



Applications

- Testing photovoltaic cell performance
- Photochemistry
- Photobiology
- Photocatalytic research
- Photosynthesis
- Environmental durability testing

Features

- Class AAA ASTM standard
- Fiberized output for flexible illumination
- Easy-to-use touchscreen controls
- Light intensity control available
- Up to 18 Suns intensity
- Remote control by PC
- Cost-effective for researchers
- CE Compliant
- Spectral match 350-1800 nm
- Easy glovebox integration

Lightline Fiberized Solar Simulators & Light Sources



Lightline Fiberized Solar Simulators

OVERVIEW

The Sciencetech LightLine series of fiberized solar simulators are a revolution in the solar simulator industry. With the Lightline, you can direct the Class AAA solar light anywhere you wish with the standard 4 foot fiber. Classic designs for solar simulators require you to bring your sample to the solar simulator. Now you can bring the solar simulator to your sample. The LightLine solar simulators come standard with a touchscreen power supply, integrated shutter, and exposure controller.

The LightLine has one base model and three output optics configurations (custom output optic configurations are available). Configuration options exist for Class AAA illumination up to 50mm square and intensity up to 18 Suns.

The Sciencetech LightLine can match class A ASTM and IEC solar simulator standards. A number of air mass filters are available. In addition to spectral matching filters, you can also add intensity filters and other spectral filters like UV and IR blocking filters. Variable or manual attenuator can be added at the time of order, or a 6-position filter wheel. These accessories occupy the same space, so either a filter wheel or attenuator may be added, not both.

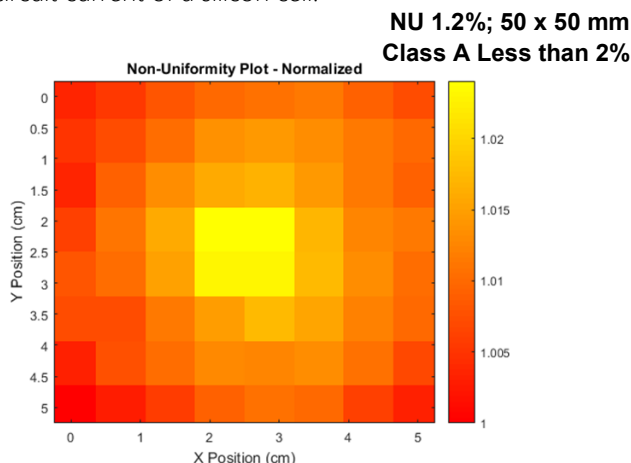
Please see the accessories page for a full list of optional accessories.

Model	Power Requirements	Classified Target Size (mm)	Maximum Sun Level	Working Distance (mm)	Classification
AX-400	100-240VAC 6-3A	50 x 50	1 Sun	390 to 410	AAA
AX-200		25 x 25	4 Suns	190 to 210	AAA
AX-100		10 x 10	18 Suns	90 to 100	AAA

Class A spatial non-uniformity (NU):

The spatial uniformity was determined for a variety of output lenses (e.g. focal length 400mm, 200mm, 100mm). The output lens also determines the working distance, target area, and irradiance at target.

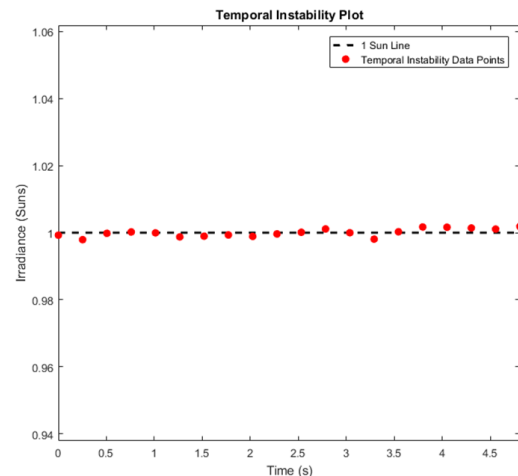
Spatial non-uniformity was measured in accordance to ASTM E927-19 standards at an intensity of 1 sun or higher as specified. Validation performed measuring the short-circuit current of a silicon cell.



Class A Temporal Instability:

Temporal instability of irradiance was measured in accordance to ASTM E927-19 standards at an intensity of 1 sun. Validation performed measuring the short-circuit current of a silicon cell.

