

# Operating Instructions

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## Xe 900 450W Xenon Arc Lamp



Issue 2, June 2000



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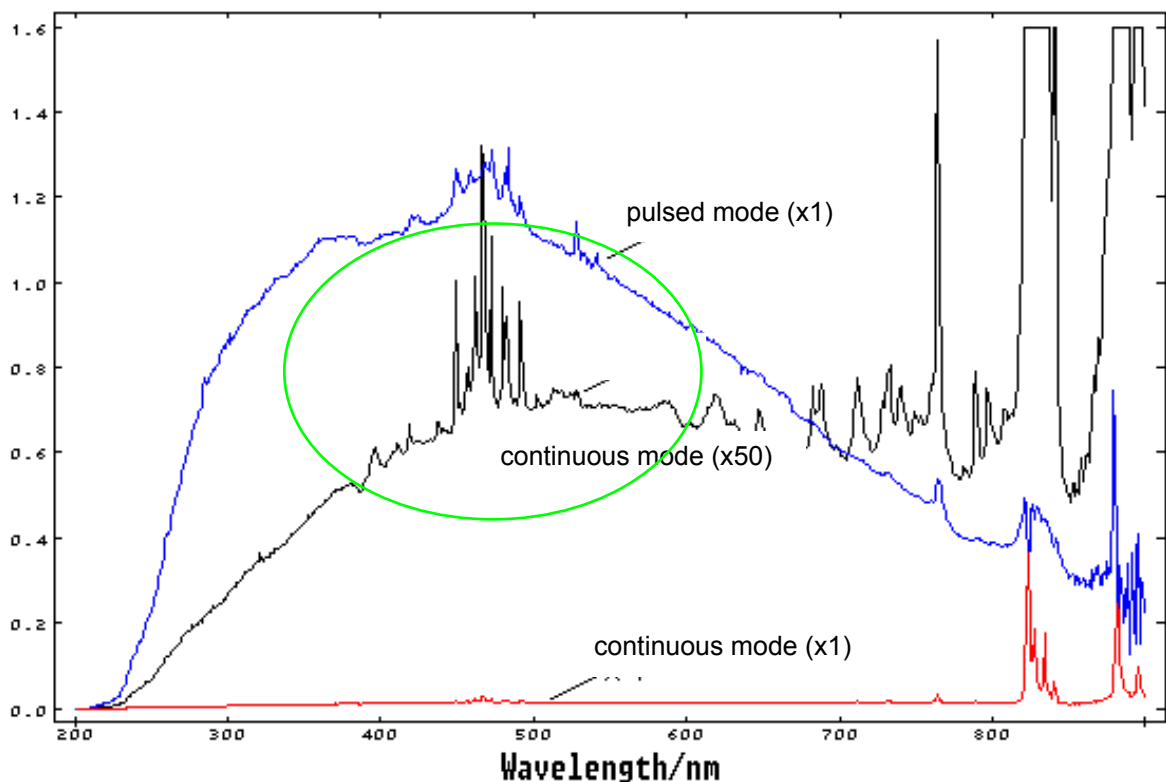


# 1. Introduction

## Xenon Arc Light Sources

Xenon arc lamps produce a continuous spectral distribution from 190 to 2600nm with intense lines between 800 and 1000nm. They are suitable for UV spectroscopy, sun simulation, dermatology, etc.

The Xe900 is a 450W xenon lamp which can be used both in the continuous mode and in the pulsed mode. (The pulsed mode requires the xP900 light pulser.) The spectrum generated by an ozone free xenon lamp in the range between 200nm and 900nm for both the continuous mode and the pulsed mode of operation is shown in the picture below.



