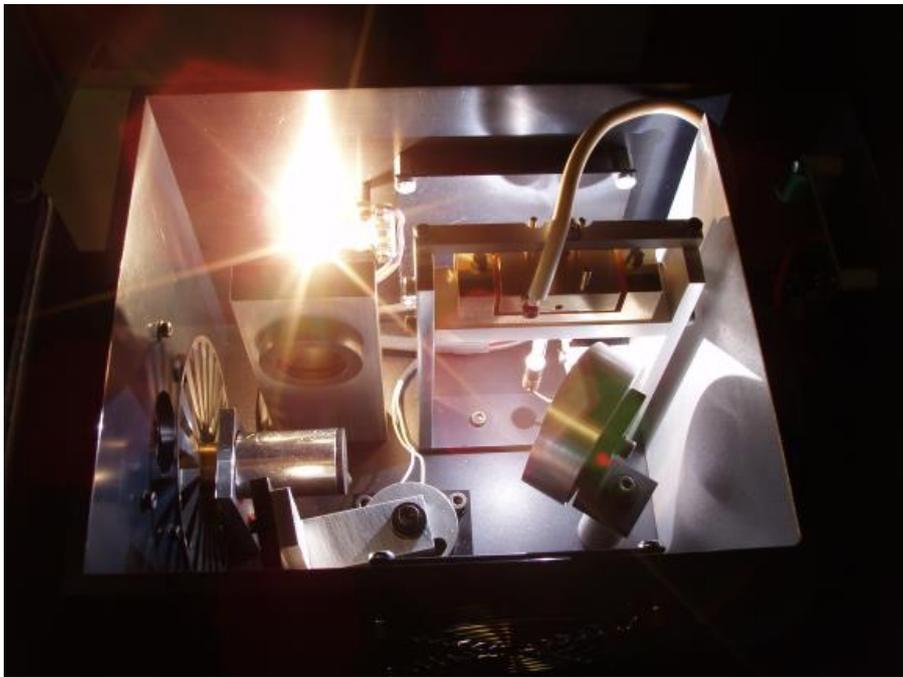




ILD-Xe-QH
Light Sources



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1. Introduction

The ILD-Xe-QH series of dual light sources combines a xenon and quartz halogen lamp in one housing to cover the spectral range 250-2500nm, thereby benefiting the high UV-Visible output of the xenon lamp and the high stability of the QH lamp and avoiding the instabilities of strong lines emissions.

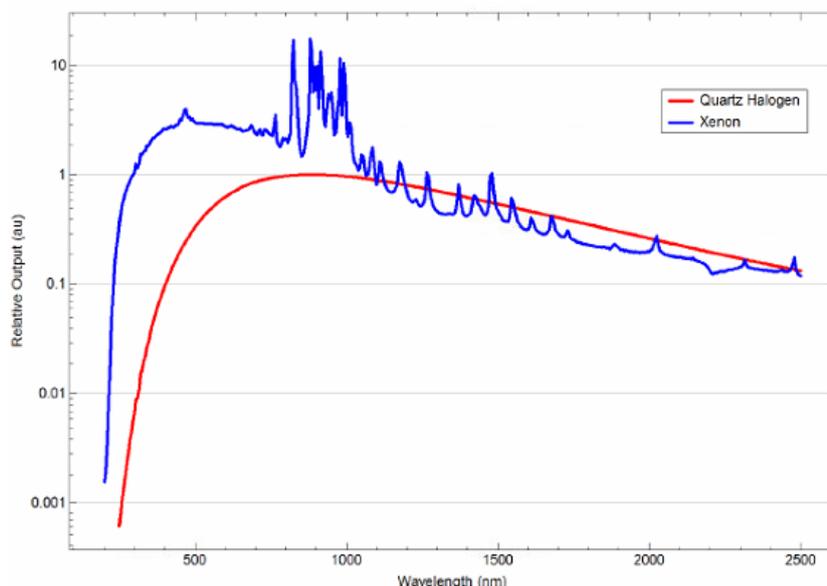


Figure 1: Relative spectra of the Xe and QH lamps

Please be aware that there are several models of the ILD-Xe-QH available with slight variations. Please take this into account when using this manual. The different models and their individual specifications are listed below:

