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UNIVERSAL
MONOCHROMATOR ILLUMINATOR

MODELS 7340 & 7345

Please read these instructions completely before operating this equipment. If there are any questions or problems regarding the use of this equipment, please contact: ORIEL INSTRUMENTS - or - the representative from whom this equipment was purchased.

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WARRANTY AND RETURNS

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I. INTRODUCTION

The 7340 and 7345 Universal Monochromator Illuminators can illuminate any monochromator with f/no. greater than (slower than) f/3.4 and f/4 respectively. Both illuminators operate at any part of the spectrum from 190 nm in the far UV to beyond 20 microns in the infrared with a variety of quickly interchangeable sources. The mirror in the 7340 is sized to fully illuminate the Oriel 77250 1/8m Monochromator. The 7345 has a mask over the mirror to assure a match to the Oriel 77200 1/4m Monochromator.

Any two of the sources listed on the following chart can be installed in the illuminator at the same time. The sources are described on the following pages. Simple, adjustable "drop in" mounts enable source installation, alignment and focusing. Once you have aligned the sources, you can select either of the two sources using the knob, on the top of the housing, which rotates the mirror between two positions. Flip the knob to switch between the two sources. You can also change to a different source by removing, installing and aligning a drop-in mount (normally a five minute procedure).

The optical system consists of a single concave mirror which creates an image of the source magnified 1.8 times at a point 2.5 inches (63.5 mm) in front of the housing (flange surface). The monochromator slit is normally placed at this position. The mirror can be switched to reflect either of the two sources installed in the housing. Because the optics are reflective, wavelength does not affect the focus. The mirror is a 2.5 inch (63.5 mm) square, located 9.44 inches (240 mm) from the focus. The 7340 mirror provides an effective f/3.4 beam that will match most fast monochromators including the Oriel 77250. The aperture of the 7345 mirror matches the input of the 77200 monochromator.

The blower cooled housing rests on four adjustable rubber feet which can be removed to allow permanent mounting to a variety of base plates.

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II. HAZARDS AND REQUIRED PRECAUTIONS

The 7340 and 7345 illuminators have four potential hazards:

Hazards due to light or radiation.

Hazards due to lamp explosion.

Excessive ozone exposure.

Electrical shock hazard.

Hazards Due to Light or Radiation

A. The following lamps, used in these illuminators, produce shortwave U.V. rays:

- short arc xenon
- mercury arc
- mercury xenon arc
- deuterium
- low pressure mercury

Exposure to shortwave intense UV radiation, visible or infrared, may produce burns, blindness and long term harm. Avoid exposure to any ultraviolet light. Use safety glasses and gloves if necessary. See the Oriel catalog, Vol. II for suitable goggles.

B. Do **not** look into the beam (or a specular reflection) from any of the sources even with protective goggles or filters. These may not be adequate blockers in the U.V. or infrared. Crossed polaroids in particular are not suitable IR blockers.

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SOURCE CHARACTERISTICS

Source	Lamp/ Model Mount	Image Size at Slit (mm) w x h	Power Supply	Ignitor Required	Source Spectrum	Comments
75W Xe short arc	6251/ 73409	0.45 x 0.9	68805 68806	68705 None	Continuous 250-800nm	Bright scanning source Power<150W but brighter
75W Xe Ozone Free	6263/ 73409	0.45 x 0.9	68805 68806	68705 None	Continuous 300-800nm	Bright scanning source Power<150W but brighter
150W Xe short arc	6253/ 73404	0.9 x 4.0	68805 68806	68705 None	Continuous 200-800nm	Best for scanning applications where power required
150W UV Xe	6254/ 73404	0.9 x 4.0	68805 68806	68705 None	Continuous 200-800nm	Best for scanning applications where power required
150W Xe Ozone Free	6255/ 73404	0.9 x 4.0	68805 68806	68705 None	Continuous 300-800nm	Best for scanning applications where power required
50W Hg	6282/ 73412	0.36 x 0.63	68805 68806	68709/68705 None	Strong lines with Continuum 240-600nm	Bright line source
100W Hg	6281/ 73410	0.45 x 0.45	68805 68806	68709/68705 None	Strong lines with Continuum 240-600nm	Bright line source
200W Hg short arc	6283/ 73405	1.1 x 4.0	68805 68806	68709/68705 None	Strong lines with Continuum 240-600nm	Bright intense light source
200W Hg Xe	6291/ 73411	1.3 x 2.7	68805 68806	68705 None	Strong lines with Continuum 240-600nm	Bright source for line irradiance
200W Hg Xe Ozone Free	6292/ 73411	1.3 x 2.7	68805 68806	68705 None	Strong lines with Continuum 240-600nm	Bright Source for line irradiance
30W Deuterium	6316/ 73403	2.5 dia.	68840	None	Smooth Continuum 180-400nm with low visible and infrared	Best below ~300nm; low visible output for stray light
30W Deuterium High radiance	63162/ 73403	1.4 dia.	68840	None	Smooth Continuum 180-400nm with low visible and infrared	High radiance version of 6316
30W Deuterium High irradiance	63163/ 73403	2.5 dia.	68840	None	Smooth Continuum 180-400nm with low visible and infared	High irradiance version of 6316
100W QTH	6333/ 73402	4.2 x 7.6 4.2 x 7.6	68830 68735	None None	Very smooth continuum 300 to >2500	Scanning. Low noise ~3200K Blackbody
IR Emitter	6363/ 73406	11 x 35	68830 68735	None	Graybody with peak near 3um	IR studies
Hg (Ar) Pencil Lamp	6305/ 73408	3.6 x 3.5	6047,6049 or 6060	None	Sharp discrete peaks for calibration	Calibration or low level irradiance

Hazards Due to Lamp Explosion (Xenon or Mercury Short Arc Lamps)

When Xenon and Mercury-Xenon arc lamps are cold, they are under several atmospheres of pressure and may explode due to internal strains or physical abuse. When hot, all lamps are under a pressure of approximately 100 atmospheres and the *POSSIBILITY OF VIOLENT EXPLOSION EXISTS.*

DO NOT HANDLE A BARE XENON OR MERCURY-XENON LAMP WITHOUT SAFETY GOGGLES and ADEQUATE PROTECTION FOR EXPOSED AREAS OF SKIN.

Do not apply torque to the quartz envelope of the lamp during installation or removal.

Fingerprints and other contaminants left on the lamp during handling or operation will cause destruction of the quartz envelope and may lead to lamp explosion.

Thoroughly clean the entire quartz envelope with alcohol or a dilute solution of detergent and water before installation in the housing. Do not touch the lamp after cleaning.

Ozone Hazard

(Xenon, Mercury, or Mercury-Xenon Short Arc Lamps, Deuterium Lamp, Low Pressure Mercury Lamp)

Shortwave ultraviolet rays causes photolysis of oxygen, producing ozone. The ozone is vented through the cooling fan. Volume II of the Oriel catalog describes ozone-free arc lamps. Use ozone-free lamps unless you need the ultraviolet below 290 nm.

There is no significant hazard from the level of ozone produced unless someone in the vicinity has an extremely low tolerance level for ozone. Provide good ventilation when using ozone-producing lamps in the 7340 or 7345.

