

## IL7 150W Xenon Illuminator User Notes



### Overview

The Bentham IL7 Xenon source consists of 150W Xenon lamp with a dual-element lens (f/1 input, f/4 output) a precise match to the acceptance cone of the monochromator is achieved, thus maximising light transfer whilst minimising scattered light.

Although designed for use with Bentham's range of monochromators and spectrometer systems, these light sources can be readily incorporated into most optical and spectroscopic set-ups requiring highly stable, focused broadband illumination.

The Xenon lamp provides a higher UV output and less IR than the quartz halogen lamp, however the continuous spectrum is superimposed by unstable line emission which may not be desirable in some uses.

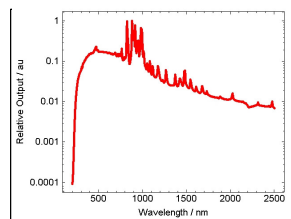
Lamp life is estimated at around 1000hrs use.

### Mechanical

The IL7 can be directly mounted (using four M3 screws) onto any Bentham monochromator, collimator, fibre optic bundle and other accessories. The Bentham 218 Optical Chopper can also be directly attached.

Should the unit be attached to a monochromator, it is recommended to position the two "feet" of the housing to bear

The IL7 can be used in conjunction with other Bentham sources using a dual or triple source changeover unit.



Relative spectral shape of Xenon lamp

### Lamp Operation

It is recommended to operate the lamp from a constant current supply such as the Bentham 605/608; the required conditions are as follows:-

Source	Lamp Rating (W)	Current Supply (A)	Typical Operating Voltage (V)
IL7	150	8.500	~14

A starter is employed to initially drop a high voltage across the electrodes to establish the arc.

For correct lamp operation, the following should be observed.

- Ensure the correct polarity is respected at all times
- Ensure that the fan is connected at all times
- Do not touch bulb with bare fingers
- Do not run the lamp at a current lower than that at which it was calibrated
- The lamp requires approximately five minutes warm-up time

### Replacement Lamp

Bentham recommend the following replacement lamp:-

Lamp	Bentham Part No.	Manufacturer	Model
Xenon	19084	OSRAM	XBO 150W/ CR OFR

### Lamp Replacement

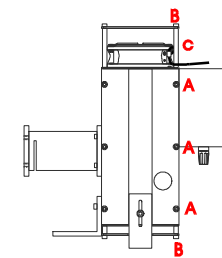
These notes detail the recommended procedure to follow in the replacement of the Xenon short arc lamp of a Bentham IL7 light source.

### CAUTION!

It should be noted from the outset, that the gas in such lamps are held under very high pressure, careless handling of the lamp could result in lamp explosion. In its transport and handling state, a protective plastic sleeve should be fitted around the lamp. This must, however, be removed before operation. It is of utmost importance that all persons in the vicinity during a lamp change wear protective eye-wear, as a precautionary measure. Ensure that the unit is switched off and disconnected from current supply unit (both lamp bias leads and fan connection)!

The procedure for lamp change follows:-

The IL7 Xenon light source housing is illustrated in figures 1a and b. The lamp itself is fixed to the back plate of the unit, the side facing the front of figure 1a (to the right wall of figure 1b). The part projecting from the rear of the housing is the lamp starter unit. It is therefore question of removing this rear wall to gain access to the lamp.



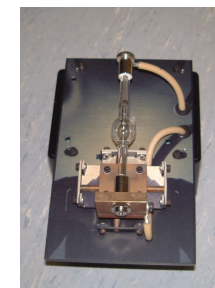
Lamp Side View

Lamp housing and access screws

Using a M2.5 Allen key, whilst keeping hold of the unit via the starter unit casing, remove the six screws, denoted A on either sides of the back wall of figure 1b. This permits completely removing the rear wall, containing starter unit and lamp, revealing the lamp as seen in figure 2.

It may be necessary to loosen any screws from the top/ bottom of the unit which may impede the removal of this rear wall. To do so, remove the four top screws, denoted B, using a M3 Allen key, to remove the fan plate, then loosen the rearmost of the four pillars denoted C. For the bottom of the unit, again using the M3 Allen key, loosen the rearmost screws, denoted B.

It may transpire that the screws on the sides of the unit are very difficult to remove. In such a case, recourse should be made, following the same procedure, to remove the front panel instead, although access to the lamp shall be rather more difficult in such circumstances.



Back wall/ starter unit removed to reveal lamp

Before handling the expired lamp, it is necessary to place over it its' protective sleeve. If you do not have a spare, it shall be necessary to use that of the new lamp (removal of protective casing from new lamp:- The protective cover can be removed by gently holding the plastic casing, releasing the clips at either end, and gently reposing the lamp on its packing receptacle).

Place the casing around the expired lamp, and replace the clips to hold it in place.

