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LIGHT PRINTS INNOVATION

LIGHTNINGCURE® LC-L5G

Linear Irradiation Type UV-LED Units

LIGHTNINGCURE® LC-L5G

Linear Irradiation Type UV-LED Units

Proprietary air cooling method

ThoMaS

Product warranty extension option

ALiCE

Proprietary nitrogen purging method

HANCE

Air-cooled UV-LED light sources that deliver the highest output in their class

The Hamamatsu LIGHTNINGCURE LC-L5G series is a family of linear irradiation type UV-LED light sources having many great features such as compact size, light weight, high output and large irradiation area, making them ideal for a vast range of applications including UV printing, UV coating and UV adhesive curing.
To extract the maximum performance from UV-LED light sources, Hamamatsu employs a proprietary air cooling method called *ThoMaS*, a proprietary nitrogen purging method called *HANCE*[*1] and a warranty extension option *ALiCE* that allows customers to extend the product warranty period.

*1: *ThoMaS* and *HANCE* are only available for model GH-103A.

Proprietary air cooling method *ThoMaS*

ThoMaS is an air cooling method using advanced thermal analysis technology along with a unique cooling structure and cooling material we developed exclusively in-house. Applying this cooling method reduces the size and weight of UV-LED light sources yet still ensures high output.

Proprietary nitrogen purging method *HANCE*

HANCE is a unique nitrogen purging method that does efficient nitrogen purging just in the area directly under the UV-LED light source. During UV printing, nitrogen purging reduces the stickiness of the UV ink caused by oxygen inhibition to achieve even faster high-speed feeding of printed materials.

Product warranty extension option *ALiCE*

This is an optional service that extends the product warranty period based on the customer's operating conditions and environment.

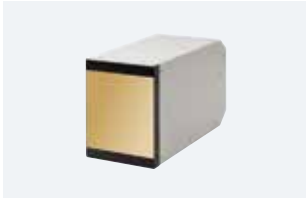
NOTE: We may not be able to extend warranty period depending on the operating condition.
Minimum order quantity to apply this option differs by the product model.

To see more detailed information, scan the QR code or access the URL below.
https://www.hamamatsu.com/all/en/product/manufacturing-support-systems/uv-led-light-source/uv-led-light-source_linear-irradiation.html

Product lineup

LIGHTNINGCURE® LC-L5G

Linear irradiation type UV-LED unit

Model No.		Light emission window size (mm)	Wavelength			UV irradiance (Max.) (W/cm²)
			365 nm	385 nm	395 nm	
GC-113A		113 x 18	✓	✓	✓	10*1
GH-103A		103 x 24			✓	22*1
GH-103A Equipped with proprietary nitrogen purging method		103 x 24			✓	22*1
GA-107		107 x 108	✓			1.5*2

*1: Maximum UV irradiance measured within the irradiation area at an irradiation distance of 0 mm.

*2: Maximum UV irradiance measured within the irradiation area at an irradiation distance of 10 mm.

NOTE：See each model's specifications for details.

Linear irradiation type UV-LED unit

LIGHTNINGCURE® LC-L5G

GC-113A

Specifications

Parameter			L14770-1604-033	L14770-2804-033	L14770-3804-033	Unit
Light emission window size			113 × 18			mm
Wavelength			365	385	395	nm
UV irradiance *1	at distance of 0 mm		7.5	10		W/cm²
	at distance of 2 mm		6	8		
LED design life *2			20 000			h
Input voltage (DC)			+48			V
Power consumption		Max.	275			W
Cooling method			Forced air cooling by fan			–
Operating temperature range			+5 °C to +40 °C			–
Storage temperature range			-10 °C to +60 °C (no freezing)			–
Operating humidity range			20 % to 80 % (no condensation)			–
Storage humidity range			Below 80 % (no condensation)			–
External control			Irradiation control, light intensity adjustment, various error signals			–
Connectable operation *3			✓			–
Applicable standard	EMC standard *4		IEC 61326-1	Emission limits: CISPR 11 Group 1 Class A Immunity requirements: Table 2		–

*1: Maximum UV irradiance within the irradiation area.
*2: Average time until the irradiance drops to 70 % of the initial level when operated at 25 °C.
*3: Optically connected operation. The light source for cascade operation is designed to minimize degradation of light output at the connected portion when light source is aligned with no gap.
*4: Evaluated with 3 light sources connected and light source connection cable.

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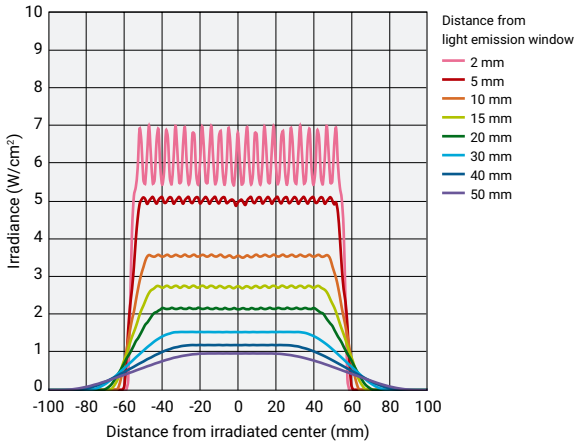
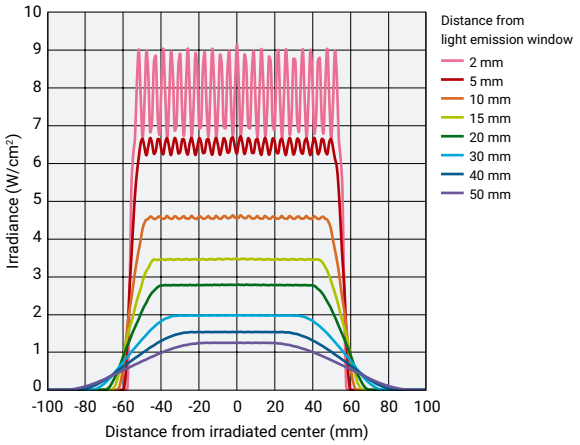
Simulation of irradiance distribution (Longitudinal displacement) (Typ.)

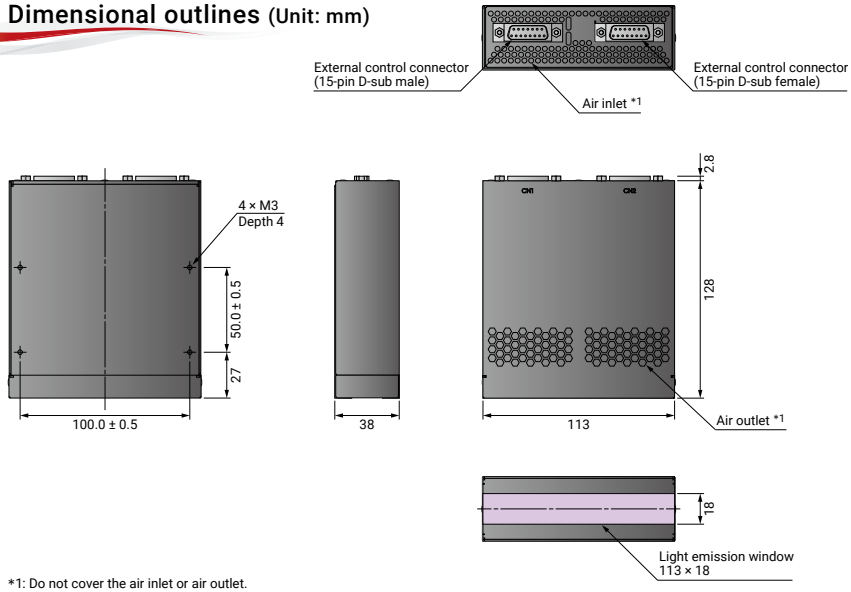
■ Wavelength: 365 nm



■ Wavelength: 385 nm and 395 nm



Dimensional outlines (Unit: mm)



*1: Do not cover the air inlet or air outlet.
Secure 100 mm or more of space from the air inlet or air outlet.