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Electrical Shock Hazard

This unit is designed for use with a variety of lamps, some of which utilize high starting voltages and an initiation capacitor discharge. These can be ***LETHAL***. Observe the following precautions:

- Stay away from all exposed terminals.
- Do not permit use by personnel unfamiliar with the hazards.
- Before changing a lamp or removing the lamp assemblies, turn off the power supply, wait for the capacitors to discharge (several minutes) and then disconnect the lamp input leads from the back of the supply.
- Always connect the housing to ground.
- For safe operation, all internal wiring must be attached in the original configuration If you remove wires temporarily for access to internal elements, re-attach the wires before operating the equipment.

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III. INSTALLATION

A. ILLUMINATOR INSTALLATION (See Figure1)

The illuminator should be mounted so that its optical axis is aligned with the center of the monochromator slit. The spacing between the flange face and the slit should be 2.5 inches (63.5mm), 2.79 inches (71mm) from the front face of the illuminator housing.

You can mount the 7340/7345 in several different ways to match the monochromator to be illuminated. Note the optical heights in the diagrams. Use Oriel's precision spacers to increase heights or use washers for small increases.

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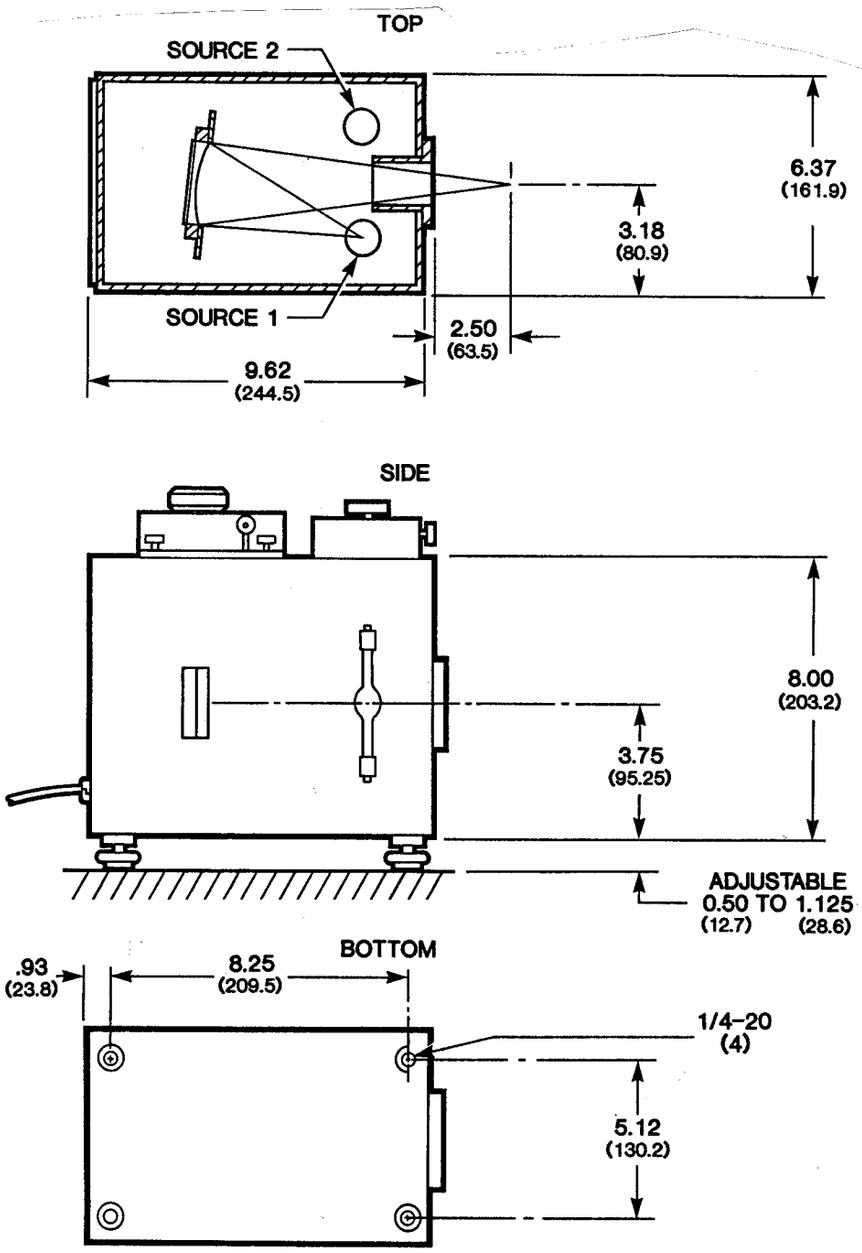


Figure 1 7340/7345 Monochromator Illuminator

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Free Standing Mounting

WE DO NOT RECOMMEND FREE STANDING MOUNTING EXCEPT FOR TEMPORARY SET-UPS -- ACCIDENTAL MOVEMENT OF THE ILLUMINATOR OR MONOCHROMATOR CAN CAUSE A LOT OF FRUSTRATION.

Use the feet of the illuminator to position it on a free standing surface. The feet allow height adjustment and provide wobble-free mounting.

Be careful to align the optical axis of the illuminator with the optical axis of the monochromator, and ensure that the illuminator-to-slit distance is correct.

Mounting to an Optical Table (See Figures 2 and 3)

The 77460(77461) Mounting Plate attaches to the bottom of the 7340/7345. The plates have clearance slots for 1/4 inch (M6) screws. This allows direct mounting to an optical table with the optical axis at a height of 4 inches above the table (matching the optical height of the 77200). Precision spacers or spacer kits are available from Oriel to raise the illuminator to match a different optical height.

The 77460 is for optical tables with inch spaced hole patterns, the 77461 for tables with holes on 25 (or 50) mm centers.

