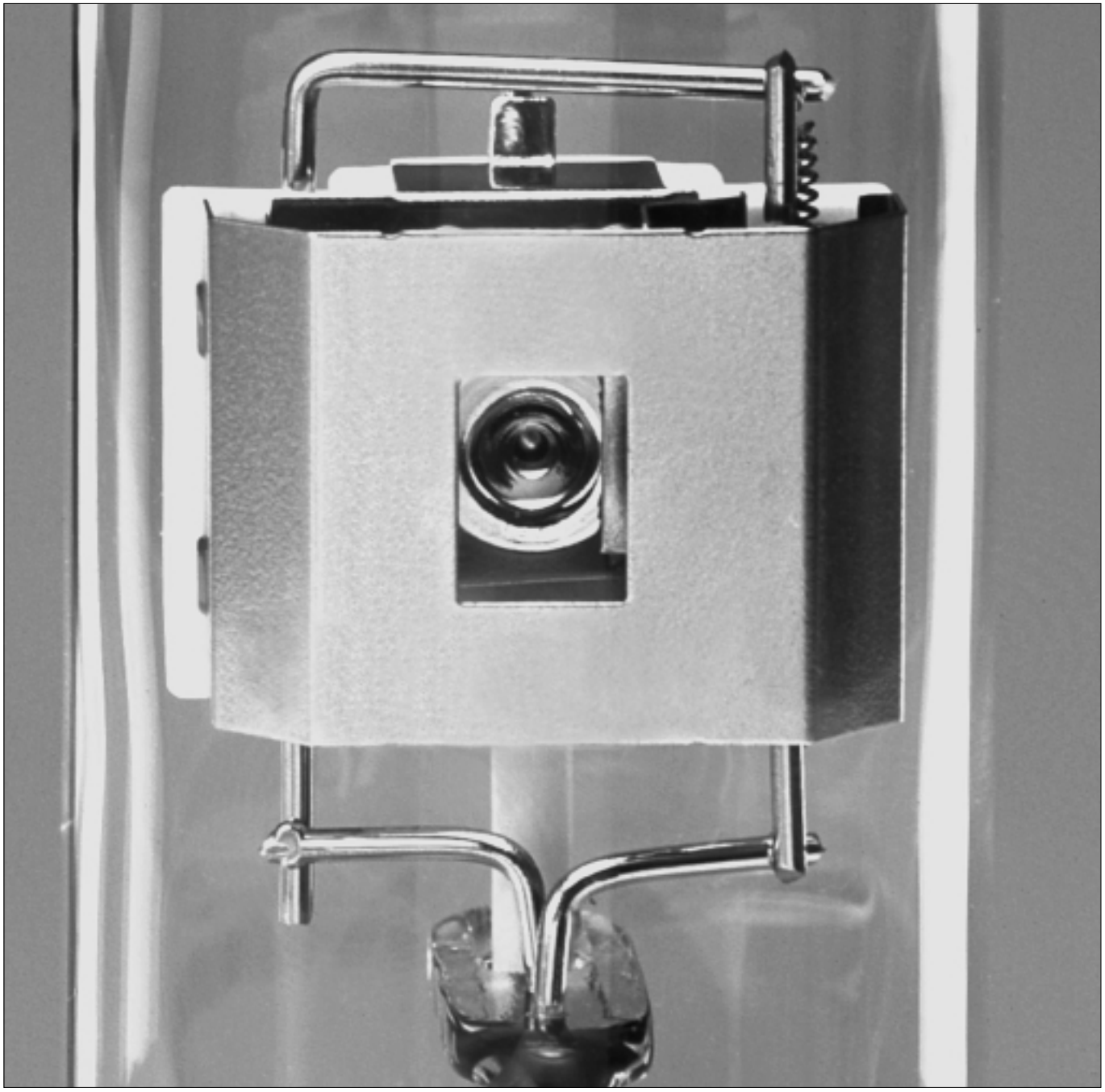
PATENTS

L2D2 LAMPS

DEUTERIUM LAMPS

The best light source is supported by the best electrode technology.



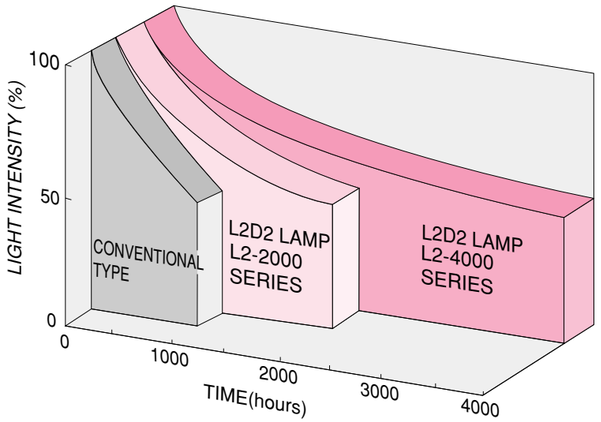
HAMAMATSU

HAMAMATSU

LONG LIFE : 4000 HOURS

4 times longer guaranteed life

■ **Life Characteristics**

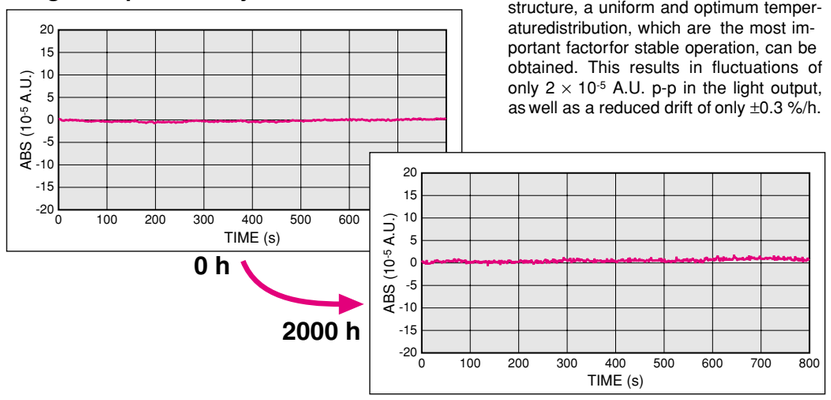


The L2-4000 series lamps assure an operating life of 4000 hours-4 times longer than conventional lamps. This is the longest operating life of any deuterium lamp.

