HAMAMATSU

PHOTON IS OUR BUSINESS

DEUTERIUM LAMPS (D_2 LAMPS)

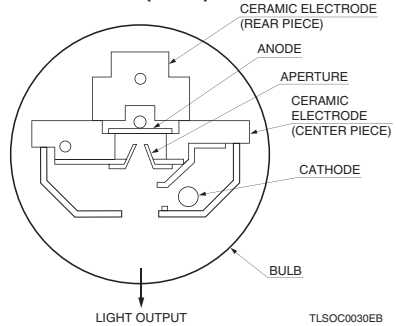
HAMAMATSU PHOTONICS K.K.

D_2 LAMPS

FOR HIGH PERFORMANCE DEVICES

Hamamatsu deuterium lamps (D_2 lamps) deliver a long lifetime, excellent stability, and high output to the highest levels to allow users to obtain the maximum performance characteristics from their equipment.

Construction (L2D2)



Hamamatsu deuterium lamps key features and the reasons

Long lifetime

1 UV-transmitting glass

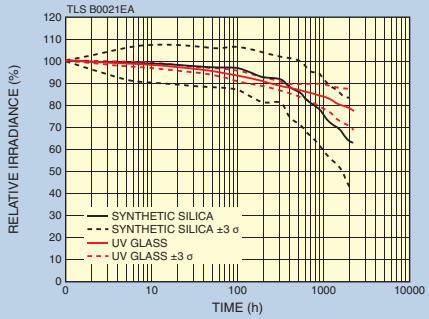
○Problems with prior lamps using quartz glass

- Premature deterioration in transmittance cause by UV light
- Quality variations due to production process and material inclusions
- Troublesome ozone generation

○We solved these problems by using UV-transmitting glass superior to quartz glass!!

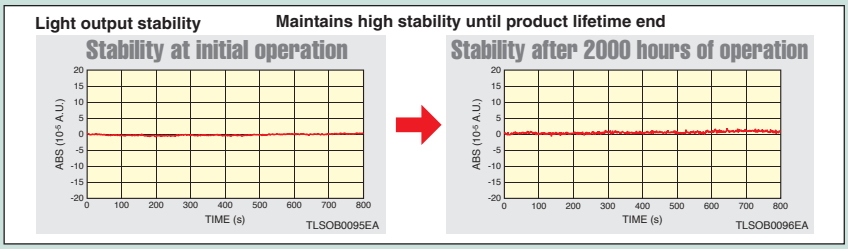
- High resistance to UV light
- High quality with less variations
- No ozone generation

Life characteristics



High stability

Light output stability — **Maintains high stability until product lifetime end**



2 Ceramic electrode

○Problems with prior lamps using (Metal electrode)

- Low stability due to being susceptible to ambient conditions
- Large variation in light output because electrode spacing is not uniform

○We solved these problems by using ceramic electrodes with excellent temperature characteristics!!

- Excellent temperature characteristics ensure high stability
- Uniform electrode spacing minimizes variations in characteristics

3 Cathode (Super quiet type)

○Problems with conventional directly-heated type

- Concentrated radiated heat damage applies a large load to the cathode
- Vibration and operating time directly affect cathode deterioration

○We solved these problems of the directly-heated type by using a super quiet cathode!!

- Electron emission capability with minimal fluctuations

Lighting performance

4 Capacitor

○Problems with D_2 lamp without auxiliary ignition

- Fails to light up due to electrode deterioration during long-term operation
- Fails to light up due to decrease of internal gas during long-term operation
- Fails to light up when the lamp is hot and in case of re-igniting right after turning off

○We solved these problems with the conventional lighting method by using auxiliary lighting method!!

- Secured lighting even if the lamp is hot or at the end of lifetime

Deuterium lamps are light source lamps that utilize an arc discharge in deuterium (D_2) gas. They emit an intense spectrum in the UV region and have feature of unrivaled stability compared to other UV light sources.

PRODUCT LINE-UP / APPLICATION LIST

33 W

X2D2® LAMPS

High brightness deuterium lamps

High-end light sources that offer the world's highest luminance among the 30 W class * (twice that of L2D2 lamps)

P3

*As of Feb. 2016 according to our research

30 W

L2D2® LAMPS

Long lifetime deuterium lamps

Best-selling light sources that deliver the high quality and high performance required by chemical analysis instruments while keeping costs low

P5

5 W to 7 W

S2D2® LAMPS

Compact deuterium lamps

Compact yet high-performance light sources that were impossible to create up till now with conventional deuterium lamps

P11

110 W

H2D2® LAMPS

Ultra-high luminance deuterium lamps

Next-generation light sources that have achieved the highest luminance in the history of deuterium lamps

P14

*As of Feb. 2016 according to our research

Applications \ Window material	UV glass	Synthetic silica	MgF_2
HPLC (High Performance Liquid Chromatography)	◎	○	×
UV-VIS Spectrophotometer	◎	○	○
CE (Capillary Electrophoresis)	◎	○	×
Atomic Absorption Spectrophotometer	◎	○	×
Thin Layer Chromatography	◎	○	×
Water Quality, Air Pollution and Other Environmental Analyzer	◎	○	×
Film Thickness Gauge	◎	◎	○
Semiconductor Testing Equipment	○	◎	◎
UV Resistance Evaluation of Materials	◎	◎	◎
Photoionization Light Source	×	×	◎
Static Electricity Removal by Vacuum UV Light	×	×	◎

◎: Optimum ○: Usable according to application ×: Not generally suitable

Peripheral devices that support high performance

Total support for extracting maximum lamp performance

To enable lamps to exhibit their maximum performance, it is important to design an optimum housing and power supply. We do not only sell deuterium lamps but also provide power supplies and housings specifically designed for deuterium lamps.
Besides selling our own products, we provide technical support to help users design their own lamp housings and power supplies. We are also glad to offer advice on optimal electrical ratings and lamp shapes that meet user specifications.
Please consult with us for specifications that are not listed in our product catalog.

X2D2® LAMPS

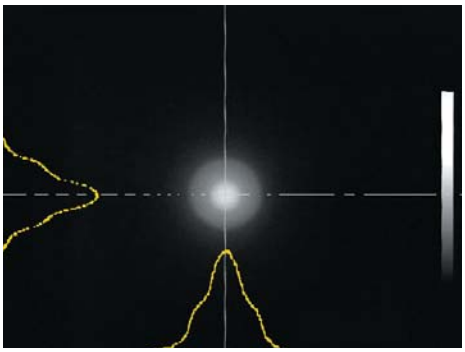
The X2D2® lamps (high brightness & long lifetime deuterium lamps) deliver unparalleled brightness twice that of L2D2 lamps (see page 5) while still maintaining the high stability and long lifetime offered by the conventional deuterium lamps. These characteristics will enhance sensitivity and throughput in various photometric instruments.

Features

- ●Long life: 2000 h
- ●High stability: 0.005 %(p-p) typ.
- ●High brightness: 2 times higher than L2D2 lamps

