

Applications

- Concentrated Solar power
- Thermal energy Storage
- Thermochemical Reactions
- Material Testing

Features

- 3MW/m² Peak Irradiance
- Complete Ready to use Systems
- Focused 6.5kW Xenon Arc Lamps
- Touchscreen Power Supply and Software Control
- Systems Can Be Customized to Meet Your Exact Needs
- CE Compliance

High Flux Solar Simulators





High Flux Solar Simulators

RADIATIVE MODULE OVERVIEW

Sciencetech's High Flux Solar Simulator (HFSS) systems are used for a variety of applications that require intense and controlled light conditions. They are essential in developing and testing solar receivers and reactors, which are used in concentrating solar power (CSP) systems to convert sunlight into thermal energy.

These simulators are also used to test thermal energy storage systems, which store heat for later use, ensuring they can effectively capture and release energy under different conditions.

Additionally, HFSS are employed in materials science to study the behavior of materials under high-temperature and high-radiative flux conditions.

They are also used in aerospace engineering to test thermal protection systems for space vehicles, ensuring these materials can withstand the extreme conditions of space travel.

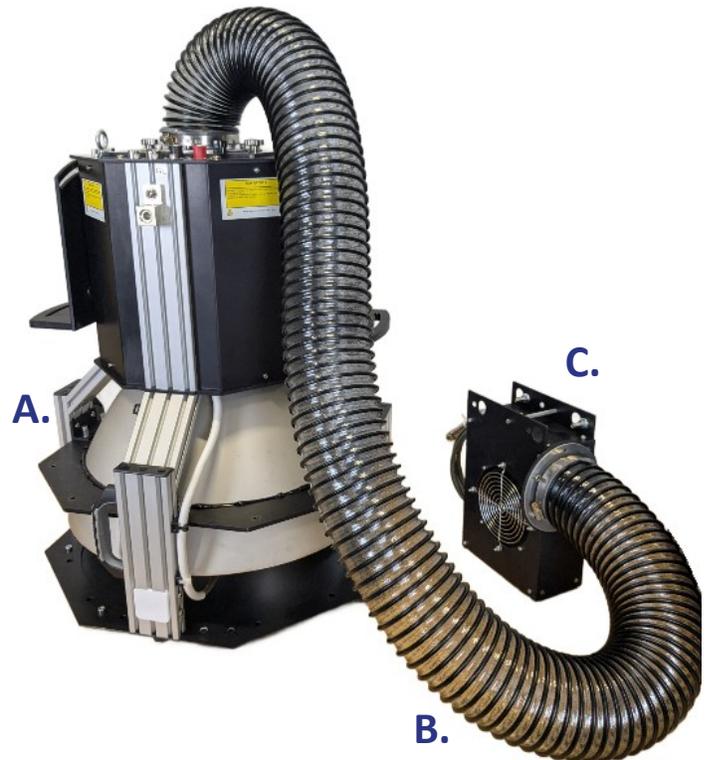
By providing a stable and repeatable light source, HFSS enable researchers to conduct experiments without the variability caused by natural sunlight, leading to more accurate and reliable results.

RADIATIVE MODULE

- A. Elliptical reflector with a 6500W xenon arc lamp
- B. Cooling duct allowing fresh air to be pulled from an area away from the lamp or test
- C. Forced air cooling blower

Each radiative module package also includes:

- Over-temperature protection
- Exposed T-SLOT for easy mounting to various structures
- Power supply with 6m cables (Radiative Module to Power Supply)
- All necessary tools