HIGH STABILITY : 2 TIMES STABLE

Fluctuation: 2 × 10^{-5} A.U. p-p Max. (up to 2000 h)

■ **Light Output Stability**



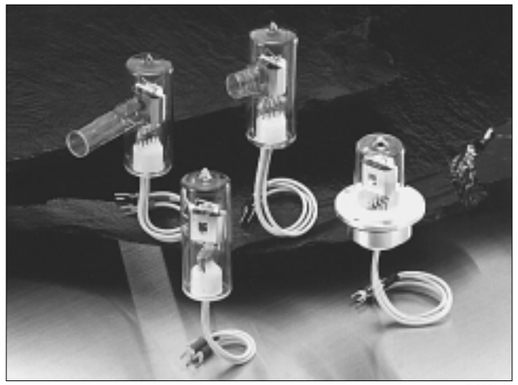
By using a newly developed ceramic structure, a uniform and optimum temperaturedistribution, which are the most important factorfor stable operation, can be obtained. This results in fluctuations of only 2 × 10^{-5} A.U. p-p in the light output, as well as a reduced drift of only ±0.3 %/h.

EXCELLENT TEMPERATURE CHARACTERISTICS

Use of a ceramic structure with excellent thermal stability ensures stable lamp operation even in the presence of ambient temperature variations.

Introducing the L2D2 lamps that open up a new generation of
Deuterium lamps used in analytical instruments.
The Hamamatsu L2D2 lamps deliver high performance in all
respects-operating life, stability and light output intensity.
You will find significant distinc tions from conventional lamps.*

L2D2 LAMPS



TLSOF0138

APPLICATIONS

- UV-VIS Spectrophotometers
- CE(Capillary Electrophoresis)
- SOx/NOx Analyzers
- Film Thickness Measurement
- HPLC
- Atomic Absorption Spectrophotometers
- Thin Layer Chromatography

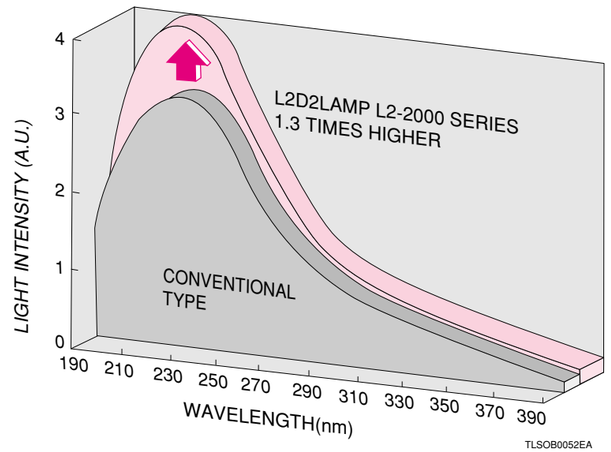
* conventional: metal structure type

HIGH LIGHT OUTPUT : 1.3 TIMES HIGHER

1.1 times higher (L2-4000 series) (L2-2000 Series)

The L2-2000 series lamps produce 1.3 times higher light output than conventional lamps. The L2-4000 series lamps even offer light output 1.1 times higher than conventional lamps.

■ **Radiant Output Intensity**

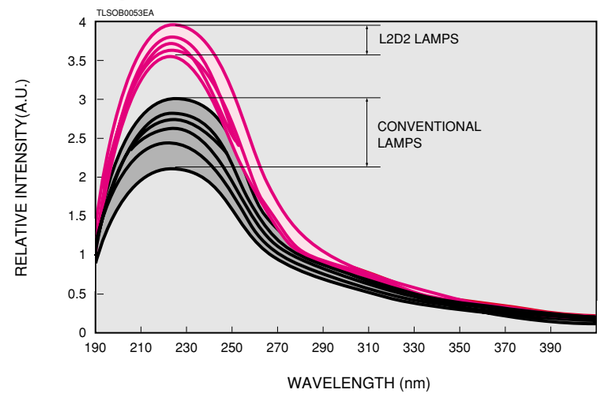


SMALL INTENSITY VARIATIONS : 1/2

Compared to our conventional lamps

The spacing between electrodes is kept fixed by a molded ceramic spacer. This reduces the lamp to lamp variations in the light output to one half of that obtained with our lamps having a conventional all metal structure.

■ **Intensity Variation**

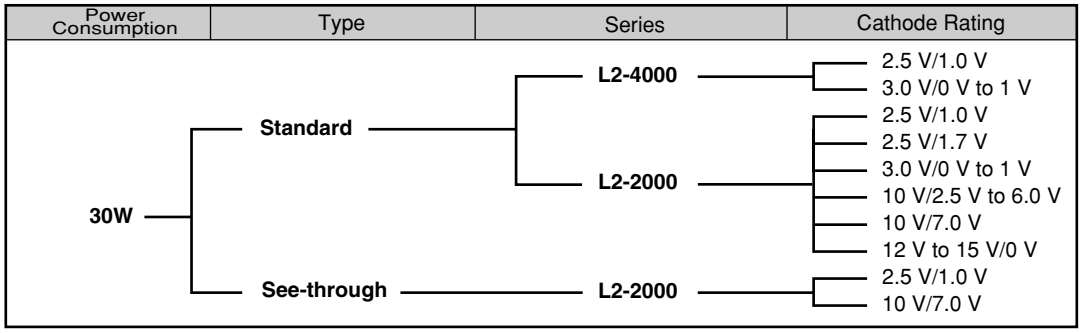


LESS MOVEMENT OF ARC EMISSION POINT

Since the ceramic structure has a small thermal expansion coefficient, there is virtually no movement of the arc emission point during operation.