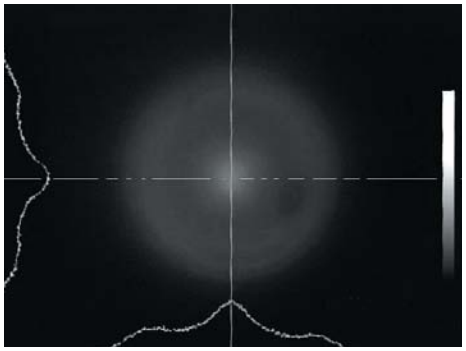
■Arc distribution

●X2D2 lamp Aperture size: 0.5 mm



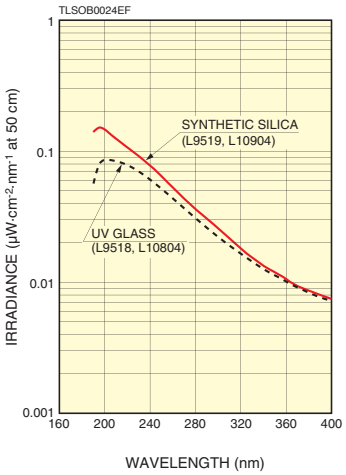
2 times
higher than
conventional type

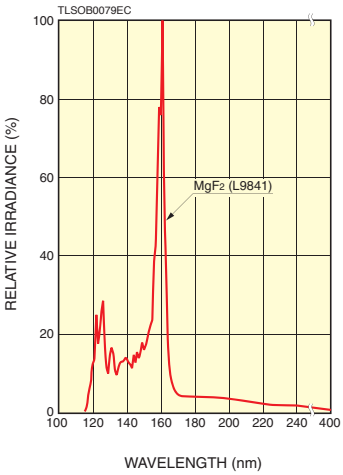
●L2D2 lamp Aperture size: 0.5 mm



Characteristics

●Spectral distribution



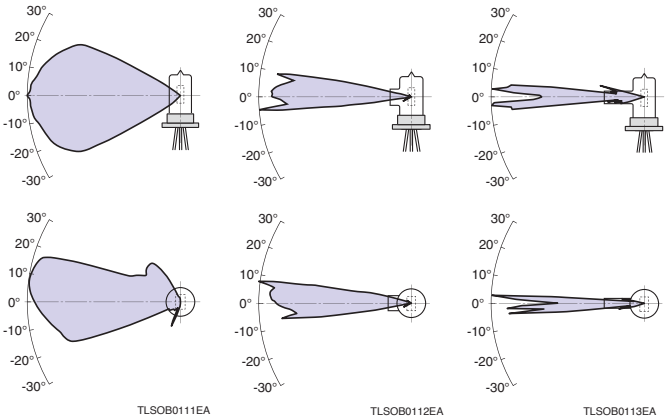


●Directivity (Light distribution)

①UV glass
L9518, L10804

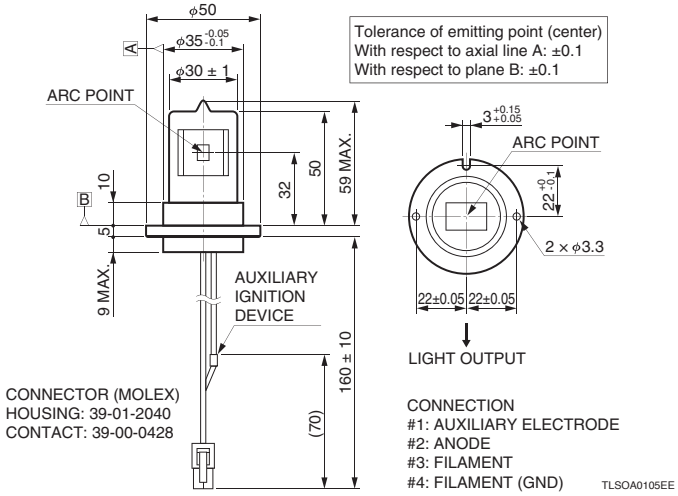
②Synthetic silica
L9519, L10904

③MgF_2
L9841

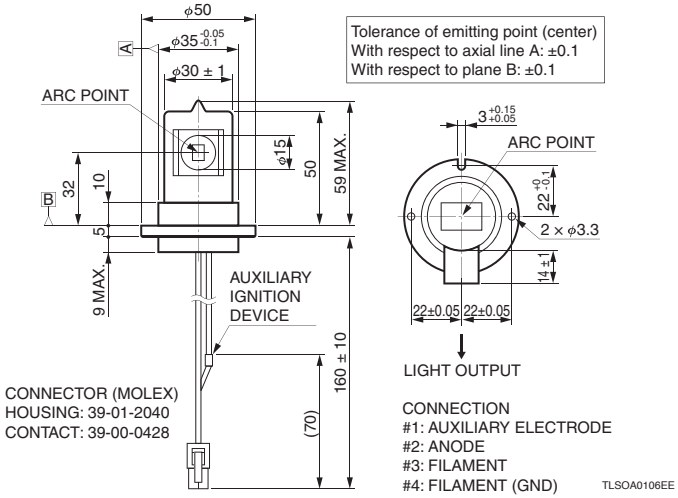


Dimensional outline (Unit: mm)

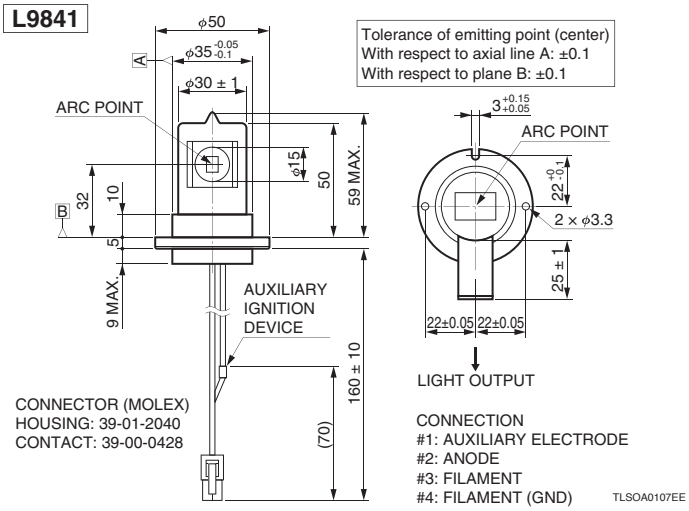
L9518, L10804



L9519, L10904

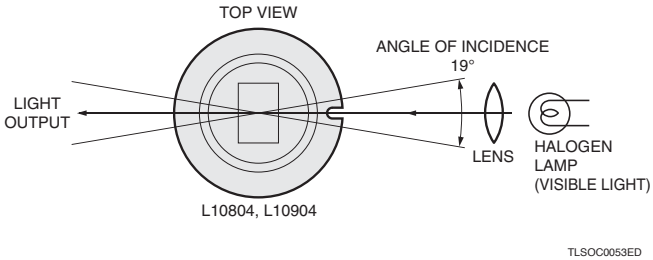


L9841



Example of optical system layout for visible light (X2D2 lamp)

The see-through structure allows easy use in combination with a visible light source.



Specifications

Type No.			L9518	L10804	L9519	L10904	L9841	Unit
Type			Standard	See-through	Standard	See-through	Standard	—
Window material			UVglass		Synthetic silica		MgF_2	—
Spectral distribution			185 to 400		160 to 400		115 to 400 Ⓔ	nm
Aperture diameter			0.5					mm
Output stability at 230 nm	Drift (Max.)		±0.3					%/h
	Fluctuation (p-p) Typ.		0.005					%
Guaranteed life at 230 nm Ⓐ			2000					h
Discharge starting voltage (Max.) Ⓑ			400					V dc
Anode current			300 ± 30					mA dc
Tube voltage (Typ.)			90		85			V dc
Filament ratings	Warm-up	Voltage	2.5 ± 0.25					V dc
		Current (Typ.)	4					A dc
	Operating	Voltage	1.7 ± 0.2					V dc
		Current (Typ.)	3.3					A dc
Filament warm-up time (Min.)			20					s
Power supply Ⓒ			C9559, M9521					—
Bulb wall temperature Ⓓ			245 to 290					°C

ⒶLamp life end is defined as the point when light output at 230 nm falls to 50 % of its initial value or when output fluctuations exceed 0.05 % (p-p).
ⒷA trigger voltage must be applied to the anode and auxiliary electrode. ⒸThe power supply for the L2D2 cannot be used to operate X2D2 lamps.
ⒹRecommended temperature for operating a lamp in the lamp housing. Consult us on how to measure the temperature.
ⒺDoes not support vacuum evacuation and so should be used in nitrogen atmosphere.
* Custom lamps not listed above will be available on request. Please feel free to contact us.