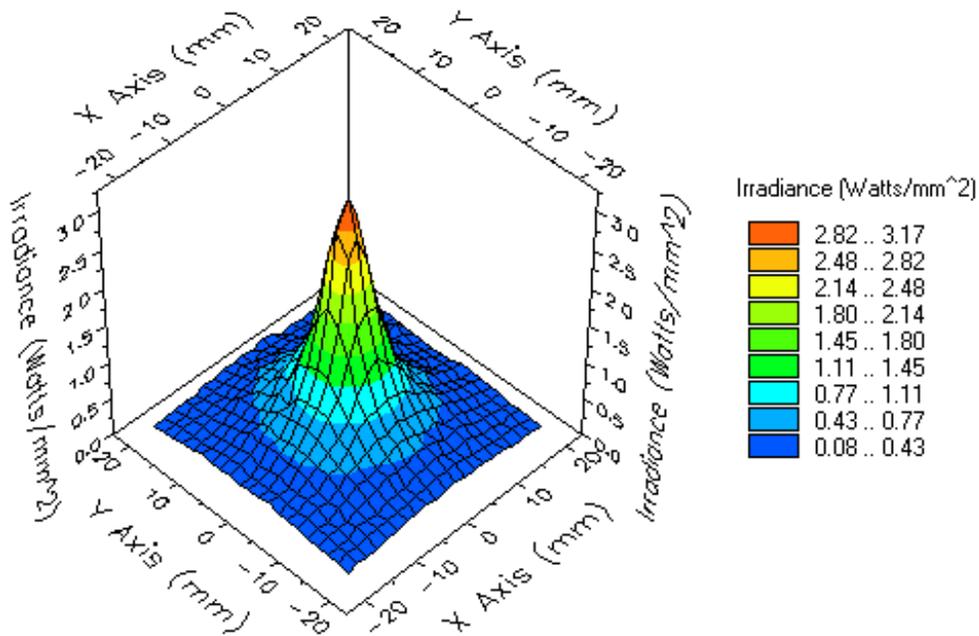
High Flux Solar Simulators

PERFORMANCE SPECIFICATIONS

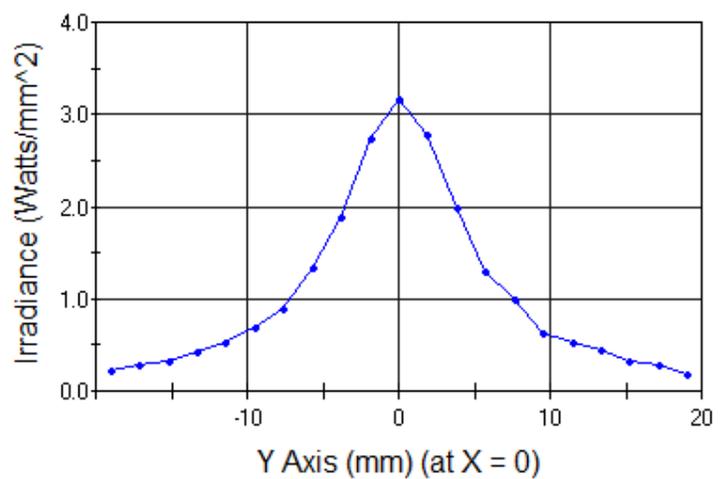
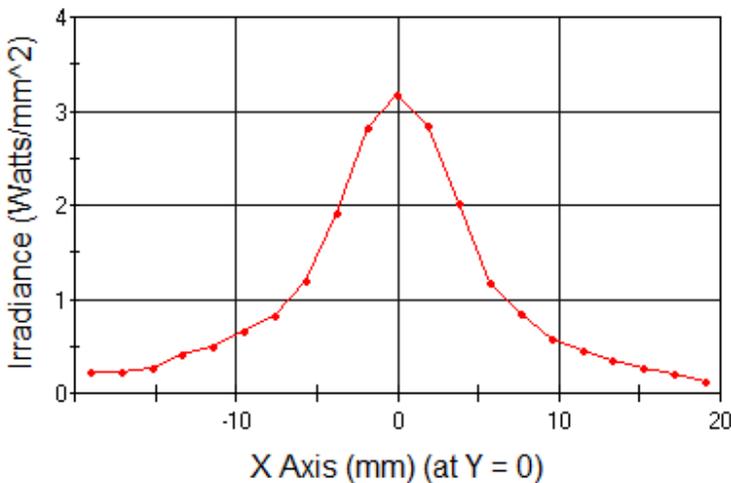
Irradiance Profile and Power at Focus

Typical power on target over a 30mm diameter is 1100W per radiative module. Typical peak irradiance is 3MW/m². Sciencetech offers a variety of accessories and customizations to adjust the optical output to suit the needs of your specific application. Shown below is the irradiance profile at the focus spot, 1 W/mm² is ~1000 Suns.