SPECIFICATIONS FOR L2D2 LAMPS

SELECTION GUIDE



SPECIFICATIONS

STANDARD TYPE

Series	Type No.	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 Ⓓ (h)	Required Discharge Starting Voltage Ⓑ Min. (V dc)	Anode Current (mA dc)	Tube Drop Voltage Typ. (V dc)
L2-4000	L6565	❶	UV glass	185 to 400	1.0	±0.3	0.005	4000	350	300±30	80
	L6566	❷									
L2-2000	L6301	❶	UV glass	185 to 400	0.5	±0.3	0.005	2000	400	300±30	80
	L6301-50	❾									
	L6303	❶									
	L6305	❷									
	L6307	❸									
	L6309	❸									
	L7296	❺	Synthetic silica	160 to 400							
	L7296-50	❼									
	L6311	❹	UV glass	185 to 400							
	L6311-50	❽									
	L7292	❻	MgF_2	115 to 400	1.0	—	—	2000 Ⓖ	350		
	L7293	❻									
	L7293-50	❿									

SEE-THROUGH TYPE

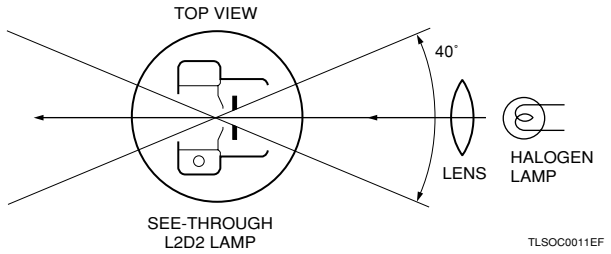
Series	Type No.	Dimensional outline	Window Material	Spectral Distribution (nm)	Aperture Diameter Ⓐ (mm)	Output Stability: Drift Max. (%/ h)	Output Stability: Fluctuation (p-p) Typ. (%)	Guaranteed Life Ⓓ (h)	Required Discharge Starting Voltage Ⓑ Min. (V dc)	Anode Current (mA dc)	Tube Drop Voltage Typ. (V dc)
L2-2000	L6999	❶	UV glass	185 to 400	0.5	±0.3	0.005	2000	400	300±30	80
	L6999-50	❾									
	L9030	❺	Synthetic silica	160 to 400							
	L9030-50	❼									

NOTE Ⓐ Lamps with an aperture of 0.5 mm diameter are high brightness types. These lamps provide 1.4 times higher brightness than standard lamps with an aperture of 1.0 mm diameter. (Refer to page 8.)
Ⓑ A trigger voltage higher than this value is required to start lamp discharge. For reliable lighting, an application of 500 V to 600 V is recommended. The maximum rated voltage that can be applied is 650 V.
Ⓒ The heater current during warming-up period is so high that the enough voltage may not be supplied to the lamp in case the cable between the lamp and the power supply is long because of voltage drop at the cable. The power supply for the heater should be designed so as to supply specified voltage at the lamp terminal.
Ⓓ The lamp life end is defined as the point when the light output falls to 50 % of its initial value at 230 nm or when output fluctuation (p-p) exceeds 0.05 %.

SEE-THROUGH TYPE

The see-through type electrode structure enables straight-line arrangement of the halogen lamp, deuterium lamp, optical system and optical passage. 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



Filament Ratings					Applicable Power Supply		Lamp House	Type No.
Warm-up			Operating		AC Input Type	DC Input Type		
Voltage ⓒ (V dc, ac)	Current Typ. (A dc, ac)	Time Min. (s)	Voltage (V dc)	Current Typ. (V dc)				
2.5±0.25	4	20	1.0±0.1	1.8	C9598-2510	M9596-2510	—	L6565
3.0±0.3	5		0 to 1	0 to 1.8	C9598-3000	M9596-3000		L6566
2.5±0.25	4	20	1.0±0.1	1.8	C9598-2510	M9596-2510	—	L6301
							E9522	L6301-50
			1.7±0.2	3.3	C9598-2517	M9596-2517	—	L6303
3.0±0.3	5		0 to 1	0 to 1.8	C9598-3000	M9596-3000		L6305
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
							E9558	L7296-50
12 to 15	0.5 to 0.55		0ⓕ	0ⓕ	C9598-1555	M9596-1555	—	L6311
								L6311-50
10±1	0.8		2.5 to 6.0ⓔ	0.3 to 0.6	C9598-1035	M9596-1035		L7292
2.5±0.25	4		1.0±0.1	1.8	C9598-2510	M9596-2510		L7293
								L7293-50

Filament Ratings					Applicable Power Supply		Lamp House	Type No.
Warm-up			Operating		AC Input Type	DC Input Type		
Voltage ⓒ (V dc, ac)	Current Typ. (A dc, ac)	Time Min. (s)	Voltage (V dc)	Current Typ. (V dc)				
2.5±0.25	4	20	1.0±0.1	1.8	C9598-2510	M9596-2510	—	L6999
								L6999-50
10±1	1.2		7.0±0.5	1	C9598-1070	M9596-1070		L9030
								L9030-50

NOTE ⓔRecommended operating voltage is 3.5 V ± 0.5 V.

ⓕIn these lamps, discharge current is allowed to flow into the filament during operation so that cathode temperature is maintained at an optimum level. So there is no need for input of external power to keep the filament heated.

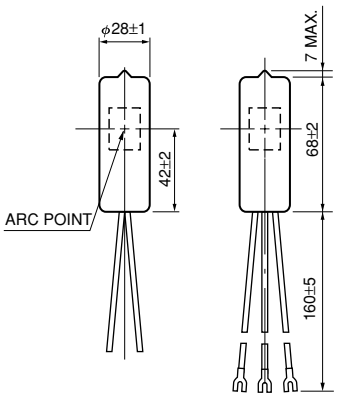
ⓒAverage operating life : Operating life depends on environmental conditions (vacuum atmosphere). It is recommended that these lamps be used in an oil-free environment.

*We recommend using Hamamatsu deuterium lamp power supplies in order to obtain the full performance from our lamps (Refer to page 7 and 9).

