



# Temperature Chamber and Environment Factor Modules

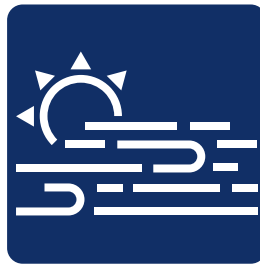
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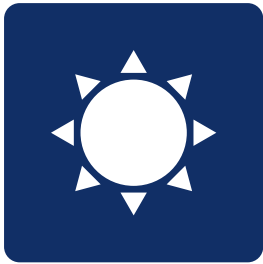
Snow



Rain



Fog



Sun



Wind



Allows evaluation tests of various products exposed to harsh outdoor environments

Evaluate automotive sensors in a blizzard without being in a blizzard

Allows repetitive tests, which is not possible in nature

Modular design made complex weather conditions possible in a chamber

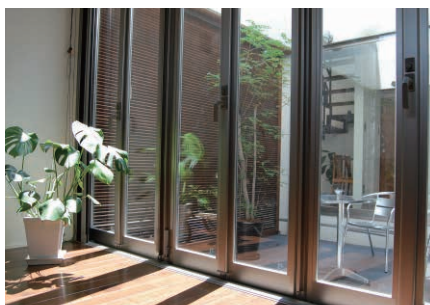
#### ■ Sensors



#### ■ Outdoor equipment



#### ■ Residential equipment



Adding environment factor modules to an existing or new temperature chamber allows for Combined Sequential Environmental Test Systems

Environment  
factor modules



New temperature  
chamber



Combined Sequential  
Environmental Test Systems

## Environment factor modules



Snow generator  
(module)



Rain generator  
(module)



Fog generator  
(module)



Sunlight module  
(LED)



Sunlight module  
(infrared lamp)



Airstream fan  
module

## Temperature chamber

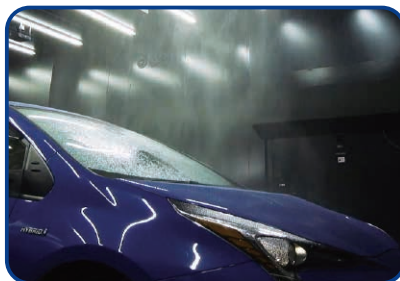


## Combined Sequential Environmental Test Systems

Temperature + Snow



Temperature + Rain



Temperature + Fog



Temperature + Sunlight



Temperature + Wind







## Snow generator module

**Recreate snow conditions found in Sapporo, Japan; Chamonix, France; or anywhere in the world without you going there.**

The snow module reproduces the snow accumulations found in the real world. You can use it to evaluate vehicles, construction materials, antennas, surveillance cameras, etc., how they perform in the snow. In combination with the airstream module, you can perform a snow adhesion test as well.



Snow adhesion test



Snowfall test



### Select snow types from two water liquid content levels

Items	Specifications
Precipitation	20 mm/h
Liquid water content (LWC)	10%, 25% (set in two levels)
Area	Approx. 4 m <sup>2</sup> (W2 × D2 m)
Remarks	Test area temperature range: -30°C to +5°C * At temperatures of -20°C and higher, the snow may take on a texture like sherbet.

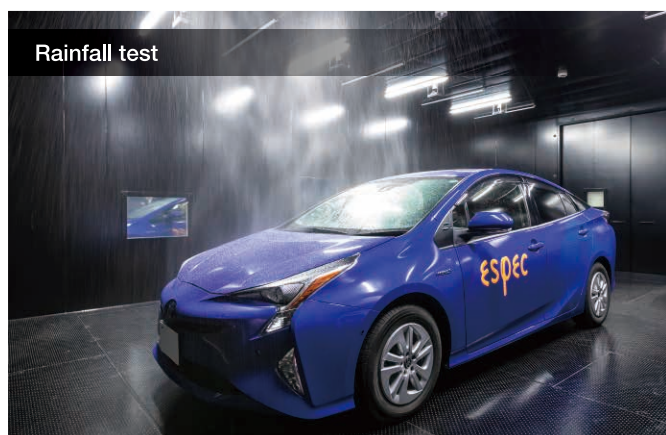
- The test results may vary due to differences in load and water penetration after snow accretion because of different snow quality such as dry and wet snow.
- In combination with a temperature chamber, this module can reproduce snowfall environments with the same air temperatures as actual environments.
- In combination with the vehicle velocity module, the snow generator can perform snow adhesion tests on on-board sensors and similar parts