## Lamp Housing

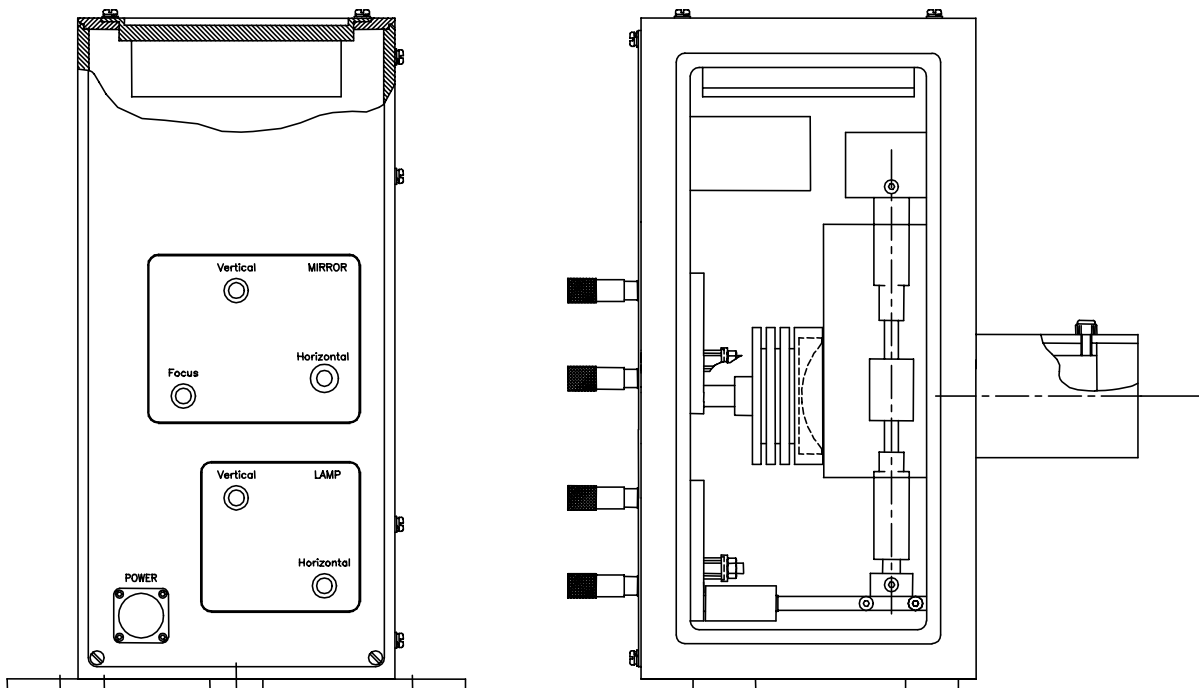
The lamp housing consists of a rigid high stability aluminium enclosure with the lamp igniter built-in to contain electromagnetic interference at source. As a result the power supply can be operated at a long distance from the lamp housing without impairing the ignition performance of the lamp. A de-ozoniser filter is fitted in the cooling ventilator assembly which permits the use of UV grade Xenon sources without the requirement for special ozone extraction facilities. The housing is also designed to withstand the possibilities of a lamp

explosion (due to their high operating pressures ca. 60 to 80 bar). The lamp holder follows the thermal expansion of the lamp and also makes lamp exchange a simple operation.

As standard a Spectrosil B condenser unit is fitted and covers the spectral range from 180 nm to  $\sim 3\mu\text{m}$ . The condenser is adjustable to allow an image to be formed from 150mm to  $\infty$  in front of the housing.

Using micrometer screws the lamp can be adjusted during operation in two orthogonal optical planes. An adjustable spherical rear reflector, also with micrometer screw adjustment, gives a 30% increase in optical output.

The housing is fitted with a four point mounting base plate.



## Power Supply

The power supply uses pulse width modulated switching operation and can supply power for lamps up to 500 W operation. The use of pulse width modulation techniques is energy efficient and the development of heat is minimal. Both lamp current and voltage can be monitored on the clear back illuminated liquid crystal display. Currents in the range 10 to 27 A can be set from the front panel control.