Model	Specification
ILD_75E_QH *	Dual Light Source, 75W Xe, 100W QH
ILD_XE_QH_24_0001	Dual Light Source 100W Xe 150W QH with 24V SAM
ILD_75E_QH_CHOP	ILD_75E_QH with Optical Chopper
ILD_75E_QH_CHOP_ARREST *	ILD_75E_QH with Arrestable Optical Chopper
ILD_75E_QH_CHOP_ARREST_0001	ILD_75E_QH_CHOP_ARREST with rear reflector
ILD_75E_QH_CHOP_ARREST_QC	ILD_75E_QH_CHOP_ARREST with quick change adaptor
ILD_75E_QH_CHOP_ARREST_QC_YAG *	ILD_75E_QH_CHOP_ARREST_QC with YAG window
ILD_HF-LF_CHOP *	ILD_75E_QH with HF LF Arrestable Chopper

ILD_HF-LF_CHOP_CAF2 *	ILD_HF-LF_CHOP with CaF2 lens
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* denotes 12V and 24V SAM available

2. Mounting the ILD-Xe-QH to Bentham Monochromators

NOTE: please wear protective clothing as described in section 5 when removing the top of the monochromator

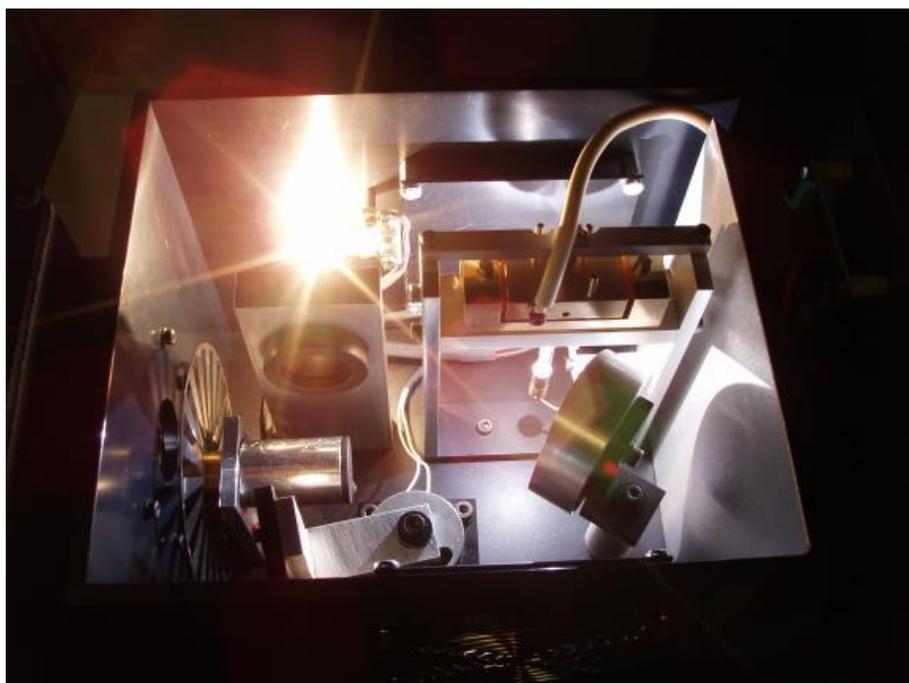


Figure 2: ILD-Xe-QH mounted to the entrance of a monochromator

To mount the ILD on a monochromator, remove the lid of the ILD (6 x M2.5 screws) and then use the included M3 screws and washers to fix the ILD (from the inside) to the monochromator slits. If securing an ILD-HF-LF source to the monochromator use the 2 button screws in the holes nearest the HF-LF chopper and the 2 cap head screws on the holes furthest from the HF-LF chopper.

With ILD sources that have a quick change (QC) adaptor the sources can be installed or uninstalled quickly by sliding them on or off the adaptors on the monochromator. Once they have slid on to the mounts, the M4 screws on the side of the adaptor should be tightened to secure the source in place.

Once the source is securely fixed to the entrance slit of the monochromator then the feet should be adjusted to support the rear of the source.