3D Irradiance Profile at Focus



Irradiance X and Y Cross-sections at Focus

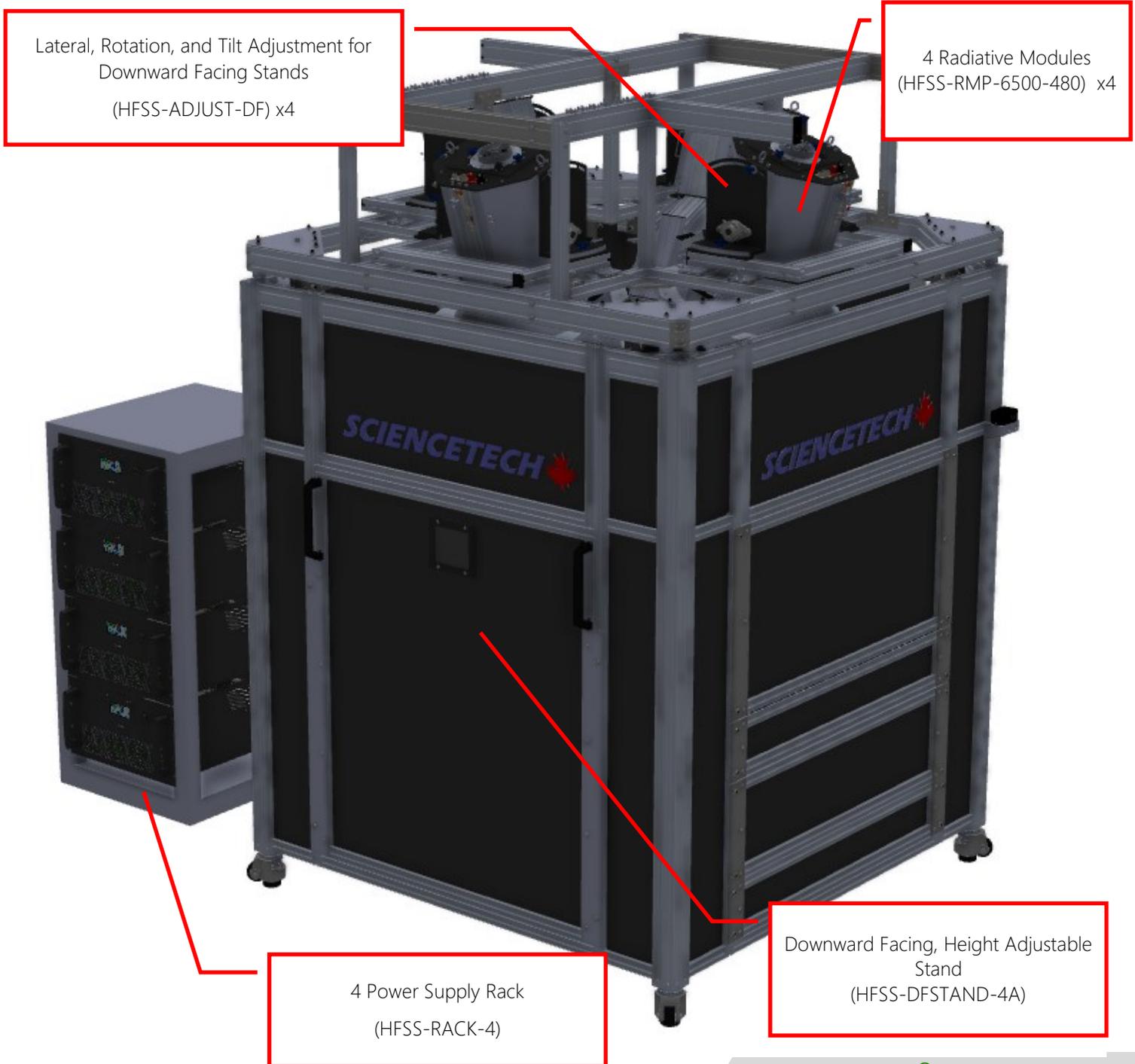


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EXAMPLE SYSTEM

Pictured below is an example HFSS system that consists of four radiative modules with lateral, tilt, and rotational adjustment; height adjustable downward facing stand; borofloat output window (hidden); and rack for power supplies.

For a full list of add-ons, please see the accessories page or talk with a Sciencetech representative.



