

SPOT LIGHT SOURCES

# LIGHTNINGCURE<sup>®</sup> SERIES

Lamp warranty: Guarantees a long operating life of 4000 hours

## LC8



Light guide is sold separately.

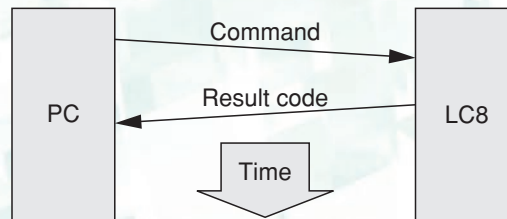
**HAMAMATSU**  
PHOTON IS OUR BUSINESS

## Operate it from your PC via the RS-232C port.

# LC8

The LIGHTNINGCURE LC8 has a built-in RS-232C port to allow PC or microcomputer control that was impossible up until now. Making program entries (irradiance, irradiation time) for the Memory Step is now accurate and easy. You can operate the light source even in a location where direct access to it is impossible. Using the USB adaptor connector lets you use a PC even if it has no RS-232C port.

### When PC starts communication



Communication is started by PC and finished by the result code sent from the unit.

## Feature

## Memory Step™ for 9 types 7-step programs

# LC8

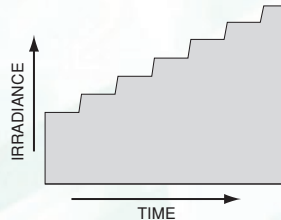
Program the irradiance and irradiation time to any level you want! Freely set the UV irradiation conditions to match the component you want to bond.

The LIGHTNINGCURE LC8 lets you store 9 types of 7-step programs in the memory, so optimal irradiation conditions matching the component for bonding can be set just by changing the program number. This holds true even when multiple bonding components are flowing in the same production process or when shifting to different production lines.

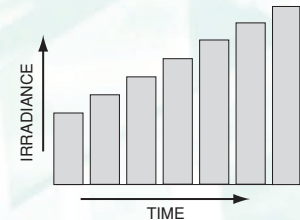
The LC8 is especially ideal for components that must be fixed in place with high precision. The mounting positions of these components often deviate due to stress warping and contraction in the adhesive that causes positional shifts. Using the LC8 gives better production stability and higher product yield especially for components demanding high position precision.

### Program example 1: Increasing light irradiance in 7 steps

Shutter "open" between steps

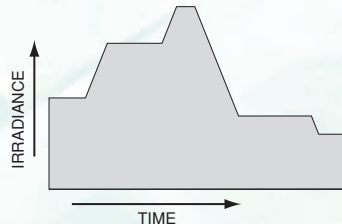


Shutter "closed" between steps

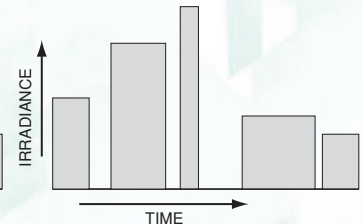


### Program example 2: Random irradiance and irradiation time settings

Shutter "open" between steps

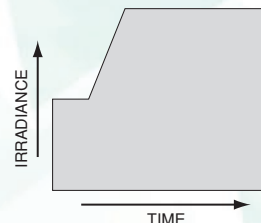


Shutter "closed" between steps

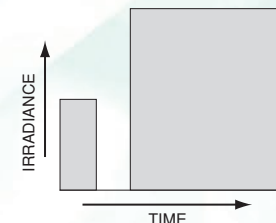


### Program example 3: Low irradiance and then long-term high intensity

Shutter "open" between steps



Shutter "closed" between steps





# LIGHTNINGCURE LC8

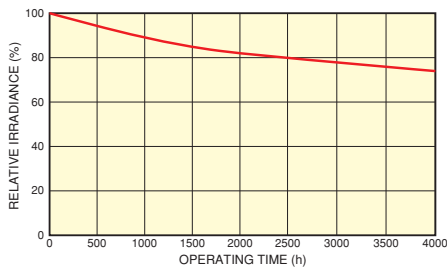
## FEATURES & FUNCTIONS

### Long life

#### Guaranteed life: 4000 h (-01A and -02A)

Irradiance generally declines with lamp operating time. Hamamatsu has drastically improved these drops in irradiance by using a mercury-xenon lamp whose electrodes suffer almost no wear and an improved optical system.

#### ●Variations in UV irradiance [365 nm] over time (typical values)



### Full line-up of external control equipment (RS-232C and D-sub connector: standard feature)

You can turn the lamp on and off and control the shutter externally. An alarm signal output is also available. Signals and data can be exchanged with the PC via the RS-232C. This unit will prove ideal for production environments such as semi-automated or fully automated manufacturing lines.



Upper: D-sub connector  
Under: RS-232C

### Great energy saving benefits

Our 200 W lamps have high output equal to lamps in the 250 W class. Light sources using our 200 W lamps also have less power consumption than those using 250 W lamps. Power consumption is the lowest in its class (280 VA Typ.). This means using multiple UV light source units at production facilities will yield tremendous energy saving benefits.

