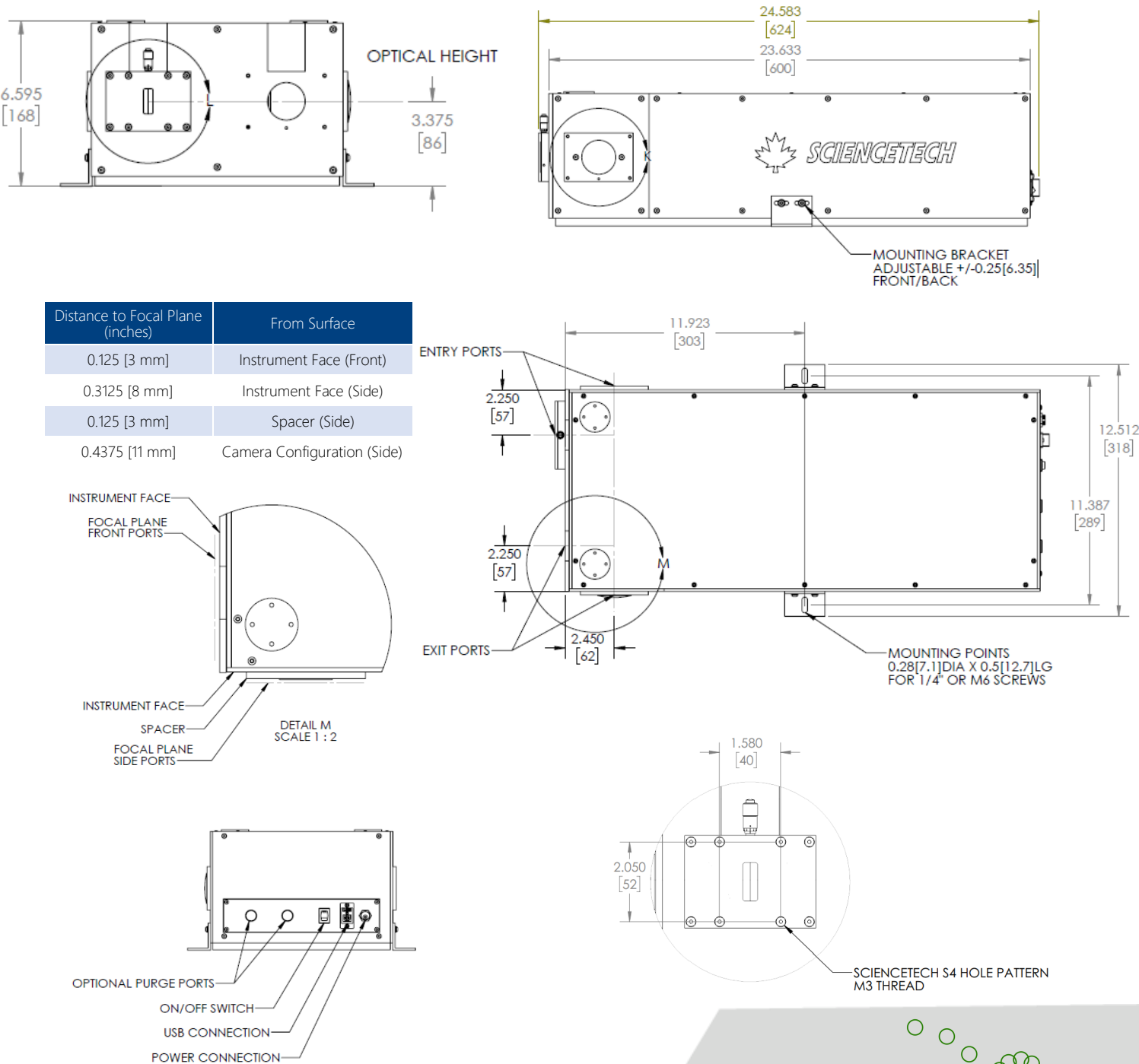USB CONNECTION
POWER CONNECTION

SCIENCETECH S4 HOLE PATTERN
M3 THREAD

SCIENCETECH

Standard Series Monochromators
DIMENSIONS

Dimensions - 9057 Single Monochromator

Dimensions are in inches [mm].

