

# Solar Simulator (350-1100nm)

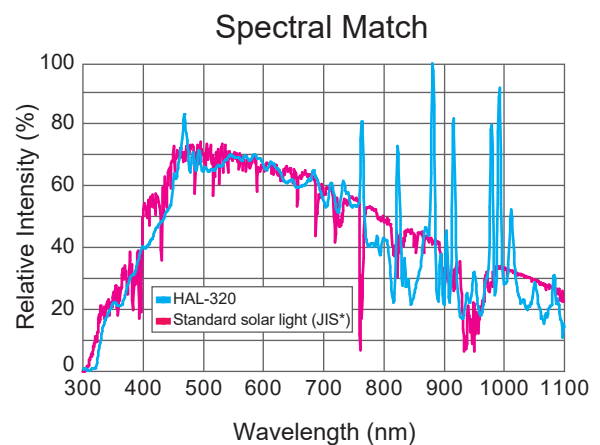
## HAL-320

**High approximation of solar spectrum with AM1.5G, compact design and fiber illumination**



### Features

- High approximation of solar spectrum
- Built-in AM1.5G filter
- Flexible illumination by light guide
- Adjustable light intensity
- Self-contained lamp and power supply
- No need of optical axis alignment
- External controller
- RS232C remote control

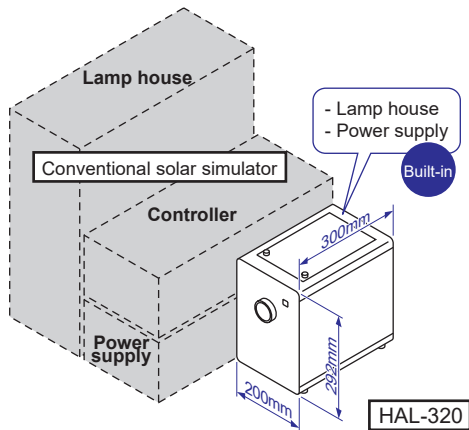


# Our unique fiber output method enables the use in various experimental configurations

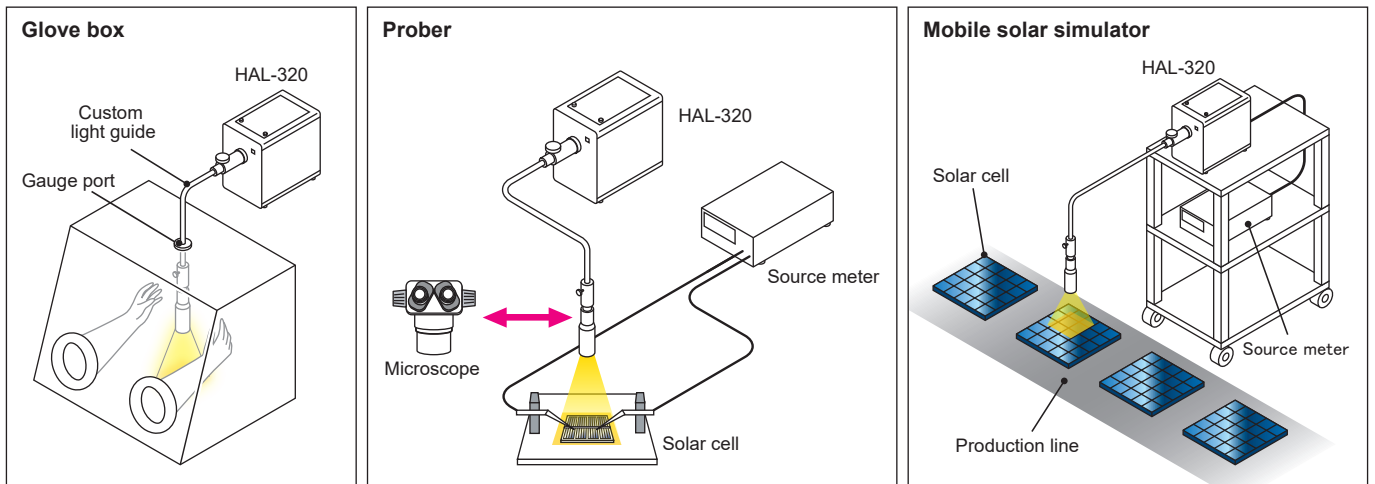
The solar simulator HAL-320, includes an AM1.5G filter, is a compact design and easy-carrying. Fiber output system enables flexible design of experiment: combination with a glove box, a prober, manufacturing line and so on.