## Rain and fog generator modules

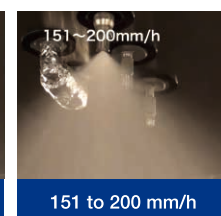
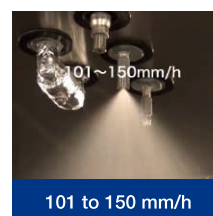
### Reproduce environments with weak visibility due to heavy rain and fog

The sensing performance of on-board sensors and cameras can be evaluated by reproducing the environments the vehicle is expected to encounter when driving. These modules can also be used in the waterproof and water resistance tests of outdoor precision equipment and control panels.



### Three precipitation intensity levels

- Select rain rate intensity from drizzle, light rain, and heavy rain.
- The temperature of the rainwater can be controlled separately from the chamber temperature, allowing it to reproduce the rain conditions found around the world.



### Controls the fog density

A visibility distance of 15 m or less can be reproduced during fog tests, allowing the sensitivity of sensors and cameras to be evaluated.

#### ■ Rainfall test

Items	Specifications
Precipitation intensity levels	50 to 100 mm/h 101 to 150 mm/h 151 to 200 mm/h
Cover area	Approx. 4 m <sup>2</sup> (W2 × D2 m)
Raindrop sizes	0.1 to 3 mm
Water temperature range	+5°C to +55°C
Remarks	Test area temp. range: +5°C to +50°C The rain duration is dependent to water tank size.

#### ■ Fog test

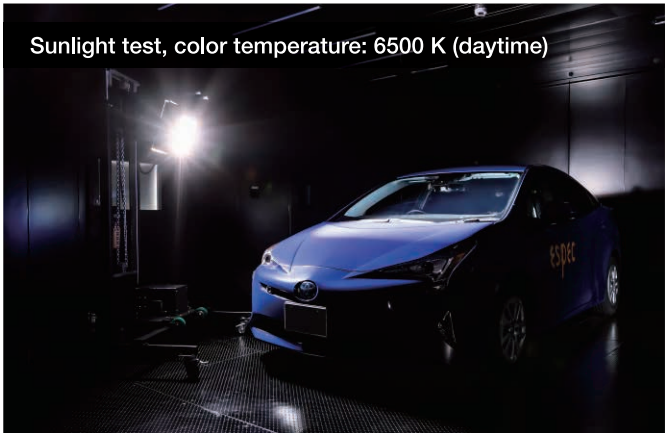
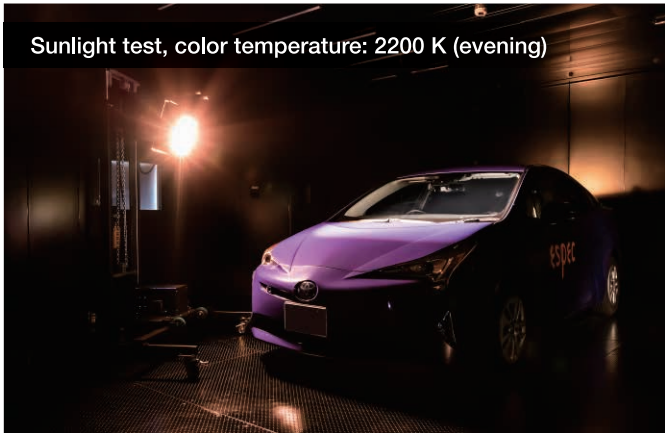
Items	Specifications
Visibility distance in fog	15 m or less
Fog area	80 m <sup>3</sup> or less



## Sunlight module (LED)

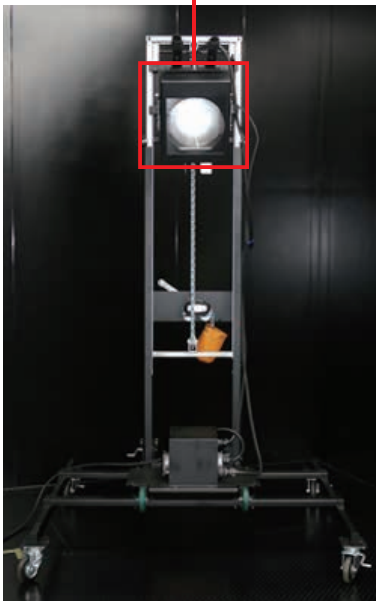
Evaluates the impact of sun glare to automotive camera and image sensor performance under driving conditions.