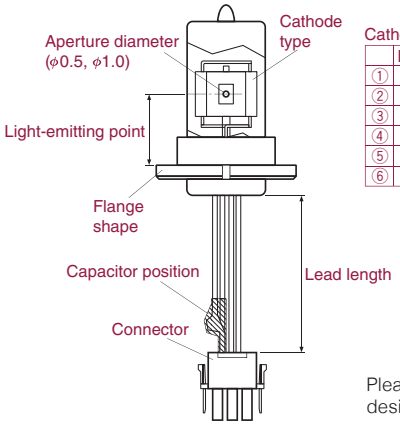
L2D2® LAMPS

The L2D2® lamps are UV light sources with a long service lifetime and high stability. These L2D2 lamps have characteristics essential for light sources used in chemical analysis instruments and provide high measurement accuracy.

Features

- Long life: 4000 h (L6565)
- High stability: 0.005 %(p-p) typ.
- Small intensity variations
- Low cost
- Error-free lighting

Example of custom-designed lamp



Cathode ratings

	Preheating	Operating
①	2.5 V	1.0 V
②	2.5 V	1.7 V
③	3.0 V	0 V – 1 V
④	10 V	2.5 V – 6 V
⑤	10 V	7 V
⑥	12 V – 15 V	0 V

Please consult us about custom designed lamp.

Specifications

Type No.	Type	Ⓐ Dimensional outline	Window material	Spectral distribution (nm)	Aperture diameter (mm)	Output stability at 230 nm: Drift Max. (%/ h)	Output stability at 230 nm: Fluctuation (p-p) Typ. (%)	Ⓑ Guaranteed life at 230 nm (h)	Required discharge starting voltage Ⓒ Max. (V dc)	Anode current (mA dc)	Tube voltage Typ. (V dc)
L6565	Standard	①	UV glass	185 to 400	1.0	±0.3	0.005	4000	350	300 ± 30	80
L6301					0.5			2000	400		
L6301-50		⑧									
L6303		①									
L12313		③									
L12313-50		⑦									
L6307		②									
L6309											
L7296		④	Synthetic silica	160 to 400							
L7296-50		⑥									
L12307		②	UV glass	185 to 400							
L7293		⑤	MgF_2	115 to 400	1.0	—	—	2000Ⓓ	350		
L7293-50		⑨									
L6999	See-through	①	UV glass	185 to 400	0.5	±0.3	0.005	2000	400		
L6999-50		⑧									
L9030		④	Synthetic silica	160 to 400							
L9030-50		⑥									

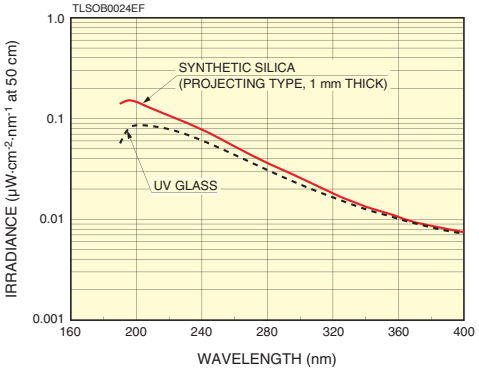
ⒶSee pages 7 and 8.
Ⓑ Lamp life end is defined as the point when light output at 230 nm falls to 50 % of its initial value or when output fluctuations exceed 0.05 % (p-p).
Ⓒ A pulse voltage higher than this value must be supplied to start reliable lamp discharge.
Ⓓ Operating life may vary depending on operating environmental conditions (vacuum atmosphere).

Characteristics

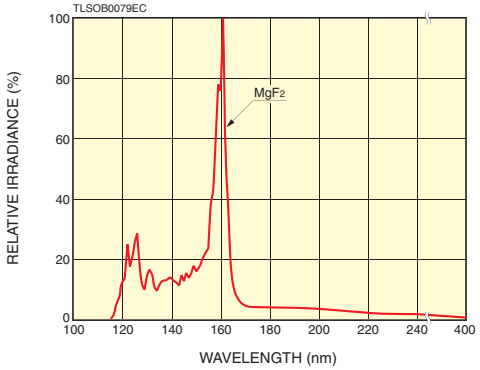
●Spectral distribution

Deuterium lamps emit high intensity light in the UV range at wavelengths shorter than 400 nm. Light intensity on the short wavelength side is determined by the window material used.

■UV glass, Synthetic silica

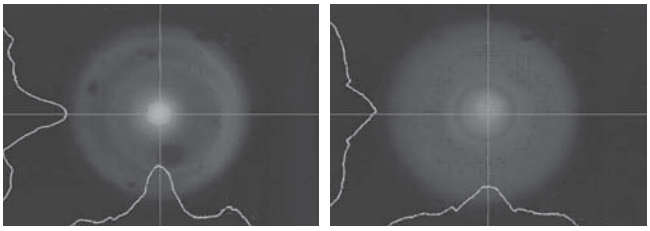


■MgF_2



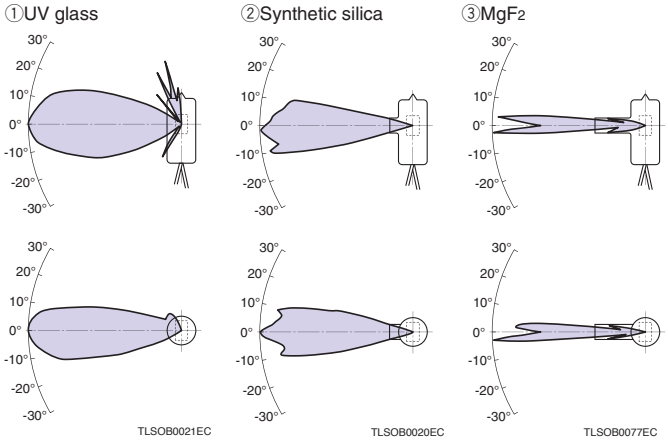
●Arc distribution

Arc distribution of deuterium lamps is determined by the aperture (light exit) size. At the same input current and voltage, lamps with a 0.5 mm aperture provide 1.4 times higher intensity than lamps with a 1.0 mm diameter aperture.



APERTURE: ϕ0.5 mm　　APERTURE: ϕ1.0 mm

●Directivity (Light distribution)



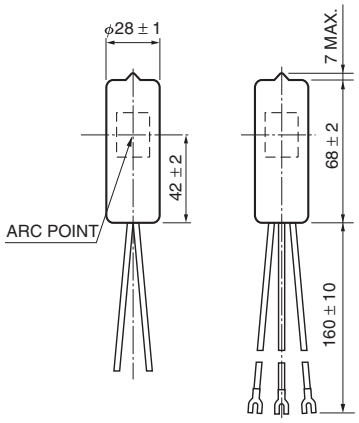
Filament ratings				Filament warm-up time	Applicable power supply Ⓗ		Bulb wall temperature (Recommended) Ⓘ	Type No.
Warm-up		Operating						
Voltage Ⓔ (V dc, ac)	Current Typ. (A dc, ac)	Voltage (V dc)	Current Typ. (A dc)	Min. (s)	AC input type	DC input time		
2.5 ± 0.25	4	1.0 ± 0.1	1.8	20	C9598-2510	M9596-2510	245 to 290	L6565
								L6301
								L6301-50
		1.7 ± 0.2	3.3		C9598-2517	M9596-2517		L6303
3	5	0 to 1	0 to 1.8		C9598-3000	M9596-3000		L12313
								L12313-50
10 ± 1	0.8	2.5 to 6.0 Ⓕ	0.3 to 0.6		C9598-1035	M9596-1035		L6307
	1.2	7.0 ± 0.5	1		C9598-1070	M9596-1070		L6309
								L7296
								L7296-50
12 to 15	0.5 to 0.55	0 Ⓖ	0 Ⓖ		C9598-1555	M9596-1555		L12307
2.5 ± 0.25	4	1.0 ± 0.1	1.8		C9598-2510	M9596-2510		L7293
								L7293-50
								L6999
								L6999-50
								L9030
								L9030-50

Ⓔ If the cable between the lamp and power supply is too long, a large filament voltage drop occurs in the cable that might make the lamp filament voltage too low. The filament power supply should be designed to supply the specified voltage at the lamp input terminal.
Ⓕ Recommended operating voltage is 3.5 V ± 0.5 V.
Ⓖ During lamp operation a discharge current flows into the filament so no external power supply is needed to maintain the filament temperature.
Ⓗ To extract full performance from our deuterium lamps we recommend using our dedicated power supplies.
Ⓘ Recommended temperature for operating a lamp in the lamp housing. Consult us on how to measure the temperature.
* Custom lamps not listed above will be available on request. Please feel free to contact us.