**Temporal Instability 0.2%
Class A Less than 2%**



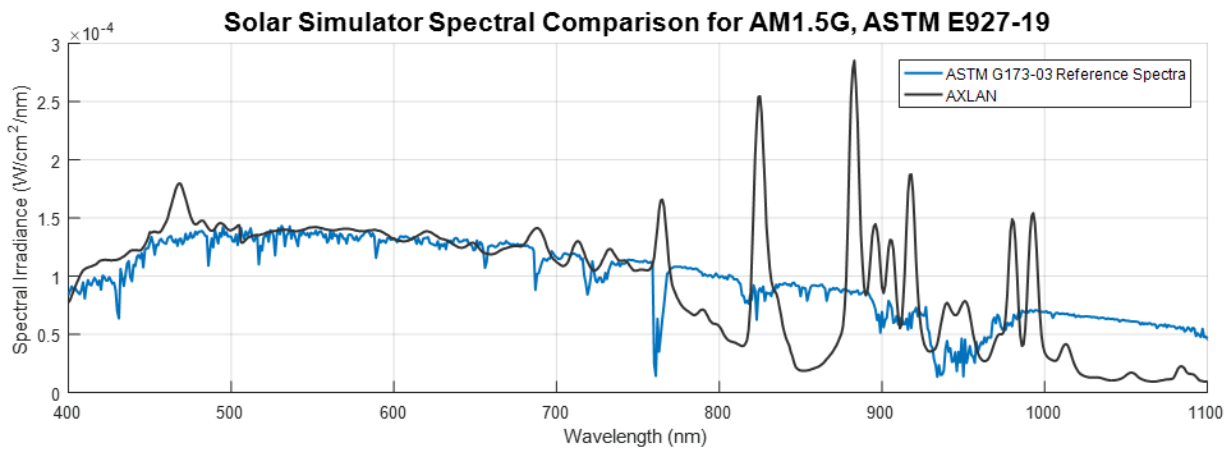
Please note: Due to our continuous improvement system, all specifications are subject to change without notice. Lightline solar simulator specifications listed are according to ASTM E927-19.

Lightline Fiberized Solar Simulators

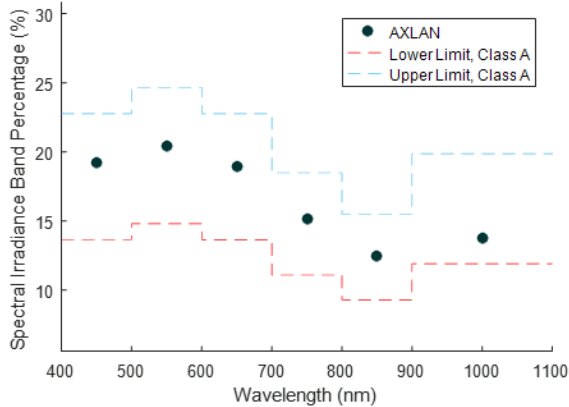
CLASSIFICATION AAA

Class A Spectral Match Testing Report

The spectral measurement was performed with a stepping-monochromator and silicon photodiode detector using modulated light and sensitive lock-in amplifier, in accordance to ASTM E927-19 standards. All testing results shown are for an example LightLine and individual reports will vary.



Spectral Irradiance Ratios, Compare to AM1.5G, ASTM E927-19



Wavelength (nm)	Percentage	Class
400-500	19.2479	A
500-600	20.3888	A
600-700	18.9138	A
700-800	15.1924	A
800-900	12.4524	A
900-1100	13.8046	A

Solar Simulator Standards

Sciencetech solar simulator specifications listed are according to ASTM E927-19 and IEC-60904-9-Ed.3 unless otherwise stated. We can accommodate testing to match several standards. Testing procedure as per ASTM E927-19 is provided by default. Please specify upon ordering if testing against IEC-60904-9-Ed.3 or other standard is required.