Weight: Approx. 510 g

■ External control connector (15-pin D-sub) connection

Pin No.	Signal	
1	Input voltage (+48 V)	Input
2	Input voltage (+48 V)	Input
3	RS-485	–
4	Irradiation control signal	Input
5	Error signal	Output
6	RS-485	–
7	GND.	–
8	GND.	–
9	Input voltage (+48 V)	Input
10	Input voltage (+48 V)	Input
11	Light intensity adjustment voltage	Input
12	EMGCY	Input
13	Alarm signal	Output
14	GND.	–
15	GND.	–

Recommended products

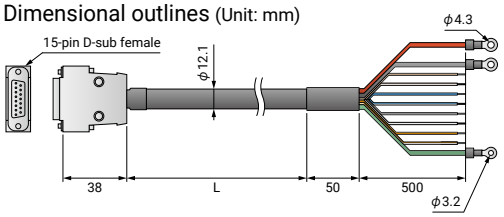
■ Power supplies *1

- COSEL Co., Ltd.
  PBA300F-48
- MEAN WELL Enterprises Co., Ltd.
  MSP-300-48

*1: Recommended power supply to operate one light source.
Please contact to each manufacturer for the latest information.

■ External control cable

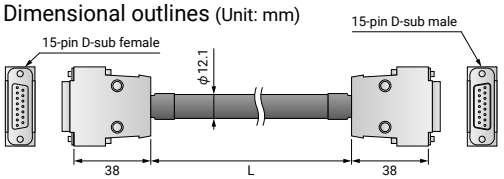
Dimensional outlines (Unit: mm)



Type No.	L: Cable length
A13692-050-34	5000 mm

■ Light source connection cable *2 (Input voltage and control signals)

Dimensional outlines (Unit: mm)



Type No.	L: Cable length
A13692-002-22	280 mm

*2: Maximum 3 light sources can be operated with one power supply.

Linear irradiation type UV-LED unit

LIGHTNINGCURE® LC-L5G

GH-103A

The GH-103A achieves the highest level of peak intensity for air-cooled method by adopting proprietary air cooling method. It is capable for high speed printing, which has been difficult with conventional UV-LED light source.

Specifications

Parameter		L15346-3A04-007	Unit
Light emission window size		103 × 24	mm
Wavelength		395	nm
UV irradiance *1	at distance of 0 mm	24 *2	W/cm²
	at distance of 2 mm	22 *2	
LED design life *3		20 000	h
Input voltage (DC)		+48	V
Power consumption	Max.	1400	W
Cooling method		Forced air cooling by fan	–
Operating temperature range		+5 °C to +40 °C	–
Storage temperature range		-10 °C to +60 °C (no freezing)	–
Operating humidity range		20 % to 80 % (no condensation)	–
Storage humidity range		Below 80 % (no condensation)	–
External control		Irradiation control, light intensity adjustment, irradiation signal, various error signals	–
Connectable operation *4		✓	–
Applicable standard	EMC standard *5	IEC 61326-1 Emission limits: CISPR 11 Group 1 Class B Immunity requirements: Table 2	–

*1: Maximum UV irradiance within the irradiation area.
*2: Light intensity can be decreased due to drifting.
*3: Average time until the irradiance drops to 70 % of the initial level when operated at 25 °C.
*4: Optically connected operation. The light source for cascade operation is designed to minimize degradation of light output at the connected portion when light source is aligned with no gap.
*5: Evaluated with 3 light sources connected and light source connection cable.

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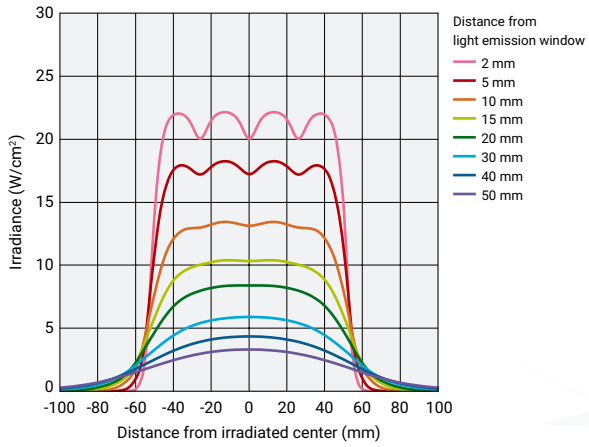
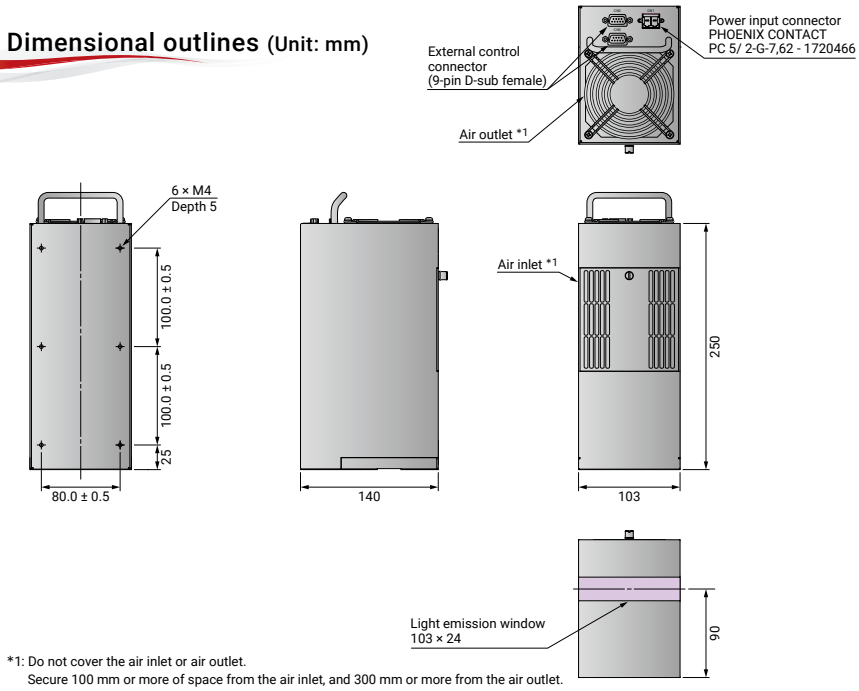
Simulation of irradiance distribution (Longitudinal displacement) (Typ.)