Dimensional outline (Unit: mm)

❶ L6301, L6565, L6303, L6999

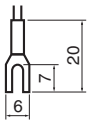
See-through type



CONNECTION

L6303	
FILAMENT	: BLUE
FILAMENT · GND	: BLACK
ANODE	: RED

L6301, L6565, L6999	
FILAMENT	: BLUE
FILAMENT	: BLUE
ANODE	: RED



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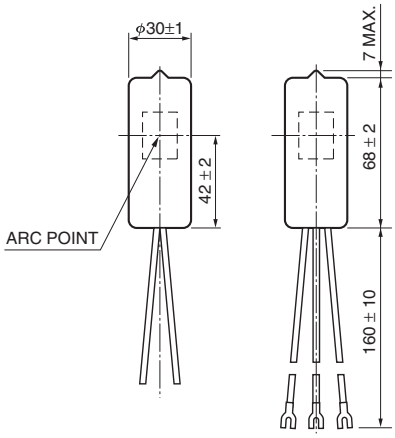
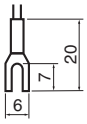
❷ L6307, L6309 , L12307



CONNECTION

FILAMENT	: BLUE
FILAMENT·GND	: BLACK
ANODE	: RED



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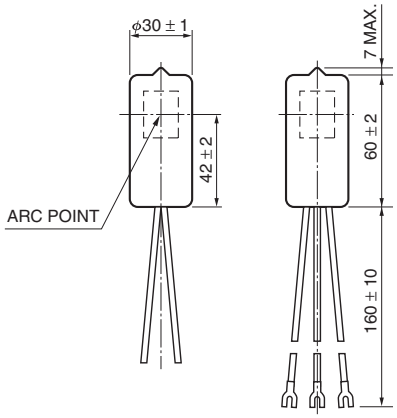
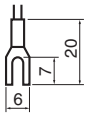
❸ L12313



CONNECTION

FILAMENT	: BLUE
FILAMENT·GND	: BLUE
ANODE	: RED



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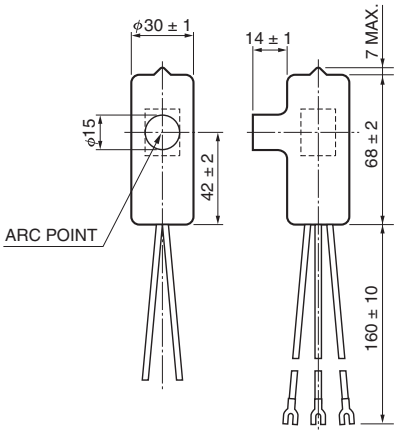
❹ L7296, L9030

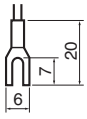
See-through type



CONNECTION

L7296	
FILAMENT	: BLUE
FILAMENT·GND	: BLACK
ANODE	: RED

L9030	
FILAMENT	: BLUE
FILAMENT	: BLUE
ANODE	: RED



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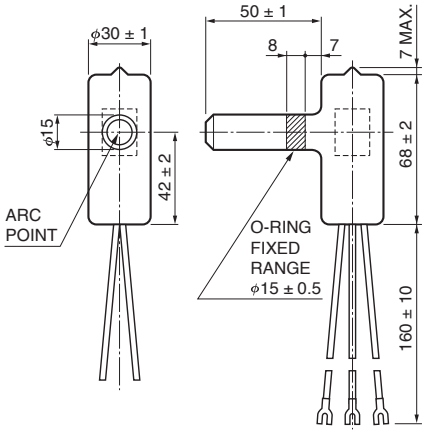
❺ L7293



CONNECTION

L7293	
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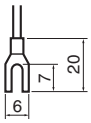
FILAMENT	: BLUE
ANODE	: RED



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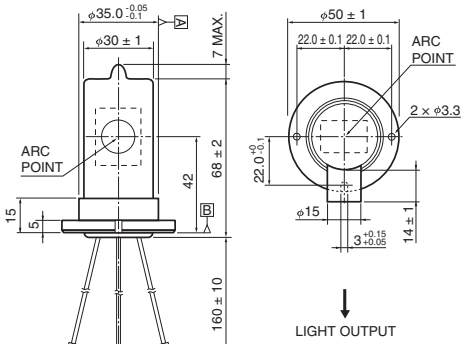
❻ L7296-50, L9030-50

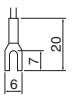
See-through type



CONNECTION

L7296-50	
FILAMENT	: BLUE
FILAMENT·GND	: BLACK
ANODE	: RED

L9030-50	
FILAMENT	: BLUE
FILAMENT	: BLUE
ANODE	: RED



Tolerance of emitting point (center)
With respect to axial line A: ±0.1
With respect to plane B: ±0.1

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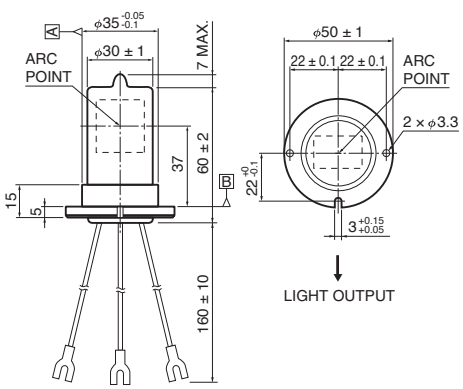
❼ L12313 -50

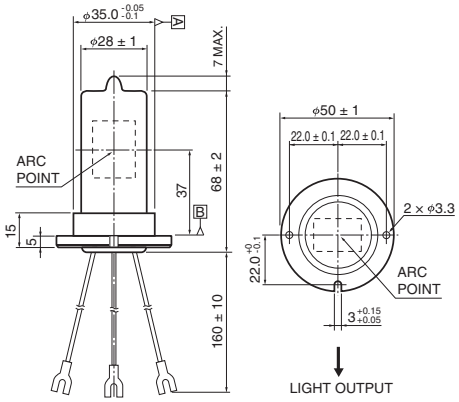


CONNECTION
FILAMENT: BLUE
FILAMENT: BLUE
ANODE : RED

Tolerance of emitting point (center)
With respect to axial line A: ±0.1
With respect to plane B: ±0.1

TLSOA0050EA

See-through type
❽ L6301-50, L6999-50

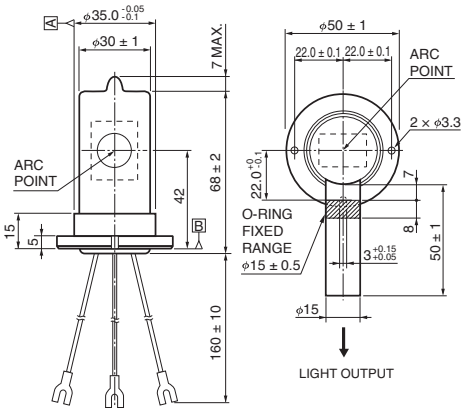


CONNECTION
FILAMENT: BLUE
FILAMENT: BLUE
ANODE : RED

Tolerance of emitting point (center)
With respect to axial line A: ±0.1
With respect to plane B: ±0.1

TLSOA0051ED

❾ L7293-50

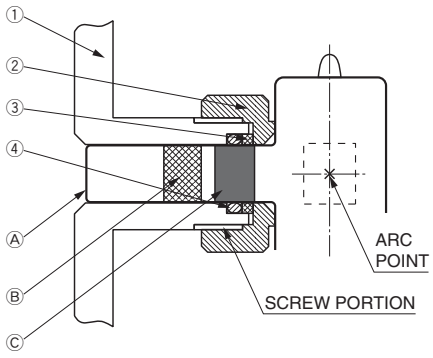


CONNECTION
FILAMENT: BLUE
FILAMENT: BLUE
ANODE : RED

Tolerance of emitting point (center)
With respect to axial line A: ±0.1
With respect to plane B: ±0.1