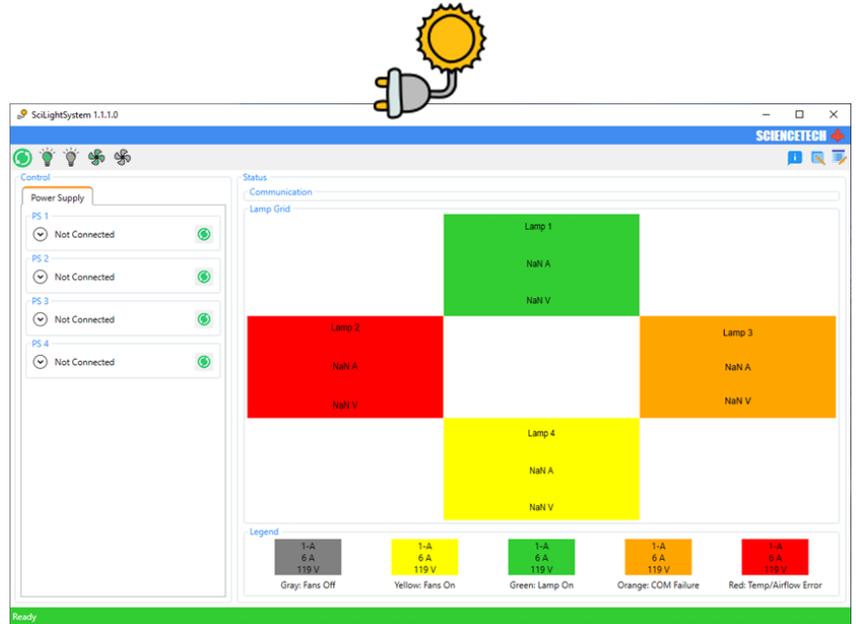


High Flux Solar Simulators CONTROL SOFTWARE

Included with every HFSS is a Windows-based control software that interfaces with all radiative modules in an HFSS. Each power supply has an RJ45 connection for control over a local area network (LAN).

If your system includes multiple radiative modules, we suggest purchasing an HFSS-TECH package that includes an 8-port network switch for easily connecting all power supplies.

The software allows for easy control of the light output from each radiative module through simple and intuitive controls and includes a visual feedback interface that clearly shows the status of each radiative module in an HFSS system.



Since the power supplies support a LAN connection, the control computer does not need to be directly connected to the power supplies and can be connected remotely on the same LAN.

ELECTRICAL REQUIREMENTS

Each radiative module package is configured for a specific electrical requirement. The packages are configured with one of two options for electrical requirements (needs to be selected at the time of order).

OPTION 1.

(HFSS-RMP-6500-220) High Flux Solar Simulator, Radiative Module Package, 6500W, 220V

200-240VAC, 50/60Hz, 31A, 3 Phase (200-240V phase to phase) 4 wires (3P+E) Includes hard wired 6ft (1.8m) power cable with L15-50P termination. Requires a minimum 40A 3-phase circuit, 200-240VAC (phase-phase), 4 wires (3P+E). This optional is only compatible in North America.

OPTION 2.

(HFSS-RMP-6500-480) High Flux Solar Simulator, Radiative Module Package, 6500W, 480V

380-480VAC (V p-p, 3P +E), 50/60 Hz, 17.4-14.2A 3 Phase Includes one L16-30 power cable. This option is compatible globally as well as in North America.

Please note that **EACH** radiative module package has the above power requirements. Current draw will increase for each additional radiative module package (i.e. 4 radiative modules would have a culminative current draw of 70 to 57A for the 380 to 480V option).



High Flux Solar Simulators

ACCESSORIES



HFSS-TECH

(168-8121)

The High Flux Solar Simulator (HFSS) Technology Package is a great addition to an HFSS system. It includes a network switch for connecting multiple power supplies and accessories for computer control (maximum of 5 power supplies plus 2 accessories), a webpage-based camera to viewing the inside of the HFSS support structure, and alignment lasers for easily locating the target plane of the radiative modules.



HFSS-OW-BF

(168-8017)

A single borofloat output window for a HFSS Radiative Module. This output window easily attaches to a radiative module with 4 screws. It does not completely isolate the radiative module arc lamp from the target plane (due to forced air cooling of the arc lamp) but will protect the output from direct contamination.



HFSS-ADJUST-DF

(168-8022)

This add-on is designed to interface with Sciencetech's line of High Flux Solar Simulator Downward Facing Stands (i.e. 168-8120). Please add 1 HFSS-ADJUST-DF for each Radiative Module (i.e. 168-9000 or 168-9001)

Typical Lateral Adjustment, HFSS Stand Dependent [mm]: ± 31
Rotational Adjustment [deg]: ± 15
Tilt Adjustment [deg]: ± 30



HFSS-ESTOP-4

(168-8023)

An E-STOP button add-on for Sciencetech's High Flux Solar Simulator systems. This E-STOP can control up to 4 radiative module systems (i.e. 168-9000). The E-STOP cuts all power to the system it is connected to.