Dimensional outlines (Unit: mm)



*1: Do not cover the air inlet or air outlet.
Secure 100 mm or more of space from the air inlet, and 300 mm or more from the air outlet.

NOTE: Light source should be installed downward, or sideward with the air inlet facing upward.

Weight: Approx. 2.8 kg

■ Power input connector connection

Pin No.	Signal	
1	Input voltage (+48 V)	Input
2	GND.	–

■ External control connector (9-pin D-sub) connection

Pin No.	Signal	
1	Light intensity adjustment voltage	Input
2	Irradiation control signal	Input
3	EMGCY	Input
4	Error signal	Output
5	Alarm signal	Output
6	GND.	–
7	Irradiation signal	–
8	RS-485	–
9	RS-485	–

Recommended products

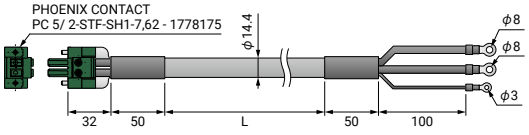
■ Power supplies *1

- COSEL Co., Ltd.
  FETA2500BA-48
- MEAN WELL Enterprises Co., Ltd.
  RST-5000-48

*1: Recommended power supply to operate one light source.
Please contact to each manufacturer for the latest information.

■ Power cable

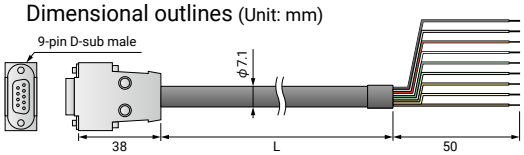
Dimensional outlines (Unit: mm)



Type No.	L: Cable length
A15593-050P-01	5000 mm

■ External control cable

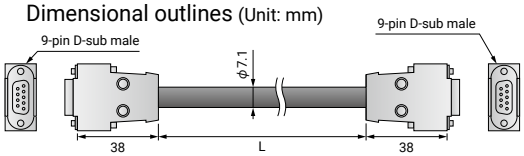
Dimensional outlines (Unit: mm)



Type No.	L: Cable length
A15593-050S-01	5000 mm

■ Light source connection cable *2 (Control signals)

Dimensional outlines (Unit: mm)



Type No.	L: Cable length
A15593-002	200 mm

*2: Maximum 31 light sources can be connected.
Power supply should be prepared for each light source.

Linear irradiation type UV-LED unit

LIGHTNINGCURE® LC-L5G

GH-103A

Equipped with proprietary nitrogen purging method

The GH-103A achieves the highest level of peak intensity for air-cooled method by adopting proprietary air cooling method. It is capable for high speed printing, which has been difficult with conventional UV-LED light source.

Specifications

Parameter			L15346-3A04-007C	Unit
Light emission window size			103 × 24	mm
Wavelength			395	nm
UV irradiance *1	at distance of 0 mm		24 *2	W/cm²
	at distance of 2 mm		22 *2	
LED design life *3			20 000	h
Nitrogen flow rate			16 NL/min to 55 NL/min	–
Input voltage (DC)			+48	V
Power consumption		Max.	1400	W
Cooling method			Forced air cooling by fan	–
Operating temperature range			+5 °C to +40 °C	–
Storage temperature range			-10 °C to +60 °C (no freezing)	–
Operating humidity range			20 % to 80 % (no condensation)	–
Storage humidity range			Below 80 % (no condensation)	–
External control			Irradiation control, light intensity adjustment, irradiation signal, various error signals	–
Connectable operation *4			✓	–
Applicable standard	EMC standard *5	IEC 61326-1	Emission limits: CISPR 11 Group 1 Class B Immunity requirements: Table 2	–

*1: Maximum UV irradiance within the irradiation area.
*2: Light intensity can be decreased due to drifting.
*3: Average time until the irradiance drops to 70 % of the initial level when operated at 25 °C.
*4: Optically connected operation. The light source for cascade operation is designed to minimize degradation of light output at the connected portion when light source is aligned with no gap.
*5: Evaluated with 3 light sources connected and light source connection cable.

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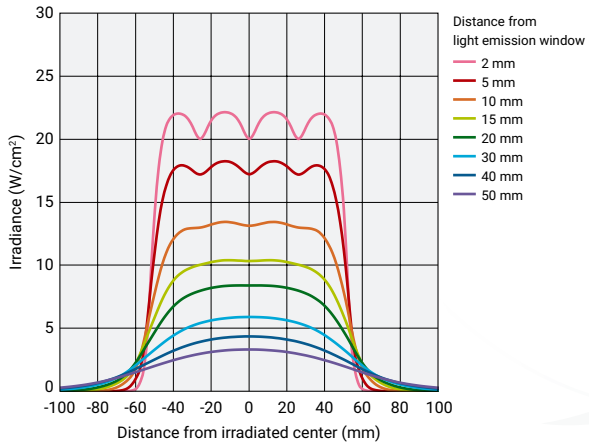
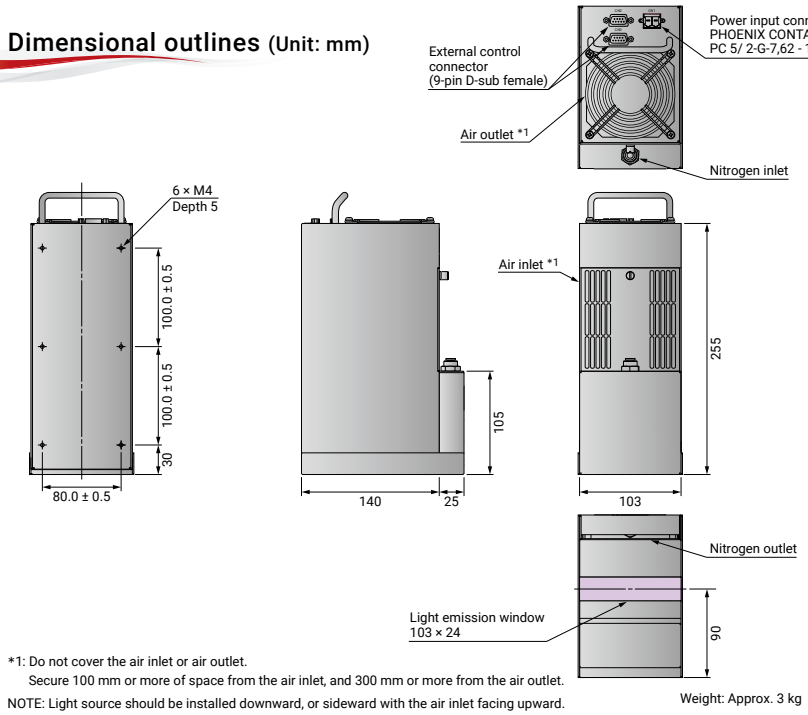
Simulation of irradiance distribution (Longitudinal displacement) (Typ.)



Dimensional outlines (Unit: mm)



*1: Do not cover the air inlet or air outlet.
Secure 100 mm or more of space from the air inlet, and 300 mm or more from the air outlet.

NOTE: Light source should be installed downward, or sideward with the air inlet facing upward.