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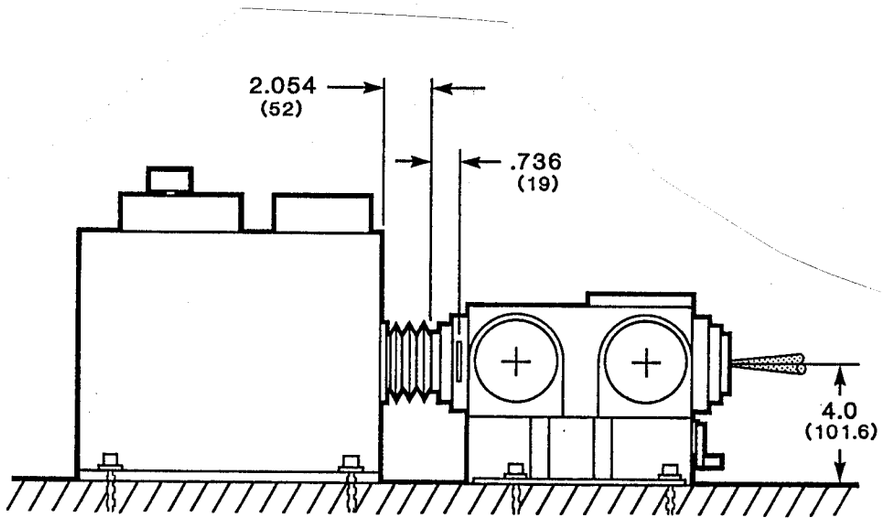
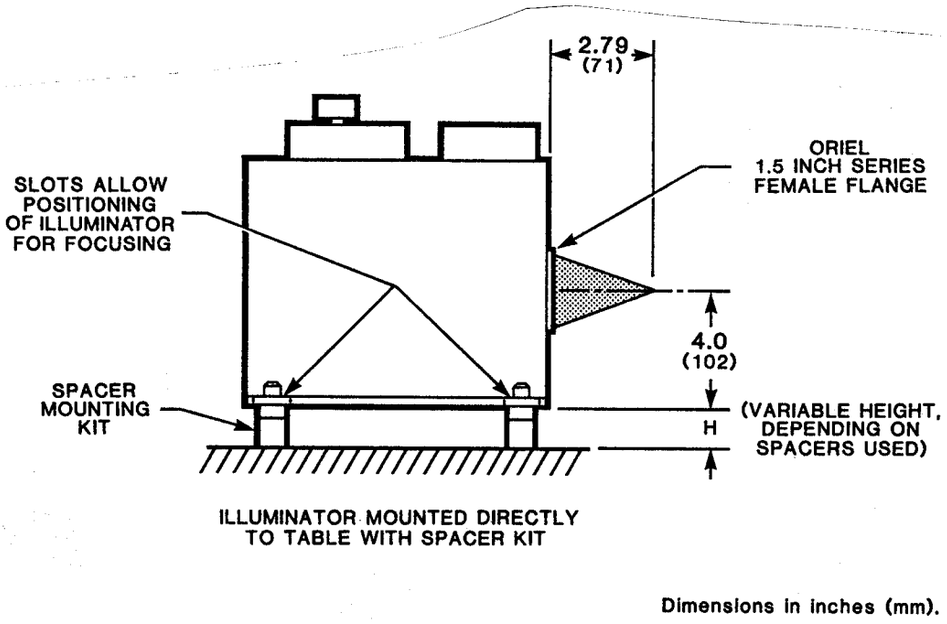


Figure 2 Table Mounted Illuminator with 77200 1/4 Meter Monochromator



Dimensions in inches (mm).

Figure 3 Table Mounted Illuminator with Spacer Kit

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Mounting with Oriel Monochromators on Baseplates (See Figures 4 and 5)

Baseplate kits simplify mounting the 7340/7345 illuminators with Oriel monochromators. The monochromator and illuminator are joined so that they can be adjusted as a single mount.

The 77470 and 77471 each include a baseplate and hardware to mount the 7340 to the 77250 1/8m monochromator. The 77470 has slots to mount it to optical tables with inch hole patterns; the 77471 has slots for optical tables with holes on 25mm (50mm) centers.

The 77475 Baseplate Mounting Kit mounts the 7345 with the 77200 1/4m monochromator. The 77475 may be conveniently mounted to optical tables with either inch or metric spacing.

To use the 7340\7345 with a 75155 chopper between the source and monochromator, you need to mount the monochromator using the set of holes located further from the illuminator output. Refocus the illuminator output to maximize the signal at the output.

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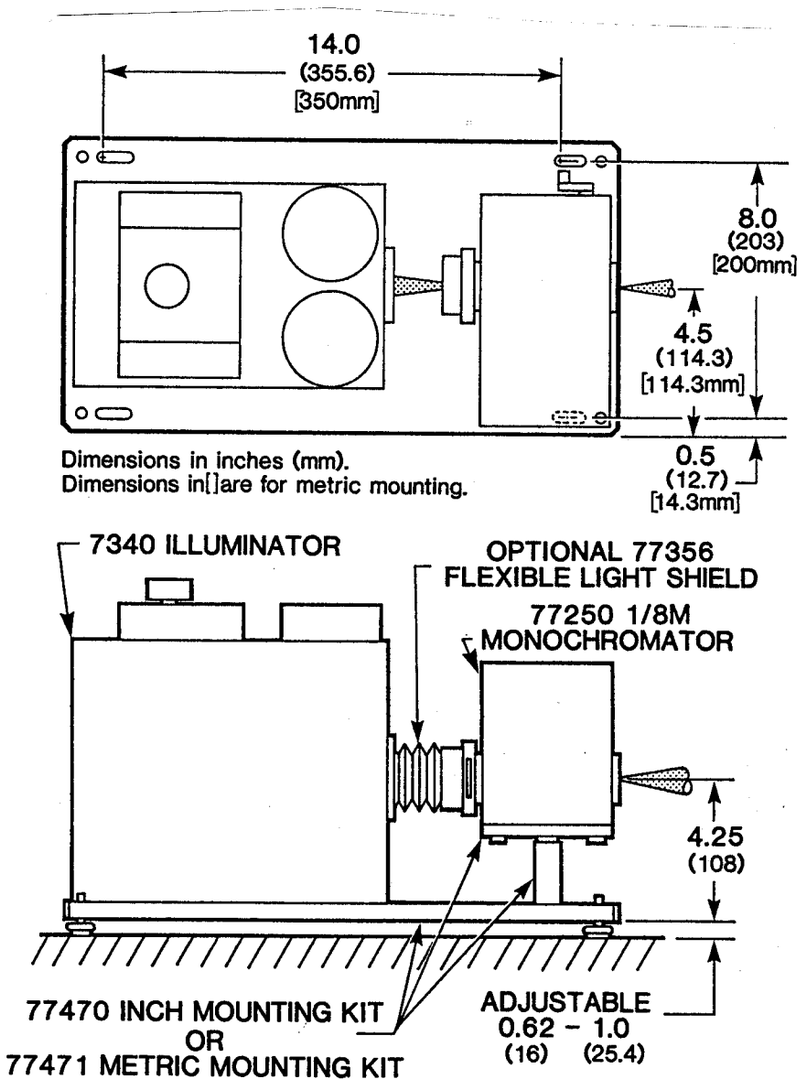
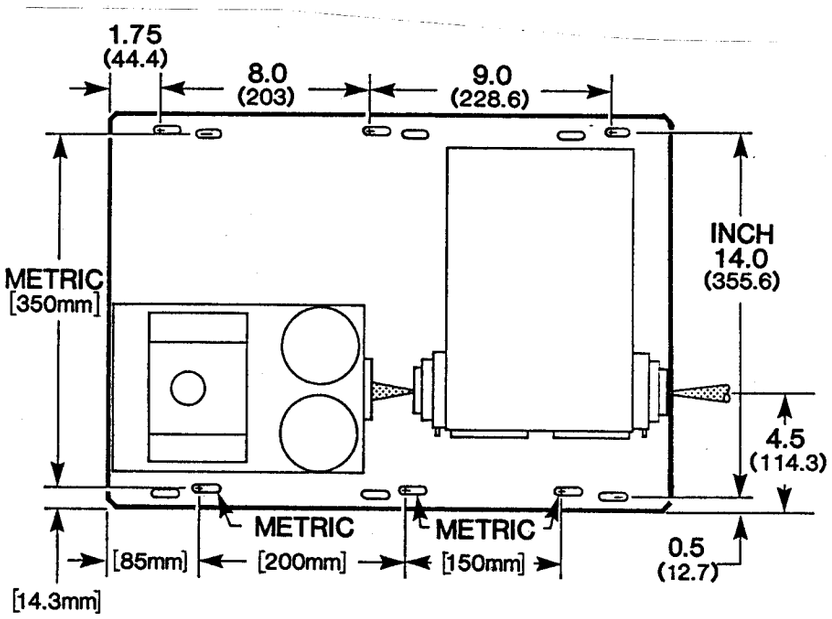


Figure 4 7340 Illuminator and 77250 Monochromator with 77470/77471 Mounting Kit

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Dimensions in inches (mm).
Dimensions in[]are for metric mounting.