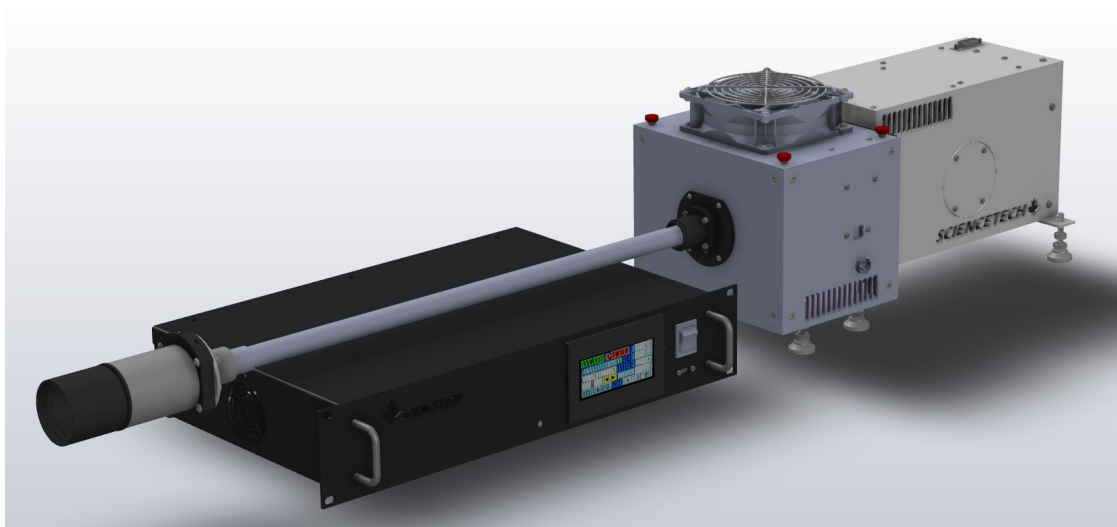
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Lightline Fiberized Solar Simulators

SPECIFICATIONS

MODEL	AX-100	AX-200	AX-400
Solar Simulator Type	Steady-State		
Test Plane Area (Target Size)	10 × 10 mm	25 × 25 mm	50 × 50 mm
Sun Level	18 Suns	4 Suns	1 Sun
Classification	AAA		
Wavelength Range	350 - 1800nm (Standard Spectral Match 400 - 1100nm)		
Spectral Match Classification	Class A. All intervals (0.75 < RSM* > 1.25). Different spectral filters available.		
Spatial non-uniformity of Irradiance Classification	< 2% Class A		
Temporal Instability of Irradiance Classification	< 2% Class A		
Working Distance	90-110 mm	190-210 mm	390-410 mm
Air Mass Filters	AM1.5G, AM1.5D		
Lamp	300W Xenon, 1000h (average) Lifetime, Forced Air Cooling		
Shutter	Integrated Touchscreen Control, 0 - 10000s, Adjustable Duty Cycle		
Fiber Bundle Length	1.22m (4') Standard		
Fiber Bundle Numerical Aperture	0.55		
Power Supply Model	601-300		
Input Voltage/Current	100-240VAC, 6A-3A		
Environment	Temperature 10-35°C , Humidity 20-80% , Avoid Condensation		
Dimension (L × W × H)	See Dimensions Page		
Weight	15kg		



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Lightline Fiberized Solar Simulators

POWER SUPPLY & SOFTWARE

Power Supply and Software

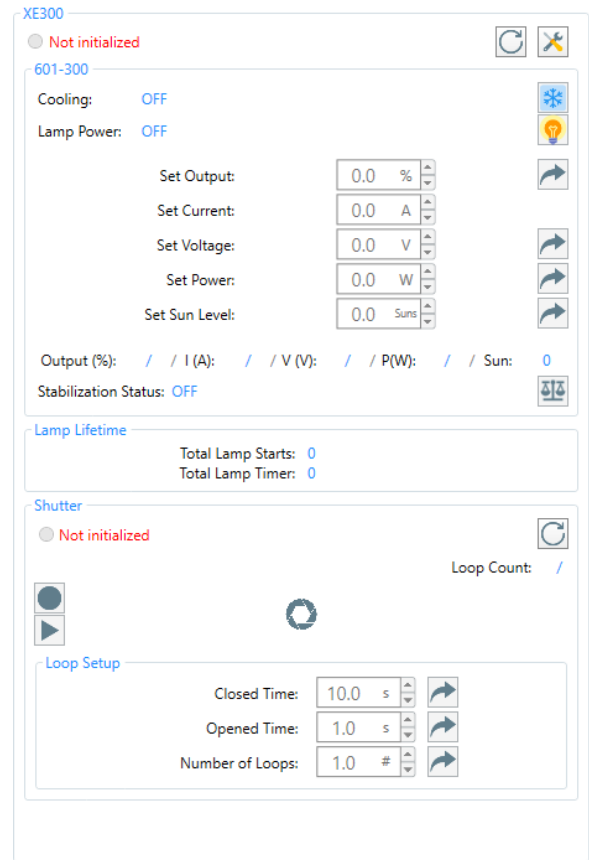
Each Lightline solar simulator comes with a 601-series power supply, allowing remote PC control.