DIMENSIONAL OUTLINES

(Unit : mm)

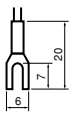
❶ L6301, L6565, L6303, L6999



CONNECTION

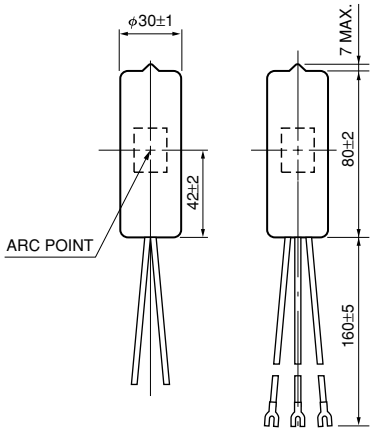
L6303	
FILAMENT	: BLUE
FILAMENT · GND	: BLACK
ANODE	: RED

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

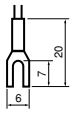


TLSOA0040EC

❷ L6305, L6566

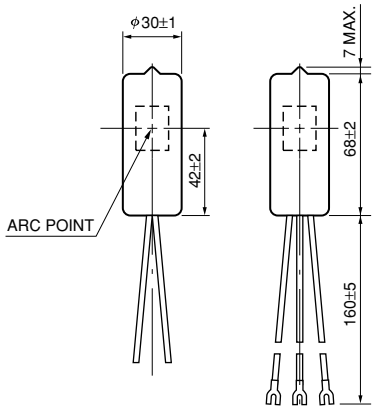


CONNECTION
FILAMENT : BLUE
FILAMENT : BLUE
ANODE : RED

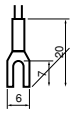


TLSOA0041ED

❸ L6307, L6309

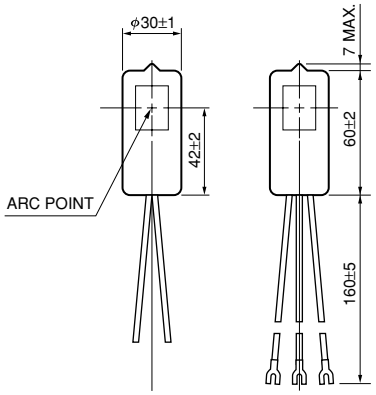


CONNECTION
FILAMENT : BLUE
FILAMENT·GND : BLACK
ANODE : RED

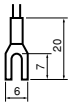


TLSOA0018EE

❹ L6311

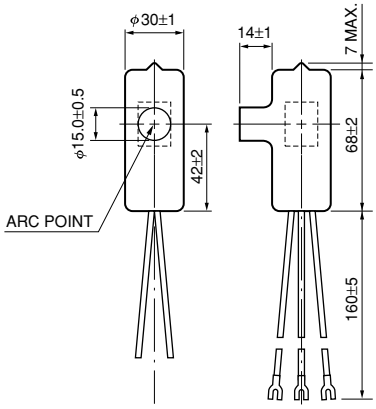


CONNECTION
FILAMENT : BLUE
FILAMENT·GND : BLACK
ANODE : RED

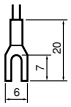


TLSOA0039EE

❺ L7296, L9030

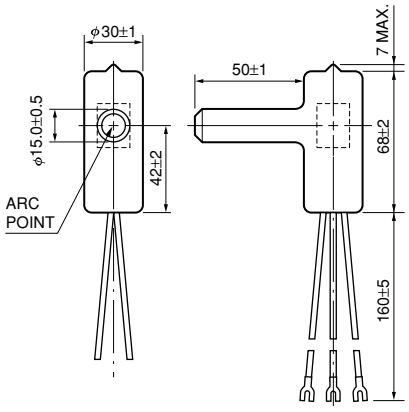


CONNECTION
FILAMENT : BLUE
FILAMENT·GND : BLACK
ANODE : RED



TLSOA0017EE

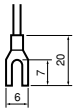
❻ L7292, L7293



CONNECTION

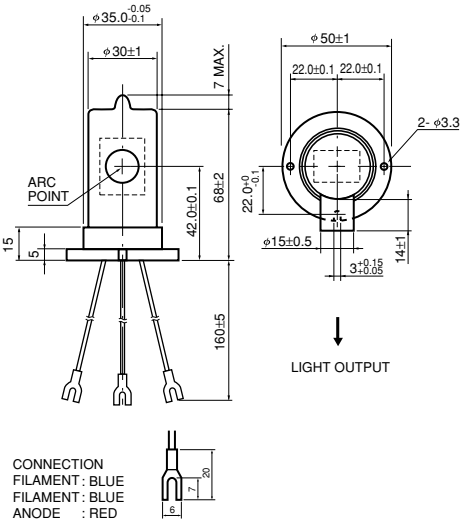
L7292	
FILAMENT	: BLUE
FILAMENT·GND	: BLACK
ANODE	: RED