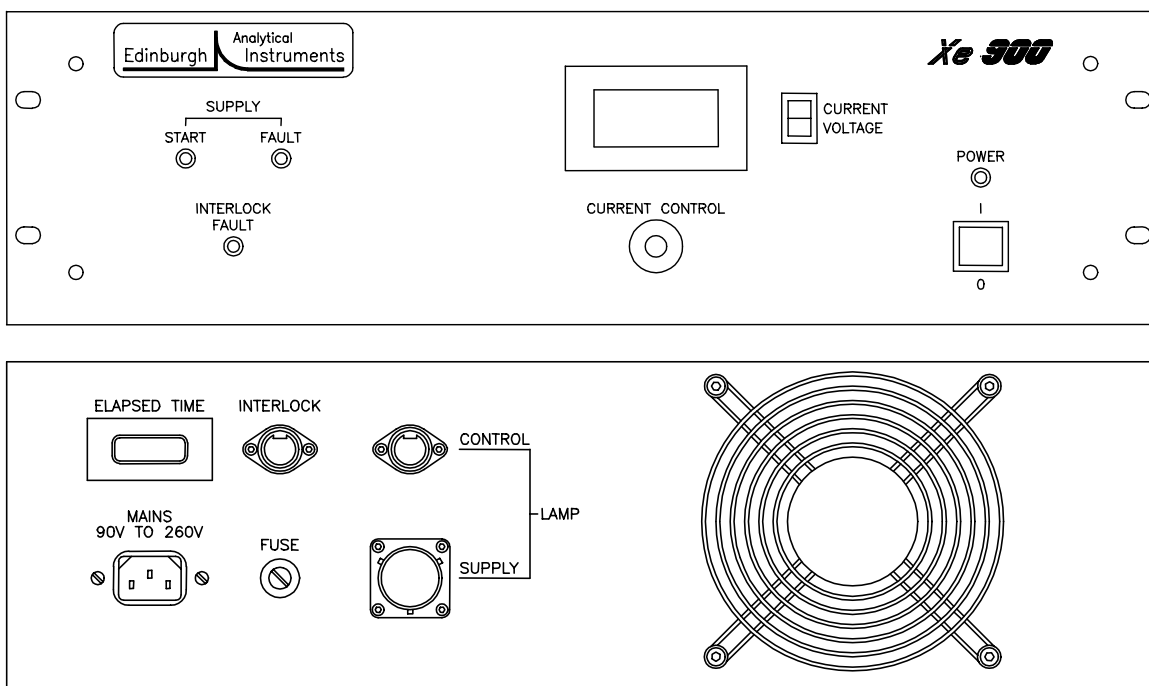
The lamp has an auto-start-up facility. After the power has been switched on the lamp undergoes several self-checks and set-up before the igniter initialises lamp operation. The lamp is ignited repetitively until lamp operation has been achieved. For the first second the

lamp will operate with full current (approx. 27A) to help to achieve stable lamp operation. After this period the current will set automatically to the value set up by the user on the front dial.

The power supply can also use an external reference voltage to modulate the lamp. In this case it can be used to keep the intensity of the lamp constant instead of the lamp current with stability of  $\leq 0.1\%$  possible.

The power supply is fitted with a safety interlock facility to remotely switch the lamp power supply current OFF in the event on external system error condition.

The power supply is fitted with an ELAPSED TIME counter for the total number of hours that the supply has been operational for. This feature allows direct observation of bulb life.







## 2. Transit and Packing

The delivery contains:

- Xe900 power supply,
- Xe900 head,
- power cable,
- mains cable
- xenon lamp
- interlock link plug
- two electrode adapter sockets

The two electrode socket adapters (of different size and shape for the two lamp electrodes) are usually packed in the xenon lamp bulb cardboard box.

For secure shipment the anode cable in the lamp head is "tie rapped" to the lamp housing and a protective pad is fixed in front of the rear reflector mirror. Refer to paragraph 3: Installation.

The xenon lamp should not be transported with the bulb fitted in place as vibrations might cause damage to the light bulb (immediately or later during operation)



## 3. Installation

### 3.1. Fitting the Xenon Lamp

The Xenon short arc lamps should be installed with the positive (+) pole facing upwards. The lamp will not work properly if it is installed in the wrong direction. The socket adapter rings supplied have different inner diameters and therefore mounting the lamp wrong way round is principally impossible.

**Warning**

Xenon lamps contain gas at high pressure and the user should wear appropriate protective clothing before handling the bulb.

Please ensure that the glass surface of the bulb is not touched.

If the lamp becomes soiled then de-vitrification of the glass surface may occur reducing bulb performance. To clean the soiled area, wipe the bulb with a soft cloth soaked in alcohol.