HFSS-DFSTAND-4A

(168-8120)

A height adjustable stand for Sciencetech's line of High Flux Solar Simulators (HFSS) for downward facing operation. This stand holds up to 4 radiative modules when the High Flux Solar Simulator Lateral and Tilt Adjustment (168-8022) is included. The support structure includes 2 access doors each with its own viewport, 1 on the front and 1 on the back. It also includes 4 access panels on each side (total of 8) of the support structure to allow routing large cables, pipes, etc. in and out of the support structure based on the experiment to be conducted with the HFSS system.



HFSS-RACK-4

(168-8123)

A power supply rack for Sciencetech's High Flux Solar Simulator system. Each rack can hold up to 4 power supplies.



High Flux Solar Simulators

ACCESSORIES



HFSS-GSC

(168-8060)

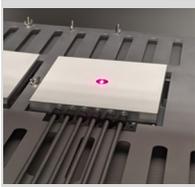
The Global Safe Control Box is a single control unit for up to 12 HFSS power supplies. The control box allows for seamless control and increased safety. All power supplies can be turned on and off at once from the Global Safe Control box. Also included is 2 E-STOP, a door proximity sensor with defeater, and 4 colour stack light.



HFSS-XYZSTAGE

(Ask a Sciencetech Representative)

An XYZ stage for easily moving the device under test to the focal plane of the HFSS.



HFSS-LAMBERTIONPLATE

(Ask a Sciencetech Representative)

A water-cooled Lambertian plate for camera visualization of the focal spot. We offer Lambertian plates that are compatible with a Gardon gauge as pictured to the left.



HFSS-GARDONGAUGE

(Ask a Sciencetech Representative)

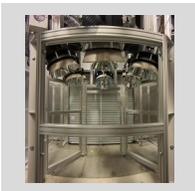
A Gardon gauge can be used for measuring the power at the focal plane of the HFSS. In conjunction with an XYZ stage, the power (irradiance) profile can be mapped.



HFSS-THERMO-10K

(Ask a Sciencetech Representative)

A thermopile for measuring the optical power at the focal plane of the HFSS.



HFSS-STAND-CUSTOM

(Ask a Sciencetech Representative)

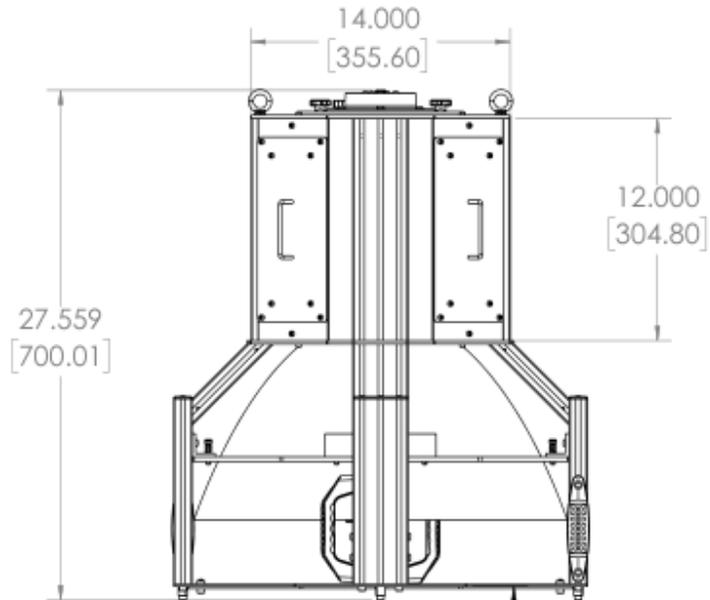
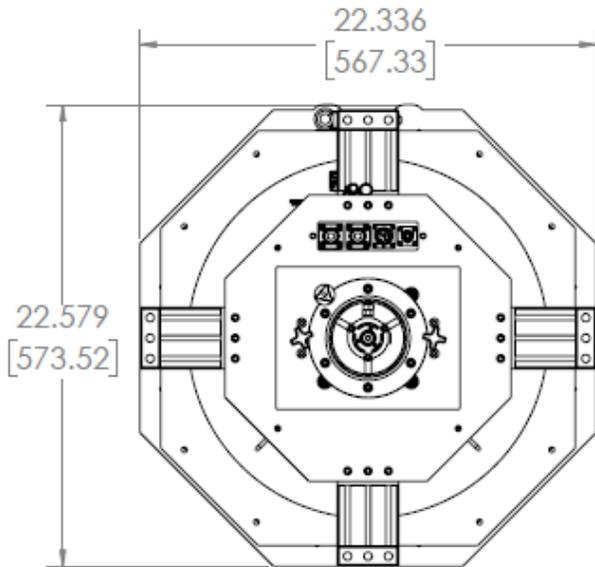
A custom stand built to your specifications based on the desired number of radiative modules.