TLSOA0088EC

Mounting example on the vacuum system (L7293, L7293-50)



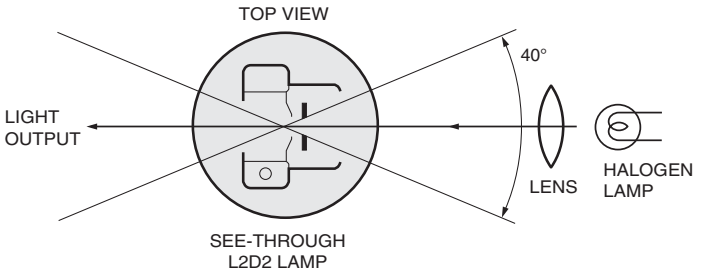
①VACUUM FLANGE
②TIGHTENING SCREW
③O-RING JIS B2401
CALL No. V15
④SPACER
ⒶMgF2 WINDOW
ⒷGRADED SEAL
ⒸO-RING FIXED RANGE

TLSO 0053EA

See-through type

The see-through type electrode structure enables straight-line arrangement of the halogen lamp, deuterium lamp, optical system and optical path. This simplifies optical design of UV-VIS spectrophotometer etc., and eliminates loss of light amount caused by the half mirror.

An example for optics of See-through type



TLSOC0011EF

▼Type No.
L6999, L6999-50, L9030, L9030-50

X2D2® LAMPS | L2D2® LAMPS

POWER SUPPLY FOR D_2 LAMPS LAMP HOUSE

Applications using deuterium lamps require very high stability of light output, so using a Hamamatsu dedicated power supply and lamp house is recommended to operate these lamps. When users are designing their own power supply and lamp housing, we provide technical support and follow-up to ensure an optimal optical design so please consult us when needed.

E9522-50: for L9518 E9558-50: for L9519
E9522: for L6301-50 E9558: for L7296-50

* We welcome requests for custom products for see-through types (L10804, L6999-50, L6999-50 and L9030-50).

Power supply for X2D2® lamps / Lamp housing

▲Power supply Left: C9559, Right: M9521

▲Lamp housing Left: E9522-50, Right: E9558-50

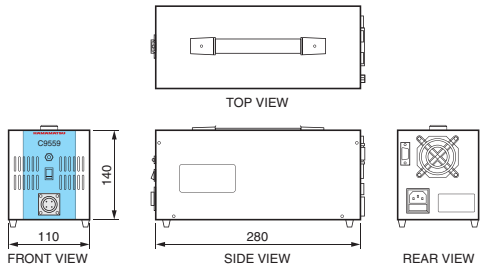
Power supply for L2D2® lamps / Lamp housing

▲Power supply Left: C9598, Right: M9596

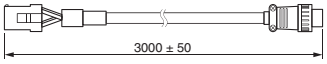
▲Lamp housing Left: E9522, Right: E9558

Dimensional outline (Unit: mm)

●C9559

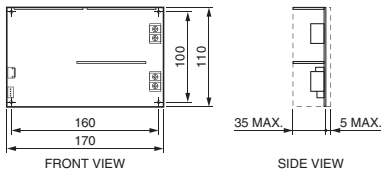


●Supplied lamp output cable



TLSOA0112EA

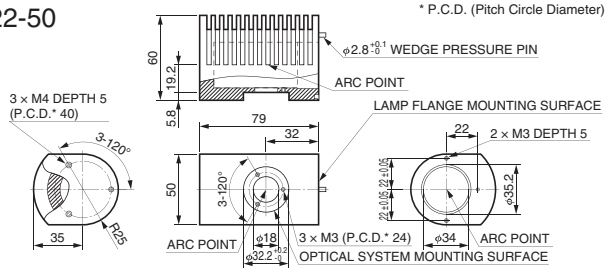
●M9521



TLSOA0113EA

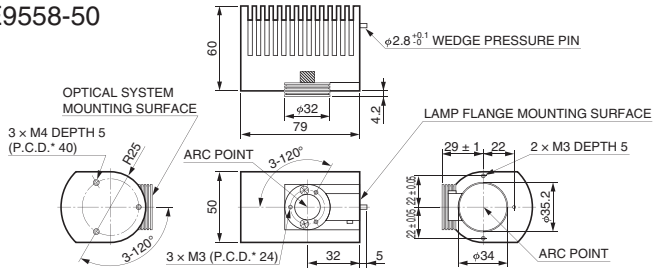
●E9522-50

* P.C.D. (Pitch Circle Diameter)



TLSOA0114EA

●E9558-50



TLSOA0115EA

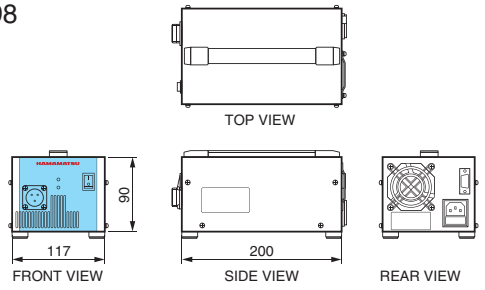
Power supply for X2D2 lamp specifications

Parameter				C9559	M9521	Unit
Input	Input voltage			AC 100 V to AC 240 V (100 V/200 V Auto switching) Single phase 50 Hz / 60 Hz	DC 24 V ± 2.4 V	—
	Input current (Max.)			1.4	3	A
Output	Output voltage (DC)	With load (Typ.)		85 / 90		V dc
		Without load (Min.)		200		V dc
	Output current (DC)			300 ± 30		mA dc
	Current fluctuation (p-p) (Typ.)			0.005		%
	Current drift at 25 °C (Typ.)			±0.02		%/h
	Filament ratings	Warm-up	Voltage	2.5 ± 0.2		V dc
			Current (Typ.)	4		A dc
		Operation	Voltage	1.7 ± 0.2		V dc
			Current (Typ.)	3.3		A dc
	Filament warm-up time			Approx. 20		s
	Trigger voltage	Anode		600		V peak
		Auxiliary electrode		600		V peak
Cooling method				—	Forced air cooling (0.3 m^3/min)	—
Operation ambient temperature				0 to +40		°C
Storage temperature				-10 to +60		°C
Operating and storage humidity				Below 80 (No condensation)		%
External control (Lamp ON/OFF, Lamp irradiation signal)				Yes	Yes	—
Conformance standards	CE			Yes	Yes	—
	UL (File No. E249677)			—	Yes	—

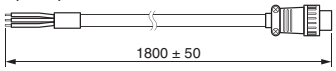
Dimensional outline (Unit: mm)

The power supply for the L2D2 cannot be used to operate X2D2 lamps. * P.C.D. (Pitch Circle Diameter)