L7293	
FILAMENT	: BLUE
FILAMENT	: BLUE
ANODE	: RED



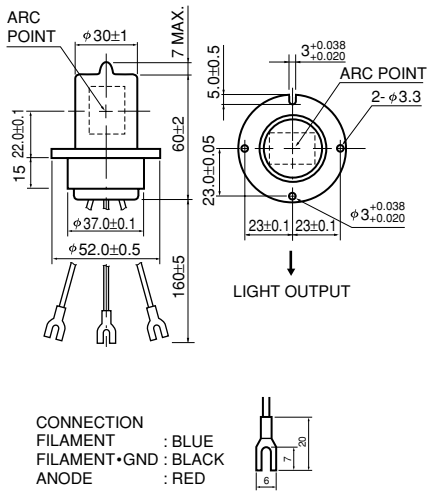
TLSOA0011ED

❼ L7296-50, L9030-50



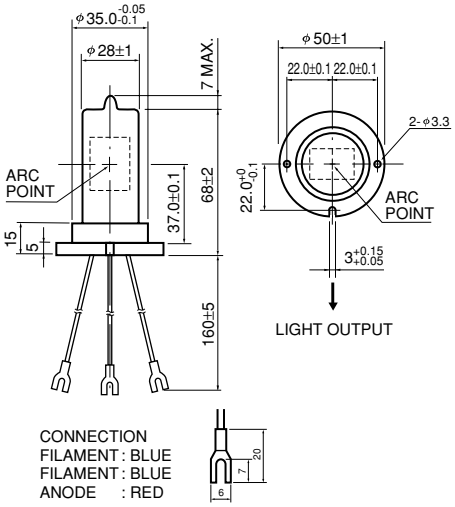
TLSOA0075EB

❽ L6311-50



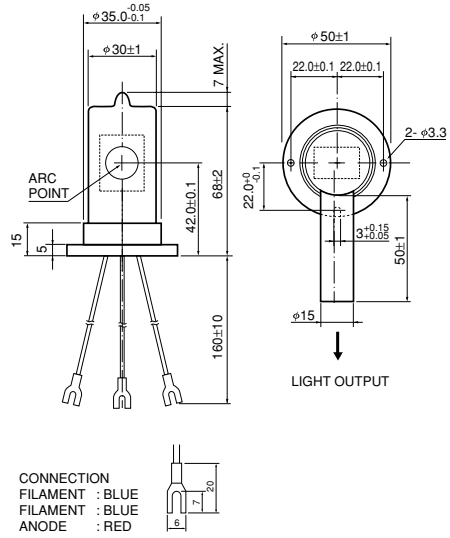
TLSOA0050EB

❾ L6301-50, L6999-50



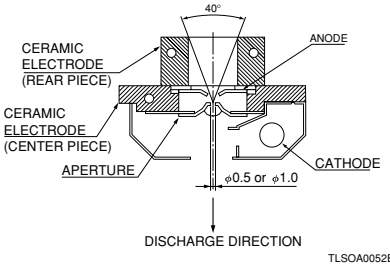
TLSOA0051EB

❿ L7293-50



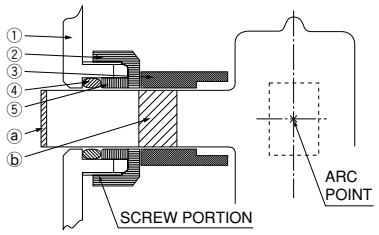
TLSOA0088EA

Cross section of see-through type



TLSOA0052EA

L7292, L7293, L7293-50 mounting example on the vacuum system

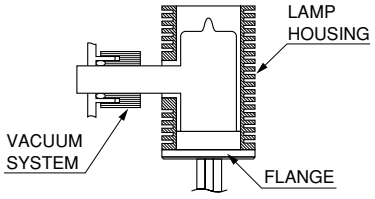


①VACUUM SIDE FLANGE
②TIGHTENING SCREW
③STORRER
④ORING (JIS B2401)
CALL No. V15
(15 mm I.D.
4 mm WIDTH)
⑤SPACER
ⓐMgF_2 WINDOW
ⓑGRADED SEAL

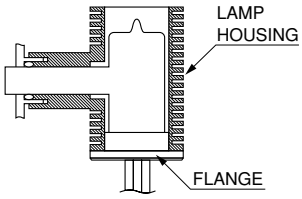
TLSOC0010EB

Precaution for use L7293-50

OK SEPARATED TYPE



NG UNIFIED TYPE

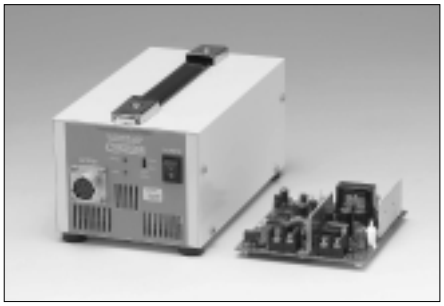


When the flange of L7293-50 is used as purpose of lamp cooling, vacuum system part should be separated from the lamp housing part. If vacuum system part is unified to lamp housing part and the lamp flange is fixed to the lamp housing, it may induce broken of lamp snout part.

TLSOC0045EA

POWER SUPPLY

Applications using a deuterium lamp require an extremely stable light output, so using a dedicated power supply to operate the lamp is recommended.
Hamamatsu deuterium lamp power supplies use a constant current circuit and constant voltage circuit. This combination ensures stable and reliable lamp lighting.
Two types of power supplies are available: 100 V ac input type C9598 and 24 V dc input type M9596.
Please select the power supply that best matches your application.



Left: C9598, Right: M9596

SPECIFICATIONS

Parameter			C9598	M9596	Unit
Input	Input Voltage		AC 100 V to 240 V (Auto Switching) Single Phase 47 Hz to 63 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.)	160		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
Operation Ambient Temperature			0 to +40		°C
Storage Temperature			-40 to +60		°C
Cooling Method			—	0.3 m³/min of Forced Air Cooling	—
Operating and Storage Humidity			Below 80 (No condension)		%
Weight			Approx. 1.8	Approx. 0.18	kg

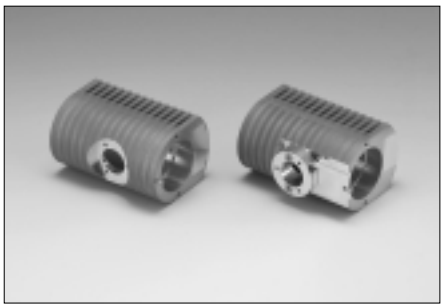
HEATER VOLTAGE AND CURRENT

Type No.	Warm-up		Operation		Applicable Lamps
	Voltage (V dc)	Current (A dc typ.)	Voltage (V dc)	Current (A dc typ.)	
C9598/M9596-2510	2.5 ± 0.2	4	1 ± 0.2	1.8	L6565, L7293, L6999, L6999-50 L7293-50, L6301, L6301-50
C9598/M9596-2517	2.5 ± 0.2	4	1.7 ± 0.2	3.3	L6303
C9598/M9596-3000	3 ± 0.2	5	0	0	L6566, L6305
C9598/M9596-1035	10 ± 0.5	0.8	3.5 ± 0.2	0.3	L6307, L7292
C9598/M9596-1070	10 ± 0.5	1.2	7 ± 0.4	1	L7296, L6309, L7296-50, L9030, L9030-50
C9598/M9596-1555	13.5 ± 0.7	0.5	5.25 ± 0.25	0.3	L6311, L6311-50

* Characteristics are measured at 23±1 °C after 30 min of warming up.