Weight: Approx. 3 kg

■ Power input connector connection

Pin No.	Signal	
1	Input voltage (+48 V)	Input
2	GND.	–

■ External control connector (9-pin D-sub) connection

Pin No.	Signal	
1	Light intensity adjustment voltage	Input
2	Irradiation control signal	Input
3	EMGCY	Input
4	Error signal	Output
5	Alarm signal	Output
6	GND.	–
7	Irradiation signal	–
8	RS-485	–
9	RS-485	–

Recommended products

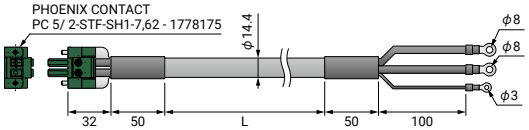
■ Power supplies *1

- COSEL Co., Ltd.
  FETA2500BA-48
- MEAN WELL Enterprises Co., Ltd.
  RST-5000-48

*1: Recommended power supply to operate one light source.
Please contact to each manufacturer for the latest information.

■ Power cable

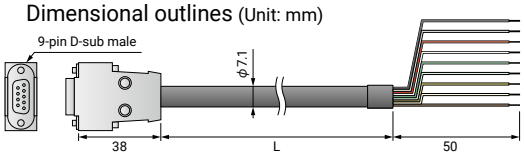
Dimensional outlines (Unit: mm)



Type No.	L: Cable length
A15593-050P-01	5000 mm

■ External control cable

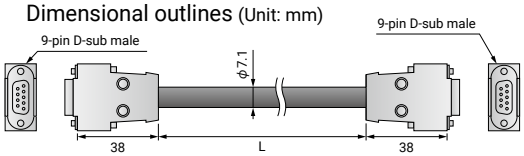
Dimensional outlines (Unit: mm)



Type No.	L: Cable length
A15593-050S-01	5000 mm

■ Light source connection cable *2 (Control signals)

Dimensional outlines (Unit: mm)



Type No.	L: Cable length
A15593-002	200 mm

*2: Maximum 31 light sources can be connected.
Power supply should be prepared for each light source.

Linear irradiation type UV-LED unit

LIGHTNINGCURE® LC-L5G

GA-107

The GA-107 is capable of irradiating to large samples in one batch. It contributes reduction of running cost, as an alternative to UV ovens.

Specifications

Parameter		L13344-1104	Unit
Light emission window size		107 × 108	mm
Wavelength		365	nm
UV irradiance *1	at distance of 10 mm *2	1.5	W/cm²
LED design life *3		20 000	h
Input voltage (DC)		+50	V
Power consumption	Max.	1100	W
Cooling method		Forced air cooling by fan	–
Operating temperature range		+5 °C to +40 °C	–
Storage temperature range		-10 °C to +60 °C (no freezing)	–
Operating humidity range		20 % to 80 % (no condensation)	–
Storage humidity range		Below 80 % (no condensation)	–
External control		Irradiation control, light intensity adjustment, irradiation signal, various error signals	–
Connectable operation*4		✓	–
Applicable standard	EMC standard	IEC 61326-1 Emission limits: CISPR 11 Group 1 Class B Immunity requirements: Table 2	–

*1: UV irradiance within the irradiation area.
*2: We recommend to keep 10 mm or more of distance.
*3: Average time until the irradiance drops to 50 % of the initial level when operated at 25 °C.
*4: Optically connected operation. The light source for cascade operation is designed to minimize degradation of light output at the connected portion when light source is aligned with no gap.

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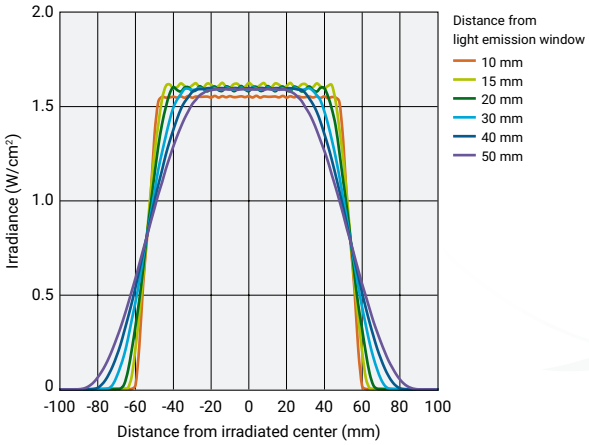
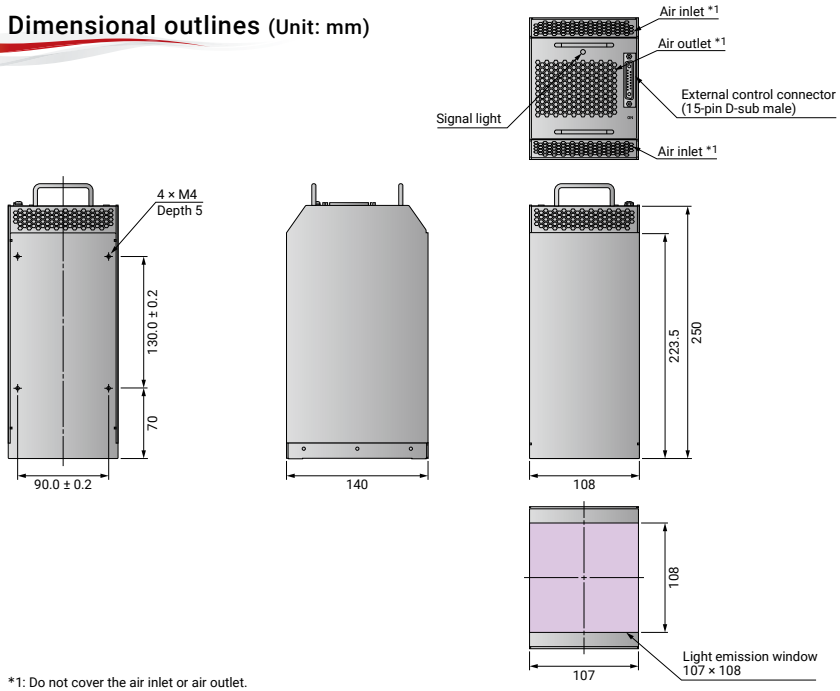
Simulation of irradiance distribution (Typ.)

■ Light emission window size: 107 mm



Dimensional outlines (Unit: mm)



*1: Do not cover the air inlet or air outlet.
Secure 200 mm or more of space from the air inlet or air outlet.

Weight: Approx. 3.7 kg

■ External control connector (15-pin D-sub) connection

Pin No.	Signal	
A1	Input voltage (+50 V)	Input
A2	GND.	–
1	No connection	–
2	No connection	–
3	GND.	–
4	Connection confirmation	–
5	Connection confirmation	–
6	EMGCY	Input
7	GND.	–
8	Output voltage (+5 V)	Output
9	GND.	–
10	Irradiation control signal	Input
11	Light intensity adjustment voltage	Input
12	GND.	–
13	Irradiation signal	Output
14	Error signal	Output
15	Alarm signal	Output

Recommended products

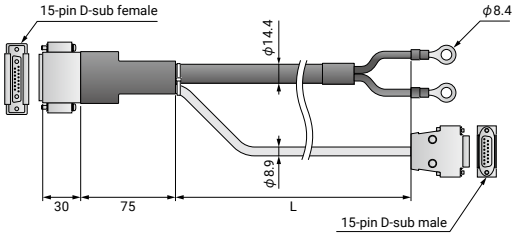
■ Power supplies *1

- COSEL Co., Ltd.
  FETA2500BA-48
- MEAN WELL Enterprises Co., Ltd.
  RST-5000-48

*1: Recommended power supply to operate one light source.
Please contact to each manufacturer for the latest information.