●C9598

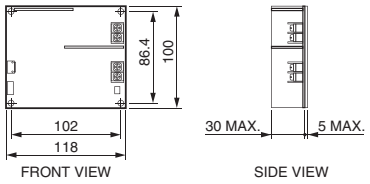


●Supplied lamp output cable



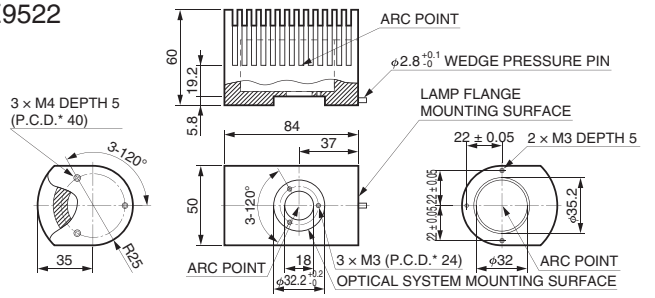
TLSOA0116EA

●M9596



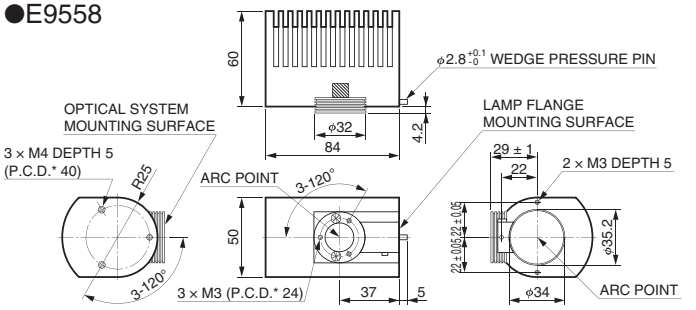
TLSOA0117EA

●E9522



TLSOA0118EA

●E9558



TLSOA0119EA

Power supply for L2D2 lamp specifications

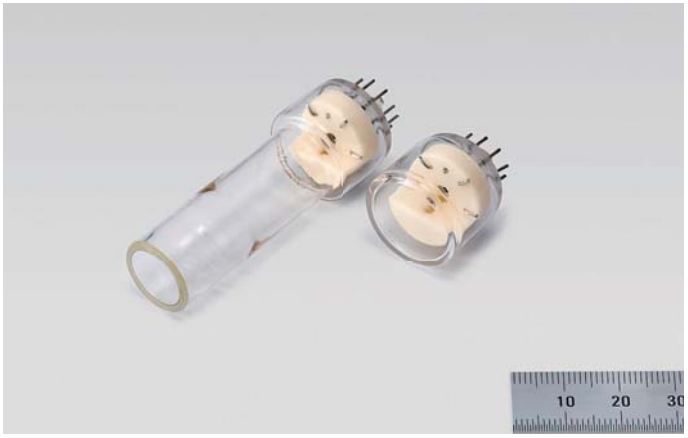
Parameter			C9598	M9596	Unit
Input	Input voltage		AC 100 V to AC 240 V (100 V/200 V Auto switching) Single phase 50 Hz / 60 Hz	DC 24 V ± 2.4 V	—
	Input current (Max.)		0.9	2	A
Output	Output voltage (DC)	With load (Typ.)	80		V
		Without load (Min.)	200		V
	Output current (DC)		300 ± 30		mA
	Current Fluctuation (p-p) (Typ.)		0.005		%
	Current drift at +25 °C (Typ.)		±0.02		%/h
	Warm-up time		Approx. 20		s
	Trigger voltage		Approx. 600		V peak
Cooling method			—	Forced air cooling (0.3 m³/min)	—
Operation ambient temperature			0 to +40		°C
Storage temperature			-10 to +60		°C
Operating and storage humidity			Below 80 (No condensation)		%
External control (Lamp ON/OFF, Lamp irradiation signal)			Yes	Yes	—
Conformance standards	EN (CE marking)		Yes	Yes	—
	UL (File No. E249677)		—	Yes	—

Filament ratings

Type No.	Warm-up		Operation		Applicable lamp
	Voltage (V dc)	Current (A dc)(Typ.)	Voltage (V dc)	Current (A dc)(Typ.)	
C9598/M9596-2510	2.5 ± 0.2	4	1.0 ± 0.1	1.8	L6565, L7293, L6999, L6999-50, L7293-50 L6301, L6301-50, L9030, L9030-50
C9598/M9596-2517	2.5 ± 0.2	4	1.7 ± 0.2	3.3	L6303
C9598/M9596-3000	3 ± 0.2	5	0	0	L12313
C9598/M9596-1035	10 ± 0.5	0.8	3.5 ± 0.2	0.3	L6307
C9598/M9596-1070	10 ± 0.5	1.2	7 ± 0.4	1	L7296, L6309, L7296-50
C9598/M9596-1555	13.5 ± 0.7	0.5	5.25 ± 0.25	0.3	L12307

S2D2® LAMPS

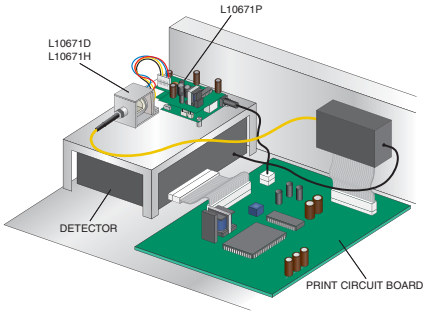
The S2D2® lamps are compact deuterium lamps with a drastically reduced size compared to ordinary deuterium lamps. Despite their compact body, the S2D2 lamps have the same high stability as conventional deuterium lamps and a unique electrode structure that delivers high brightness.



▲Left: L13301
Right: L10671D

Features

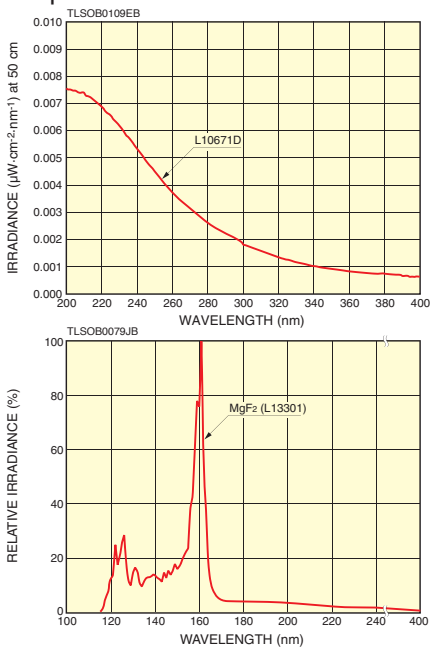
- ●Long life: 1500 h (L10671D)
- ●Compact
- ●High stability: 0.005 %(p-p) typ.
- ●High output UV continuous spectrum
- ●Low power consumption
- ●Easy to use



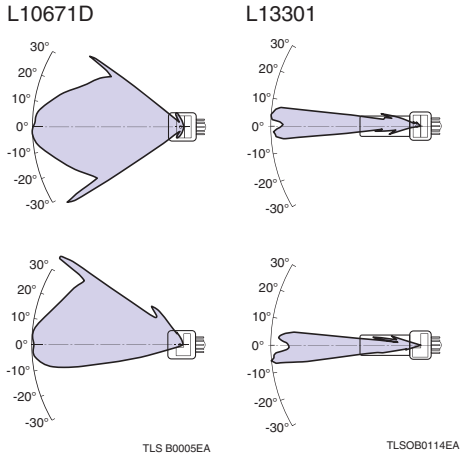
TLS C0005EA

Characteristics

●Spectral distribution



●Directivity (Light distribution)



TLS B0005EA

TLSOB0114EA

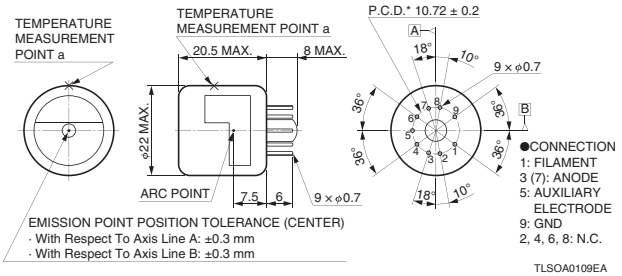
Specifications

Parameter			Description / Value		Unit
Type No.			L10671D	L13301	—
Window material			UV glass	MgF_2	—
Spectral distribution			185 to 400	115 to 400	nm
Aperture diameter			1.0		mm
Output stability at 230 nm	Drift (Max.)		±0.25		%/h
	Fluctuation (p-p) (Typ.)		0.005		%
Guaranteed life at 230 nm Ⓐ			1500	1000 Ⓓ	h
Output current			30	50	mA
Output voltage (Typ.)			Approx. 135		V
Filament ratings	Warm-up	Voltage	4.2		V
		Current (Typ.)	0.55		A dc
	Operating	Voltage	3.5		V
		Current (Typ.)	0.5		A dc
Filament warm-up time (Min.)			Approx. 25		s
Bulb wall temperature Ⓑ (Max.)			185	240	°C
Storage temperature			-10 to +60		°C
Storage humidity			Below 85 % (No condensation)		—

ⒶLamp life end is defined as the point when light output at 230 nm falls to 50 % of its initial value or when output fluctuations exceed 0.05 % (p-p).
Ⓑ Position “a” in dimensional outline ⒸOperating life may vary depending on operating environmental conditions (vacuum atmosphere).