### Power supply compatible in world-wide

Internal power supply automatically switches to a 100 V or 200 V input. There is no problem when shifting the operating location in world-wide.

**WORLD-WIDE  
OPERATION**

### Selectable positions of light guide port

A front port type and a rear port type are available. The front port type allows lamp replacement from the operation panel side. This helps hold limits on equipment movement and installation location to a minimum. Select the light guide port position that best matches the component for bonding and its mounting position.



Left: Rear light guide port type L9566, Right: Front light guide port type L9588

### Anybody can use it! One-touch replacement!

Lamp is replaceable in less than 30 seconds!

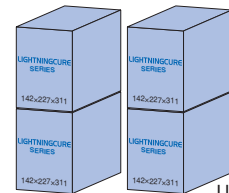
Just insert the lamp to replace it. No wiring to worry about. This is so easy you can do it with one hand.

Lamp is the cassette type with a preset optical axis so no troublesome optical alignment is needed after replacement.



### Clever layout allows a compact body

Superb features are concentrated into a compact body. Weight has been reduced to a mere 6.4 kg. Area of installation can be reduced. Stacking the units allows saving even more space.



Unit: mm

### Instantaneous power-outage response program

Restores operation in about 10 seconds after power outages of a second or less. Conventional products take at least a few minutes to start up again after a power shutdown, so you can see this function drastically shrinks down-time due to power outages.

This function is especially convenient in places where the supply of power is intermittent or unstable.

### CE marking compliance

The LIGHTNINGCURE complies with CE marking requirements and can also be used in Europe.

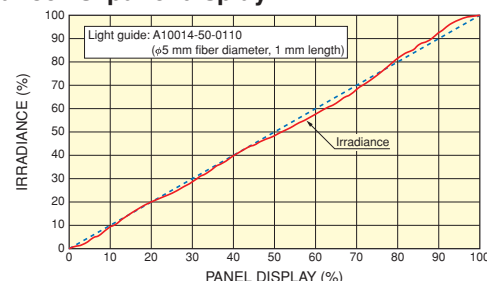
#### Applicable standards

- EMS standard: IEC/EN 61326-1
- Emission limits: CISPR 11 Group 1 Class A
- Immunity requirements: Table 2
- Safety standard: IEC/EN 61010-1
- RoHS directive: IEC/EN 63000

### Irradiance adjustable anywhere within 0 to 100 %!

An electric diaphragm mechanism allows a digital display of the relative irradiance from 0 % to 100 % on the LCD panel. Unlike conventional analog scales, this means highly precise irradiation. Irradiance also can be controlled from an external device, so meeting various kinds of measurement conditions is now even easier.

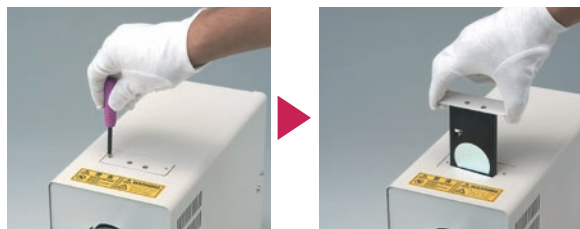
#### Irradiance vs. panel display



## STRUCTURE

### Easy filter replacement

Seven types of filters are provided for selecting the irradiation light. A single screwdriver is all you need to replace the filter via the upper filter insertion port. There is no need to open any cover as on conventional units, so you save even more replacement time.



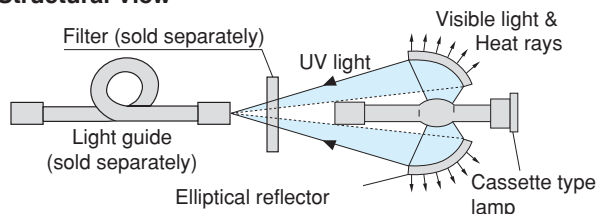
Filters and filter holder are sold separately.

### High efficiency optical system - no heat problems

The LC8 combines a mercury-xenon lamp having high output UV line spectra with an elliptical reflector having reflectivity higher than 90 % in the UV range and a quartz light guide with excellent UV transmittance.

The lamp can be operated in a horizontal position, so the optical system has less light loss compared to lamps operated in an upright position, allowing the UV light to input efficiently to the light guide. The elliptical reflector efficiently reflects only the UV light, and lets heat rays and visible light pass through to prevent adverse effects from heat on the irradiated point (-01A and -02A).

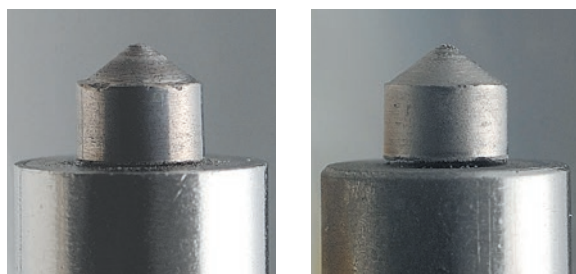
#### ●Structural View



### No optical axis alignment

Uses a highly stable mercury-xenon lamp developed expressly for analysis and measurement applications. There is almost no wear on the electrodes and no positional shift of the arc point. Absolutely no optical axis alignment is needed, even during lamp replacement or during lamp use.