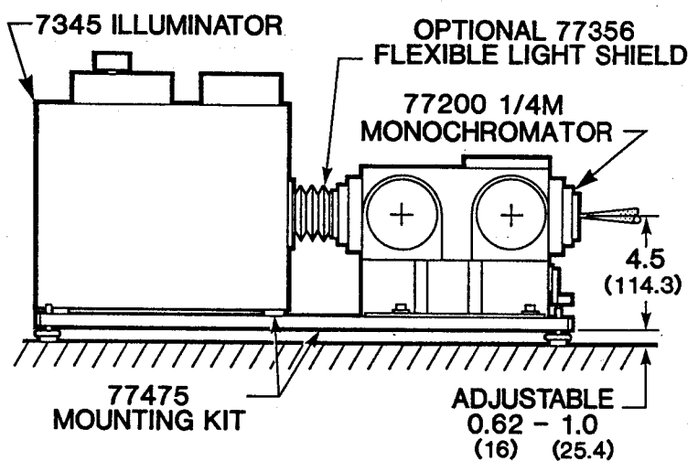
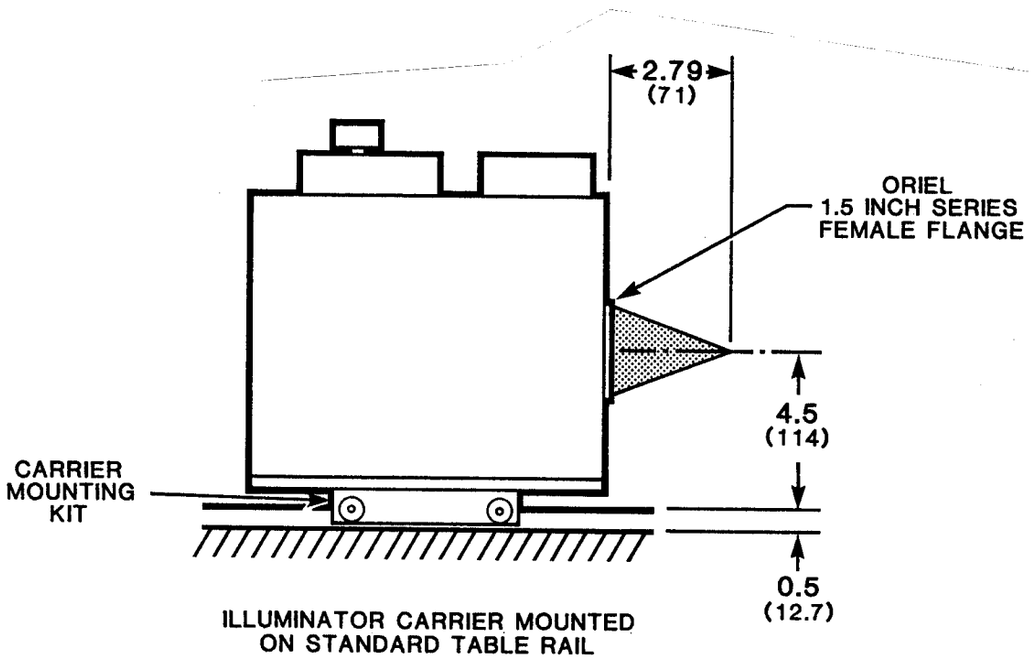


Figure 5 7345 Illuminator and 77200 Monochromator with 77475 Mounting Kit

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Mounting to an Optical Rail (See Figure 6)

The 77466 mounting kit includes a clamping carrier and all the hardware needed to mount the 7340\7345 to Oriel standard rails. The standard optical height above the rail top is 4.5 inches (114 mm). Spacers are provided to raise the height to 4.875 inches to match the rail-mounted 77200 1/4 meter monochromator.



Dimensions in inches (mm).

Figure 6 Mounting to an Optical Rail

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Rod Mounting (See Figure 7)

Rod mounting allows selection of any optical height. Use two rods and the 77460/77461 base. A variety of rods, rod holders, and, if necessary, bases for rod holders, are available. See the Oriel catalog, Volume I. The 77460 is for optical tables with one inch spaced hole patterns; the 77461, for tables with holes on 25 (or 50) mm centers.

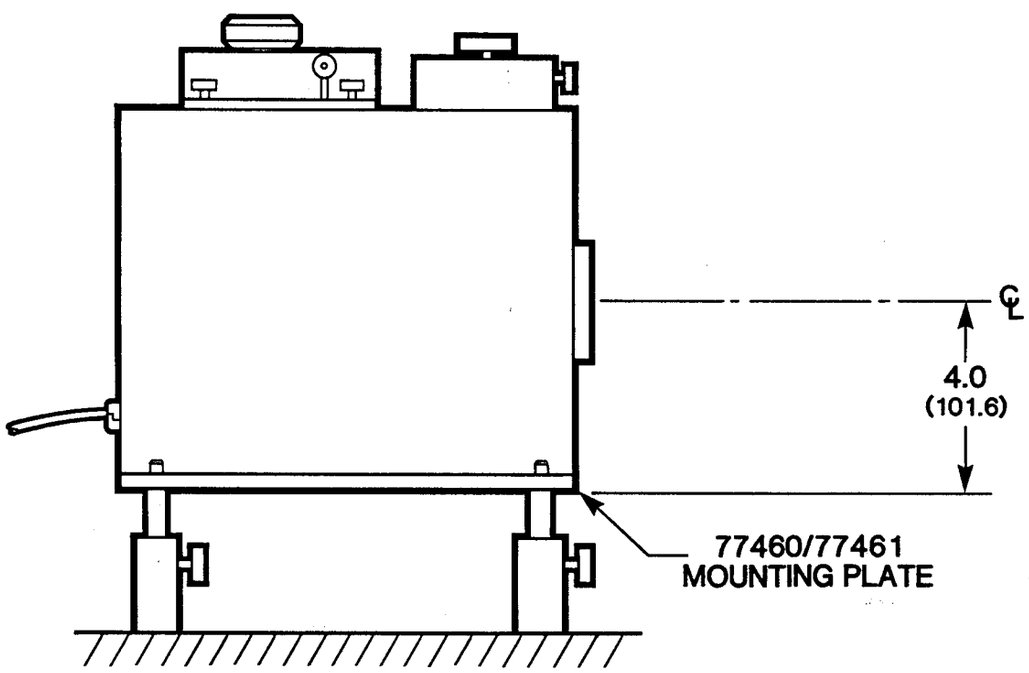


Figure 7 Illuminator Rod Mounted to 77460/77461 Mounting Plate

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B. LAMP/SOURCE INSTALLATION (See Figure 8)

Mercury Lamps may be mounted in position 1 only. Xenon and Mercury-Xenon Arc Lamps may be mounted in position 2 only. Other sources may be mounted in either position 1 or position 2. Several of the lamp mounts have a ceramic tube insulator. It is important that the mount be rotated so the insulator is adjacent to the wall of the unit as shown in Figure 8.

