LIGHT SOURCE

DEUTERIUM LAMPS FOR PHOTOIONIZATION

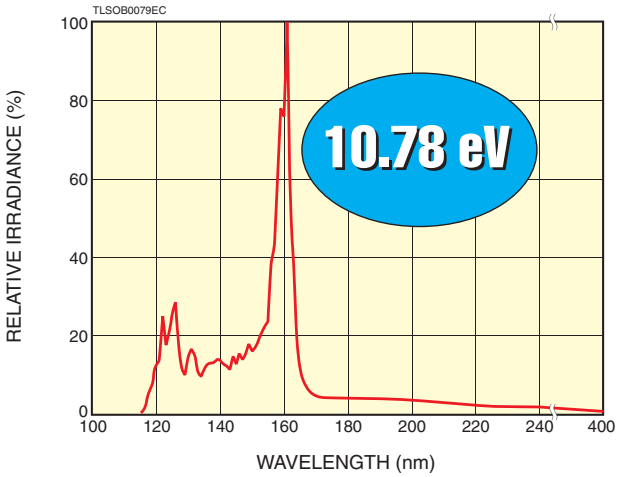
L7293, L13301

OVERVIEW

The L13301 and L7293 are photoionization light sources that emit light with energy up to 10.78 eV. Photoionization is so-called “soft ionization” that offers advantages over other ionization methods. However, conventional photoionization using lasers or PID lamps has problems such as that the lasers are expensive and difficult to handle, or the light output from the PID lamps is low. Using the L13301 and L7293 deuterium lamps that emit high-energy ultraviolet UV light allows easily building a photoionization system that is safe and low cost. The L13301 and L7293 deuterium lamps also feature a compact size and long lifetime.

SPECTRAL DISTRIBUTION

(Window material: MgF_2)



APPLICATIONS

- Photoionization
- Mass spectrometers
- Gas analyzers

FEATURES

- High energy: 10.78 eV
- Soft ionization
- Long service life
- Long lifetime
- Lower cost compared to other photoionization methods
- Easy to assemble and handle
- Compact size

▼Portable gas detector (VOC detector)

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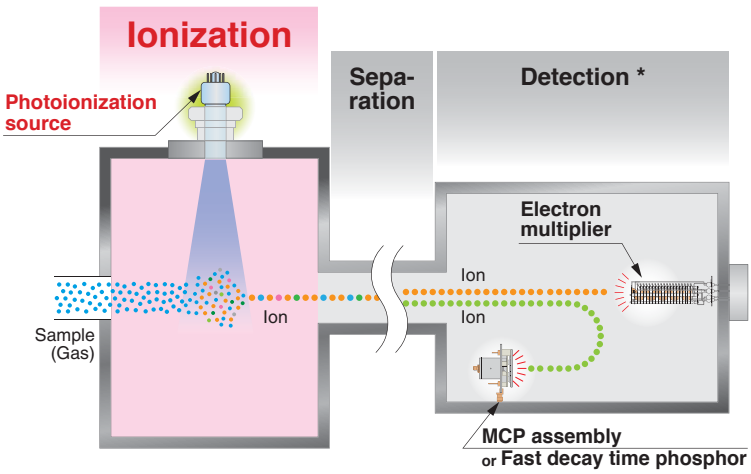
▼Schematic view of mass spectroscopy



* We provide MCP and other detectors for mass spectroscopy.
Please contact us for detailed information.

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LAMP

The L13301 and L7293 are deuterium lamps for photoionization that emit vacuum UV light with energy up to 10.78 eV. These lamps are simple in structure and low in cost, yet offer high performance, making them also suitable for high-precision mass spectrometers and gas analyzers.
These lamps provide a high degree of design freedom since they are supplied as single components. When designing peripheral devices for your equipment, please consult us. We are glad to offer support and advice to help you obtain the best performance from these lamps.

Left: L7293, Right: L13301

Parameter	L7293	L13301
Major features	Long lifetime	Compact size
Light output (relative to L13301 light output)	10	1
Housing *	Should be prepared by user.	
Vacuum flange *	Please contact us.	Should be prepared by user.
Power supply	Sold separately (See to the next section)	

* Please feel free to contact us for information on designing housings and vacuum flanges.