#### ●Electrode wear



Before use

After 4000 hours of use

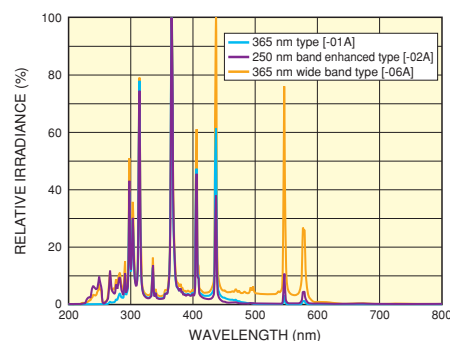
## CHARACTERISTICS

### Selectable wavelength

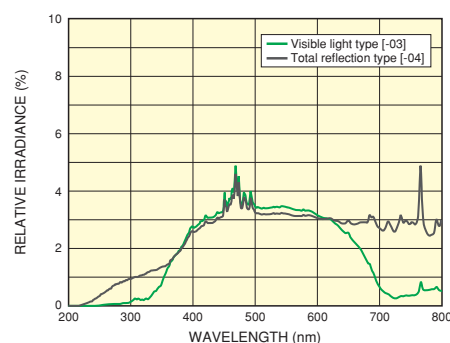
The LC8 allows you to select the wavelength range you need. The lineup includes the model "-01A" with a center wavelength of 365 nm, "-02A" enhanced for 250 nm wavelength band, "-03" designed for the visible light range, "-04" of total reflection type, and "-06A" with a wide band around 365 nm. Select the light source that matches your applications.

If you need special specifications, please feel free to consult us.

#### ●UV spectral distribution (-01A, -02A and -06A)



#### ●Visible light spectral distribution (-03 and -04)



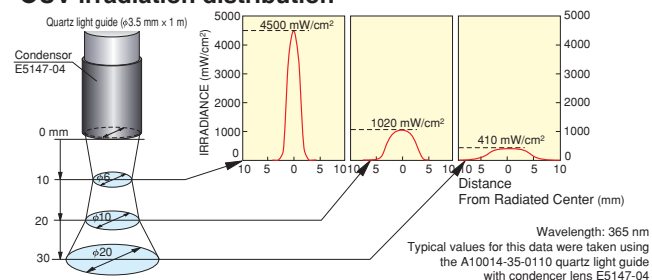
Visible light and the infrared rays can be cut, and it can combine with the filter etc. that suppress the heat influence on the irradiation part to the minimum (see "ACCESSORY" section).

### High output

#### UV irradiance: 4500 mW/cm<sup>2</sup> (-01A, at 365 nm)

The LC8 yields an extremely strong spectral distribution in the UV range most effective for UV curing. UV irradiance distribution is dependent on the distance from the light guide output end to the target surface to be irradiated, as well as on the type of light guide used. The greater the distance from the light guide output end to the target surface, the more the maximum UV irradiance drops and the more the light beam expands (see below).

#### ●UV irradiation distribution



## CONTROL

Control	Front panel control	Communication connector (RS-232C)	External control terminal (D-sub connector)
Main power ON / OFF	○	—	—
Lamp ON / OFF	○	○	○
Shutter drive	Open / Close	○	○
	Auto open / close by timer *1	○	○
	Auto shutter time setting	○	—
Irradiation program (Memory Step™) setting	○	○	—
Optical power adjustment (UP / DOWN)	○	○	○
Lamp ON indicator	○	○ (Signal output)	○ (Signal output)
Lamp stability indicator	○	○ (Signal output)	○ (Signal output)
Shutter open indicator	○	○ (Signal output)	○ (Signal output)
Lamp operation hour meter	○	○	—
Overheat alarm	○	○ (Signal output)	○ (Signal output)
Lamp operation time alarm	○	○ (Signal output)	○ (Signal output)
Operating switch for power saving mode *2	—	—	—

\*1 Corresponds to "start / stop" of Memory Step™.

\*2 The operating switch is inside

○ : available, — : not available

## SELECTION GUIDE

Type No.	Spectral distribution ①		Lamp for maintenance ②	Guaranteed life
L9566-01A, L9588-01A	[365 nm type]	300 nm to 450 nm	L10852	4000 h (at 365 nm)
L9566-02A, L9588-02A	[250 nm band enhanced type]	240 nm to 400 nm	L10852	4000 h (at 365 nm)
L9566-03, L9588-03	[Visible light type]	400 nm to 700 nm	L14753	2000 h (at 436 nm)
L9566-04, L9588-04	[Total reflection type]	300 nm to 800 nm	L14753	2000 h (at 436 nm)
L9566-06A, L9588-06A	[365 nm wide band type]	240 nm to 550 nm	L10852	4000 h (at 365 nm)

**NOTE:** ① Major spectral distribution. Various optical filters (sold separately) can also be attached. Refer to the spectral distribution graph for details on the spectral distribution.