## Compact and Easy-carrying



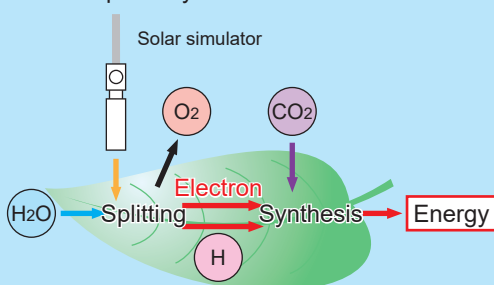
## Flexible Configuration with Light Guide



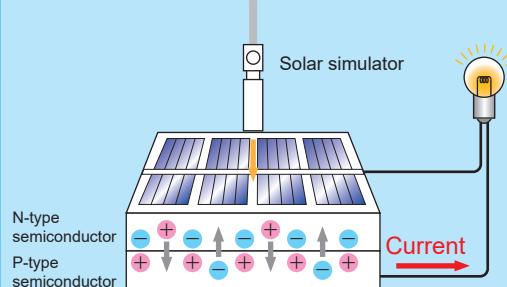
## Applications

### Solar simulator for various inspection and research

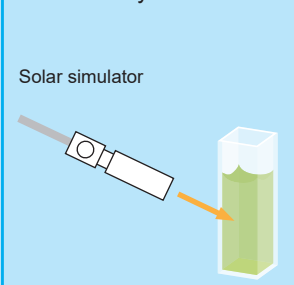
#### Artificial photosynthesis



#### Solar cell research



#### Photocatalytic research



# Compact solar simulator achieves high approximation of solar spectrum

## Spectral Match <sup>\*1 \*5</sup>

Type of Solar Cell	Class
Crystal	<b>A</b>
Amorphous	

JIS Classification

JIS C8904-9:2017

<b>A</b>	<b>B</b>	<b>C</b>
0.75~1.25	0.6~1.4	0.4~2.0

Energy Distribution

Crystal		Amorphous	
Wavelength (nm)	(%)	Wavelength (nm)	(%)
400 - 500	18.4	350 - 400	6.2
500 - 600	19.9	400 - 450	11.8
600 - 700	18.4	450 - 500	14.9
700 - 800	14.9	500 - 550	14.6
800 - 900	12.5	550 - 600	14.3
900 - 1100	15.9	600 - 650	13.8
		650 - 700	12.9
		700 - 750	11.5

## Non-uniformity of Irradiance <sup>\*2</sup>

Condition	Class
Working distance: About 363mm Irradiance area: 50x50mm Class A area: 30x30mm (±15mm from the center)	<b>A</b>

JIS Classification

JIS C8904-9:2017

<b>A</b>	<b>B</b>	<b>C</b>
$\leq \pm 2 \%$	$\leq \pm 3 \%$	$\leq \pm 10 \%$

## Temporal Instability of Irradiance <sup>\*1</sup>

Measurement Item	Class
Short term instability (STI) <sup>*3 *6</sup>	<b>B</b>
Long term instability (LTI) <sup>*4</sup>	

JIS Classification

JIS C8904-9:2017

	<b>A</b>	<b>B</b>	<b>C</b>
STI	$\leq \pm 0.5 \%$	$\leq \pm 2 \%$	$\leq \pm 10 \%$
LTI	$\leq \pm 2 \%$	$\leq \pm 5 \%$	$\leq \pm 10 \%$

\*1 Warming up: More than 30 minutes, measuring the center of Class A area.

\*2 Warming up: More than 30 minutes, measuring the whole Class A area.

\*3 Sampling time: 10 sec, Sampling interval: 1 ms

\*4 Sampling time: 1 hour, Sampling interval: 0.1 sec

\*5 It is confirmed at the time of shipment.

We are not able to guarantee it, when the lamp is degraded as time passes.

\*6 Only for I-V measurement

## User-friendly External Controller



< Operation contents >  
 1. Shutter function Open/Close  
 2. Timer function  
 3. Light intensity adjustment etc.

The HAL-320 is controlled by our proprietary controller. Various functions can be easily controlled just by pressing the control buttons of the controller and it has a comprehensive display.

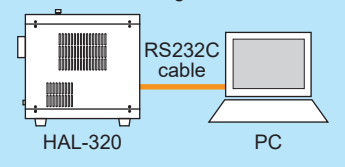
## RS232C Remote Control



RS232C connector



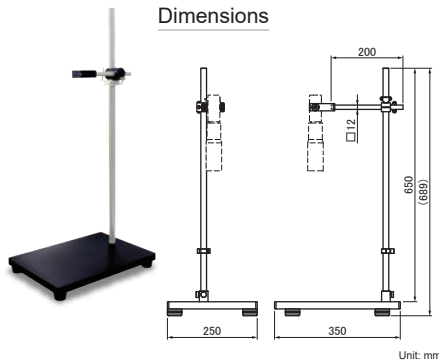
< Connection image >



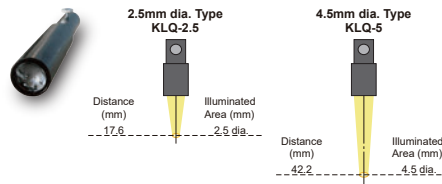
The HAL-320 can be controlled remotely via RS232C.