To mount and align a different source:

Remove the cover plate by unscrewing the three socket screws on the top of the source holder (see diagram). A 3/32 hex wrench is supplied for this purpose. Insert the source facing toward the mirror. Tighten the three socket screws.

Rotate the mirror knob for the desired source. See the safety recommendations for arc lamps before operating these sources. Use safety goggles when aligning or using an arc lamp, and remember that the visible output from the monochromator may contain ultraviolet rays (in the second order) unless they are blocked with a glass plate or filter. The illuminator housings have a grounding post on the rear of the housing. If you use an arc lamp, be sure to connect this to a suitable ground point using the strap provided. Oriel arc lamp power supplies have a post for the ground strap.

Plug in the fan. NOTE: The fan should be used whenever the total power being dissipated in the housing exceeds 100W. We recommended that the fan not be used when running the 50W or 100W Mercury lamps because the airflow created by the fan can overcool the lamp and add noise to the output. If another source is active in conjunction with one of these Mercury lamps - so that total power exceeds 100W - it may become necessary to turn off both the other source and the fan to minimize noise from the Mercury source. The fan is designed to cool 200W of total power so it is necessary to turn off one lamp if this level will be exceeded.

Turn the source on. See Installation and Operation of Specific Sources, later in this section.

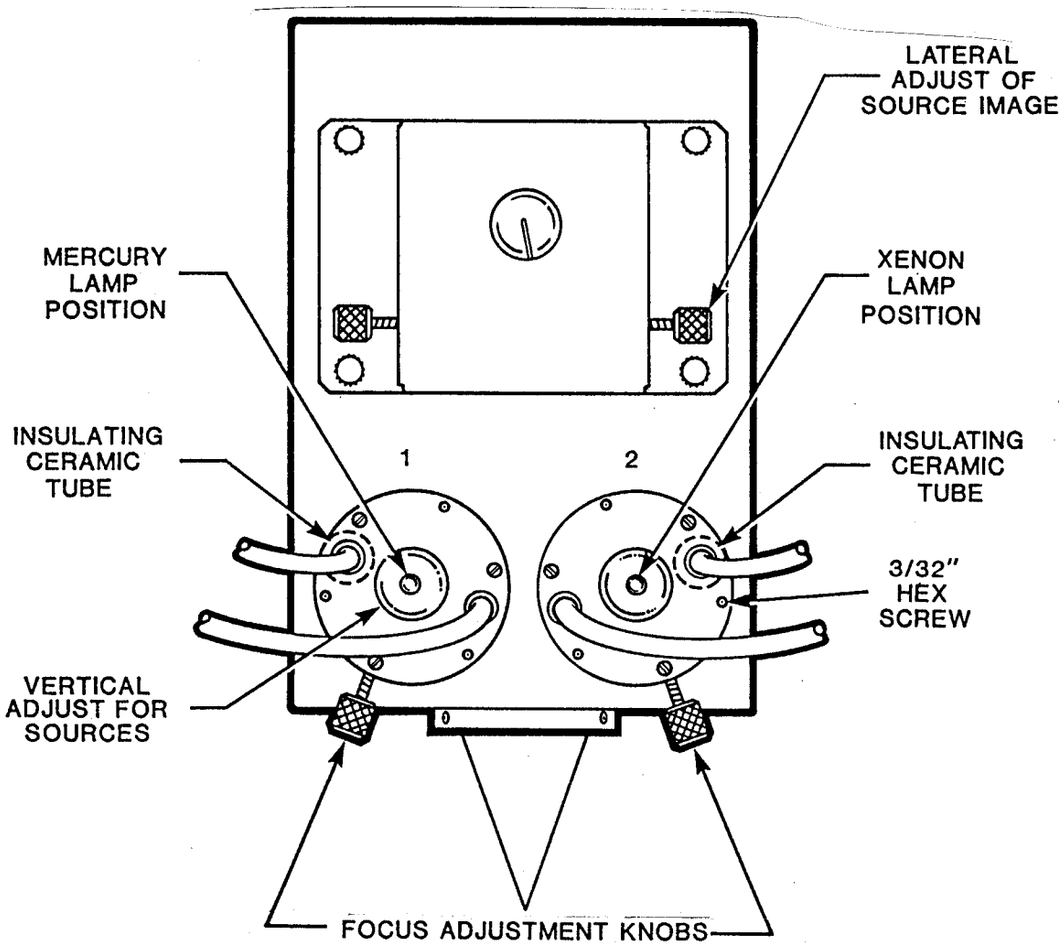
Align and focus the image of the source onto the entrance slit of the monochromator. You can look at the monochromator **output** in the visible for alignment of all sources except the IR glower.

a. Adjust the vertical position by turning the knurled knob on top of the source holder.

b. Focus by turning the knurled knob on the front of the source holder.

c. Adjust horizontal position by turning the knurled knob on the side of the mirror housing. After alignment, select the appropriate source by turning the mirror knob to the appropriate position.

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Position 1: Mercury lamp
Quartz Tungsten Halogen
IR Element
Deuterium lamps

Position 2: Xenon and Mercury-Xenon lamps
Quartz Tungsten Halogen
IR Element
Deuterium lamps

Figure 8 Source Installation

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C. INSTALLATION AND OPERATION OF SPECIFIC SOURCES

100 Watt Quartz Halogen Filament Lamp

a. Insert the lamp into holder on 73402 Lamp Mount. *DO NOT TOUCH THE LAMP ENVELOPE.* If you touch the lamp, clean it with alcohol or detergent and water. Fingerprints will devitrify and destroy the quartz.

b. Connect leads to the 68735 or 68830 Power Supply.

c. Read the instructions on these supplies before operating. The holder supplied operates in position 2 only. Turn the holder around to operate in position 1.

Deuterium Lamp

a. Place the lamp base down in the holder held by spring.

b. Connect the red lead to the terminal marked (+).

c. Connect the other leads to the other two terminals.

d. Rotate the lamp so that the source will illuminate the mirror. This is particularly important for the Model 63162 and Model 63163 lamps (which come with a "snout"). These lamps have a directional radiation pattern with a small lobe. They are more sensitive to angular misalignment and therefore require more care to achieve optimum performance.

e. Clean the lamp envelope with alcohol or detergent and water to remove fingerprints which will etch into the quartz during operation.

f. Connect the cable to the connector on the 68840 Power Supply.

g. Read the instructions on Power Supply before proceeding.

Infrared Element

The 6035 Infrared Element is a silicon carbide resistor. The resistor is installed into a brass clamp on the 73408 Mount, with the other end connected to a spring clip. This source is operated by a 68735 or 68830 Power Supply. The 68830 can operate the 6035 at higher temperatures. For longer life operate this source at lower voltage (temperature). See the power supply instructions.

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75W and 150W Xenon Short Arc Lamps

Operate these lamps with the anode (+) up.