■ External control cables

Dimensional outlines (Unit: mm)

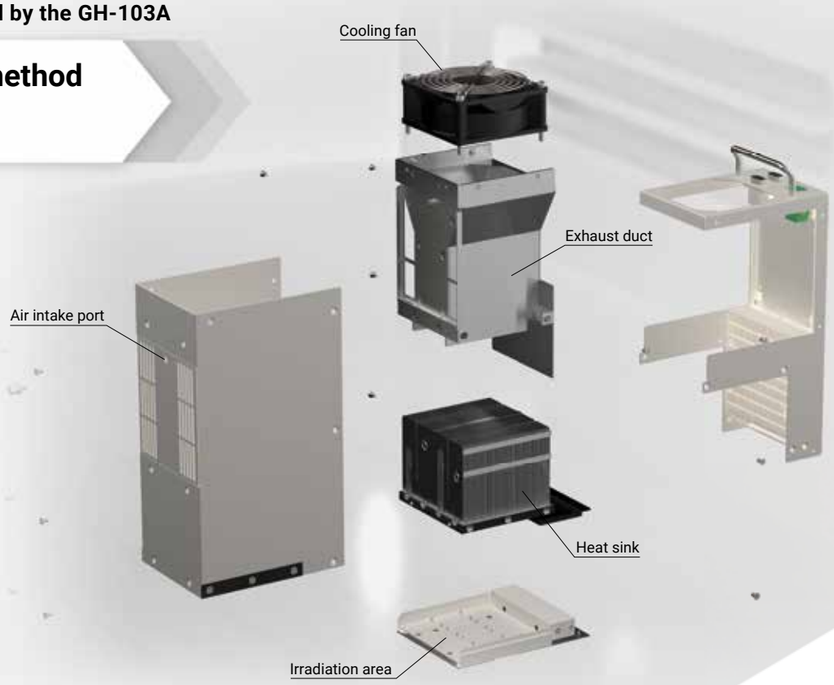


Type No.	L: Cable length
A13052-015-01	1500 mm
A13052-030-01	3000 mm
A13052-050-01	5000 mm

The latest technology and approach to UV-LED light sources represented by the GH-103A

Proprietary air cooling method
ThoMaS

ThoMaS is our patent pending cooling method specifically designed to optimize the layout of the air intake port, heat sink, exhaust duct and cooling fan to maximize cooling performance that is the key to boosting the light output.

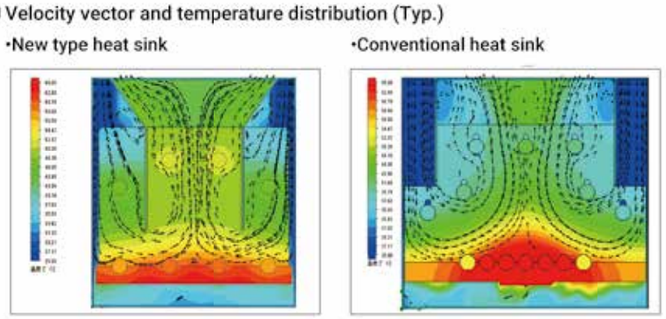


Air guide fins installed in new heat sink

The air is drawn in through the air intake port on the side of the product and then fed into the heat sink.
Installing air guide fins inside the heat sink creates air flow within the heat sink and improves cooling performance.

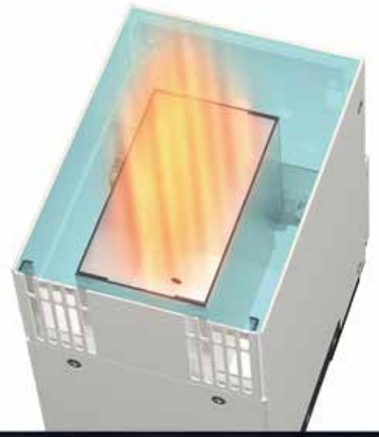
Comparing the performance of the new type heat sink with a conventional heat sink in terms of their velocity vector and temperature distribution shows that air flow contacts the base surface of the new heat sink more efficiently to achieve better cooling.

■ Velocity vector and temperature distribution (Typ.)



Dual-wall insulation structure for exhaust duct

The air flow passing through the heat sink is expelled from the cooling fan on top of the product through the exhaust duct at the center of the product.



The exhaust duct is built with a dual-wall insulation structure. All sides of the exhaust duct are surrounded by cooling air so are not in contact with the outer enclosure. This arrangement prevents the enclosure temperature from rising. When operating two or more light source units in a daisy-chain operations, this dual-wall insulation structure helps suppress mutual elevation of the enclosure temperature to eliminate adverse effects on the irradiance distribution characteristics as well as reduce the thermal load on the UV-LED light source itself.

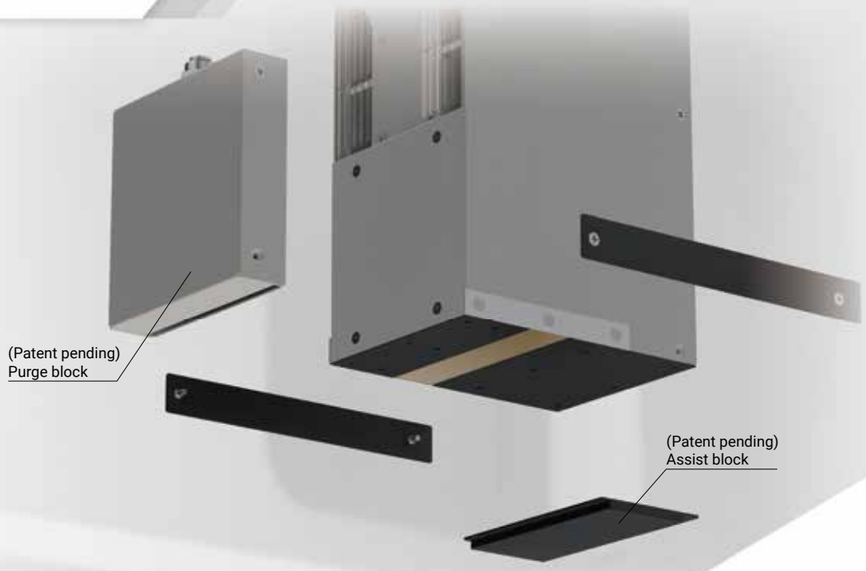
The latest technology and approach to UV-LED light sources represented by the GH-103A

Proprietary nitrogen purging method

HANCE

HANCE is our patent-pending nitrogen purging method that ensures efficient nitrogen purging just in the area directly under the UV-LED light source. *HANCE* consists of a purge block and an assist block which are assembled so that only the area directly under the UV-LED light source is purged with nitrogen and the amount of nitrogen consumed is minimal. HANCE is designed to cope with feeding speeds up to 150 m/min*1 at a nitrogen flow rate of 27 NL/min.