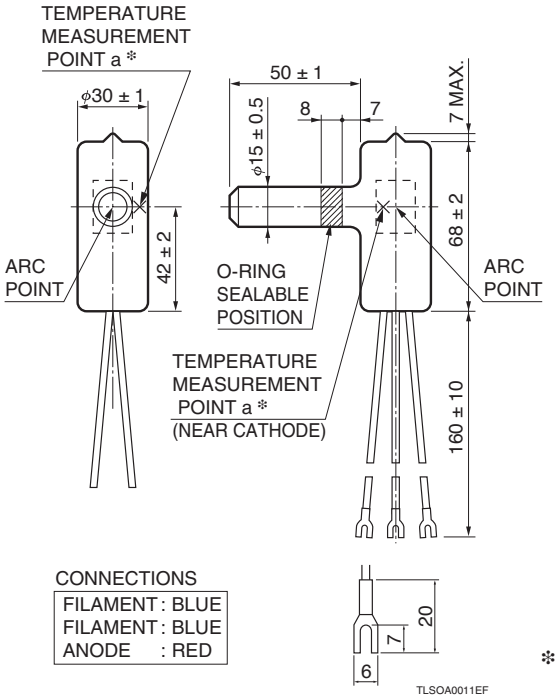
SPECIFICATIONS

Parameter		L7293	L13301	Unit
Spectral distribution		115 to 400		nm
Window material		MgF_2		—
Power consumption (Max.)		30	8.5	W
Aperture diameter (Arc point)		ϕ1.0		mm
Guaranteed life Ⓐ		2000	1000	h
Output stability at 230 nm	Drift (Max.)	±0.3	±0.25	%/h
	Fluctuation (p-p)(Max.)	0.005		%
Weight		41	11	g
Storage temperature range		0 to +60		°C
Storage humidity range		Below 85 % (no condensation)		—

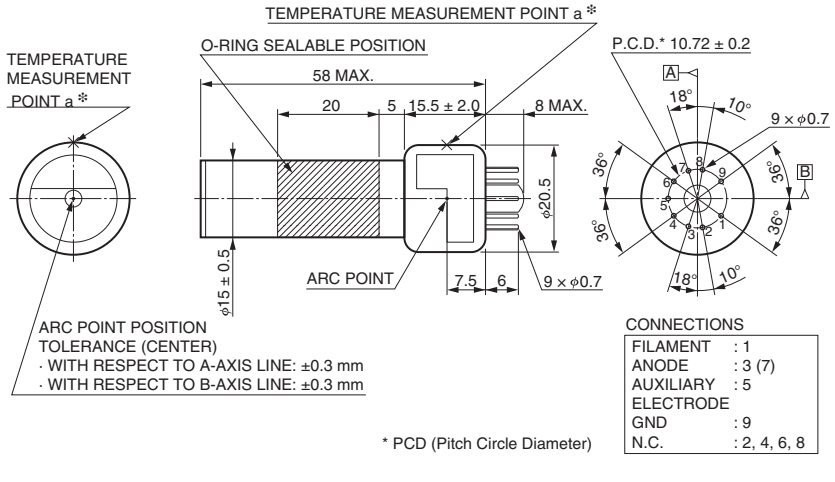
ⒶLife end is defined as the time when the light output intensity at 230 mm falls to 50 % of its initial value or when output fluctuations exceed 0.05 % (p-p).

DIMENSIONAL OUTLINES (Unit: mm)

● L7293



● L13301



❇ Optimum operating temperature range is 245 °C to 290 °C (L7293) 240 °C at maximum (L13301). Please contact us when you have any question on measurement.

LAMP INSTALLATION EXAMPLE

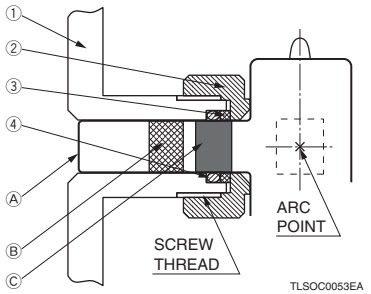
When installing a photoionization deuterium lamp to a vacuum device, the method shown below can be used. Since the graded glass seal section and MgF_2 window of the lamp are mechanically weak, design the installation method so that excessive force will not be applied to those sections of the lamp. Wear protective gloves to prevent it from touching your bare hands when you handle it.

Deuterium lamps emit UV light harmful to human body. In addition, UV light generates ozone when it irradiates in an atmosphere containing oxygen. Therefore, please be sure to take a measure against UV leakage and do adequate ventilation when UV light generates ozone. Please feel free to contact us for more information about how to use deuterium lamps.

● L7293

Example of lamp installation to vacuum device (L7293, L7293-50)

①VACUUM FLANGE
②CLAMP SCREW
③O-RING
④SPACER
ⒶMgF_2 WINDOW
ⒷGRADED GLASS SEAL SECTION
ⒸO-RING SEALABLE AREA



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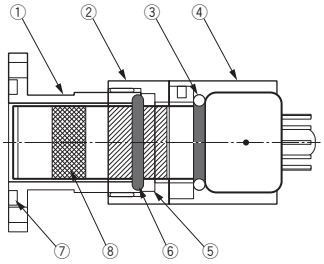
● L13301

Example of lamp installation to vacuum device (L13301)

①VACUUM FLANGE (HX-VF02)
②SEALING CAP (HX-GP01)
③O-RING P15 (STOPPER)
④LAMP COVER (HX-LH01)
⑤O-RING BLOCK (HX-OC01)
⑥O-RING P15 (VACUUM SEALING)
⑦GROOVE FOR P20 O-RING (VACUUM SEALING)
⑧GRADED GLASS SEAL SECTION



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LAMP POWER SUPPLIES

We also provide power supplies specifically designed for use with our deuterium lamps.