> ***C A U T I O N***
>
> **Wear goggles and glove while handling the bare lamp. Avoid mechanical stress to the lamp. The lamp is pressurized and subject to explosion, even when cold.**
>
> **Make sure the grounding strap is properly connected.**
>
> **Be sure that the Xenon Lamp has the anode (+) at the top and that the top electrode is connected to the positive terminal of the power supply or ignitor. Using this lamp with the WRONG POLARITY will immediately destroy the lamps's electrodes.**
>
> **Lamps run at 50 - 80 atmospheres pressure when hot. DO NOT OPERATE LAMPS OUTSIDE THE HOUSING.**

a. Install these lamps in position 2 only.

b. Remove the thumb nuts and screw the lamp into the insert on the 73409 (75W) or 73404 (150W) mount.

c. Rotate the lamp so the sealing pip (and trigger wire if used) do not impede mirror illumination.

d. Install the lower lead and lower thumb nut.

e. After the lamp is installed, clean the envelope with alcohol and lint free tissue. *FINGERPRINTS ON THE LAMP WILL DESTROY THE QUARTZ AND MAY CAUSE THE LAMP TO EXPLODE.*

f. Connect leads to the output terminals of the 68806 power supply or 68705 ignitor (if the 68805 power supply is being used).

See Starting Arc Lamps, later in this section.

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50W, 100W, and 200W Mercury Short Arc Lamps

Operate these lamps with the anode (+) down.

> ***C A U T I O N***
>
> **Wear goggles and gloves while handling the bare lamp. Avoid mechanical stress to the lamp. The lamp is pressurized and subject to explosion, even when cold.**
>
> **Make sure the grounding strap is properly connected.**
>
> **Be sure that the Mercury Lamp has the anode (+) at the bottom and that the lower electrode is connected to the positive terminal of the power supply or ignitor. Operation with the wrong polarity will immediately destroy the lamp's electrodes.**
>
> **Lamps run at 50 - 80 atmospheres pressure when hot. DO NOT OPERATE LAMPS OUTSIDE THE HOUSING.**

a. Install these lamps in position 1 only.

b. Remove the upper thumb nut and screw the lamp into the insert provided in the 73412 (50W), 73410 (100W), or 73405 (200W) lamp mount.

c. Rotate the lamp so the sealing pip does not impede mirror illumination.

d. After the lamp is installed, clean the envelope with alcohol and lint free tissue. FINGERPRINTS LEFT ON THE LAMP WILL DESTROY THE QUARTZ AND MAY CAUSE THE LAMP TO EXPLODE.

e. Connect the lamp leads to the output terminals of the 68806 power supply or the 68709 or 68705 ignitor if the 68805 power supply is being used.

You can use the 50W and 100W lamps with Oriel OEM supplies described in the Oriel catalog, Volume II. This requires that you use the 68815 Adaptor set or cut the lamp leads and wire them to the power supply.

See Starting Arc Lamps, later in this section.

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200 Watt Mercury Xenon Short Arc Lamp

This lamp should have a trigger wire for ease of ignition.

This lamp is operated with anode (+) up.

> ***C A U T I O N***
>
> **Wear goggles and gloves while handling bare lamps. Avoid mechanical stress to the lamp. The lamp is pressurized and subject to explosion, even when cold.**
>
> **Make sure the grounding strap is properly connected.**
>
> **Be sure that the Mercury-Xenon Lamp has the anode (+) at the top and that the top electrode is connected to the positive terminal of the power supply or ignitor. Operation with the wrong polarity will immediately destroy the lamp's electrodes.**
>
> **Lamps run at 50 - 80 atmospheres pressure when hot. DO NOT OPERATE LAMPS OUTSIDE THE HOUSING.**

a. Operate this lamp in position 2 (+ up, - down) only.

b. Remove the upper thumb nut and screw the lamp into insert provided in the 73411 lamp mount.

c. Rotate the lamp so the sealing pip (and trigger wire if used) do not impede mirror illumination.

d. Install the lower lead and lower thumb nut.

e. After the lamp is installed, clean the envelope with alcohol and lint free tissue. FINGERPRINTS LEFT ON THE LAMP WILL DESTROY THE QUARTZ AND MAY CAUSE THE LAMP TO EXPLODE.

f. Connect the lamp leads to the output terminals of the 68806 power supply or 68705 ignitor if the 68805 power supply is being used.

See Starting Arc Lamps, later in this section.

Low Pressure Mercury Calibration Lamp

This lamp is useful for checking wavelength calibration. Installation in the 73408 lamp mount is simple. Set the vertical adjustment by loosening the set screw. This lamp is made from double bore tubing. For best results, rotate the lamp so that only one bore is facing the mirror. This provides a single image. Check that the installed height approximately centers the lamp on the optical axis.

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Starting Arc Lamps

Arc lamps are started "breaking down" the gas between the electrodes, sustaining the breakdown with a capacitive discharge and then applying the main running current.

Xenon, and mercury-xenon lamps require a rapidly rising multi-kV pulse to breakdown the gap. These ignition pulses also start mercury lamps, but applying a several kV ramp also works for mercury lamps, and causes less RFI. The 68709 soft-start ignitor operates in this way. If partial break down occurs, the main capacitive discharge may be inadequate. Sometimes break down is assisted by the use of a "trigger wire" on the lamp.

Do not look at the lamp to check whether it is igniting; it may hurt your eyes. The ignition pulse may "leak away" through capacitive coupling in the high voltage cable or by tracking across surfaces. Therefore, if you are having ignition problems, ensure that the leads from the ignitor or power supply are separated and do not run close to any metal surface.

Check the lamp mounting for secure conductive connections and check the condition of the wiring. If correcting these conditions does not cure any ignition problems, try another lamp. If you still have difficulty consult an Oriel Sales Engineer for advice.

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Mercury Lines and the Multiples Used for Wavelength Calibrations

253.7 nm	U.V.
365.0 nm	U.V.
404.7 nm	Visible - Violet
435.8 nm	Visible - Blue
507.3 nm	(2nd Order) U.V.
546.1 nm	Visible - Green
577.0 nm	Visible - Yellow (cannot resolve w/wide slits)
579.1 nm	Visible - Yellow (cannot resolve w/wide slits)
730.0 nm	2nd Order U.V.
760.9 nm	3rd Order U.V.
809.4 nm	2nd Order - Violet (dim)
871.6 nm	2nd Order - Blue

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IV. IGNITION OF ARC LAMPS

STARTING ARC LAMPS

Oriel's 68705 and 68706 ignitors and 68806 Arc Lamp Power Supply with built-in ignitor produce short high voltage spikes to cause electrical "break down" in the high pressure gas between the electrodes of the lamp. Electrical breakdown of this type is necessary for starting xenon and mercury(xenon) lamps, and is also effective for mercury lamps. This breakdown has a random nature as what exactly happens depends on the availability of the few free electrons in the neutral gas when the ignitor applies the high field. Oriel power supplies sustain the filamentary arc caused by the ignitor and feed the growing arc into the stable DC phase. Failure to start a lamp can result from inability of the ignitor to cause electrical breakdown, inability of the power supply to provide adequate current and voltage in the initial growth phase, or inability of the DC section of the power supply to "take over" and maintain the arc. The power supply safety circuitry may sense the arc as a short and turn off.

These ignition pulses also start mercury lamps, but applying a several kV ramps also works for mercury lamps and causes less RFI. The 68709 soft-start ignitor operates in this manner.