② L10852 is 200 W super-quiet mercury-xenon lamp. L14753 is 150 W super-quiet xenon lamp (low ozone type).

## SPECIFICATIONS

Parameter	L9566	L9588
Light guide port	Rear	Operation panel (front)
Lamp replacement position	Operation panel (front)	Rear
UV irradiance (Typ.) ④	4500 mW/cm² Typ. (at 365 nm, -01A)	
Spectral distribution	Refer to the SELECTION GUIDE	
Lamp for maintenance	Refer to the SELECTION GUIDE	
Guaranteed life	Refer to the SELECTION GUIDE	
Input voltage (AC)	100 V to 240 V (100 V / 200 V auto switching), single phase 47 Hz to 63 Hz	
Power consumption	280 VA Typ.	
Weight	Approx. 6.4 kg	
Operating temperature range	+5 °C to +35 °C	
Storage temperature range	-10 °C to +70 °C	
Operating and storage humidity range	Less than 80 % (no condensation)	

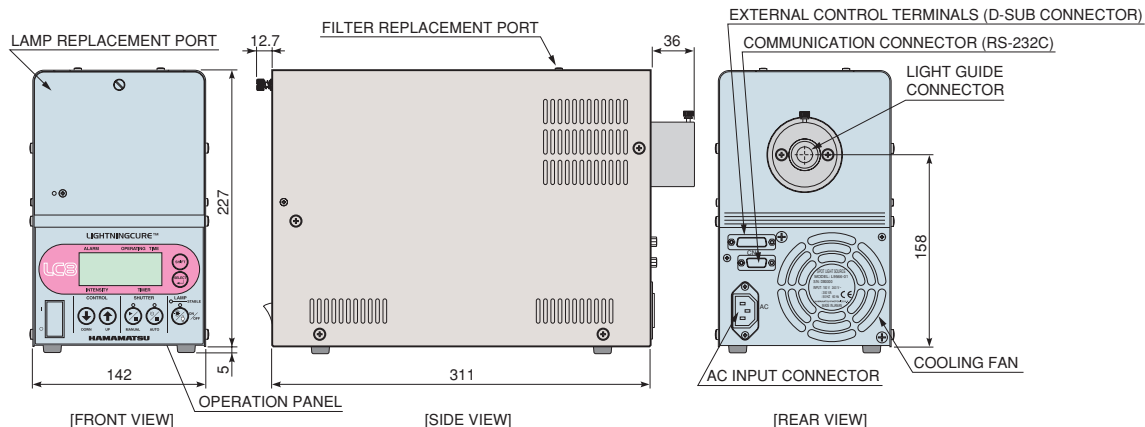
**NOTE:** ④ UV irradiance (at 365 nm) is measured in the center at a point 10 mm away from the output end of the A10014-35-0110 light guide (sold separately) with E5147-04, by using the Hamamatsu C6080-365 UV power meter.



## DIMENSIONAL OUTLINES

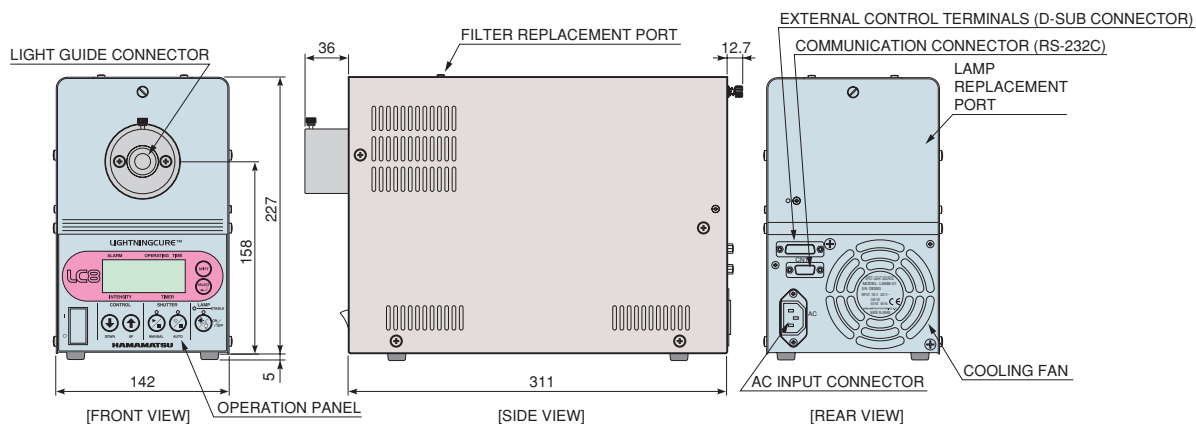
### L9566

(Unit: mm)



### L9588

(Unit: mm)



## WARNING

#### ● Light

This equipment emits very strong ultraviolet light which is harmful to eyes and the skin.