Standard features included with Sciencetech's 601-series power supplies:

- Touchscreen interface
- Shutter and exposure control
- Single connection for lamp power, cooling, and communication
- Lamp starts and timer log
- Fan cooling safety interlock
- RS232 software GUI included



601-series power supply



Software GUI for computer control

LAMP ON	LAMP OFF	T	21	87.0
	0.0	V	FANS On	88.0
	0.0	I	FANS Off	SET
	0.00	LOG	FANS OFF	
				SHUTTER

601-series touch screen power supply main control screen

Electronic Shutter Control

This shutter can be used with any high powered light source and can effectively block a 4" diameter beam.



This device is computer controlled through Sciencetech's line of touchscreen power supplies.

CLOSE		OPEN/CLOSE TIME		EX-POSE
		2	2	
SHUTTER				LOOP
STOP LAMP		0	0	
		MAIN	RUNTIME	HELP

Lightline Fiberized Solar Simulators

GLOVE BOX INTEGRATION

The Lightline solar simulator can be easily integrated into a glovebox to provide solar illumination without the losses associated with passing the beam through a window.

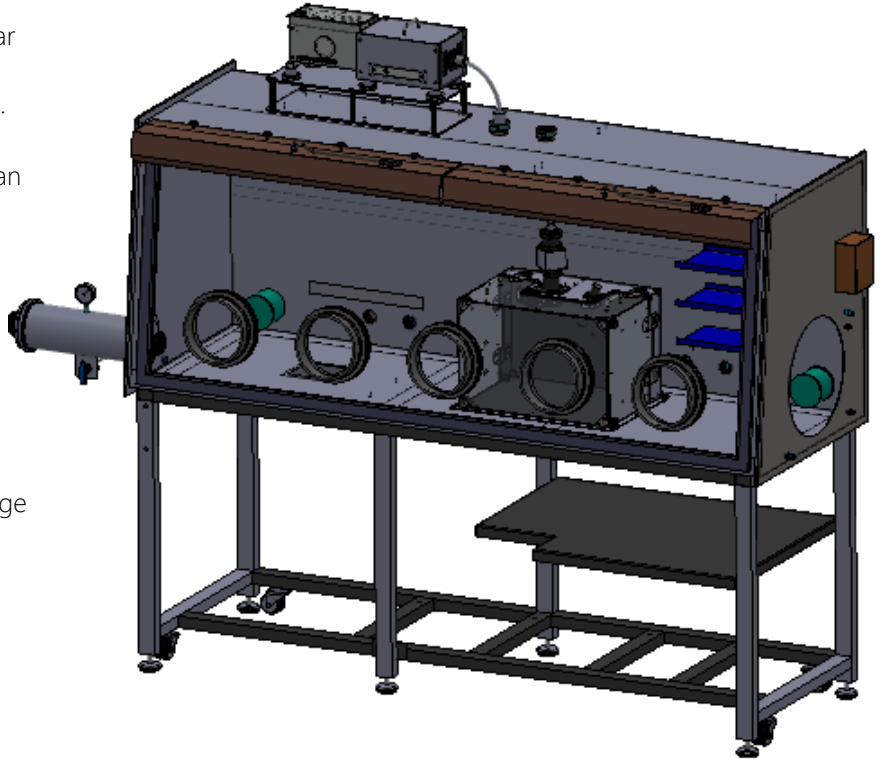
The fiber can be potted into a flange for an effective seal, and the light can be easily directed into the location and orientation desired with precision.



Lightline fiber potted in a FT40-LG KF flange



SC-MOD sample chamber



Lightline with fiber potted in a FT40-LG KF flange, coupled to SC-MOD sample chamber (shown here inside glovebox).

