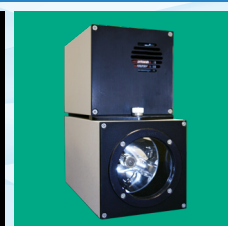
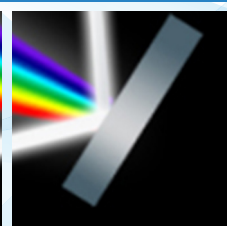
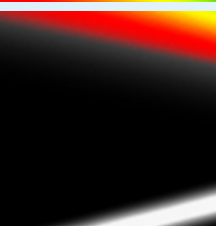
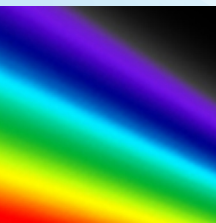


## What makes the PowerArc a better Illuminator



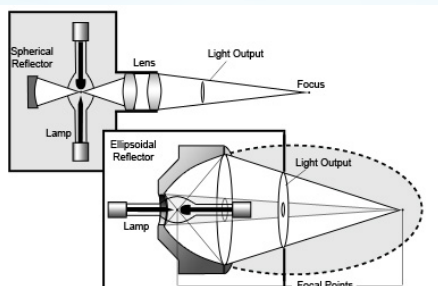
A 75 Watt Xenon Arc Lamp Illuminator Provides the Same Power Output as a 450 Watt Xenon Arc Lamp in a Vertical Lamp Housing!

Users of old style vertical arc lamp housings are throwing away as much as 90% of the lamps output, due to poor collection efficiency. These old style vertical lamp housings have a collection lens in front of the arc lamp and sometimes, but not always, a back reflector behind them. The problem with this old design is that only the light that actually strikes these optical elements is delivered outside of the lamp housing. All other photons emitted by the lamp are wasted, simply heating the inside of the lamp housing. Conversely the unique PowerArc™ lamp housing has an enveloping ellipsoidal reflector that collects virtually all of the light emitted by the lamp arc, delivering those photons to a secondary focal point outside of the lamp housing, and it does so without any lenses.

Please note that the PowerArc™ series of lamp housings are designed for lamps from 75 watts to 150 watts. Please also refer to our KiloArc™ light source for ultra high intensity requirements with 1,000 watt arc lamps.

### Arc Lamp Housing

At the heart of the PowerArc™ lamp housing is a proprietary on-axis ellipsoidal reflector. Our reflectors collect up to 70% of the radiant energy from the arc lamp, versus only 12% for typical condenser systems in vertical lamp housings. The ellipse literally wraps around the arc lamp, collecting 5 to 6 times more output power than a conventional system.



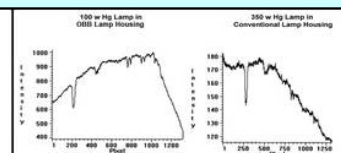
For the same bulb, the PowerArc™ delivers 5 to 6 times more light, to the secondary focus! That means that an OBB PowerArc™ lamp housing with a 75 watt xenon lamp provides the equivalent optical power of a 450 watt xenon lamp in an old style vertical lamp housing. And it does so with greater power density due to a smaller focal spot, and at a small fraction of the cost of a big old 450 watt illuminator.

### Comparative field-test results: "High Efficiency lamp housing yields 20x better sensitivity...lower operating cost."

In an independent comparison of OBB lamp housing with ellipsoidal reflector vs. a competitor's condenser (lens reflector) housing, a 100 watt Hg lamp was mounted in the OBB lamp housing and a 350 watt Hg lamp was mounted in the competitor's conventional lamp housing. Both lamps were focused through the same monochromator then imaged onto a capillary flow cell "sample". The flow cell emission was then imaged onto a line scan camera, with each pixel representing 1 mm of sample length.

As the attached graphs indicate the smaller OBB lamp housing produced 5.5 times more emission signal with the less expensive 100 watt lamp than the larger, conventional lamp housing produced with the more expensive 350 watt lamp; approximately a 20 fold improvement.

Test and data courtesy of  
Dr. Heinrich Roder, Fox Chase Cancer Institute, Phila. PA.



### Hardware

The compact high intensity light source includes: the lamp housing, lamp, adapter, power supply and igniter; just select the desired focal length optics, lamp and window.