1. Ensure that the lamp power supply is switched OFF and disconnected from the lamp housing by removing the power connector at the rear of the housing.
2. Remove the access cover on the side of lamp housing by removing the six M3 screws.
3. Open the lamp protection cage of the xenon lamp housing (removal of one M4 screw).
4. Turn the fine threaded adjustment screw marked "FOCUS" anti-clockwise to release the protective plate in front of the spherical mirror which is used during shipment. Remove the protective plate from the lamp head and discard it.
5. With the bulb still in its protective enclosure, connect the socket adapters for positive and negative electrodes to the lamp bulb. Tighten the M4 screws securing screws on each socket. While tightening the socket adapter rings ensure no tension is made to the quartz bulb. Hold the bulb only on the metal electrode which is currently fitted with the adapter ring.
6. Connect the (red colour) power cable to the top of the positive electrode adapter ring (one M4 screw). Ensure a good electrical contact is made.
7. Remove the protective enclosure from around the bulb and place the bulb within the lamp housing.
8. Connect the bottom electrode socket to the lamp bulb holder and tighten the two M4 screws to ensure a good electrical contact is made.

9. Using the “VERTICAL” and “HORIZONTAL” fine threaded adjustment screws check the free movement of the light bulb and then set the bulb position such that it stands fairly upright.
10. Close the door of the protective cage and fix it using the M4 screw.
11. Replace the access cover and fix it using the six M3 screws.

### **3.2. Electrical Interconnections**

1. Connect the Xe900 power supply to the lamp housing using the 19 way Metalok connecting cable. The connection is from “SUPPLY LAMP” on the power supply unit to “POWER” on the lamp housing.
2. Connect the INTERLOCK loop back plug to the “INTERLOCK” 3 pin DIN socket. If this connector is not in place the lamp supply will not operate and the “INTERLOCK FAULT” indicator will illuminate on the front panel.
3. Connect the power cord IEC plug to the “MAINS 90 V to 260 V” socket. The power supply senses the electrical supply voltage and automatically adjusts for correct operation.

### **3.3. De-Ozone Filter**

The **De-Ozone Filter** should be regularly checked (about once per year) for blockage by dust. If an ozone generating lamp is used replacement of the de-ozone filter may be required more often. Replacement filters can be purchased from the vendor.

The de-ozone filter is mounted in the fan unit on top of the lamp housing. It may be easily replaced by first switching the lamp system OFF and then removing the top of the lamp housing (six M3 screws). The fan unit needs to be disassembled to access the de-ozone filter.

## 4. Operation

Although the power cable connecting the lamp head to the power supply is heavily shielded to avoid any interference to other electrical equipment when starting the lamp, it is recommended that **the lamp system is switched ON prior to the other equipment.**

The following adjustments generally do not need to be made regularly. If the lamp has been correctly set-up the adjustments will maintain until re-adjustment is required, e.g. after xenon lamp replacement.

### 4.1. Switching ON the Lamp

Before switching on the lamp system ensure that:

1. the bulb is correctly installed;
2. the electrical connections are correctly made;
3. the fans on both the power supply and lamp housing are not covered and that air ventilation is not hindered;

The lamp system should then be ready for operation:

Switch ON the lamp power supply by switching the power switch to the ON position. At this time the green power ON lamp will illuminate. **Approximately 15 seconds** later the xenon lamp will ignite.

If ignition has been successful the current meter located on the front panel should read about 27 A for about 1 second before setting to the level adjusted prior by the 10- turn potentiometer on the front panel. If the xenon bulb does not strike, the power supply will retry to ignite the lamp for a maximum retry period of 2 seconds. If after this period the lamp has not switched on the supply fault indicator will illuminate (refer to "Trouble Shooting").

### 4.2. Current Control Adjustment



The operating current of the bulb can be adjusted by turning the control potentiometer located underneath the current/voltage display. The VOLTAGE/CURRENT switch next to the display should be set for current monitoring and the readout then directly displays the operating current.

For an Osram XB0450W bulb the operating current is usually **24 to 25 A** when the lamp is operated in the continuous mode or approx. 12A when the lamp is operated in the simmer mode (for pulsed applications – requires the xP900 xenon lamp pulser).