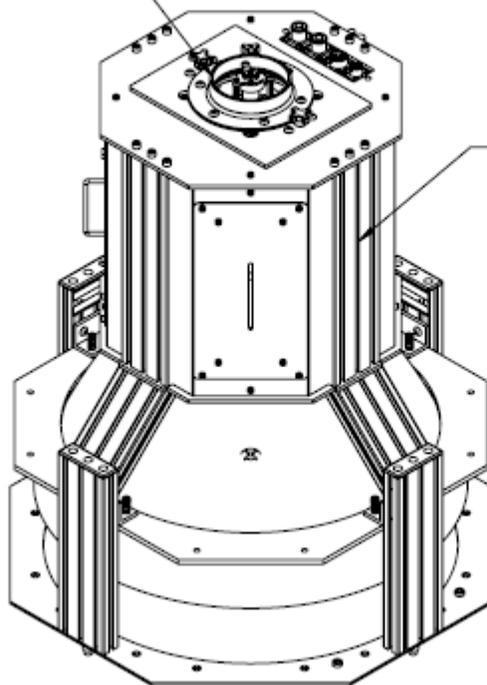
High Flux Solar Simulators

RADIATIVE MODULE

Dimensions are in inches [mm].



ALLOW MINIMUM 6" [152MM] CLEARANCE ABOVE MODULE FOR AIRFLOW TUBING



USE 1" TSLLOT RAILS FOR MOUNTING
USE STANDARD TSLLOT HARDWARE AS NEEDED

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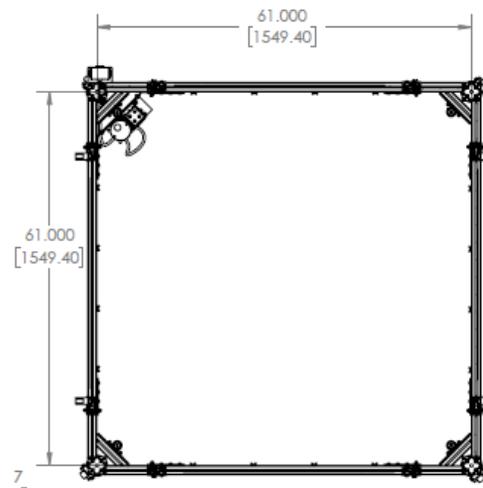
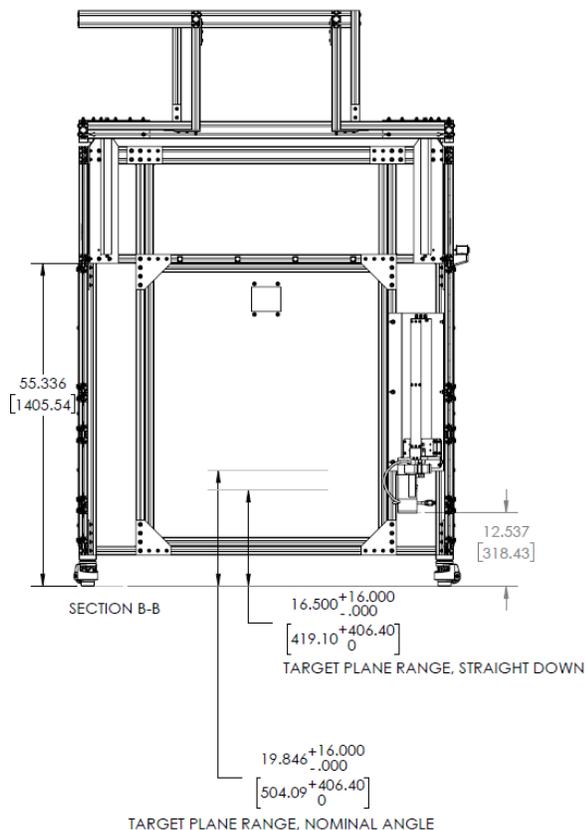
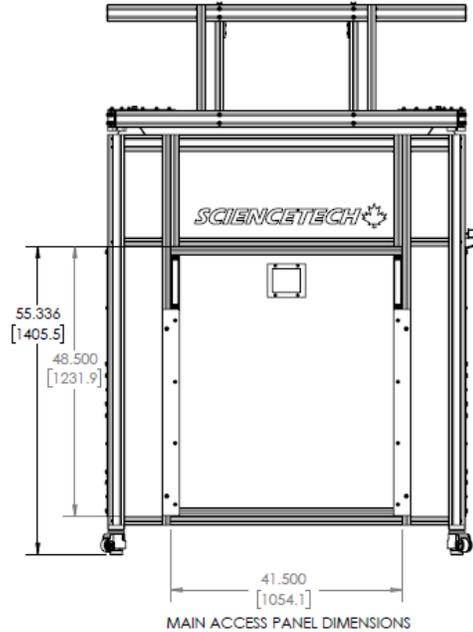
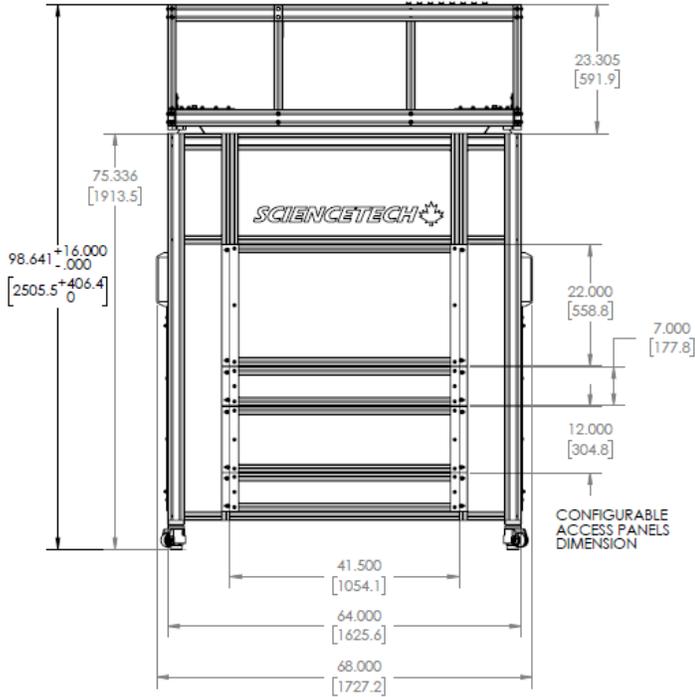
TARGET PLANE