*1: This is the maximum feeding speed at which a satisfactory nitrogen purging effect is still obtained at the specified nitrogen flow rate through our simulation.

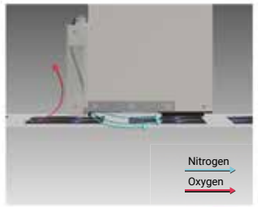


Purge block

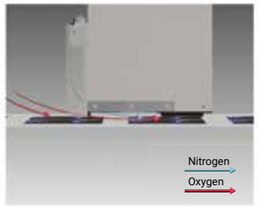
The purge block sprays nitrogen onto the nitrogen purge area.
A metal filter mounted at the nitrogen inlet of the purge block helps control the nitrogen flow pressure. Pressure control ensures a uniform nitrogen supply to multiple units without the need for flow meters. The tapered internal structure also accelerates the flow of nitrogen as it sprays outward.

Under ordinary circumstances, oxygen penetrates into the nitrogen purge area during feeding of printed materials. However, accelerating the flow of nitrogen makes it function as an air curtain to prevent unwanted intrusion of oxygen during feeding of printed materials.

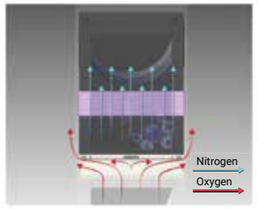
•With tapered structure



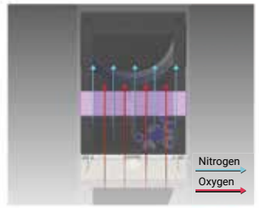
•Without tapered structure



•With tapered structure

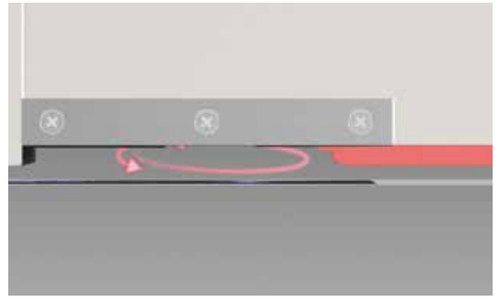


•Without tapered structure



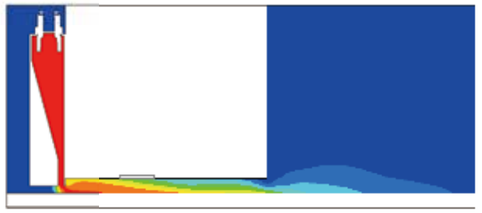
Assist block

The assist block prevents outflow of the filled nitrogen and retains nitrogen within the nitrogen purge area.
We verified the effectiveness of this assist block by simulating a nitrogen fluid. Without countermeasures, there is almost no drop in the nitrogen outflow even when partition panels are installed at various positions. The assist block, however, is designed to create a distance between the nitrogen accumulation area and the low pressure region, and so efficiently prevents nitrogen outflow.

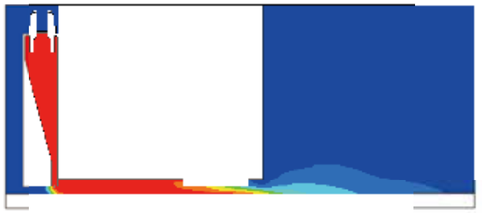


■ Nitrogen fluid simulations (Typ.)

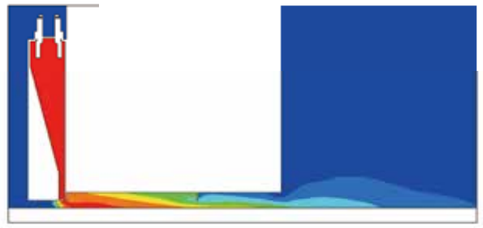
•Without countermeasures



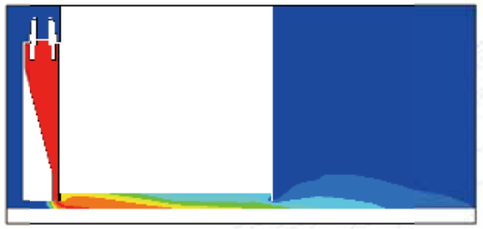
•With assist block



•With partition panels (mid section)



•With partition panels (rear section)



FAQs

Light source

Question	Answer
What is the temperature of the light source unit during operation?	The typical value is about 40 ℃ to 50 ℃ (about 60 ℃ in localized sections) when the operating ambient temperature is 25 ℃, although this differs depending on the particular light source model.
Are there classifications like laser classes?	LEDs are not classified as lasers but are instead classified under IEC 62471 "Photobiological safety of lamps and lamp systems." A risk group determination is made for each light source model.
Is customization possible?	We will consider your request based on the specifications and quantities, so please feel free to contact us.

Light source installation environment

Question	Answer
Are there any other requirements for operating the light source besides the light source itself?	The items shown in the connection diagram are required. This light source is designed to operate by external control, so power supply and cables are required.
Is a cooling exhaust duct required?	No cooling exhaust duct is required because the mounted cooling fan is basically sufficient for cooling. However, if used in an enclosed space, the exhaust air from the light source might raise the operating ambient temperature. In that case a cooling exhaust duct is required depending on the environment where installed.
Does this light source produce ozone?	No, it does not produce ozone.
Does replacing a metal halide lamp with a UV-LED light source change the working environment?	UV-LED light sources emit less heat than metal halide lamp, so the temperature in the working environment will likely be lower, although this depends on how tightly the space is enclosed or how the air conditioning cools the working environment.
Are there any thermal effects on the target objects?	The thermal effect of UV-LED light sources on the target object is less than that of metal halide lamps which emit heat rays. However, target objects might be thermally affected depending on their materials or the wavelength and light intensity.

■ Light intensity monitoring and maintenance

Question	Answer
How can light intensity be measured or monitored?	We recommend using Hamamatsu UV power meter to measure or monitor light intensity. Light intensity can also be measured or monitored with a calibrated UV power meter owned by the customer.
How should maintenance be performed?	Optional parts specified by each model can be replaced on site. If other maintenance or troubleshooting becomes necessary please return the light source unit to us for servicing.

■ Light source evaluation

Question	Answer
Is it possible to evaluate the performance of light sources?	We have a demo unit available for this task, so please feel free to contact us for detailed information.