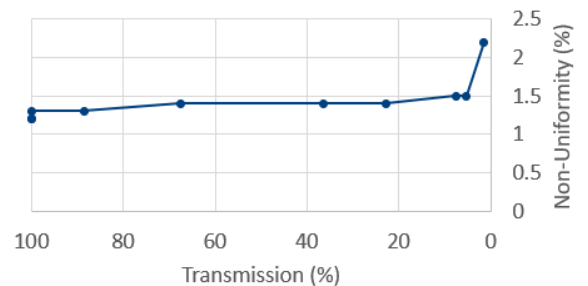
ATTENUATOR PERFORMANCE

Attenuator Position	Cell (mA)	Transmission (%)	Non Uniformity (%)
0	13.2	100.0	1.2
1000	13.2	100.0	1.2
2000	13.2	100.0	1.3
3000	11.7	88.6	1.3
3500	8.9	67.4	1.4
4000	4.8	36.4	1.4
4200	3	22.7	1.4
4400	1	7.6	1.5
4450	0.7	5.3	1.5
4500	0.2	1.5	2.2

The Lightline preserves its uniformity well with attenuation.

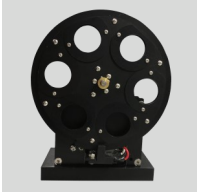
The VAR-ATTN-LL-A attenuator option maintains Class A non-uniformity below 10% transmission.

Lightline Non-Uniformity vs Attenuation



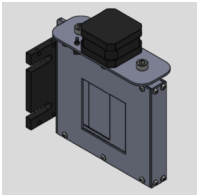
Lightline Fiberized Solar Simulators

ACCESSORIES



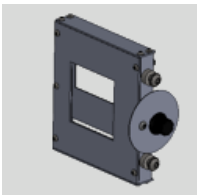
FILTER WHEEL—SFW (189-9012)

6 position filter wheel supporting up to six 25mm diameter filters. Must be selected at time of purchase. Incompatible with VAR-ATTN-LL-A or VAR-ATTN-LL-M - only one of the three options may be installed.



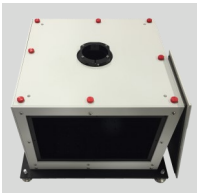
ATTENUATOR VAR-ATTN-LL-A (173-8002)

Automatic variable attenuator allowing 20 steps of attenuation from 10% to 100% throughput. Must be selected at time of purchase. Incompatible with filter wheel SFW or VAR-ATTN-LL-M - only one of the three options may be installed.



ATTENUATOR VAR-ATTN-LL-M (173-8003)

Manual variable attenuator allowing continuous attenuation from 10% to 100% throughput. Must be selected at time of purchase. Incompatible with filter wheel SFW or VAR-ATTN-LL-A - only one of the three options may be installed.



SC-12 SAMPLE CHAMBER (130-9011)

A general-purpose sample chamber that can be configured in multiple ways to address a number of application requirements. The SC-12 includes 4 optical ports as well as a side door for easy access to the sample area.



SC-MOD SAMPLE CHAMBER (130-9020)

A modular sample chamber suitable for integration with the Lightline and many other Sciencetech products. Numerous options available for passthroughs and couplings.



STAND PM-90 (100-8060)

A stand/fiber holder designed to hold the LightLine optical illumination delivery fiber. Fiber holder position is adjustable for vertical and horizontal illumination.



OPTICAL FIBER FB-0.5-8 (670-0103)

8 foot optical fiber upgrade to allow for further versatility with the LightLine. Please note that there will be a reduction in the power output with an 8 foot fiber.

Lightline Fiberized Solar Simulators

ACCESSORIES



SOL-METER

(125-9011)

Solar Power Meter, a digital meter for use with solar calibrated detectors (e.g. SOL-REF-Q).



SCI-MO Reference Cell

(125-9040)

A robust PCB mounted solar cell with active area of 22x7mm, it is intended to be used as a reference monitors for determining solar simulator sun level.



SOL-REF-Q

(125-9060)

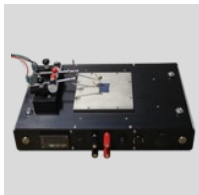
Calibrated Reference Cell, Quartz Window, options available for traceability to NIST and NREL.



SSIVT-20C

(175-9103)

20W IV Tester for Continuous Solar Simulators (current range = 1 A, voltage range = 200 V).



SCI-SCC3-TE

(165-8202)

3.5" x 3.5" Solar Cell Chuck, TE Cooled, Computer controllable, Vacuum Ready.