Inspection of the lamps reveal that at either end there exists a thread and thumb screw. The lamp is held in the IL7 unit by attachment to the lower brass plate, by the lamp thumb screw. The top screw connection is merely electrical.

Very gently, undo the thumb screw at the top-most end (positive) of the lamp to remove the fly lead, as shown over.

Should the thumb screw be difficult to turn, try applying further pressure whilst holding the metal sheathing just below the thumb screw. In no instance should you turn one electrode whilst holding the other electrode, else the glass shall be strained and the lamp liable to explosion.

Now, holding the lamp near to its' base (metal), undo the lower thumb screw. Beware that the brass plate does not have a thread, as soon as this screw is loose, the lamp will be no longer supported.

Should the thumb screw prove to be tight, it is suggested to gently use a pair of pliers or similar implement to aid its' undoing, again whilst holding the lamp by the metal sheathing corresponding to the electrode in question.

Remove the lamp from the housing and place beside the new lamp in the box receptacle.

If you have only one protective casing, remove this now from the old lamp and fit it around the new.

Gently undo the thumb screws from the new lamp to ready it for fitting.

The lamp polarity is such that the negative end is fitted to the brass plate, the positive end uppermost. The +/- signs can be found inscribed upon the electrode metal sheathing at the ends of the lamp. This can also be verified by inspection of the arc needles:- the positive end should have the thicker needle, the negative the thinner needle.

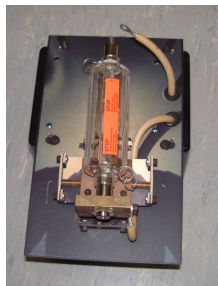
Ensuring the correct polarity proceed to fit the lamp into the lower brass fixture. Push the negative-side screw through the plate and use the thumb screw in its reverse sense to firmly attach the lamp to the housing . The thread in the thumb screw starts at the side of the largest radius, and ends inside the screw, towards the side of the smallest radius, attaching the screw therefore with the largest radius side toward the lamp ensures the best purchase of the lamp thread.

Very gentle use of a pair of pliers may be used but firm finger turning ought to be sufficient. Ensure again that whilst you are turning the screw, that you hold the lamp from its base-metal sheathing, to prevent wrenching.

Place the washer of the positive electrical connection over the lamp thread and fit the thumb screw again finger-tight, taking care again to hold the electrode metal sheathing.

Ensuring that the protective cover has been removed, gently replace the rear wall part in its position in the housing, and replace all side and bottom screws.

The lamp is now fitted, all that remains to do is an optical alignment of the lamp to the system.



### **Alignment**

Lamp alignment comes in two parts, lateral and vertical, and is performed by the rotation of plain-style brass alignment screws located at the interior of the unit.

### **Lateral Alignment**

Lateral alignment is performed by removing a plastic cap on the bottom left of the unit , to expose a hole as seen in figure 5, therein is to be seen the alignment screw in question.

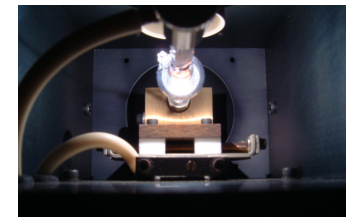
### **Vertical Alignment**

Vertical alignment is somewhat more difficult. It is necessary to reach an alignment screw positioned behind the lamp, and it is therefore necessary to remove the fan unit from the top of the lamp. This is performed, with reference to figure 1b, by removing the top screws B, removing the fan plate, removing the four pillars C, and finally placing the fan unit aside to permit access to the top of the housing.



### **Alignment Technique**

- Re-connect the power supply to the lamp, and the fan.
- Set the monochromator to zero order or to a fixed wavelength (via signal set-up in Benwin+, zero order defined as wavelength 0), dependant on whether or not the zero order signal saturates the detector.
- Using the output of the detector, read either via Benwin+ (monitor signal) or via the analogue dial on the 217 bin/display, adjust lateral and vertical screw positions in the search of a maximum signal.
- When obtained, replace fan unit and side cover.
- Leave lamp running for half an hour to stabilize before calibration or experimental use.



### **The Xenon Lamp**

The xenon short arc lamp comprises two electrodes sealed in a quartz envelope, in which is present xenon gas. The cathode is narrow, and is doped with another material to ensure that it reaches a high temperature to emit as much electrons as possible. The anode is much larger to withstand being inundated with electrons. The distance between the cathode and may be up to several mm. A starter is employed to initially drop a high voltage across the electrodes to "start" the arc.

In general the Xenon lamp provides a higher UV output and less IR than the quartz halogen, however the continuous spectrum is superimposed by unstable line emission which may not be desirable in some uses.

### **WEEE statement:**

Bentham are fully WEEE compliant, registration number is WEE/CB0003ZR. Should you need to dispose of our equipment please telephone 0113 385 4352 or 4356, quoting account number 135419.



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