### 4.3. Condenser Lens Adjustment

The lamp housing contains a fused silica condenser unit of 55 mm focal length. It can be moved in the lens tube by  $\pm 30$  mm by releasing the locking screw on the top of the lens tube and sliding it either towards or away from the lamp. Please note that in normal lamp operation this lens tube may become very hot and could result in skin burns if touched.

For initial alignments it is useful to move the lens assembly fully away from the lamp. This allows observation of the arc (and the image of the arc by the rear reflector) on a screen in front of the lamp (see next paragraph).

### 4.4. Lamp and Rear Reflector Adjustment

The lamp and rear reflector positions may be adjusted using the external "VERTICAL" and "HORIZONTAL" adjustment screws for the "LAMP" and "MIRROR" control. In addition the rear reflector has a focus adjustment ("FOCUS").

1. Adjust the lamp condenser lens to give an image of the arc at a distance of about 2 m.
2. Adjust the lamp "HORIZONTAL" and "VERTICAL" micrometers to centre the image. [Generally two images of the arc should be seen on the screen: one directly generated by the condenser lens assembly and one (inverted) generated by the rear reflector (and by the condenser). When the horizontal adjustment screw of the lamp is turned both images move. If only horizontal adjustment screw of the reflector is turned only one image moves.] For the adjustment it might help to move the inverted image from the rear reflector deliberately out of the centre (using the horizontal adjustment of the reflector) in order to centre the direct arc image first.
3. Adjust the "MIRROR HORIZONTAL" and "VERTICAL" fine threaded screws to locate the inverse image of the arc directly on top of the direct arc image.
4. Adjust the "MIRROR FOCUS" control such that both direct and reflected images have the same dimensions.

### 4.5. Switching OFF the Lamp

To switch OFF the lamp system, switch the power switch on the power supply to the OFF position.

Please note that the lamp housing becomes hot during operation and remains hot for a period of ca 15 minutes after it is turned OFF. When it is hot, do not touch it with your bare skin or else you could be burned.

In the interests of Xenon bulb life, the lamp should not be restarted frequently.

A hot xenon lamp is prone to start difficulties.

## 5. Trouble Shooting

### 5.1. The Lamp Does Not Start

#### **Interlock Fault and Supply Fault Indicator ON**

The interlock fault indicator will always be on together with the power fault indicator (but the power fault indicator can be on without the interlock fault indicator).

The lamp has three interlocks:

1. A temperature interlock sensor in the lamp head
2. A temperature interlock sensor in the lamp power supply
3. An external interlock facility

If one of these three interlocks is broken the lamp will not start and the interlock fault indicator will be on.

If both the lamp head and the power supply are cold, then the most likely fault is the external interlock. Check that the external interlock. If only the link plug is fitted to the back of the power supply, ensure it is connected properly.

If the external interlock link is established and the problem is still not resolved contact Edinburgh Instruments service department.

#### **Supply Fault Indicator ON**

If the Supply Fault indicator comes on within the first 15 seconds after switching the lamp on (before attempting to ignite the lamp, which is associated with an acoustical noise) then the most likely fault is an internal supply fault in the lamp power supply.

Switch the lamp off, disconnect the power supply from the mains, and open up the power supply (4 screws on either side of the front panel). Check fuses F1.... F6 (Refer to paragraph 5.3 for fuse ratings.)

If a fuse brakes repetitively, please contact the service department of Edinburgh Instruments.

If the fuses are all intact, then either the mains voltage supplied to the power supply is below 90Vac, or the voltage across the xenon bulb electrodes exceeds 21V. (A heavily used xenon bulb with a too big gap distance could be the reason.)

## 5.2. Lamp Fails During Operation

The most likely cause for this is a broken light bulb. The light bulb can either fail by explosion or by a small gas leak. An explosion is more likely.

An explosion is usually associated with a “big bang”. There is a chance that the bulb explosion might have caused damage to the rear reflector and/or the condenser lens. Replace the xenon bulb and if applicable other components.

## 5.3. Fuse Replacement

The lamp power supply is fitted with a mains fuse (accessible on the rear of the unit) and six fuses for individual bias voltage supplies internally. There is no fuse in the xenon lamp head.