SCI-SCC3-L-B

(165-8221)

3.5" x 3.5" Solar Cell Chuck, Liquid Cooled, Rear Contact.



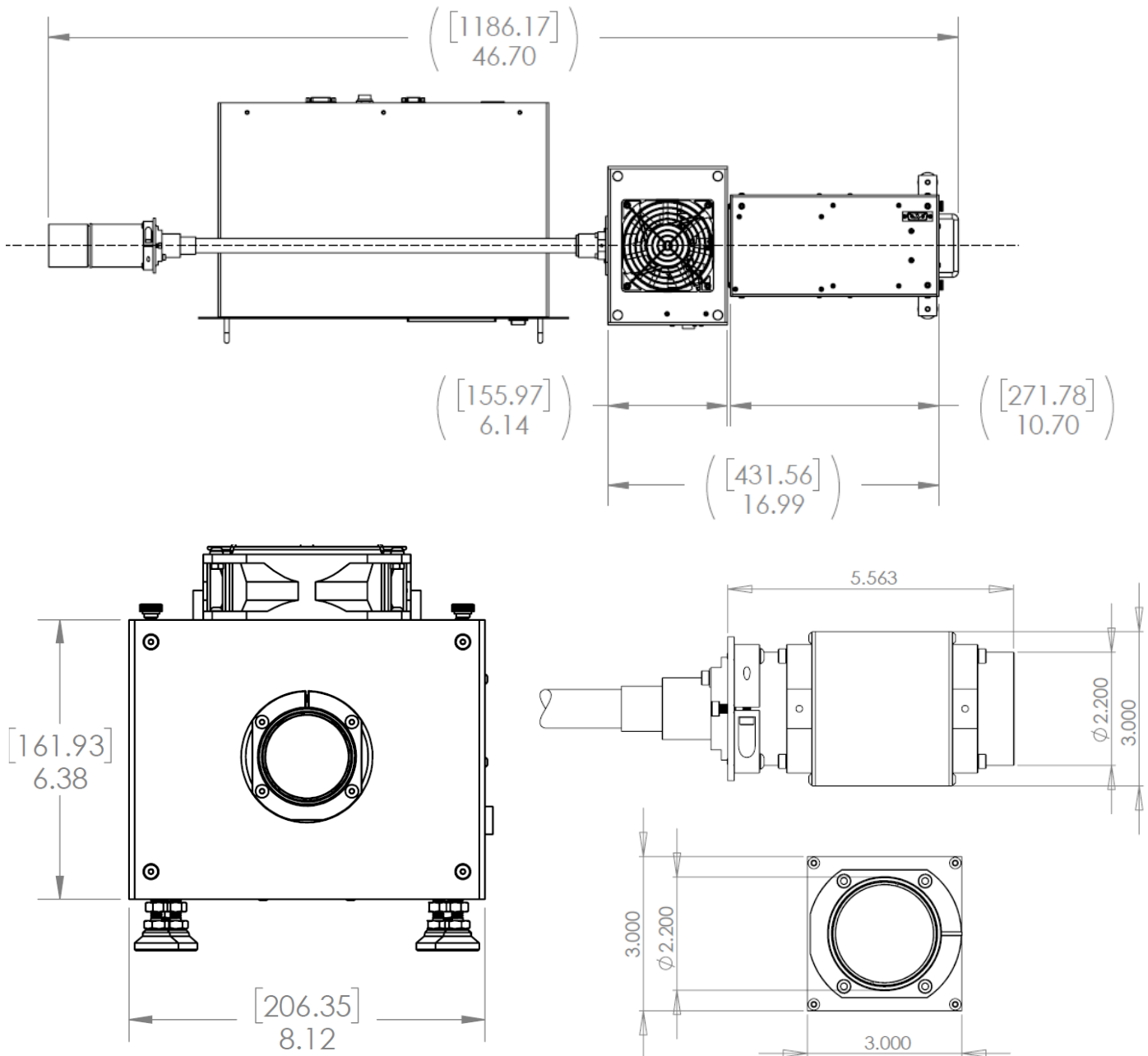
FILTERS

Numerous filtering options are available with the Sciencetech Solar LightLine. The standard Solar LightLine comes with two filter slots.

Lightline Fiberized Solar Simulators

DIMENSIONS

Dimensions are in [mm] and inches.



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