LAMP HOUSING

This lamp housing is designed for Hamamatsu deuterium lamps with an installation flange. Despite being compact and less expensive, this lamp housing works as a good heat radiator housing and allows easy but reliable lamp operation that meets the required lamp specifications. To make it easy to install this lamp housing in equipment, the window and mount surfaces of the lamp housing are finish-machined and have tapped holes.
This lamp housing helps you develop photometric equipment that uses deuterium lamps.
E9522 for L6301-50
E9558 for L7296-50



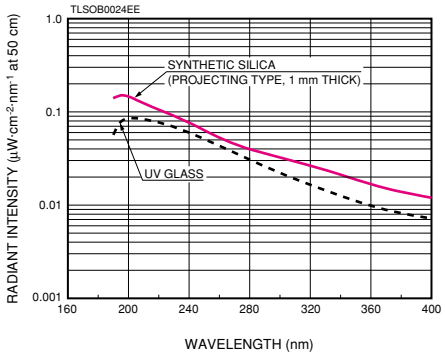
* The see-through types (L6999-50 and L9030-50) are also available with custum-made.

TECHNICAL INFORMATION

■ 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.

Figure 1: Spectral Distribution



■ Window Material

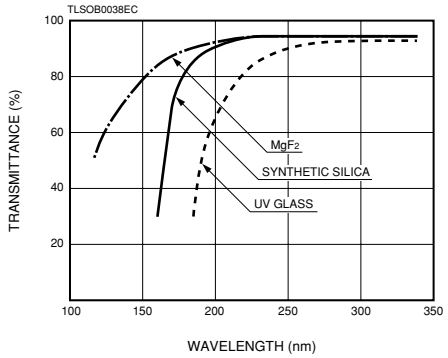
The following three types of window material are available for deuterium lamps.

(1) UV glass (2) Synthetic silica (3) MgF_2

Figure 2 shows the transmittance of various window materials.

UV light at wavelengths shorter than 190 nm attenuates greatly due to its absorption by oxygen. To obtain the fullest performance in window transmittance, it is recommended that the inside of the equipment be filled with nitrogen or vacuum-evacuated to eliminate this absorption effect.

Figure 2: Typical Transmittance of Various Window Materials



●UV glass

UV glass has a higher ultraviolet transmittance than normal optical glass (borosilicate glass). It has the longest cut off wavelength of 185 nm among the three types. However the generation of ozone is lower than other window material types, it is not necessary to have special anti-ozone treatments.

●Synthetic silica

Synthetic silica is obtained by fusing a silica crystal that is artificially grown. Although its cut off wavelength is 160 nm, it contains less impurities than fused silica, and transmittance at 200 nm has been improved by approx. 50 %.

●MgF_2

MgF_2 is a crystallized form of alkali metal halide that has an excellent ultraviolet transmittance, a low deliquescence and is used as window material for vacuum ultraviolet applications. Its cut off wavelength is 115 nm.

■ Light Distribution

The non-projecting type uses the side of the cylindrical glass bulb as the emission window, whilst the projecting type uses a plane glass attached to a projection on the bulb.

The projecting type has a uniformed transmittance due to the plane glass. Since the window is located far from the discharge position, the amount of dirt produced by spattering from the electrodes is reduced resulting in low deterioration of light output. The non-projecting type requires less space and has a wider directivity since there is no projection, enabling effective use of emitted light. The long-nose projecting type uses an MgF_2 window and is suitable for vacuum ultraviolet applications. This type is used with the tip of the nose inserted into the vacuum equipment.

Figure 3: External View

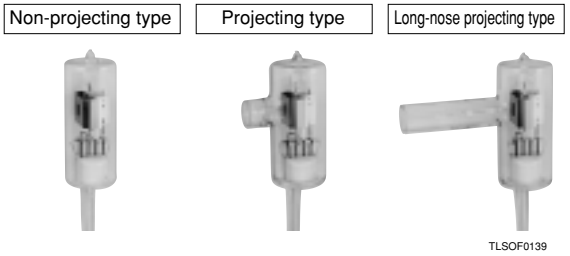
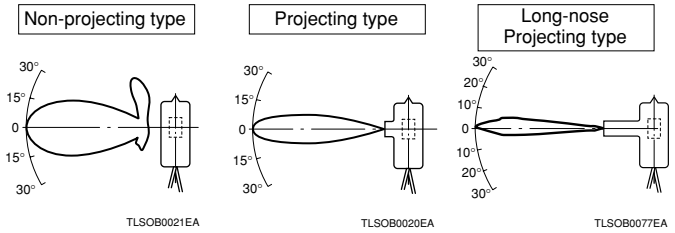


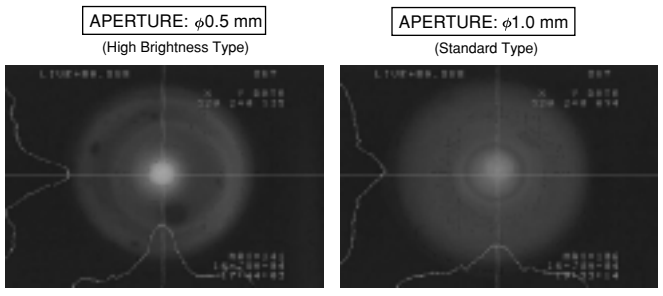
Figure 4: Directivity (Light Distribution)



■ Arc Distribution

Arc intensity is determined by the aperture (light exit) size. Figure 5 shows typical spectral distributions for lamps with different aperture sizes. At the same input current and voltage, lamps with an aperture of 0.5 mm diameter (high brightness type) provide 1.4 times higher brightness than lamps with an aperture of 1.0 mm diameter (standard type). The half width of spectral distribution also becomes narrower with a reduced aperture size. When higher intensity is required or the object to be irradiated is very small, the high brightness type is recommended.