Dimensional outline (Unit: mm)

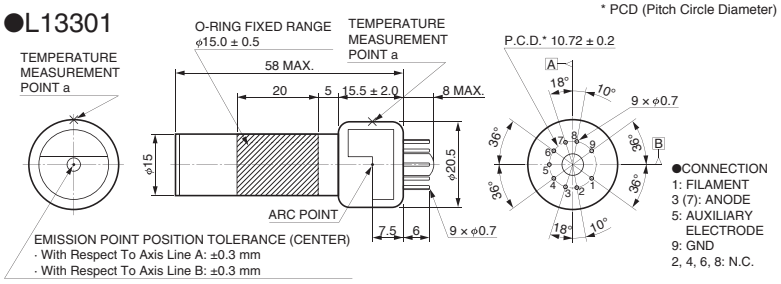
●L10671D



TLSOA0109EA

●L13301

* PCD (Pitch Circle Diameter)



TLSOA0016EA

RELATED PRODUCTS

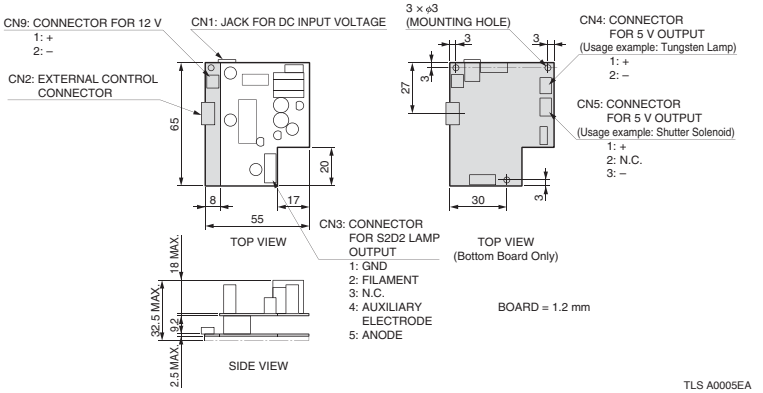
Power supply

●L10671P (for L10671)

Parameter		Description / Value	Unit
Input voltage (DC)		12 *	V
Power consumption	Max.	10	VA
External control		S2D2 lamp ON /OFF	—
		CN4 output ON/OFF	—
		CN5 output ON/OFF Ⓐ	—
		Status signal (S2D2 lamp, CN4, Main power)	—

ⒶEach time a signal for external control is input across terminals 3 and 10, voltages +5 V and -5 V are alternately output at 200 ms intervals.

* Input voltage range is from 8.5 V dc to 13.2 V dc.

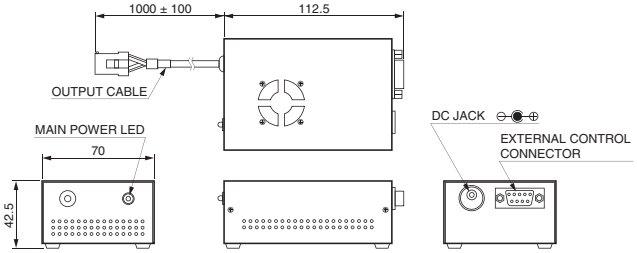


TLS A0005EA

●C10707 (for L13301)

Parameter		Description / Value	Unit
Input voltage (DC) *		10.8 to 13.2	V
Power consumption	Max.	17	VA
External control		Lamp ON /OFF	—
		Lamp status signal	

* This power supply come with AC/DC adapter.

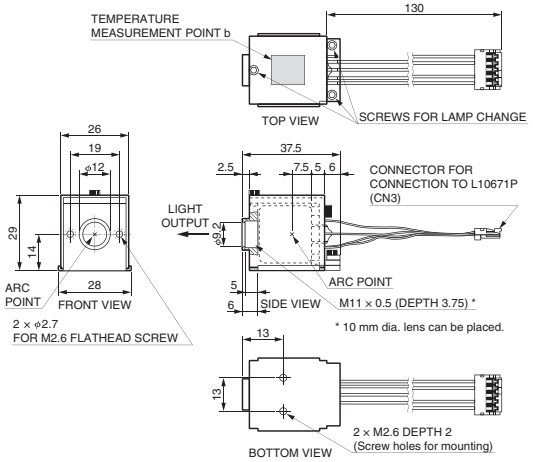


Lamp housing

●L10671H (for L10671D)

Parameter	Description / Value	Unit
Weight	320	g
Optimum operating temperature Ⓑ	+40 to +80	°C

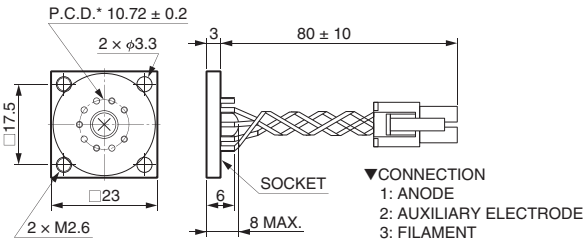
ⒷAt position "b" in the L10671H dimensional outline. (When this lamp housing is installed in equipment, thermal design specs must be considered to ensure the operating temperature will be within this range.)



TLS A0006EA

Socket with cable E13807 (for L13301)

* PCD (Pitch Circle Diameter)

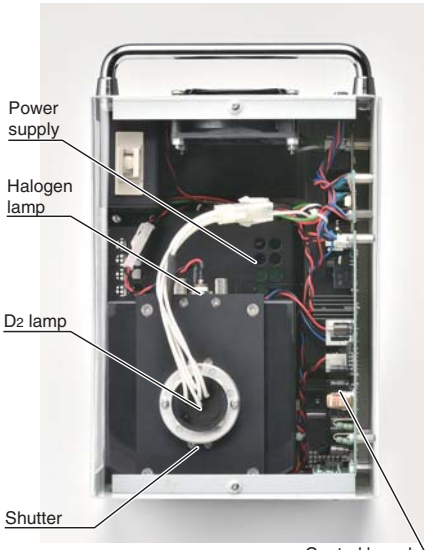


* Please consult us on the housing and vacuum flange for the L13301.

Technical information: Module type

Hamamatsu can propose customized modules which meet your requests - application and other conditions of your concept - with best performance of our lamps.
The following are just examples of customization, so please contact us with the information of your request.

UV-VIS fiber light source high power type (X2D2 lamp)



▲Customize image

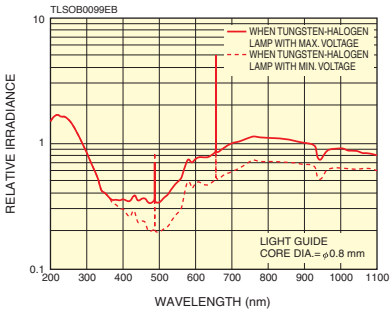
Reference dimention (W × H × D)
: 178 mm × 157 mm × 250 mm

Features

- Spectral distribution 200 nm to 1600 nm
- High power
- High stability: Fluctuation 0.004 % p-p (Typ.) (equivalent to 2 × 10^{-5} A.U.)
- Long life lamp: 2000 hours
- External control
- Shutter function
- Filter holder
- Fiber output

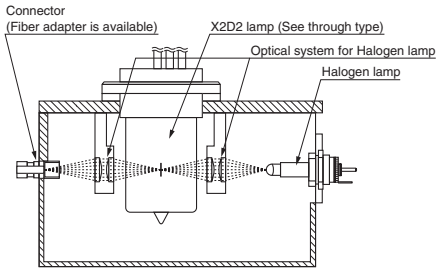
Characteristics

- Spectral distribution (Typical data)



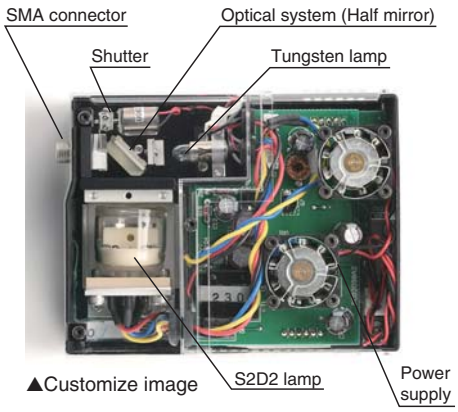
Customize example

- UV-VIS fiber type module



* Power supply for lamp operation should be prepared.