High Flux Solar Simulators

DOWNWARD FACING STAND DIMENSIONS

Dimensions are in inches [mm].

UPPER SECTION ADJUSTABLE BY 16" [406.4MM]



INDIVIDUAL RADIATIVE MODULE ADJUSTMENT RANGE
 ROTATION = +/- 15 DEGREES
 TILT = +/- 30 DEGREES
 HORIZONTAL = +/- 1.25" [31.75MM]

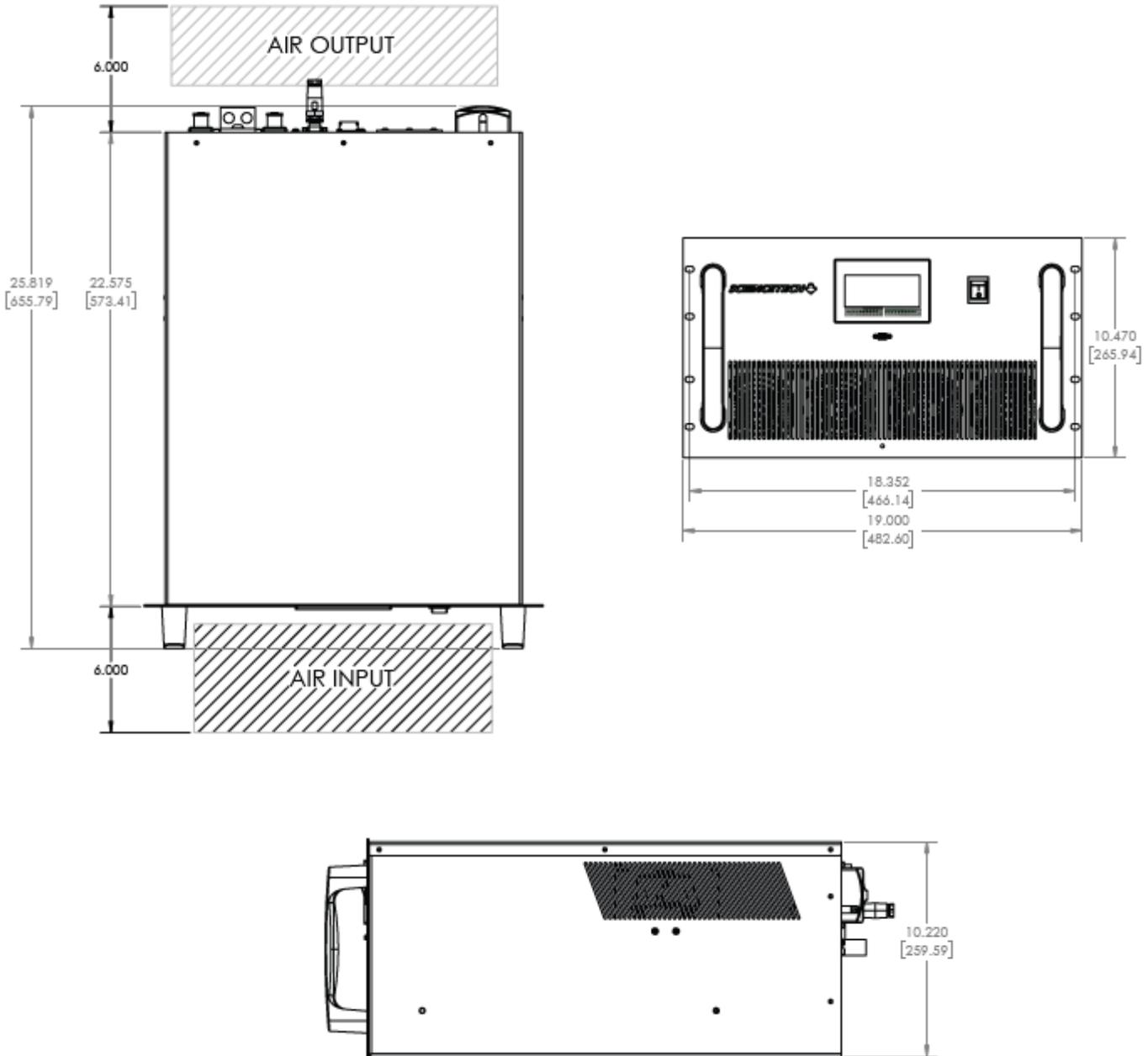
TYPICAL ANGLE OF INCIDENCE FROM NOMINAL MOUNTING TO CENTER OF CHAMBER = 18.06 DEGREES



High Flux Solar Simulators

POWER SUPPLY DIMENSIONS

Dimensions are in inches [mm].





High Flux Solar Simulators

ORDERING INFORMATION

Model	Part Number	Description
Packages		
HFSS-RMP-6500-480	168-9000	High Flux Solar Simulator, Radiative Module Package, 6500W, 480V
HFSS-RMP-6500-220	168-9001	High Flux Solar Simulator, Radiative Module Package, 6500W, 220V
Accessories		
HFSS-OW-BF	168-8017	High Flux Solar Simulator Output Window for Radiative Module, Borofloat
HFSS-ADJUST-DF	168-8022	High Flux Solar Simulator Lateral, Rotation, and Tilt Adjustment for Downward Facing Stands
HFSS-ESTOP-4	168-8023	High Flux Solar Simulator Emergency Stop Button, 4 Radiative Modules