Figure 5: Arc Distribution

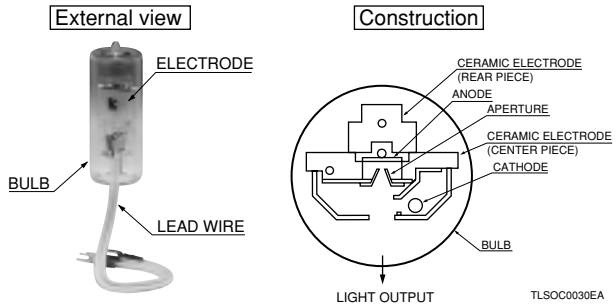


TECHNICAL INFORMATION

■Construction

Figure 6 shows the external view and internal construction of a deuterium lamp. The anode has a unique structure covered with ceramic to prevent abnormal discharge, and the cathode has a highly durable electrode. Since a deuterium lamp uses the positive column flash of arc discharge, the cathode is shifted sideways and an aperture is located immediately in front of the anode so that high intensity is obtained. The aperture plate placed between anode and cathode may be used as an auxiliary electrode for lamps designed for low voltage lighting.

Figure 6: External View and Electrode Construction



■Terminology

①Solarization

Transmittance of UV glass and fused silica drops when they are used over a long period. This is caused by a drop in transparency of the glass resulting from dirt on the glass and the influences of ultraviolet rays. In the worst case, the glass becomes cloudy and its life is shortened. This is called solarization, and transmittance drops, particularly in short wavelength region. This phenomenon is hardly ever seen with synthetic silica.

In addition, the lamp with MgF_2 window expose strong UV light, so possibly loose transparency with a film will be deposited by CVD (chemical vapor deposition). Therefore, an atmosphere should be high vacuum or an inert gas to avoid the reaction.

②Discharge starting voltage

When the cathode is sufficiently heated and ready for arc discharge, a pulse trigger voltage is applied between anode and cathode, and discharge starts. The discharge starting voltage of 30 W deuterium lamps is approx. 350 V (400 V max.). However, since the discharge starting voltage rises according to the prolongation of operation time, it is recommended that a voltage of approx. 500 V be applied to assure discharge. (The maximum applied voltage for trigger is 650 V.) The discharge starting voltage varies depending on the trigger method and trigger constant.

③Output stability

(1)Drift

Drift refers to variation of output over a long period caused as a result of the change in thermoelectron discharge characteristic of the cathode, change in gas pressure or dirt on the window. It is expressed in variation per hour. In the case of deuterium lamps, it takes 10 to 15 minutes until the inside of the lamp reaches thermal equilibrium after start of discharge, so a warm-up period of 20 to 30 minutes is required.

(2)Fluctuation

Fluctuation refers to variation of output caused by deterioration of the cathode or fluctuation of discharge position. Light output fluctuates 0.005 %(p-p) Typ. at intervals between a few minutes and a few hours. In addition, the position of the arc point also fluctuates.

④Life

(1)Fluctuation of light output

Life is determined by the point at which fluctuation combining fluctuation and shift exceeds 0.05 %p-p.

(2)Drop of light output

Life is determined by the point at which the total emitted energy drops to 50 % of the initial level. As described earlier, decrease in light output is caused mainly by solarization and dirt inside the window. The life specified is 2000 hours for L2-2000 series, and 4000 hours for L2-4000 series.

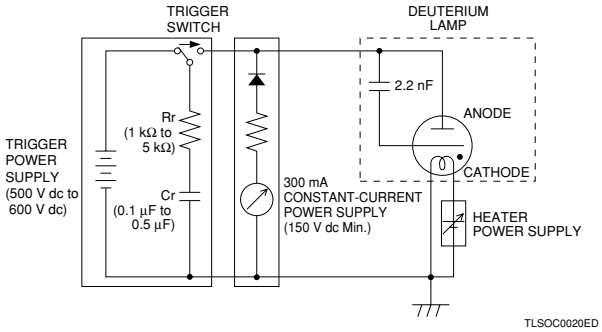
■Discharging the L2D2 Lamps

In deuterium lamps, an aperture electrode is placed between cathode and anode to compress the discharge, so that high light intensity is obtained. This required, a high voltage trigger discharge across cathode and anode.

In general, a typical power supply for deuterium lamps consists of the following three power supplies.

- Constant current power supply of 300 mA (open voltage about 150 V)
- Trigger power supply of 500 V peak to 600 V peak
- Power supply for the heater (about 10 W)

Figure 7: Example Circuit Diagram



When the L2D2 lamp series with an aperture size of 0.5 mm diameter will be operated by the circuit as shown above, it is recommended to employ CR constant as R_T=1 kΩ and C_T=0.5 µF to obtain the reliable lamp ignition.

OPERATING TEMPERATURE

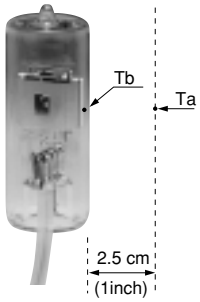
Optimum Operating Temperature

To obtain high stability and long operating life, adequate care must be paid to operating conditions including the operating temperature of the lamp.
Although the lamp's bulb wall temperature (Tb) rises as the ambient temperature (Ta) rises, the bulb wall temperature of the L2D2 lamp rises to approx. +245 °C to +280 °C when the ambient temperature is +25 °C. Moreover, the bulb wall temperature of the L2D2 lamps rises even further by +50 °C reaching +280 °C due to the way in which the electrode is constructed. (Bulb wall temperature (Tb) also differs depending on the lamp type and heater voltage as well as lamp housing.) Although the operating temperature of Hamamatsu L2D2 lamps has been designed based on lamps operated under normal temperature, the temperature range given in the table below is recommended as the allowable operating temperature range enabling the use of the lamps over a long period of time with high stability.