3. Operation

When connecting the lamps to power supplies please ensure the correct current is used. The connections to be made are:

1. Red/Black wires connect Xe lamp to 610 PSU, set at 5.4A (75W lamp) or 7.2A (100W lamp)
2. Red/Black wires connect QH lamp to 610 PSU, set at 8.5A (100W lamp) or 6.3A (150W lamp)

3. 3-pin cable connects with fan connector on back of ILD with fan output on either 610 PSU
4. 3-pin cable connect SAM connector on back of ILD with SAM connector on monochromator
5. Amphenol cable (5 or 7 pin connector) connects back of ILD with 218 chopper module
6. Connect the DC chopper to the LEMO connector on the module

NOTE: please ensure the mono is switched off when connecting the DC chopper

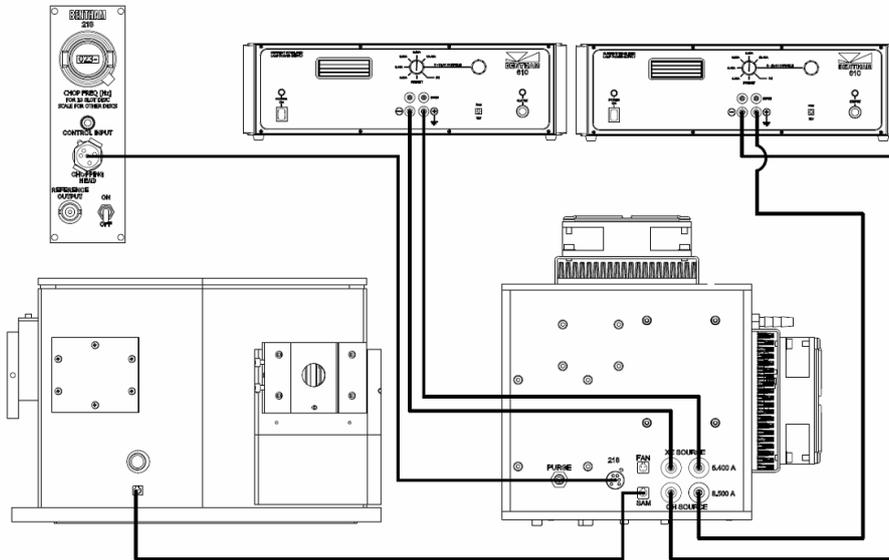


Figure 3: Connections for the rear of the ILD-Xe-QH

As previously stated, the ILD-Xe-QH uses a 75 W xenon lamp and a 100W quartz halogen (QH) lamp. Typically, these will be powered using Bentham 610 Constant Current Power Supplies. A current of 5.4A and 8.5A is needed to power the Xe and QH lamp respectively.

A computer controlled, solenoid-based swing away mirror allows the selection between light sources. This can be used either to select one light source to use for the entirety of a scan or switch sources at a preselected wavelength. If the latter is chosen, then this can either be setting in the attributes (*.atr) file if using the SDK or using the Swing Away Mirror (SAM) menu in BenWin+.

```

entrance
  settle time = 0
  settle time,1 = 0
  initial state = 1
  switch wavelength,1 = 0.000000000000000E+0000
  state,1 = 1
  switch wavelength,2 = 7.000000000000000E+0002
  state,2 = 0
  deflect = Deflect
  no deflect = No Deflection
  move at each wavelength = 1
end

```

Figure 4: Settings for the ILD-Xe-QH seen in the configuration file, with a switchover of 700nm from the Xe to the QH lamp