Also, as the light emanating from the light guide connection aperture contains infrared light in addition to ultraviolet light, its irradiation will cause heat generation. Be sure to observe following instructions for operation of the equipment.

- Never look directly into the light guide connection aperture or at the light emanating from the light guide. Strong ultraviolet light can cause visual disorder.
- Do not allow light to come into contact with skin. Contact with skin may cause sunburn-grade inflammation. Always wear safety glasses, gloves, and other appropriate protective gear when operating this equipment.
- Never allow light from the light guide to radiate onto flammable material.
- The unit includes an interlock that prevents the lamp from lighting while top cover is open. Never attempt to override the interlock function by manually depressing the switch, as this may result in uncontrolled release of dangerous ultraviolet light.

#### ● High-Voltage trigger

- The mercury-xenon lamp employed started by a high-voltage (30 kV) pulse applied at the lamp electrodes.

As protection against accidental electrical shock hazard, the design includes an interlock switch that disables lamp operation while the top cover is open. Never attempt to turn on the lamp by blocking the sensor window of the interlock switch.

#### ● Lamp Replacement

- The inside of the lamp housing becomes extremely hot during lamp operation. Before replacing the lamp, switch it off and run the cooling fan for at least 15 minutes.
- Always exercise due caution when handling or replacing a lamp.

A lamp contains high-pressure gas [approximately 1 MPa (10 atmospheres) at room temperature, approximately 4 MPa (40 atmospheres) during operation] and may burst if dropped or otherwise impacted.

#### ● Inhibition of Removal and Modification

- Do not remove the cover unless absolutely necessary and never touch any of the screws inside the unit. As the internal components of this unit have been precisely adjusted, disassembling or modifying the equipment can cause problems with the unit, fire and electrical shock.

## DISPOSAL OF LAMPS

Lamps are filled with high pressure (approx. 1 MPa at room temperature) xenon gas (xenon gas and mercury in mercury-xenon lamps). When disposing of the used lamp, take appropriate measures in compliance with applicable regulations regarding waste disposal and correctly dispose of it yourself, or entrust disposal to a licensed industrial waste disposal company. In any case, be sure to comply with the regulations in your country, state, region or province to ensure the used lamp is disposed of legally and correctly.

**Mercury xenon lamp contains mercury, Dispose according to local, state, or federal law.**

## WARRANTY PERIOD

This device is guaranteed for one year after delivery date from us. The warranty extends only to replacement of the products. The warranty does not cover damage due to misuse or natural calamity.

# LIGHTNINGCURE LC8

## ACCESSORY

### LIGHT GUIDES

Various light guides using a core material with high UV transmittance are available ranging from the single type up to a 6-furcated type. Select the desired light guide that suits your application.

#### TYPE NO. GUIDE

**A10014-35-0110**

A: Core material  
B: Output diameter  
C: Furcated  
D: Length

A		C (Suffix numbers are examples)	
Type No.	Core material	Suffix	Furcated
A10014	Synthetic silica	01	Single
A10015	Glass (for-03 type)	04	4
		06	6

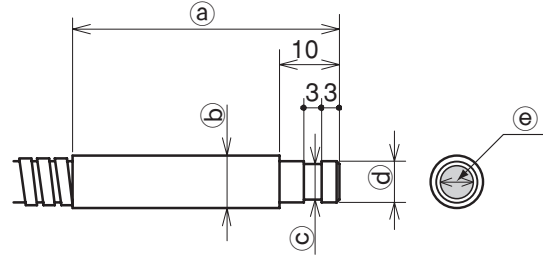
  

B (Suffix numbers are examples)		D (Suffix numbers are examples)	
Suffix	Output diameter	Suffix	Length
35	φ3.5 mm	10	1 m
50	φ5 mm		
70	φ7 mm		

#### DIMENSIONAL OUTLINE OF OUTPUT END

(UNIT: mm)

Ⓐ to Ⓔ: see the table below.



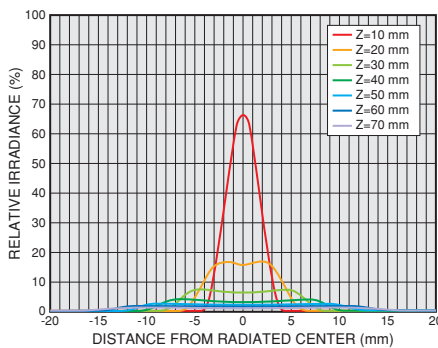
#### MAIN LIGHT GUIDE

Type No.				Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
A	B	C	D					
A10014	35	01	10	45	φ8	φ5.8	φ6	φ3.5
A10014	35	02	10					
A10014	35	03	10					
A10014	35	04	10					
A10014	35	05	10					
A10014	35	06	10	60	φ11	φ6.5	φ7	φ5
A10014	50	01	10					
A10014	50	02	10					
A10014	50	03	10					
A10014	50	04	10					
A10014	70	01	10	60	φ14	φ8.5	φ9	φ7
A10015	50	01	10	60	φ11	φ6.5	φ7	φ5