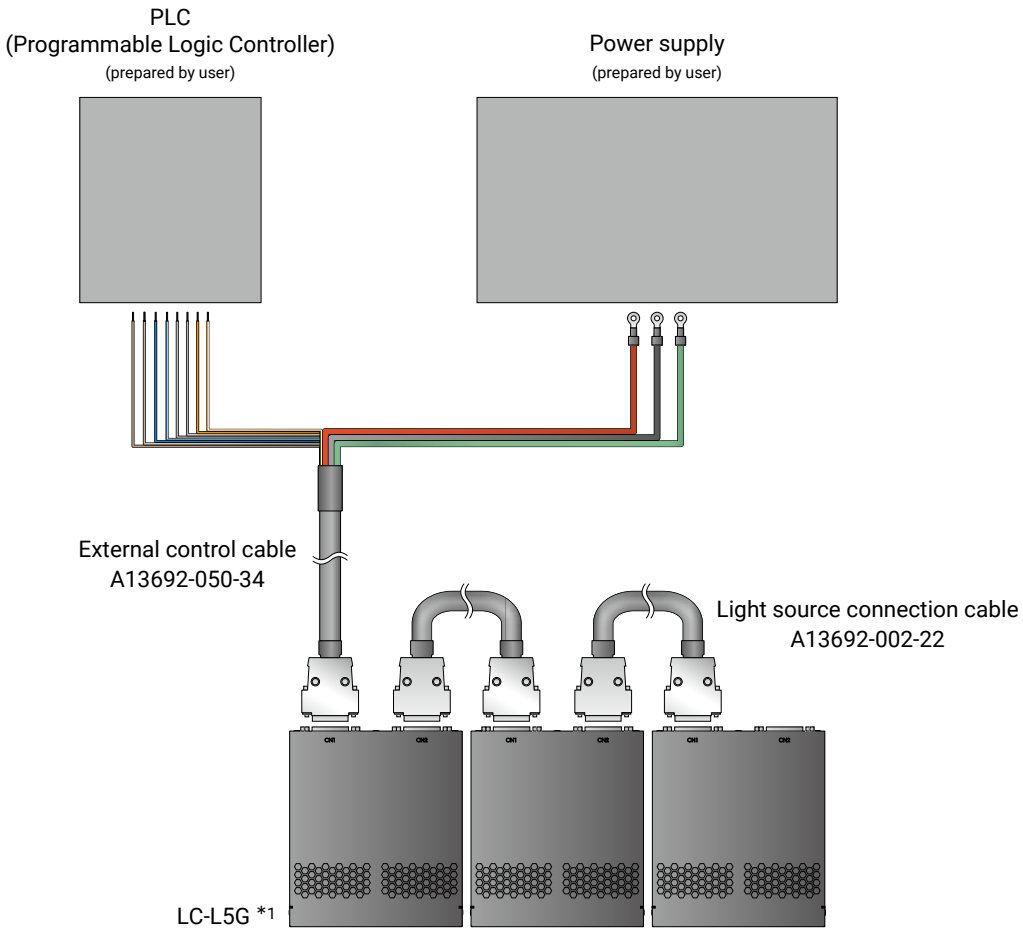
■ Other

Question	Answer
What precautions should be taken during use?	UV-LED light sources emit strong UV light harmful to the skin and eyes, so be sure to wear protective equipment when handling. Install UV-LED light sources in equipment designed to prevent UV light leakage.

Connection diagram

LIGHTNINGCURE® LC-L5G
Linear irradiation type UV-LED unit

GC-113A

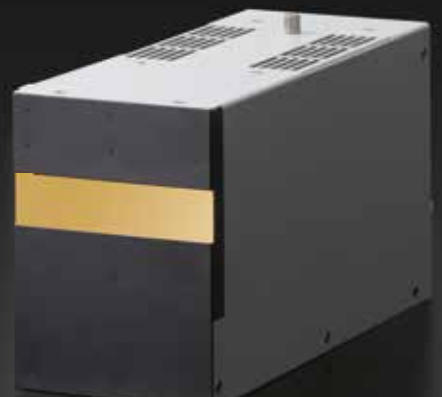


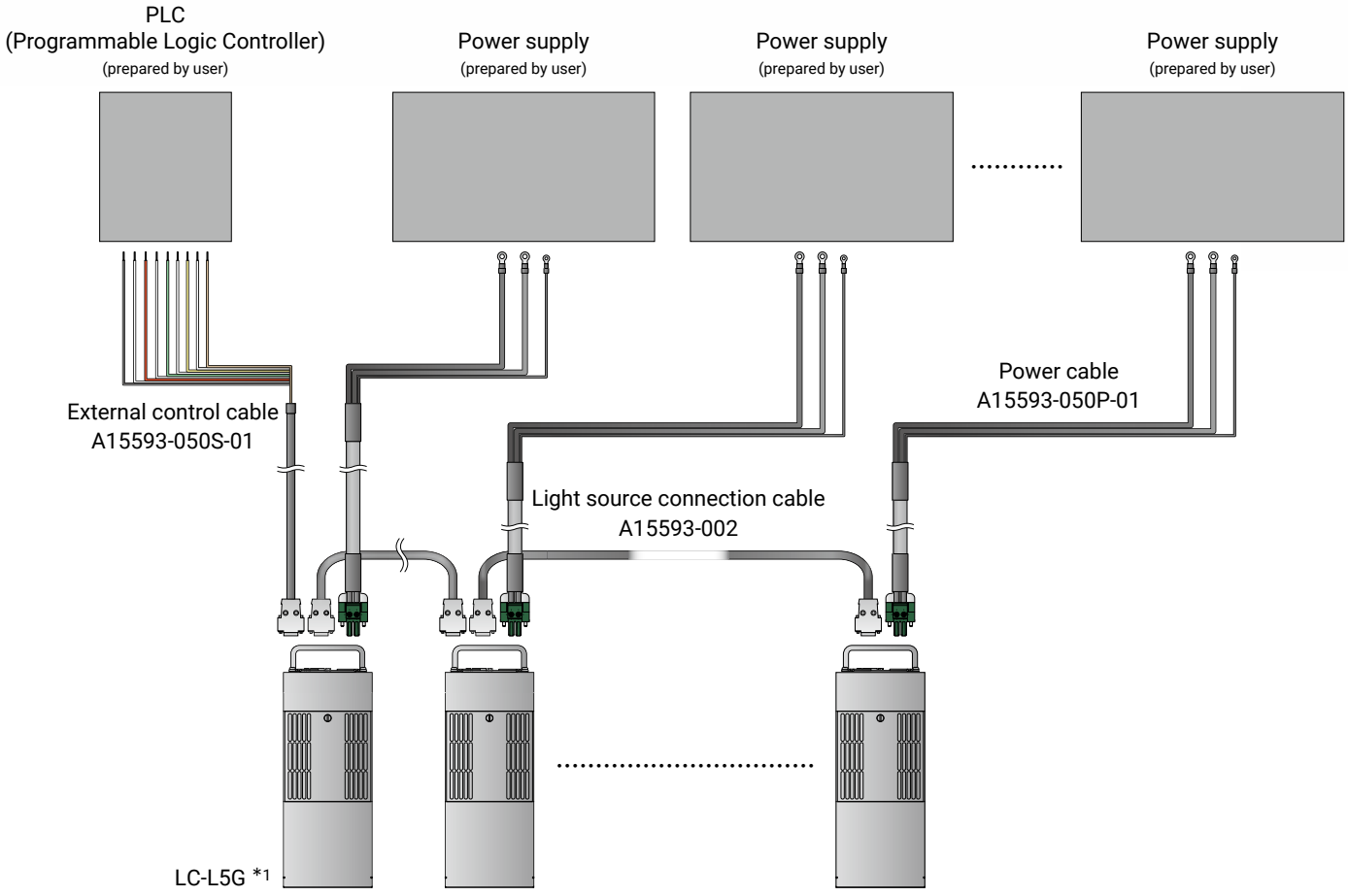
*1: Maximum 3 light sources can be operated with one power supply.