HFSS-DFSTAND-4A	168-8120	High Flux Solar Simulator Downward Facing Stand, 4 Radiative Modules, Height Adjustable
HFSS-TECH	168-8121	High Flux Solar Simulator Technology Package
HFSS-RACK-4	168-8123	High Flux Solar Simulator 4 Power Supply Rack
HFSS-GSC	168-8060	High Flux Solar Simulator, Global Safe Control Box
HFSS-XYZSTAGE	Please inquire	High Flux Solar Simulator XYZ stage
HFSS-LAMBERTIANPLATE	Please inquire	High Flux Solar Simulator Lambertian Plate
HFSS-GARDONGAUGE	Please inquire	High Flux Solar Simulator Gardon Gauge
HFSS-THERMO-10K	Please inquire	High Flux Solar Simulator Thermopile, 10kW
HFSS-STAND-CUSTOM	Please inquire	High Flux Solar Simulator Custom Stand
Spare/Replacement Components		
HFSS-RM-6500	168-8018	High Flux Solar Simulator, Radiative Module, 6500W
631-6.5k-480-B-LAN	150-9312	6.5kW Xenon Power Supply, 480V, LAN Communication
631-6.5k-220-B-LAN	150-9322	6.5kW Xenon Power Supply, 220V, LAN Communication
HFSS-CABLES	150-7292	High Flux Solar Simulator Cable Package
HFSS-FAN	168-8016	High Flux Solar Simulator Cooling Fan
XE6500	650-0104	Lamp Bulb, 6500W Xenon Arc, Ozone Free