The arc source is located at one focal point of the ellipse, and the radiation is reflected by the ellipse to the secondary focus which is actually outside of the lamp housing. Since the light is brought to a focus by reflection

rather than refraction (through a lens), there are less losses from absorption or lens-surface back-reflection. This design is so efficient that a PowerArc™ lamp housing can deliver up to 11 times more optical power into a given smaller area than a conventional lamp housing. This is critical when illuminating light guides, monochromator slits, pinholes or other small areas.

What this means is simply that you get the same output with a 75 W system as with a conventional 450 W system. You obviously will save money and space.

While conventional lamp housings resemble chimneys emitting ozone and requiring cumbersome venting, the PowerArc™ has a sealed lamp housing that requires no ozone venting.

### Arc Lamp Housing Specifications

<b>Lamp Power Capacity</b>	75 to 150 watts
<b>Height</b>	100 mm (3.9 inches)
<b>Width</b>	100 mm (3.9 inches)
<b>Length</b>	210 mm (8.3 inches)
<b>Weight</b>	1.9 kg (4.2 pounds)
<b>Window Diameter (D)</b>	65 mm

### Ozone-Free Arc Lamp Housing

We call the PowerArc compact arc lamp housing design an ozone free lamp housing regardless of the lamp selected, even in the case of UV enhanced lamps. It is ozone free primarily because it is a sealed lamp housing that is air tight and not air cooled, unlike most arc lamp housings which use air cooling.

The PowerArc lamp housing with UV enhanced lamps has been tested following OSHA safety standards. While some ozone was detected outside the lamp housing, the ozone levels in the test room were well below the safe guidelines. Of course some UV light is delivered outside the lamp housing and into the air in the test room, and you can even detect this by smell, but not enough ozone is created to pose a health risk or require a chimney for venting.

Air cooled lamp housings have a real problem because they blow oxygen at the UV source, and, like blowing oxygen on a fire, this creates problems. One way to get around this problem with an air cooled lamp housing is to select a lamp that has an envelope that does not emit wavelengths below 250 nm. As such even an air cooled lamp housing will not create an ozone problem since there is no UV output outside the lamp itself. The problem with this solution is that many applications require deeper UV wavelengths.

If you require deep UV output for your application then you necessarily require a lamp that emits deep UV wavelengths. For these applications we recommend a UV enhanced lamp and a suprasil front window for the PowerArc lamp housing to get the most UV output you can. Even in this configuration, the sealed PowerArc

lamp housing is still considered to be an ozone free lamp housing.

Since oxygen is the principle absorber of light in the 150 to 200 nm range, some applications, such as CD spectroscopy, require nitrogen purging to access the lowest UV wavelengths emitted from UV enhanced xenon lamps (down to about 180 nm). For output in the 180 to 200 nm range you will need to nitrogen purge your optical environment, and also to use no front face window on the lamp housing. The housing is now no longer air tight, but the nitrogen purging negates the concern for ozone creation.

The unique PowerArc design allows you to choose whatever lamp, reflector and front face window is best for your particular optical needs. And the Ozone free design means that your choice is always safe and requires no venting or chimney to deal with.

### Arc Lamp



You have a choice of lamps depending on the spectral output that you require. Of course you may order different types of lamps for the housing, they are interchangeable.

There are two types of arc lamps available—xenon and mercury. The xenon gas used in the lamp provides continuous spectra from 180 nm to 2,500 nm of course at varying intensity (refer to spectral output graph). The mercury provides a line spectra (refer to spectral graph). The spectral curves for xenon and mercury are normalized (relative intensities) therefore it is not obvious that the mercury lamps, intensity—where it emits, exceeds that of the xenon lamp. Because of the smaller arc size, the mercury lamp can also provide greater intensity in a smaller area (greater brightness) than the xenon lamp.

We also have an optional tungsten-halogen filament lamp for NIR applications.

Arc lamps come with a quartz or suprasil envelope depending on the application. Quartz lamps do not transmit the deep UV below 240 nm. Suprasil lamps do transmit the deepest UV output from the arc down to about 180 nm. For either type of lamp envelope our unique lamp housing design does not create ozone and therefore requires no ozone venting.