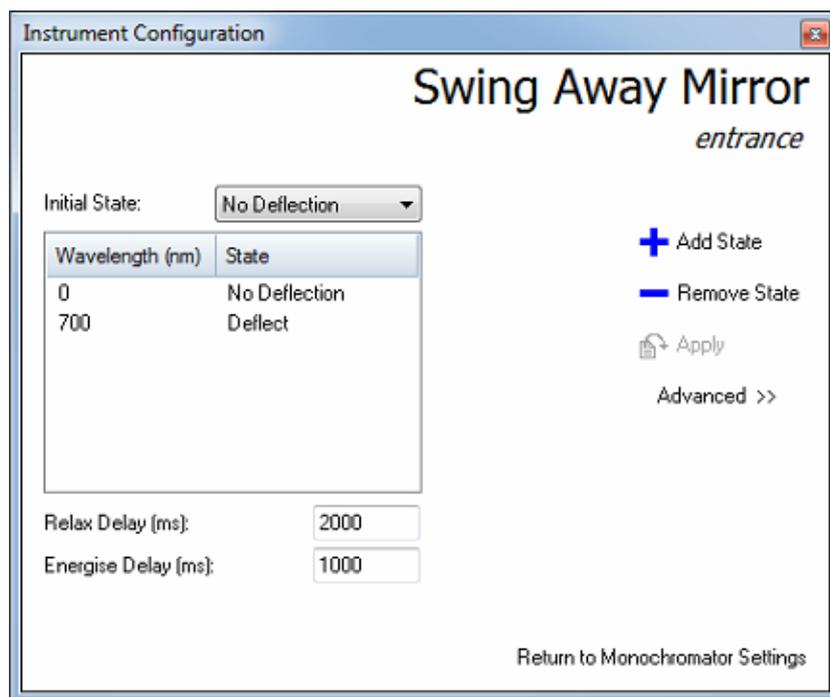


Figure 5: BenWin+ window showing the settings for the ILD-Xe-QH, with a switchover wavelength of 700nm from the Xe to QH lamps

4. Replacing and Aligning Lamps

NOTE: please wear protective clothing as described in section 5 when removing the top of the monochromator

The Xe lamp should be changed if it fails or when it has reached 87.5% of its original output. The QH lamp needs to be changed when it fails or when the voltage across the lamp changes by more than ~2-3V from the nominal voltage. The lamps used in the ILD-Xe-QH sources are:

Lamp Type	Power (W)	Current (A)	Manufacturer	Model Number	Lifespan (Hrs)
Xenon lamp	75	5.4	Ushio	UXLS75XE	2000
	100	7.2	OSRAM	XBO 100W OFR	500
Quartz Halogen lamp	100	8.5	OSRAM	HLX64623	2000
	150	6.3	OSRAM	HLX64640	2000

4.1 Xenon Lamp Replacement

- Remove the lid of the dual light source by removing the 8 screws that hold the lid onto the source, the lid can then be removed
- Undo the grub screw that holds the top of the bulb in the brass holder. This will release the top of the bulb



Figure 6: Grub screw that releases the top of the xenon lamp

- Gently pull the bulb out of the brass holder and place it so that the top rests on the floor of the source, by the xenon mirror. Now undo the screw that holds the base of the bulb to the main support
- The bulb can now be removed from the source entirely. Rest the bulb on a soft surface and gently release the wired collar from the base of the bulb
- The new bulb can now be inserted following the reverse procedure. Ensure that polarity is observed, and that the collar is placed onto the correct end of the bulb



Figure 7: Remove this screw to remove the cable connecting the xenon lamp

4.2 Alignment of Xenon Lamp

- The system should be started up in reflection mode (using the 498 and 496), but with the silicon detector (DH-Si) connected rather than the sphere and the mirror which deflects the beam towards the sphere out the way so that the beam falls onto the DH-Si.
- Now the system is set so that the probe beam strikes the silicon detector. To do this the lock-in amplifier page is opened by opening the Instruments → Lock in amplifier page from the top of BenWin+. The wavelength is set to 555nm and the “Start” button is pressed so that the probe beam is falling onto the DH-Si. There will now be values in Channel 1, Channel 2, theta and resultant.
- The bulb can now be aligned until this resultant value is as high as possible. There are 2 alignments to be performed on the bulb which should be repeated until the resultant is as high as possible.

The 2 alignments are the height of the bulb and the tilt of the bulb. These 2 are controlled in the following way.

Height: At the top of the light source is a central screw held in place with a nut onto the central aluminium bar (red circle). This nut can be loosened so that an Allen key can be inserted in the top of the grub screw. As this grub screw is rotated the bulb will be moved vertically in the mount. The resultant value should be watched and the height of the bulb adjusted until this is a maximum value.