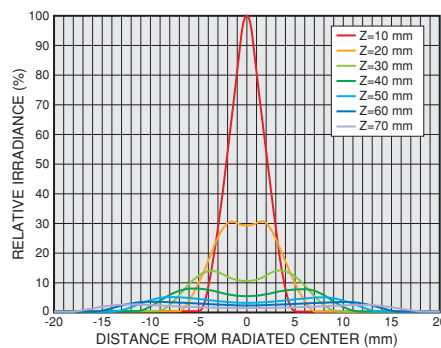
#### IRRADIANCE DISTRIBUTION <Typ.>

\* Relative irradiance: 100 % is equal to 3500 mW/cm<sup>2</sup>, the irradiance at the distance of 10 mm from the output end of the A10014-50-0110 (without condenser lens).  
\* Z: Distance from output end

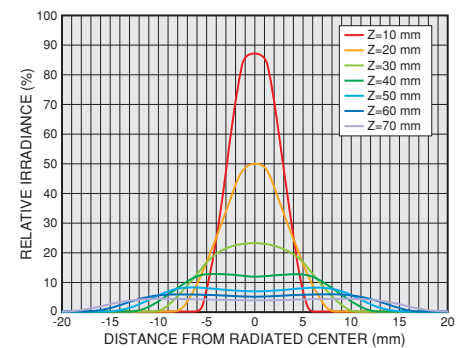
##### ■ A10014-35-0110 (at 365 nm)



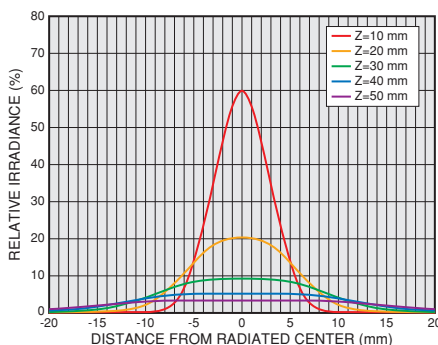
##### ■ A10014-50-0110 (at 365 nm)



##### ■ A10014-70-0110 (at 365 nm)



##### ■ A10015-50-0110 (at 436 nm)\*



#### MAXIMUM IRRADIANCE FOR FURCATED FIBER

##### A10014-35 SERIES (Suffix, lower 4 digits)

Single (-0110)	2 furcated (-0210)	3 furcated (-0310)	4 furcated (-0410)	5 furcated (-0510)	6 furcated (-0610)
65 %	60 %	50 %	45 %	40 %	35 %

##### A10014-50 SERIES (Suffix, lower 4 digits)

Single (-0110)	2 furcated (-0210)	3 furcated (-0310)	4 furcated (-0410)
100 %	75 %	60 %	50 %

\* 100 % is equal to the irradiance (436 nm) at the distance of 10 mm from the output end of the A10014-50-0110 (without condenser lens).

# ACCESSORY

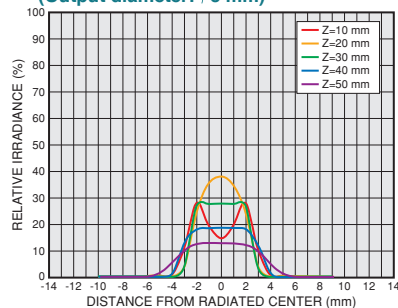
## CONDENSER LENSES

Condenser lenses collect light emitted from a light guide and make it illuminate an object efficiently. Condenser lenses are recommended when illuminating an object located away from the light guide end.

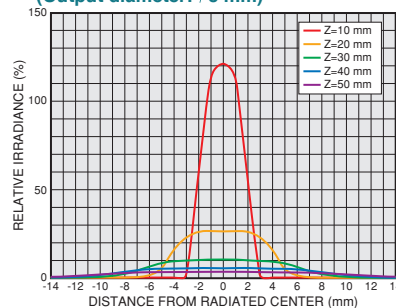
### IRRADIANCE DISTRIBUTION <Typ.>

- \* Relative irradiance: 100 % is equal to the irradiance at the distance of 10 mm from the output end of each light guide (without condenser lens).
- \* Z: Distance from output end

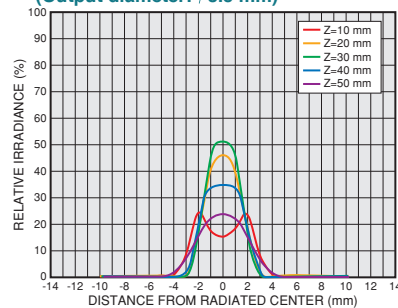
#### LONG FOCAL POINT TYPE E5147 (Output diameter: $\phi 5$ mm)