### Arc Lamp Specifications

Lamp Wattage	Lamp Type	Nominal Arc Gap
75 watt	Compact Arc Xenon	0.8 mm
100 watt	Tungsten Halogen Filament	4 x 2 mm
100 watt	Mercury	0.25 mm

Lamp Wattage	Lamp Type	Nominal Arc Gap
75 watt	Suprasil Compact	70 A rms
Arc Xenon	1.3 mm	
150 watt	Compact Arc Xenon Ozone free	2.1 mm
150 watt	Compact Arc Xenon	2.1 mm

The 75 watt xenon lamp and 100 watt tungsten-halogen lamps require no cooling whatsoever. The larger wattages of lamps require water cooling.

You can either get your water directly from the cold-water tap (can be a problem if the water is hard or when water is not available) or from an inexpensive circulating water bath option that we provide.

We have selected water-cooling over air: because it allows us to make a more compact housing; seal in the ozone and eliminates the need for venting.

### Arc Lamp Housing Ellipsoidal Reflector

Our ellipsoidal reflectors are proprietary in design and the coating used. They are NOT electro-formed reflectors, which can distort with heat, and can degrade within months. Our proprietary design ensures that distortion of the critical ellipsoid can not occur as the lamp reaches its operating temperature. This ensures thermal stability of focus. The coating ensures reasonably long operating life—typically 3-5 years.

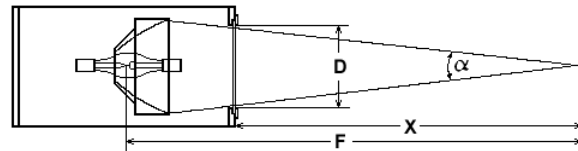
With an PowerArc™ lamp housing you have a choice of three different ellipsoidal reflectors depending on your requirements. The proprietary reflectors HORIBA uses allows for the great 70% collection efficiency. In addition to collection of light the reflectors are used as focusing elements. Hence the selection of a reflector determines the focal length. The different focal lengths correspond to the different “focal cones” of light coming from your lamp housing. This “focal cone” is variously referred to as f/#, Numerical Aperture, and/or acceptance, convergence, or divergence angle.

The f/# is important when considering matching a light source to some other component, for example: fiber optics, liquid light guides or monochromators. However the f/# does not affect the light collection as it does in a simple lens design. The shape and size of the ellipsoidal reflector determines how much light is collected from the lamp arc, and the amount of delivered light is the same for all of HORIBA's reflectors. Selection of your HORIBA reflector f/# is primarily based on matching the focal cone of the converging beam with any secondary optical elements you will be using. However the f/# also determines the focal distance and the focal spot size with lower f/#'s having shorter focal lengths and smaller spot sizes.

The spot size at the focus is directly related to the original arc gap size of the lamp and the focal length of the

reflector. The larger the arc, or the longer the focal length, the larger the spot size at the focus. Hence if you want to have the maximum power in the smallest spot select the fastest focal length (f/1) and the smallest arc size lamp (100 W Mercury). This is another unique benefit of the HORIBA's system; we give you the most power in the smallest spot. No one using an arc lamp can match us in this regardless of their systems size or cost.

Reflector Selection Guide (dimensions are in millimeters)



### Arc Lamp Ellipsoidal Reflector Specifications

	f/4.5 reflector	f/2.5 reflector	f/1 reflector
<b>Focal length (F)</b>	379 mm	240.5 mm	112 mm
<b>Focal point from housing (X)</b>	284.35 mm	151.46 mm	22.25 mm
<b>Beam angle (a)</b>	14.5 degrees	28 degrees	45 degrees
<b>Numerical Aperture N.A.</b>	0.12	0.24	0.45
<b>Arc Xenon</b>	1.3 mm		
<b>150 watt</b>	Compact Arc Xenon Ozone free		2.1 mm
<b>150 watt</b>	Compact Arc Xenon		2.1 mm

### Arc Lamp Housing Window

The PowerArc™ is a sealed arc lamp housing. You have a choice of the optical front windows such as Pyrex, Fused Quartz or Suprasil, depending on the spectral output that you require. If you plan to use different types of lamps in your lamp housing, you may want to order different windows or select Suprasil since it will transmit all spectra.

### Arc Lamp Power Supply

The PowerArc™ lamp housing comes with one of two choices for the power supply and igniter.