FIRST LEVEL DIAGNOSTICS

If the lamp fails to ignite, then safe viewing of an image of the region between the electrodes can give useful diagnostic information. Safe viewing implies the arc lamp is safely confined and the electrode area or its image is viewed through UV safety glasses. For setting up an imaging plane you can illuminate the electrodes with a flashlamp from the side or rear, and image the electrodes onto a white card. Replace any safety cover on the lamp enclosure before proceeding.

If the ignitor is working properly then, you should see a weak blue flash. If only the thin blue striae appear, then check that the Oriel Power Supply open circuit voltage is present. If the second phase, the initial "current dump" is operating successfully then you should see a more intense white flash. Failure of the power supply to keep the arc going may be due to its safety circuitry operating too sensitively, or a major problem with the power electronics. You can check the DC operation with a high power resistor of similar impedance to an operating lamp load.

To some extent the power supply must be "tuned to" the ignitor. Using older Oriel Power Supplies with the new generation (1992) of ignitor can lead to ignition problems as the power supply automatically shuts off.

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POTENTIAL EMI PROBLEMS

Xenon and mercury xenon lamps require fast rising pulses of 25-40 kV to initiate the first electrical breakdown. Unfortunately electrical pulses of this type exhibit a very independent streak. Insulators with a high DC hold-off rating won't necessarily stop the high frequency pulses that can capacitively or inductively couple out of their intended path. The pulses can radiate to and cause damage to nearby sensitive electronics. You should take steps to shield and ground nearby systems, but bear in mind that fast pulses can transiently raise the potential of DC grounds. Oriel has invested considerable effort in seeking a cost effective solution to the ignition problem. Igniting arc lamps is easy with overpowering RFI high voltage generators worthy of Nikolai Tesla. Ignitors of this type wreak havoc with ICs, so we toned down our wonderful hash ignitor. We spent a long time designing our latest generation of ignitors for the optimum pulse shape for reliable ignition, and to allow cable shielding.

STARTER WIRES

In practice we find that ignition is more reliable for some lamps when a starter wire is used. Oriel lamps requiring a starter wire are shipped with it already attached. If you need to attach your own wire then be sure you do so with extreme care and cleanliness. Above all, do not connect the terminals of the lamp with the wire!

WHY THE IGNITOR MAY NOT WORK

Obviously it is possible that the ignitor may not be working. Viewing the small spark gap in the ignitor will help you determine this.

Dissipation of the ignition pulse energy may weaken the pulse too much. You can feel a tingle from the pulses if you were to touch them during ignition. This tingle is harmless except possibly in the case of those with heart pacemakers; note that we don't know of any problems with pacemakers. The tingle obviously comes form the electrical pulse and so represents loss of ignition capability. Pulse energy can dissipate to nearby conductive material; isolate the wires from metal optical tables or metal instrumentation. Dissipation will depend on humidity. The cables from Oriel ignitors to the lamps are made with durable high insulators. (Note that capacitors that are transparent to high frequency pulses use insulating materials between two conductors. When the cable lies on a conductor, the central wire in the cable, the cable insulation and the external conductor make a capacitor.)

High voltage pulses can also track surprising distances over surfaces sometimes converting organics (dirt or applied coatings) into conducting carbon to make future tracking easier. Sharp edges in the conduction path lead to very high fields and loss of energy through corona.

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The actual energy in the pulse is quite small and enough can be lost at a poor electrical contact to make lamp ignition impossible.

So if the ignitor is working but the lamp doesn't light check:

1. All contacts such as the ignitor cable-lamp housing socket.
2. Ensure that the ignitor cables are separated and isolated from any conductive plane.
3. The lamp has a starter wire if appropriate.
4. The lamp is intact and within its prescribed life. Lamps become harder to ignite as they age.

SHIELDING THE IGNITION CABLES

If you are tempted to shield the ignition cables then you should be prepared for an empirical approach. Wrapping grounded braid around the ignitor cable will probably reduce the radiated EMI, but it will also reduce the pulse peak voltage and therefore make lamp ignition less certain if not impossible. Pre 1992 Oriel ignitors cannot successfully ignite lamps when shielding is used. Current ignitors are better but please bear ignition pulse energy loss in mind when using shielding.

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V. OPTIONAL ACCESSORIES

This section describes some of the accessories used with these illuminators. The full list of accessories is described in Volume II.

73415 Fixed Aperture Kit

This kit converts a 7340 to a 7345 by masking the illuminator mirror to match the Oriel 1/4 meter input.

73401 Adjustable Aperture Kit

The 73401 Adjustable Aperture Kit lets you stop down the f/3.4 beam of the 7340 or the f/4 beam of the 7345 to match the input cone of your monochromator. This kit consists of two moveable right angle jaws which adjust the effective mirror size from 0 to 2.5 inches (63.5mm) square. These adjustments are particularly useful to avoid overfilling the grating of a slow monochromator and reduce the stray light.

68850 Photofeedback System

The 68850, when used in conjunction with the 68805 or 68830 power supply, can maintain constant light output over a range of operating conditions. For best performance, the photofeedback sensor should "see" the same light variation as the sample path. With a monochromator, the sensor head should be located after the monochromator to stabilize the flux in the isolated spectral region. The photofeedback head has been designed so it may be attached appropriately to the 78150 Beam Splitter Holder, 78100 Sample Compartment of any Oriel 1.5 inch series component. If however, the preferred location is not practical, the 68805 Adapter may be used to mount the sensor head to the 7340/7345 housing, permitting the source to be viewed directly, with the desired filters, so that output level may be maintained. Volume II of the Oriel catalog has details of this system.

Tables, Benches and Accessories

Volume I of the Oriel catalog describes tables, benches and accessories.

Filter Holders

Volume II of the Oriel catalog has details on filter holders, etc., for use with the 7340.

Volume III lists filters. Avoid placing filters in the focused beam, particularly near the focus. If you must use a filter in the output of these illuminators, place it as close as possible to the output aperture. Note that filter transmittance will be altered by the converging beam as described in Volume III.

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Flange-Mounted Accessories

The output of the 7340 and 7345 monochromator illuminators have a female Oriel standard 1.5 inch series flange. This flange lets you mount accessories directly on the illuminator output. The full list of accessories appears in Volume II of the Oriel catalog. Selected accessories frequently used in our laboratories include:

71430 Shutter for beam blocking (for zero reference).

77356 Flexible Light Shield - Encloses beam between illuminators and monochromators.

71260 Enclosed Flanged Filter Holder.

62020 Flanged Multiple Filter Holder - Mounts 2" filters on the output of the illuminator for order sorting.

75155 Enclosed Chopper - Mounts between the source and the monochromator. Particularly valuable for infrared work.

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VI. INSTALLING THE PHOTOFEEDBACK CONTROL OPTION

To install Optical Photofeedback Control:

1. Remove cover plate from side of illuminator housing.
2. Remove mirror holder assembly.
3. Mount photofeedback control adapter block with binder head screws from inside the housing.
4. Reinstall mirror holder assembly.
5. Install desired filters in photofeedback sensor assembly.
6. Mount sensor assembly to adapter block with cap screws.
7. See photofeedback control manual for operation instructions.

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VII. INSTALLATION OF THE 73401 ADJUSTABLE APERTURE

See Figure 9

1. Remove the four thumb screws on the mirror holder.
2. Lift the mirror holder out of the illuminator housing.
3. Assemble the two mounting bars (7) on the mirror plate (6) with flat head screws, as shown on the sketch.
4. Attach the aperture blades (8) to the mounting bars (7) and secure in place with locking clamps (9).
5. To adjust the size of the aperture blades to the desired size, center the square on the mirror.