The electrodes and gases in deuterium lamps wear out over time in operation, so when a lamp is approaching the end of its life, it is likely to fail to light up. Our lamp power supplies use the lighting method optimized for deuterium lamps, allowing operation with reliable lighting until the end of lamp life.

We also have C10707 and M9596-2510 demonstration devices. Please feel free to contact us for more information.

Left: C10707, Center: M9596-2510, Right: C9598-2510

●SPECIFICATIONS

(Characteristics are measured at 25 °C ± 1 °C after 30 min warming up.)

Parameter			C10707	M9596-2510	C9598-2510	Unit
Input	Input voltage		AC 100 V to 240 V (When used with the supplied AC/DC adapter)	DC 24 V ± 2.4 V	AC 100 V to 240 V (100 V/200 V Auto switching) Single phase 50 Hz / 60 Hz	—
	Input current (Max.)		0.4	2	0.9	A
Output	Output voltage (DC)	With load (Typ.)	135	80	80	V
		Without load (Min.)	250	200	200	V
	Output current (DC)		50 ± 5	300 ± 30	300 ± 30	mA
	Warm-up time		25 ± 5	Approx. 20	Approx. 20	s
	Trigger voltage		Approx. 230	Approx. 600	Approx. 600	V peak
Dimensions (W × H × D)			70 × 42.5 × 112.5	100 × 35 × 118	117 × 107 × 200	mm
Cooling method			—	0.3 m^3/min	—	—
Operating ambient temperature			0 to +40			°C
Storage temperature			-10 to +60			°C
Operating ambient / storage humidity			Below 80 (no condensation)			%
Weight			Approx. 0.25	Approx. 0.18	Approx. 2.1	kg
Conformance standard	EN (CE marking)		—	Yes	Yes	—
	UL (File No. E249677)		—	Yes	—	—
Suitable lamp (Type No.)			L13301	L7293	L7293	—

LAMP UNIT

Hamamatsu also provides lamp units that include a light source, housing, and power supply. These lamp units can be easily put to use by just preparing a vacuum flange. This eliminates the time and effort needed for optical and electrical designs and device fabrication.
Demo units are also available to help you attempt simple photo-ionization using a deuterium lamp.

Left: L12542, Right: L11798

Parameter	L12542	L11798
Major features	Large irradiation (neutralizing) area	High power
Light output (relative to L13301 light output)	10	20
Housing	Accessory	
Vacuum flange	Option (See below)	
Power supply	Accessory	

●SPECIFICATIONS

Parameter	L12542	L11798	Unit
Spectral distribution	115 to 400		nm
Window material	MgF_2		—
Power consumption (Max.)	90	200	VA
Aperture diameter (Arc point)	ϕ1.0	ϕ0.6	mm
Guaranteed life Ⓐ	2000	1000	h
Cooling method	Air cooling by cooling fan		—
Weight	2.3	3.8	kg
Operating temperature range	+10 to +40		°C
Storage temperature range	0 to +60		°C
Operating humidity range	Below 80 % (no condensation)		—
Storage humidity range	Below 85 % (no condensation)		—

ⒶThe life end is defined as the time when light output falls to 50 % of its initial intensity value while operated under our measurement conditions.
Note that the light output attenuation depends greatly on the environment of the vacuum equipment.

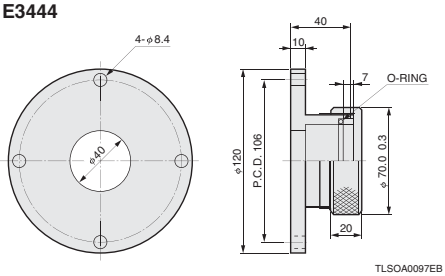
VACUUM FLANGE

●SPECIFICATIONS

Parameter	E3444	E3444-01	E3444-02
Sealing method	O-ring		
Flange	Regular	JIS VF50	ICF114
Mount flange	—	JIS VG50	ICF114
Seeling force retention	1.33×10^{-4} Pa L/s or less (1×10^{-6} Torr L/s)		
Demo unit	Available		

●DIMENSIONAL OUTLINE (Unit:mm)

E3444



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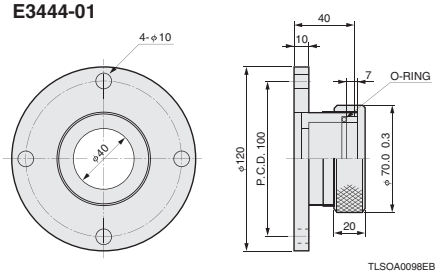
E3444-01



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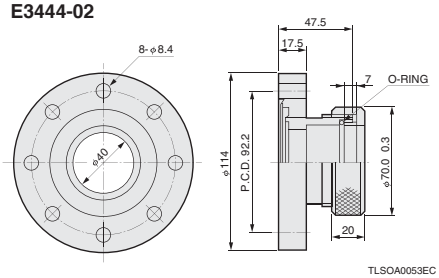
E3444-02



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* PCD (Pitch Circle Diameter)

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