Compact type (S2D2 lamp)



▲Customize image

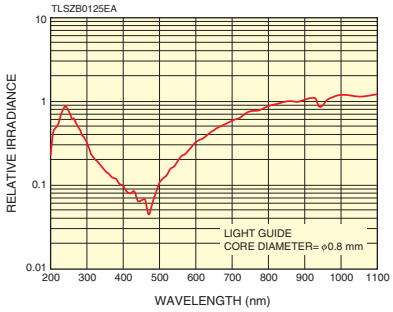
Reference dimention (W × H × D)
: 72 mm × 40 mm × 90 mm

Features

- Compact
- High stability: Fluctuation 0.004 % p-p (Typ.) (equivalent 2 × 10^{-5} A.U.)
- External control
- Shutter function
- Fiber output

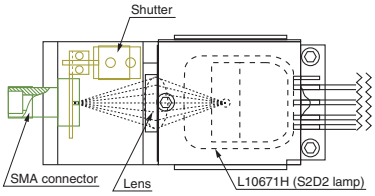
Characteristics

- Spectral distribution (Typical data)



Customize example

- UV fiber type module



* Power supply for lamp operation should be prepared.

VUV light source

■APPLICATIONS

- ●Electrostatic remover
- ●Film thickness measurement
- ●Spectrophotometry
- ●Semiconductor inspection
- ●Material resistance evalution
- ●Photoionization source
- ●Dechucking of electrostatic chucks
- ●LCD manufacturing equipment

H2D2 light source unit L11798, L11799

The H2D2 light source unit contains a high-brightness, high-end deuterium lamp (H2D2 lamp) that emits light at a brightness 6 times higher than our current deuterium lamps (L2D2 lamps). Despite its high brightness, the H2D2 is highly stable, has a long service life, and allows air-cooled operation by a specially designed housing. This feature makes it much more convenient and easy to use than ordinary water-cooled lamps.
The H2D2 can be used in various applications and enhances equipment sensitivity and throughput.

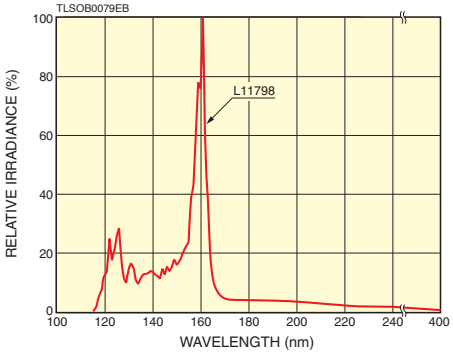
▲L11798, L11799
Left: Light source, Right: Power supply

Features

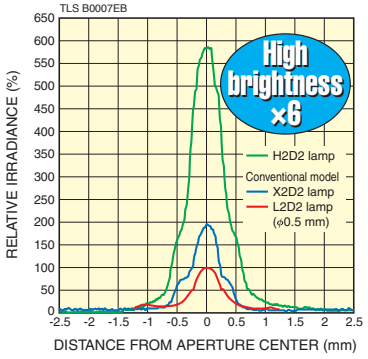
- ●High brightness: 6 times
  (Compared to L2D2 lamp)
- ●High stability: Fluctuation 0.05 % p-p (Max.)
  Drift ±0.3 %h (Max.)
- ●Long life: Warranty of 1000 hours
- ●Air cooling (needs no cooling water)
- ●External control

Characteristics

●Spectral distribution



●Arc distribution



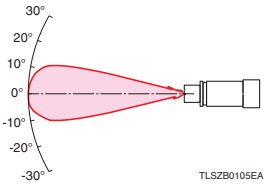
Electrostatic remover VUV ionizer L12542

Due to its wide irradiation angle about 3 times larger than our current VUV light source, the L12542 efficiently removes electrostatic charges over large areas in depressurized or vacuum environments.
Up until now two or more VUV light sources were needed to neutralize electrostatic charges in large areas due to their limited irradiation angle. The L12542 solves this problem and efficiently neutralizes large areas in a vacuum.

▲L12542
Left: Light source, Right: Power supply

Characteristics

●Directivity
(Light distribution)



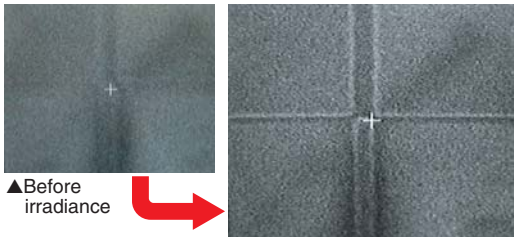
S2D2 VUV light source unit L10706 series

The S2D2 VUV light source unit is a vacuum ultraviolet light source unit that incorporates a compact deuterium lamp with an MgF_2 window.
Equipped with a SUS flexible tube with a vacuum flange and a unique cooling mechanism, this light source unit allows irradiating objects or samples at a very close distance, and can be installed and operated under depressurized conditions.
The compact lamp unit and SUS flexible tube offer greater flexibility in attaching the light source unit to various types of equipment.

▲L10706
Left: Light source, Right: Power supply

SEM image

●Comparison of electrostatic change removal effect



▲Before irradiance

▲After irradiance

* It is also possible to remove electrostatic charges by other D_2 lamps with MgF_2 window.

■HANDLING PRECAUTION

1. Deuterium lamps emit ultraviolet rays which can be harmful to eyes and skin. Do not look directly at the emitted light or allow direct exposure to skin. Always wear protective glasses or goggles and clothing when operating the lamps. (Refer to JIS T 8141 or equivalent safety standards).
2. Since the bulb wall temperature reaches a high temperature (over 200 °C) during lamp operation, do not touch it with bare hands or bring inflammable objects near it.
3. Do not apply vibrations or mechanical shocks to the lamp. These might cause light output stability to deteriorate.
4. Graded sealing of synthetic silica and MgF_2 window:
   On bulbs using synthetic silica or MgF_2 window, the window is formed by so-called "graded sealing" which connects different glasses with slightly different expansion rates. Since the mechanical strength of the seams of this graded sealing is low, use caution when securing the lamp so that no force is exerted on those seams during use.
5. Before turning on the lamp, wipe the bulb and window gently using alcohol or acetone. Do not handle the lamp with bare hands. Dirt or smears on the window will cause a significant drop in ultraviolet transmittance.
6. High voltage is used to operate these lamps. Use extreme caution to prevent electrical shock.
7. Be sure to avoid to store the lamp under high humidity and high temperature. Also, in case the lamp is not used for a long time, it with package in the place where shock or vibration is not applied.
8. Handling MgF_2 and synthetic quartz windows:
   UV light generates ozone when it irradiates an atmosphere containing oxygen. The amount of the generated ozone is low and so does not affect the human body but does produce an ozone smell. So ventilate the room from time to time when using a lamp with an MgF_2 or synthetic quartz window in a closed room.

■WARRANTY

Lamps are warranted for a period of one year from the date of shipment. If a lamp is found to be defective within this warranty period, Hamamatsu will replace the defective lamp without charge. (This warranty is limited to replacement of the defective lamp.) Even if within the warranty period (one year), the warranty shall not apply to cases where the lamp operation time has exceeded the guaranteed life, or the trouble was caused by incorrect operation or natural or man-made disasters.

■DISPOSAL OF 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.

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