Sunlight module comes with two light intensities and color temperature control. In combination with a temperature (& humidity) chamber, it can mimic the sun that you encounter while driving from dawn to dusk.



- Selectable light intensity between high and low, between clear sky and cloudy or evening sky.
- Color temperature is also adjustable, from daylight (white) to dusk (orange).
- A single lamp design with multiple LED chips reduce shadows from dividers in multiple lamp design.
- The lamp unit is mobile, allowing you to change both the horizontal and vertical positions as well as its approach angle.

Items	Specifications
Light intensity	20000 Lx (at 2200 K), 35000 Lx (at 6500 K)
Color temperature	2200 to 6500 K (Programmable)
Illumination area	Max. ø600 mm (distance: 1.3 m)
Remarks	Test area temperature range: -5°C to +55°C



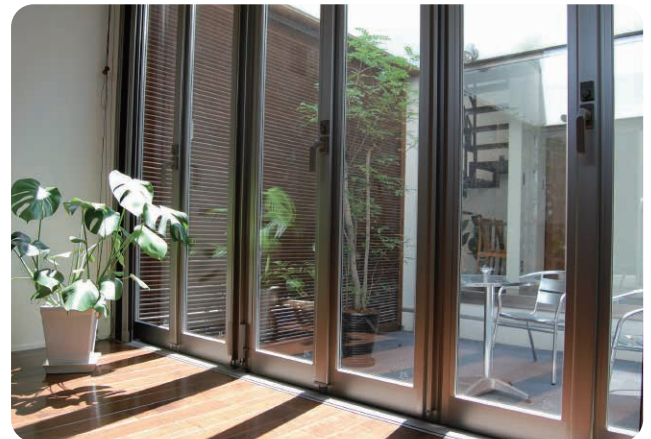




## Sunlight module (infrared lamp)

### Infrared radiation evaluation on outdoor-installed equipment

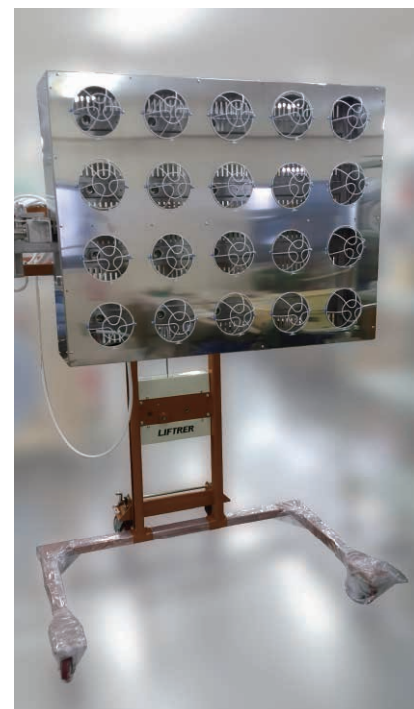
IR solar module is designed to recreate the environment commonly found outdoors, where objects such as vehicles and construction materials are exposed to infrared light and reach high temperatures.



◀ Lamps ON

### Portable infrared sunlight device

- The module comes with casters and height adjuster allowing you to position it freely. Also, the tilt is adjustable to change the angle to match the sample shape or simulate the sun angle.
- In combination with a temperature (& humidity) chamber, you can perform sunlight test under a specific ambient conditions.
- It comes with feedback circuit to accommodate input from sensors attached to the specimen, to control the light intensity to maintain the heat load.



Items	Specifications
Light unit	Portable, one-point output control via black panel temperature signal 250 W × 20 lamps × 1 surface
Radiation intensity	900 W/m <sup>2</sup> (distance from lamps: 500 mm)
Black panel surface temperature	+110°C (with test area at +80°C), +90°C (with test area at +60°C) Control point: one point in center of illumination surface
Remarks	Test area temperature range: -10°C to +80°C



## Airstream fan module

### Compact wind blower unit

The fan module helps to replicate airflow surrounding a vehicle in actual driving.



### Compatible with other modules

- The module material can be changed to stainless steel for compatibility with combined environmental tests along with a rain/snow generator modules.
- Together with a rain/snow generator module allows evaluation of a vehicle driving in heavy rain storm or through a blizzard.

Item	Specifications
Wind speed	0 to 70 km/h
Nozzle sizes	W1400 × H700 mm
Remarks	Test area temperature range: -30°C to +40°C



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● Specifications are subject to change without notice due to product improvements.

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