NOTE: Adjust the aperture to match the input cone of the monochromator. Calculate the size of the aperture as follows:

$$\textit{Height of Aperture} = \frac{\textit{Grating Height} \times 240}{\textit{Focal length of Monochromator (mm)}}$$

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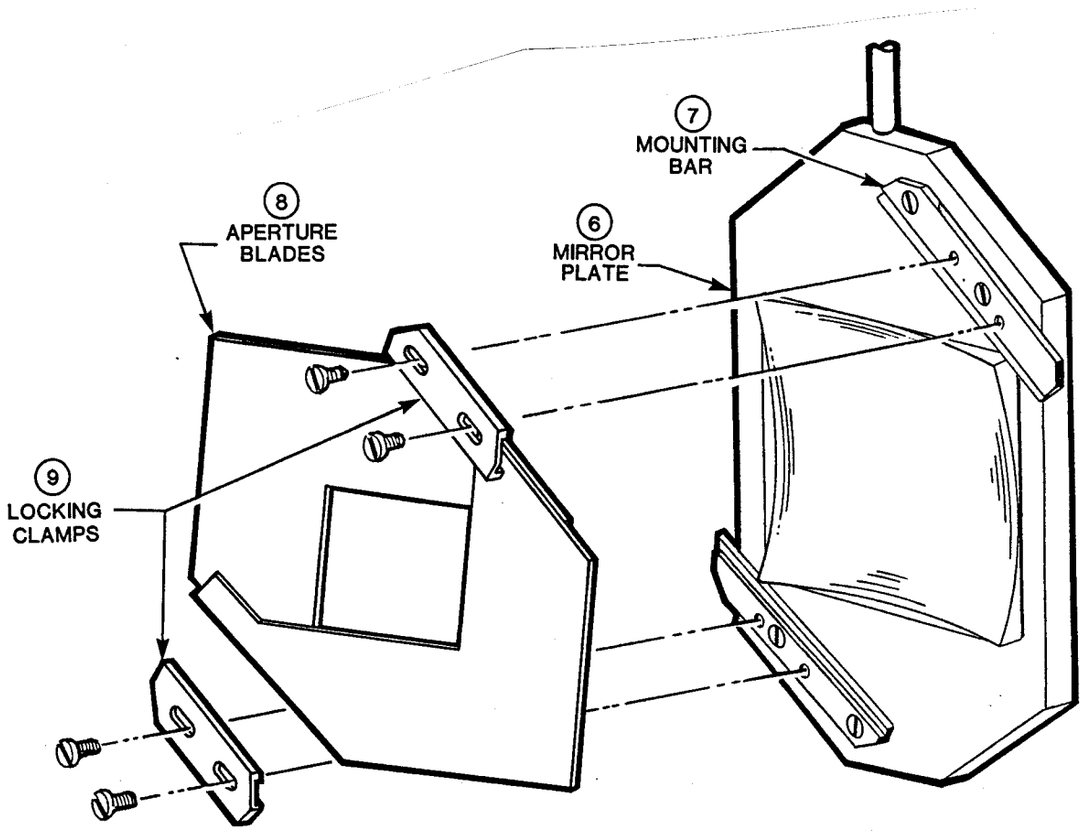


Figure 9 Adjustable Aperture Kit 73401 Installation

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WARRANTY AND RETURNS

WARRANTY

Oriel Corporation warrants that all goods described in this manual (except consumables such as lamps, bulbs, filters, ellipses, etc.) shall be free from defects in material and workmanship. Such defects must become apparent within the following period:

1. All products described here, except spare parts: one (1) year or 3000 hours of operation, whichever comes first, after delivery of the goods to buyer.

2. Spare parts: ninety (90) days after delivery of goods to buyer.

Oriel Corporation's liability under this warranty is limited to the adjustment, repair and/or replacement of the defective part(s). During the above listed warranty period, Oriel Corporation shall provide all materials to accomplish the repaired adjustment, repair or replacement. Oriel Corporation shall provide the labor required during the above listed warranty period to adjust, repair and/or replace the defective goods at no cost to the buyer ONLY IF the defective goods are returned, freight prepaid, to an Oriel Corporation designated facility. If goods are not returned to Oriel Corporation, and user chooses to have repairs made at their premises, Oriel Corporation shall provide labor for field adjustment, repair and/or replacement at prevailing rates for field service, on a portal-to-portal basis.

Oriel Corporation shall be relieved of all obligations and liability under this warranty if:

1. The user operates the device with any accessory, equipment or part not specifically approved or manufactured or specified by Oriel Corporation unless buyer furnishes reasonable evidence that such installations were not a cause of the defect. This provision shall not apply to any accessory, equipment or part which does not affect the safe operation of the device.

2. The goods are not operated or maintained in accordance with Oriel's instructions and specifications.

3. The goods have been repaired, altered or modified by other than Oriel authorized personnel.

4. Buyer does not return the defective goods, freight prepaid, to Oriel repair facility within the applicable warranty period.

IT IS EXPRESSLY AGREED THAT THIS WARRANTY SHALL REPLACE ALL WARRANTIES OF FITNESS AND MERCHANTABILITY. BUYER HEREBY WAIVES ALL OTHER WARRANTIES, GUARANTIES, CONDITIONS OR LIABILITIES, EXPRESSED OR IMPLIED, ARISING BY LAW OR OTHERWISE, WHETHER OR NOT OCCASIONED BY ORIEL'S NEGLIGENCE.

This warranty shall not be extended, altered or varied except by a written document signed by both parties. If any portion of this agreement is invalidated, the remainder of the agreement shall remain in full force and effect.

CONSEQUENTIAL DAMAGES -

Oriel Corporation shall not be responsible for consequential damages resulting from misfunctions or malfunctions of the goods described in this manual. Oriel's total responsibility is limited to repairing or replacing the misfunctioning or malfunctioning goods under the terms and conditions of the above described warranty.

INSURANCE -

Persons receiving goods for demonstrations, demo loan, temporary use or in any manner in which title is not transferred from Oriel, shall assume full responsibility for any and all damage while in their care, custody and control. If damage occurs, unrelated to the proper and warranted use and performance of the goods, recipient of the goods accepts full responsibility for restoring the goods to their condition upon original delivery, and for assuming all costs and charges.

RETURNS

Before returning equipment to Oriel for repair, please call the Customer Service Department at (203) 377-8282. Have your purchase order number available before calling Oriel. The Customer Service Representative will give you a Return Material Authorization number (RMA). Having an RMA will shorten the time required for the repair, because it ensures that your equipment will be properly processed. Write the RMA on the returned equipment's box. Equipment returned without a RMA may be rejected by the Oriel Receiving Department. Equipment returned under warranty will be returned with no charge for the repair or shipping. Oriel will notify you of repairs not covered by warranty, with the cost of the repair, before starting the work.

Please return equipment in the original (or equivalent) packaging. You will be responsible for damage incurred from inadequate packaging, if the original packaging is not used.

Include the cables, connector caps and antistatic materials sent and/or used with the equipment, so that Oriel can verify correct operation of these accessories.

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