Tilt: There are three other grub screws present which screw directly into the brass block (blue circles). Each of these adjusts the tilt of the xenon bulb. Each of these should be adjusted so that a maximum resultant value is seen. It may be found that after all 3 have been adjusted, the first can be adjusted further to gain even more signal, therefore this process should be done iteratively until no more gain in signal can be achieved.

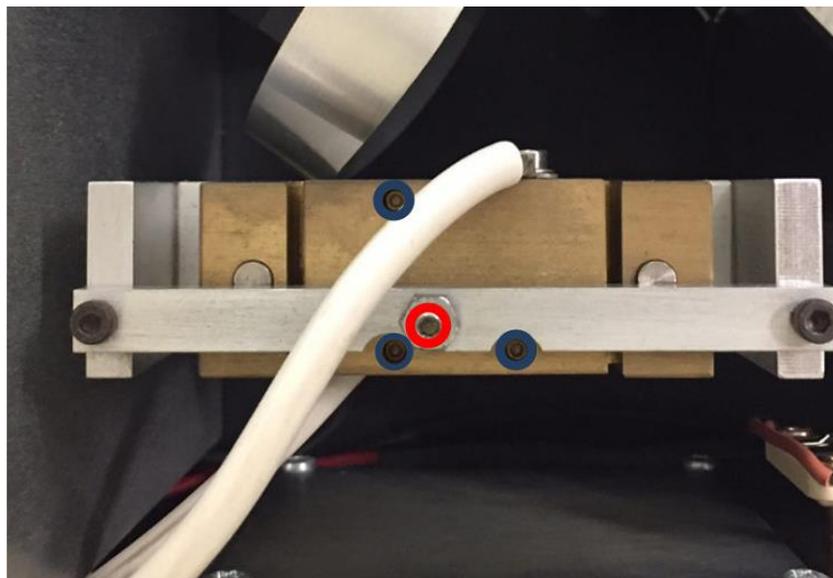


Figure 8: Grubs screws used to adjust the height (red) and tilt (blue) of the xenon lamp

Both the height and tilt alignments should be done iteratively until no more signal can be gained. The xenon bulb signal should finally be roughly 4 times higher than the Quartz Halogen signal. Once complete the nut on the height control should be tightened.

4.3 Quartz Halogen Lamp Replacement

Replacement of the quartz halogen (QH) lamp is a relatively easy procedure. Simply remove the expended lamp and replace with a new 100W lamp. There is no need to observe polarity on the lamp.

4.4 Alignment of the Quartz Halogen Lamp

The QH lamp should be fitted such that the image of the filament is located centrally on the monochromator slits.

Although under normal circumstances, there is no need to focus the lamp as this should already be set. However, should users need to, undoing the grub screw that secures the lens and then move this back or forward until the signal is maximised in the same way as the xenon lamp. If a rear reflector is fitted, this can be adjusted using the screws on the outside of the ILD and then maximising the signal as described in the Xe alignment section above.

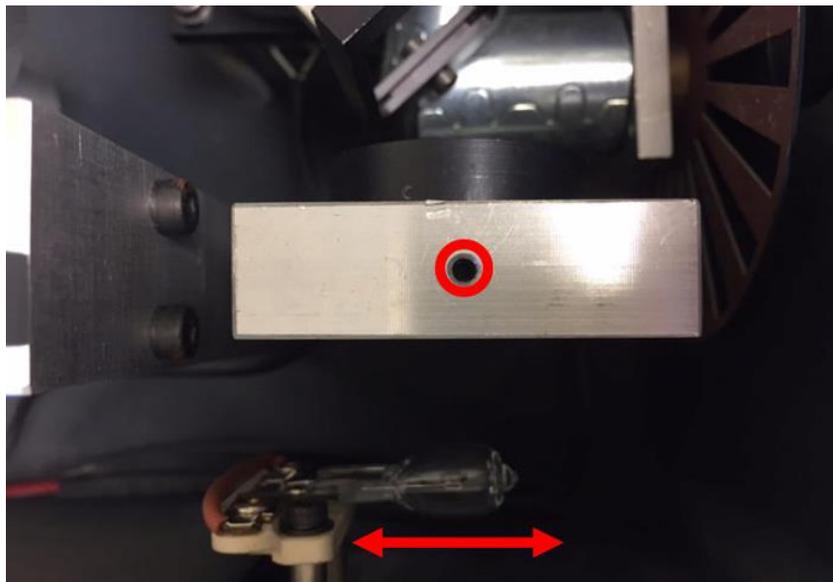


Figure 9: Moving the QH lamp left or right allows the user to centre the filament on the slits, while the lens allows focussing