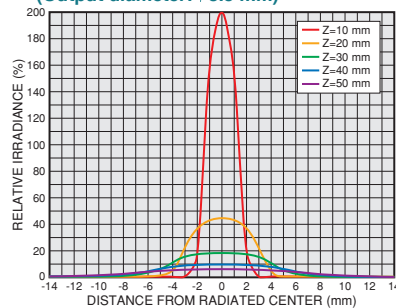
#### SHORT FOCAL POINT TYPE E5147-03 (Output diameter: $\phi 5$ mm)



#### LONG FOCAL POINT TYPE E5147-02 (Output diameter: $\phi 3.5$ mm)

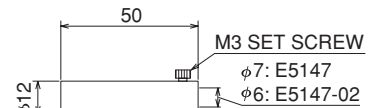


#### SHORT FOCAL POINT TYPE E5147-04 (Output diameter: $\phi 3.5$ mm)

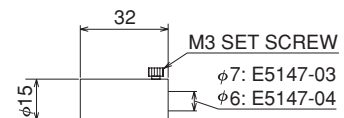


### DIMENSIONAL OUTLINE (UNIT: mm)

#### LONG FOCAL POINT TYPE E5147-02



#### SHORT FOCAL POINT TYPE E5147-03/04



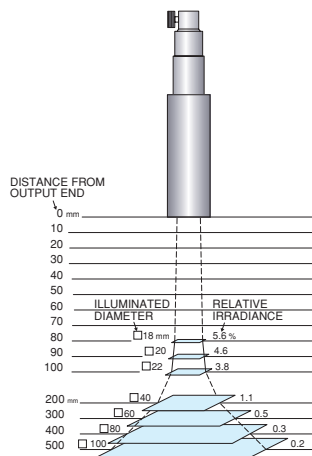
## CONDENSER LENS (Uniform illumination type)

A condenser lens (uniform illumination) is attached to the tip of the light guide to uniformly illuminate an entire surface. It efficiently emits light at wavelengths longer than 300 nm.

### IRRADIANCE DISTRIBUTION <Typ.>

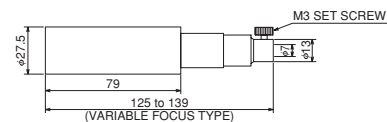
- \* Relative irradiance: 100 % is equal to 3500 mW/cm<sup>2</sup>, the irradiance at the distance of 10 mm from the output end of the A10014-50-0110 (without condenser lens).

#### E5147-06



### DIMENSIONAL OUTLINE (UNIT: mm)

#### E5147-06





## FILTERS

Four types of filters are available, including UV-transmitting filters that efficiently transmit only the UV light needed for UV curing, as well as infrared cut filters and UV cut filters. Please select the filter that matches your applications. The types "-03" and "-05" are designed to minimize heat generation from the irradiated surface, making them effective when bonding components that are vulnerable to heat.

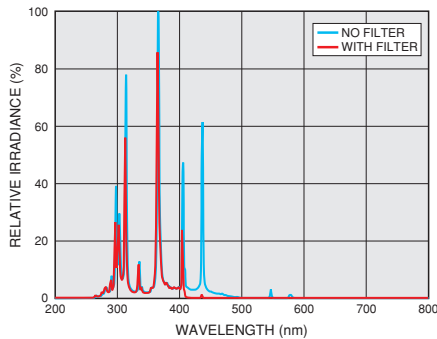
These filters have a long service life. Almost no drop in the transmittance even after 10000 hours of operation.

## SPECIFICATIONS

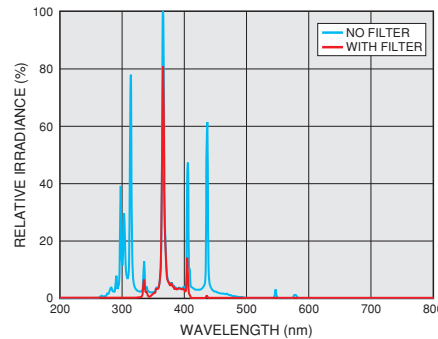
Type No.	Number of filter used	Transmittance wavelength (nm)	Transmittance (%)	Note
A9616-03	1	280 to 400	Approx. 85	High UV transmittance, block heat
A9616-05	2	350 to 400	Approx. 80	Cuts off heat over a wide spectral range more efficiently than -03 type.
A9616-07	2	355 to 375	Approx. 50	Transmissive light of around 365 nm only
A9616-09	1	over 400	Approx. 95	Block UV light

## SPECTRAL DISTRIBUTION WITH A FILTER ATTACHED

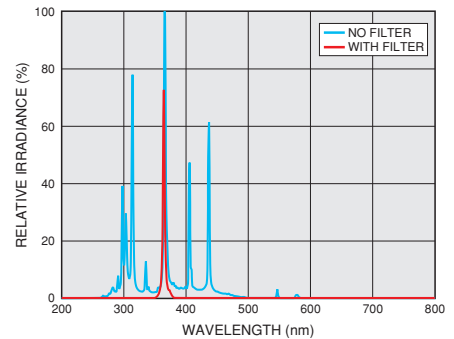
■ A9616-03 (Light source: -01A)