# Options

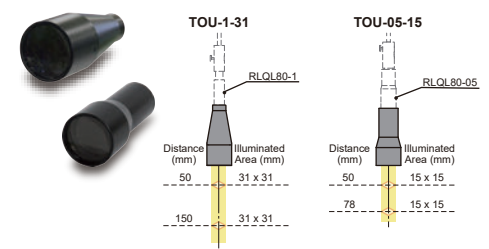
## Stand for Collimator Lens



## High Condensing Lens



## Telecentric uniform illumination unit



## 1 SUN Checker CS-20



1 SUN Checker is used for checking the light intensity (1 SUN) of HAL-320. It is battery operated and portable.

## Light Guide (TPO)



This light guide is the option for bringing a light into a glove box. The gauge port is equipped.

## Package Contents

- HAL-320 main unit
- Lamp cartridge
- Quartz light guide (1m)
- Light guide adapter
- Collimator lens
- Controller
- Controller cable (2m)
- AC cable (3m)
- RS232C cable (1.8m)
- Instruction manual

## General Specifications

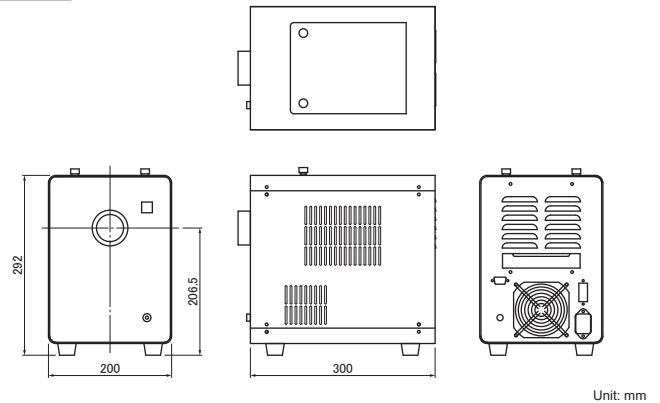
- Model: HAL-320  
 Output wavelength: 350 - 1100nm  
 \*AM1.5G filter made by ASC is equipped as standard.
- Lighting mode: Continuous  
 Scope of application: I-V measurement, irradiation test  
 Irradiance: 1000W/m<sup>2</sup> (1 SUN condition)  
 \*Confirmed with a reference solar device.
- Max. AOI on irradiance area:  $\leq 15^\circ$   
 Input voltage: AC100 - 240V $\pm 10\%$  50/60Hz  
 Apparent power: Less than 510VA (AC100V/50Hz)  
 Less than 500VA (AC240V/50Hz)  
 Lamp type: Xenon lamp 300W (UV)  
 Lamp voltage, current: 14V, 21A (DC) \*Representative value  
 Lamp control method: Constant power control  
 Lamp life: 500h \*1  
 Optical axis alignment: Cartridge type (Alignment-free)  
 Cooling method: Forced air cooling  
 Functions: Shutter, Timer, Lamp life \*2, Light intensity control  
 100-30 (steps) continuously variable  
 Remote control: RS232C \*The cable must be less than 3m.  
 Controller: Remote controller  
 Safety mechanism: Lamp turns off and warning lamp turns on:  
 - Xenon lamp problem - Top door is open  
 - Cooling fan problem - Temperature anomaly  
 Circuit protector is used, shut off when AC input is overcurrent
- Recommended environment: Temperature 10 - 35 deg C  
 Humidity 20 - 80% \*Avoid condensation
- Dimensions: Main unit 200(W) x 300(D) x 292(H)mm  
 Controller 160(W) x 37(D) x 99(H)mm  
 Weight: Main unit 11.3kg  
 Controller 0.6kg (including cable)

\*1 Less than 1 year after delivery, under our condition.

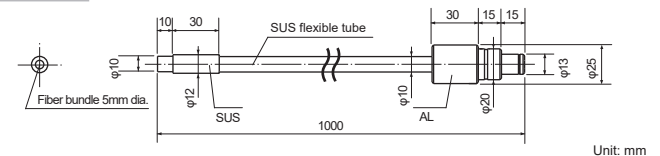
\*2 Count the lamp usage hours. (Unit: h)

## Dimensions

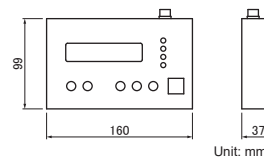
### Main unit



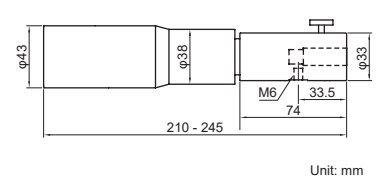
### Light guide



### Controller



### Collimator lens



\*Product specifications are subject to change without notice.

# ASAHI SPECTRA

Gardenia Bldg. 4F, 2-13-1 Kamijujo, Kita-ku, Tokyo 114-0034 Japan  
 Phone: +81-3-3909-1151 / FAX: +81-3-3909-1152  
 E-mail: info@asahi-spectra.com

[www.asahi-spectra.com](http://www.asahi-spectra.com)