Table1: Allowable Operating Temperature Range for Deuterium Lamps

Lamp Type	L2D2 Lamp
Cathode Type	All Cathode type
Ambient temperature: Ta	+10 °C to +50 °C (+20 °C to +30 °C)*
Bulb wall temperature: Tb	+245 °C to +280 °C
Maximum allowable bulb wall temperature: Tb Max.	+290 °C Max.

*Temperature enclosed by ( ) indicates the optimum ambient temperature.



Ta: Temperature measured at a position 2.5 cm (1 inch) away from the bulb wall

Tb: Temperature on the bulb wall (cathode side)

As the ambient temperature (Ta) rises, cathode temperature increases, resulting in evaporation of the cathode. If the ambient temperature (Ta) drops, the gas pressure inside the bulb is reduced increasing the kinetic energy of the gas and ions causing sputtering of the cathodes thermionic coating. In both cases, the gas inside the bulb is rapidly consumed. This deteriorates the stability and intensity. Thereby drastically shortening the operating life.
For stable operation of deuterium lamps, care should be paid to the installation of the lamps so that the bulb wall temperature (Tb) does not exceed +290 °C.

PRECAUTION AND WARRANTY

Precautions When Using Deuterium Lamps

1. Deuterium lamps emit ultraviolet rays which can be harmful to your eyes and skin. Never look directly at the emitted lights, nor should you allow it to come into contact with your skin. Always wear protective goggles and clothing when operating the lamps. (JIS T 8141)
2. Since the bulb wall reaches a very high temperature (over +200 °C) when the lamp is on, do not touch it with bare hands or bring flammable objects near it.
   Need to wait at least 30 minutes after turning the lamp off in case of handling.
3. Do not exert mechanical vibration or shock on the lamp, otherwise the stability will deteriorate.
4. Silica glass graded sealing.
   In the case of bulbs using silica glass and MgF_2, the window is formed by connecting different glass sections having slightly different expansion rates. Since the mechanical strength of these seams is low, the bulb fixing method should be so arranged that no force is exerted on these seams during fixing or operation.
5. Before turning on the lamp, wipe the bulb and window gently with alcohol or acetone. Dirt on the window will cause deterioration of the UV transmission, so always wear gloves when handling the lamp.
6. High voltage is used to operate the lamp. Use extreme caution to prevent electric shocks.

Warranty

The warranty period will be one year after our shipment to original purchaser or guaranteed life time whichever comes first. The warranty is limited to replacement of the faulty lamp. Faults resulting from natural disasters and incorrect usage will also be excluded from warranty.

Related Products

Water-Cooled 150 W VUV Deuterium Lamps

These water-cooled 150 W lamps provide a radiant output 3 to 4 times higher than 30 W lamps and are chiefly used as excitation light sources. Two window materials, synthetic silica(L1314) and MgF_2(L1835) are available.
The MgF_2 window type is widely used as a VUV light source in photo CVD, solar simulator(in space) and other VUV applications. A vacuum flange E3444 series are provided as an option allowing simple connection to a vacuum instrument.

TLSOF0140

Air-Cooled VUV light Source Unit L8998

Hamamatsu now introduces a vacuum ultraviolet (VUV) light source that combines a 30 watt head-on type deuterium lamp with a vacuum flange. Its compact size and air-cooled configuration allow easy handling and operation. The deuterium lamp uses an MgF_2 (magnesium fluoride) window to efficiently transmit VUV radiation down to 115 nm.
The vacuum flange (ICF70), assembled as a standard feature, connects easily to most vacuum chambers.
A metal connector on the lamp housing permits easy connection to a dedicated power supply provided together from Hamamatsu.

UV-VIS Fiber Light Source L7893 Series

This light source L7893 series incorporates a highly stable L2D2 lamp and a Tungsten lamp into a single compact housing with an optical fiber light guide. The combination of these two lamps covers a wide spectral range from 200 nm to 1100 nm, yet offers highly stable light output and long service life. This light source L7893 series is ideal for a compact analytical equipment such as miniature grating units, portable spectrophotometers and reflection meters.

TLSXF0148

Calibrated Deuterium Light Source L7820

The L7820 is the calibrated light source consisting of L2D2 featuring high stability and good repeatability, which are required for calibrated light source.
In order for anybody to achieve stable light, not only the lamp design but also power supply and lamp housing design are optimized. It delivers high stable light in the long and the short term operation especially in the calibrated range of 250 nm to 400 nm.
The L7820 is suitable for quality control of light source, light detector and so on.
The certificate with JCSS logo mark is attached.

TLSXF0159

For details, please refer to the catalogs which are available from our sales office.

CE Marking

This catalog contains products which are subject to CE Marking of European Union Directives. For further details, please consult Hamamatsu sales office.

HAMAMATSU WEB SITE http://www.hamamatsu.com
HAMAMATSU PHOTONICS K.K., Electron Tube Division
314-5, Shimokanzo, Iwata-city, Shizuoka-pref., 438-0193, Japan, Telephone: (81)539/62-5248, Fax: (81)539/62-2205
U.S.A.: Hamamatsu Corporation: 360 Foothill Road, P. O. Box 6910, Bridgewater. N.J. 08807-0910, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218 E-mail: usa@hamamatsu.com
Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-2658 E-mail: info@hamamatsu.de
France: Hamamatsu Photonics France S.A.R.L.: 8, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: infos@hamamatsu.fr
United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road Welwyn Garden City Hertfordshire AL7 1BW, United Kingdom, Telephone: 44-(0)1707-294888, Fax: 44(0)1707-325777 E-mail: info@hamamatsu.co.uk
North Europe: Hamamatsu Photonics Norden AB: Smidesvägen 12, SE-171-41 SOLNA, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01 E-mail: info@hamamatsu.se
Italy: Hamamatsu Photonics Italia: S.R.L.: Strada della Moia, 1/E, 20020 Arese, (Milano), Italy, Telephone: (39)02-935 81 733, Fax: (39)02-935 81 741 E-mail: info@hamamatsu.it

TLSO1027E07
APR. 2005 IP