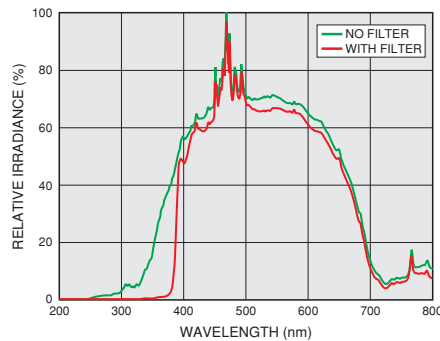
■ A9616-05 (Light source: -01A)



■ A9616-07 (Light source: -01A)

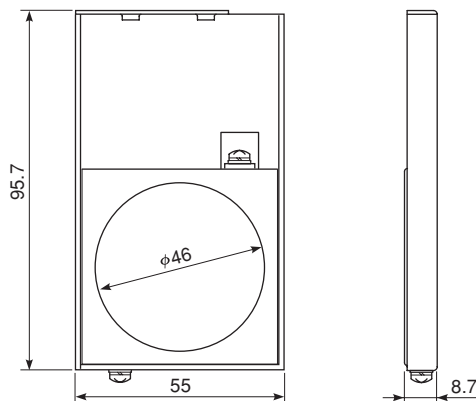


■ A9616-09 (Light source: -03)



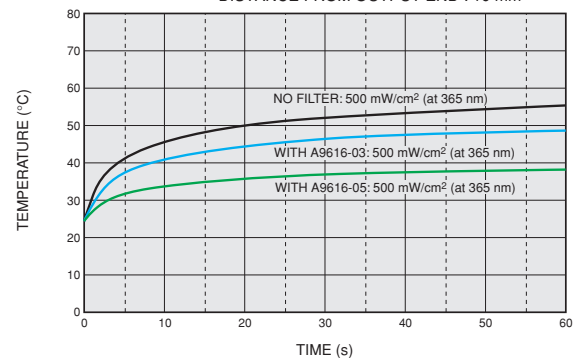
## DIMENSIONAL OUTLINE

(UNIT: mm)



## TEMPERATURE COMPARISON ON THE ILLUMINATED SURFACE

- SPOT LIGHT SOURCE : L9566-01A
- LIGHT GUIDE : A10014-50-0110
- OBJECT BEING IRRADIATED : GLASS BOARD
- DISTANCE FROM OUTPUT END : 10 mm



**NOTE:** The data shown above is typical values measured by Hamamatsu, just for your reference. Actual performance may greatly depend on the object to be illuminated and distance to it, and may differ from the above data.

# ACCESSORY

## FOOT SWITCHES

### E8263 SERIES

Pushing on the E8263 foot switch opens and closes the shutter. These are highly effective when a worker is using 1 or more spot light sources.

Different product series are available according to the cable length, connection method and operating method you need.

Type No.	Cable length	Connection	Operation
E8263-22	2 m	D-sub connector	Manual shutter
E8263-25	5 m		
E8263-32	2 m		Auto shutter
E8263-35	5 m		



## PROTECTIVE GLASSES

### A6905-01

The A6905-01 protective glasses are eyewear for protection against powerful UV radiation. When working with UV radiation, always wear protective glasses or eyewear for eye protection.



## RELATED PRODUCTS

### UV INTENSITY INTEGRABLE POWER METERS

#### H12684 series, C12144

The H12684 series and C12144 are designed to function as a power meter that measures irradiance and integrated power. The H12684 series sensor head exhibits little degradation in UV sensitivity, allowing stable measurements with high repeatability.

Type No.		Effective area (mm)	Calibrated wavelength (nm)	Measurement range	
Sensor head	Controller			Irradiance	Integrated power
H12684-365	C12144	$\phi 1$	365	0.1 mW/cm <sup>2</sup> to 100 W/cm <sup>2</sup>	0.1 mJ/cm <sup>2</sup> to 9999 J/cm <sup>2</sup>
H12684-385			385		
H12684-395			395		
H12684-405			405		



### UV-LED SPOT LIGHT SOURCES LIGHTNINGCURE<sup>®</sup> LC-L1V5

The LC-L1V5 is a compact, lightweight, palm-top size UV-LED spot light source with independently controllable 4 heads. The LC-L1V5 can be installed either vertically or horizontally even in a small space, allowing flexible layout in any place. Our unique feedback function enables the LC-L1V5 to achieve constant light output with variations held within  $\pm 5\%$  even immediately after it starts lighting.



### LINEAR IRRADIATION TYPE UV-LED UNITS LIGHTNINGCURE<sup>®</sup> LC-L5G

This is a linear irradiation type UV-LED light source that achieves high output, compactness and lightweight by adopting Hamamatsu's original air-cooling method. The high output makes it possible to support high-speed transportation. Hamamatsu offers a wide range of products to meet customers' requirements.





\* **LIGHTNINGCURE** is registered trademark of Hamamatsu Photonics K.K..

Subject to local technical requirements and regulations, availability of products included in this promotional material may vary. Please consult with our sales office.

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