OPTICAL HEIGHT

6.595 [168]

3.375 [86]

24.583 [624]

23.633 [600]

MOUNTING BRACKET ADJUSTABLE +/-0.25[6.35] FRONT/BACK

Distance to Focal Plane (inches)	From Surface
0.125 [3 mm]	Instrument Face (Front)
0.3125 [8 mm]	Instrument Face (Side)
0.125 [3 mm]	Spacer (Side)
0.4375 [11 mm]	Camera Configuration (Side)

ENTRY PORTS

11.923 [303]

2.250 [57]

2.250 [57]

12.512 [318]

11.387 [289]

INSTRUMENT FACE

FOCAL PLANE FRONT PORTS

INSTRUMENT FACE

SPACER

FOCAL PLANE SIDE PORTS

DETAIL M SCALE 1 : 2

EXIT PORTS

2.450 [62]

M

MOUNTING POINTS 0.28[7.1]DIA X 0.5[12.7]LG FOR 1/4" OR M6 SCREWS

1.580 [40]

2.050 [52]

SCIENCETECH S4 HOLE PATTERN M3 THREAD

OPTIONAL PURGE PORTS

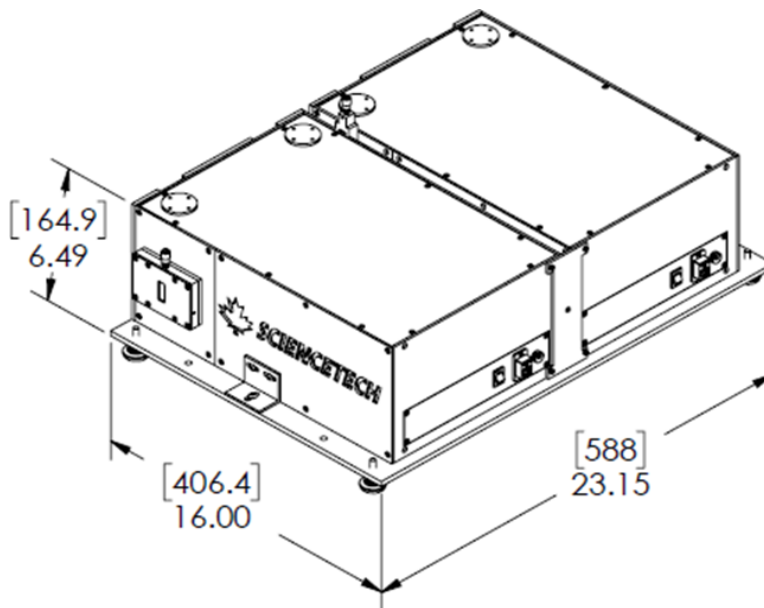ON/OFF SWITCH

USB CONNECTION

POWER CONNECTION

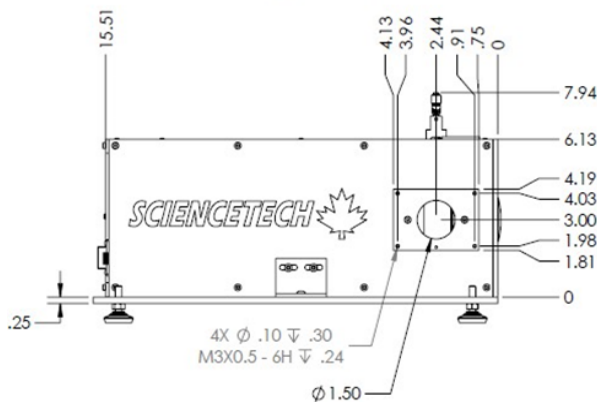SCIENCETECH

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