The fuse ratings are as follows:

Mains	6.3A, A/S
FS1	250mA, A/S
FS2,3	3.15A, Q/B
FS4,5,6	500mA, A/S

Before changing fuses ensure the lamp is switched off and disconnected from the mains.



## 6. Technical Specification

### General

#### Xe900 Lamp Head

Maximum power:	500 W
Max. Lamp Length:	260 mm
Adjustment:	2 orthogonal planes with micrometer screws
Rear Reflector:	Spherical front surface with adjustment in 3 orthogonal planes
Depth of Focus:	150 mm to $\infty$
Built-in igniter:	25 kV HF
Cooling:	By fan exhaust with built in de-ozoniser filter.
Dimensions:	170W x 200D x 370H mm
Weight:	7 kg

#### Xe900 Power Supply

Supply:	90-260 V, 50-60Hz, 900 W
Output Power:	500W
Current range:	10 to 27 A (via 10 turn potentiometer)
Voltage:	12-25 V
Current Regulation Accuracy:	0.5 %
Stability (after warm-up):	0.2 %
Display:	3½ digit back lit LCD. Current or Voltage selectable.
Starter:	Automatic lamp strike
Dimensions:	3U high 19" rack
Weight:	9 kg



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## 7. Warranty

- 1 a) The Company guarantees the equipment forming the subject of the contract/quotation against defective materials and workmanship for a period of one year from the date of delivery to the Purchaser.
  - b) In the case of sub-assemblies of equipment not manufactured by the Company, but incorporated in the equipment ordered, the Purchaser will be entitled only to the benefit and/or limitations of any guarantee given by the makers of such assemblies.
  - c) In no event shall the Company be liable for any consequential loss or damage arising from failure of the equipment under warranty.
  - d) At the end of the one year period referred to herein, all claims upon all liability of the Company shall be absolutely at an end.
- 2 a) The Company also warrants that the equipment conforms to specifications contained in current brochures or to extra specifications confirmed in writing at the time of order acknowledgement.
  - b) No warranty is made or implied as to the suitability of any equipment for the Purchaser's intended use beyond such performance specifications as form part of the contract.
3. The purchaser warrants:
  - a) That he will carefully examine and list all parts of the equipment supplied by the Company and notify the Company in writing of any shortage, defect or failure to comply with the contract, which is or ought to be apparent upon such examination and test, within 48 hours of the equipment being delivered to or collected by the Purchaser.
  - b) The equipment will be operated in accordance with the instructions and advice detailed in the appropriate operating instructions manual, or any other instructions which may be provided by the Company. The Company shall not be held responsible for any defect arising from the Purchaser's failure to comply with these recommendations and instructions or from damage arising from negligence or exposure to adverse environmental conditions.
4. The warranty is effective when:
  - a) Any defects in the equipment supplied are notified immediately by the Purchaser to the Company.
  - b) The equipment is returned to the Company at its Edinburgh premises, transportation and insurance prepaid, and undamaged by the failure to provide sufficient packaging.
  - c) The Purchaser has made payment in full for the contract in accordance with the Company's normal trading terms, ie. 30 days from date of invoice.
5. The warranty covers:
  - a) Engineer's time costs during inspection and repair.
  - b) Any materials or components, which require to be replaced.
  - c) Return carriage costs to the Purchaser
6. However, if the Purchaser requests a service engineer to carry out the necessary inspection and repair of the equipment covered by the warranty on site, the Purchaser will be liable, at the Company's discretion, for:
  - a) Engineer's travelling time costs.
  - b) Engineer's travelling and accommodation expenses.

The timing of the inspection and repair of the equipment will be determined entirely at the discretion of the Company.



## 8. CE Declaration of Conformity



Manufactured by: Edinburgh Instruments Ltd.  
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Kirkton Campus  
Livingston  
EH54 7DQ, United Kingdom  
Tel.: + 44 (0)1506 425300  
Fax.: + 44 (0)1506 425320

Applicable Standards: Generic Immunity EN 50082-1 : 1992  
Generic Emission EN 50081-1 : 1992  
Electrical Safety Standards EN 61010-1 : 1993

**Edinburgh Instruments Ltd. certify that this equipment conforms with the protection requirements of the above Directives.**