5. Safety Warnings and Precautions

	Explosion risk: Xenon arc lamps could explode when not in operation causing serious injuries. It is critical to follow safety instructions carefully.
	Hot surface: Never touch the lamp when it is on, or soon after it has been turned off, as it is hot and will cause serious burns. Lamps should be allowed to cool for a minimum of ten minutes after the lamp is turned off.
	Face mask: Explosion risk, wear full face mask throughout lamp change procedure.
	Protective gloves: Explosion risk, wear gloves and cover sleeves throughout lamp change procedure.
	Protective apron: Explosion risk, wear protective apron throughout lamp change procedure.
	Notice: To avoid risk of explosion, xenon arc lamps should not be used beyond their rated service life.
	Caution: Always transport the lamp in the provided protective case or cover until installation.
	Caution: Ensure correct lamp used in accordance with consumables listed in section 2.7. Using a lamp above or below its rated current or voltage may cause the lamp to leak or burst.
	Caution: Install the lamp properly in the equipment, without twisting, bending or otherwise applying excessive stress to the lamp to avoid explosion or lamp degradation.
	Caution: Save the protective case or cover and packaging materials (box) for lamps that have been used to their rated service life. Use the protective case when disposing of the lamps.
	Caution: Affix the lamp in the correct polarity according to the lamp and fixture design.
	Caution: Place the protective cover if attached, on the lamp immediately before or after removal of the lamp.
	Caution: On disposal, inform the recycler that the lamp is filled with high pressure gas.
	Notice: Do not touch the diffraction grating of the TLS120Xe. If gratings inadvertently touched, do not attempt to clean, only further damage can result.

	<p>Notice: To avoid contamination of the inside of the unit, perform this operation in a dust-free environment.</p>
	<p>Notice: Do not touch quartz envelope with bare hands. If quartz envelope is dirty, wipe with alcohol-soaked clean cloth.</p>

6. Guarantee

Bentham Instruments warrants each instrument to be free of defects in material and workmanship for a period of two years after shipment to the original purchaser. Liability under this warranty is limited to repairing or adjusting any instrument returned to the factory for that purpose. The warranty of this instrument is void if the instrument has been modified other than in accordance with written instructions from Bentham, or if defect or failure is judged by Bentham to be caused by abnormal conditions of operation, storage or transportation.

This warranty is subject to verification by Bentham, that a defect or failure exists, and to compliance by the original purchaser with the following instructions. Before returning the instrument, notify Bentham with full details of the problem, including model number and serial number of the instrument involved. After receiving the above information, Bentham will issue an RMA reference number and provide shipping instructions.

After receipt of Shipping instructions, ship the instrument “carriage paid” to Bentham. Full liability for damage during shipment is borne by the purchaser. It is recommended that instruments shipped to us be fully insured and packed surrounded by at least two inches of shock-absorbing material. Specific transit packaging as used in Monochromators etc. must be installed.

Bentham reserves the right to make changes in design at any time without incurring any obligation to install same on units previously purchased.

This warranty is expressly in lieu of all other obligations or liabilities on the part of Bentham, and Bentham neither assumes, nor authorises any other person to assume for it, any liability in connection with the sales of Bentham’s products.

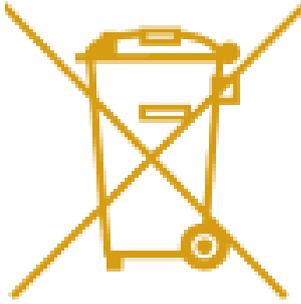
NOTHING IN THIS GUARANTEE AFFECTS YOUR STATUTORY RIGHTS.

7. Notice for Clients in European Union

This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste.

Bentham are fully WEEE compliant, our registration number is WEE/CB0003ZR.

Should you need to dispose of our equipment please telephone +44 (0) 118 975 1355



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For all technical support issues, please go to http://www.bentham.co.uk/online_support.htm