Connection diagram

LIGHTNINGCURE® LC-L5G
Linear irradiation type UV-LED unit

GH-103A



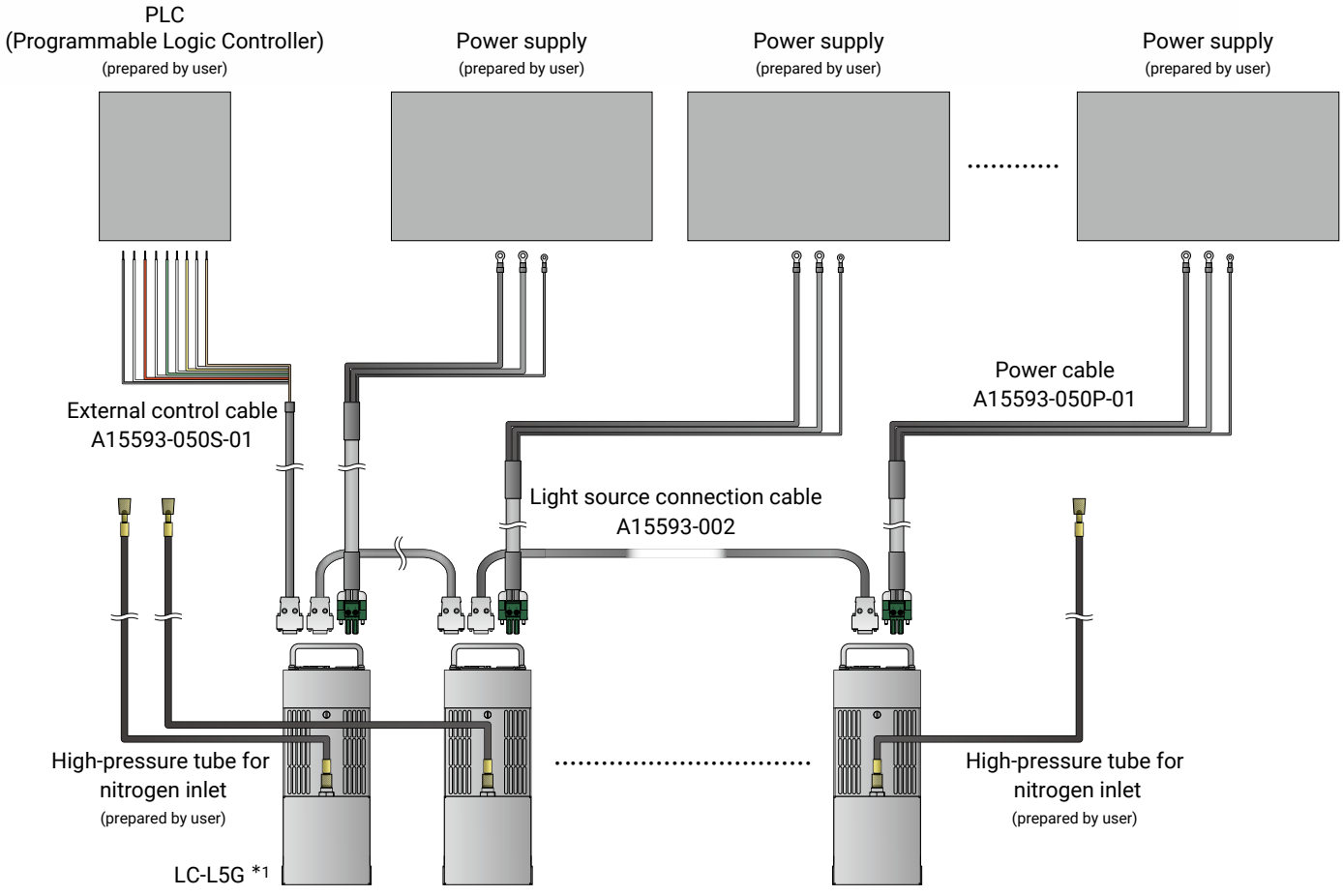


*1: Up to 31 light sources can be connected. Power supply should be prepared for each light source.

Connection diagram

LIGHTNINGCURE® LC-L5G
Linear irradiation type UV-LED unit

GH-103A
Equipped with proprietary nitrogen purging method

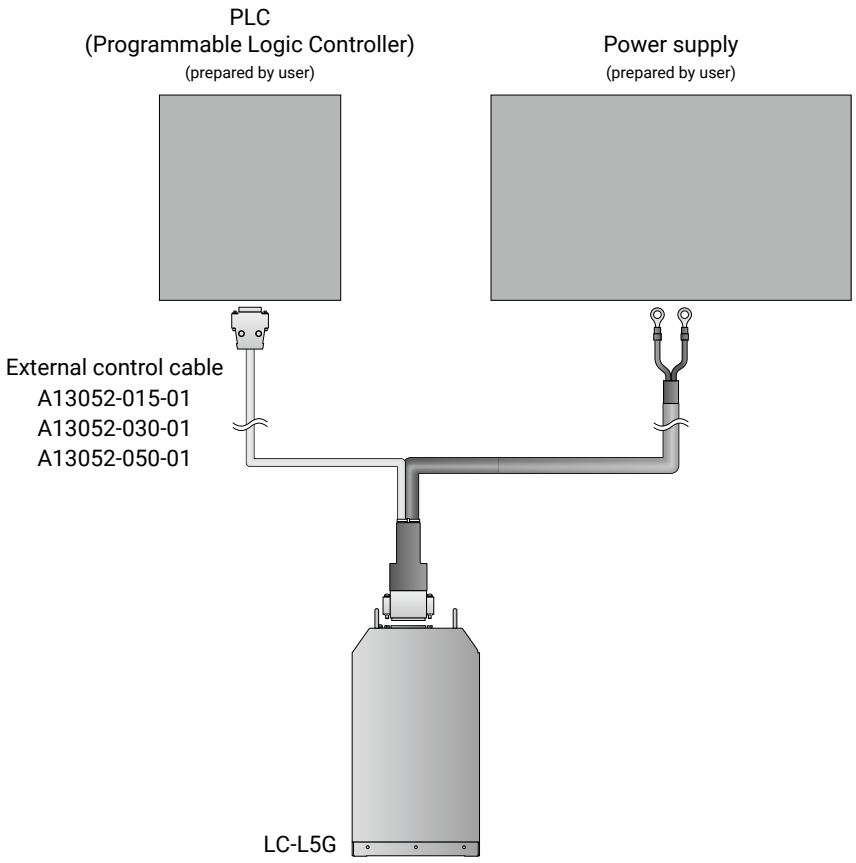


*1: Up to 31 light sources can be connected. Power supply should be prepared for each light source.

Connection diagram

LIGHTNINGCURE® LC-L5G
Linear irradiation type UV-LED unit

GA-107



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