#### Dedicated 75 or 100 Watt Arc Lamp Power Supply:

Dedicated 75 or 100 Watt Power Supply If you are only ever going to use the 75 watt xenon lamp or 100 watt mercury lamp with your OBB PowerArc™ lamp housing, then we offer two dedicated compact power supplies and igniter units that are integrated onto the lamp housing. They are specially designed switch mode power supplies offering outstanding stability with a simple push button, electronically safe, ignition. In fact, although they are not DC regulated power supplies, OBB carefully designed them to offer virtually identical stability specifications to our linear power supply. When used with the PowerArc™ lamp housing this illuminator offers a very small form at a very affordable price.

**New Feature:**

\* New lamp hour usage meter



**75 Watt Switch Mode Power Supply Specifications**

Input (user selectable)	90–274 V AC, 50–60 Hz
Power Rating	50 to 100 watts
Operating Voltage	10 to 25 volts
Operating Current	3 to 7 amps
Pre-Ignition Voltage	65–75 V DC
Ripple at Max Current	< 3% peak to peak
Stability After Warm-up	0.5%
Line Voltage Regulation	< 0.5% current variation for 5 volts line change
Dimensions (H x W x D)	4.82 x 4.14 x 8.02 inches
12.2 x 10.5 x 20.4 cm	
Weight	4 pounds, 2 kg

**Universal 75 to 150 Watt Arc Lamp Power Supply:**

If you need to use a lamp other than 75 or 100 watts, then we offer a universal highly-regulated, constant current, linear, DC power supply. This universal power supply provides very stable power for arc lamps. It can also be used with a 100 watt tungsten-halogen filament lamp for enhanced IR output. Designed for use with various lamp housings, it may be used with lamp housings from other manufacturers. When used with an arc lamp in OBB's PowerArc™ lamp housing, this stand alone power supply is connected to a compact igniter that is integrated onto the lamp housing for electronically safe ignition.

The DC regulated power supply pictured below has a current adjust for different operating wattages and can display operating voltage, wattage or current.



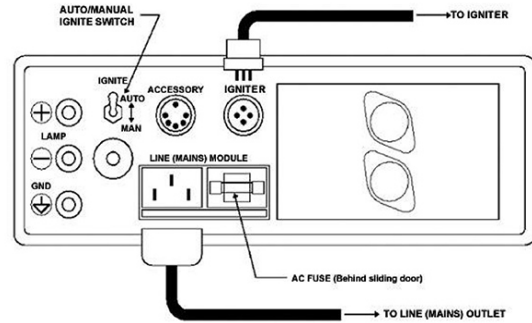
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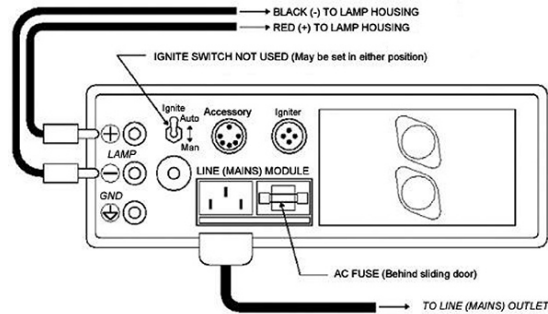
**France:** +33 (0)1 69 74 72 00  
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Universal Supply Connections for Arc Lamp



Universal Supply Connections for Tungsten Lamp

**75 to 150 Watt Universal Power Supply Specifications**

Input (user selectable)	105–120 V/60 Hz or 210–240 V/50 Hz
Power Rating	0 to 150 watts
Operating Voltage	10 to 24 volts
Operating Current	0 to 8 amps
Pre-Ignition Voltage	> 85 volts
Ripple at Max Current	< 10 millivolts
Stability After Warm-up	0.2%
Line Voltage Regulation	0.1% current variation for 5 volts line change
Load Regulation	0.1% current variation for 50% change in load impedance
Dimensions (H x W x D)	4.5 x 10.75 x 12.5 inches, 11.5 x 27.3 x 31.8 cm
Weight	12 pounds, 5.45 kg

**Ignition Safe Arc Lamp Igniter**

Ignition noise can disrupt, or even destroy, sensitive equipment in the vicinity of an arc lamp during start-up. This can be quite a concern in a crowded lab environment. OBB Engineers introduced an igniter that is integrated onto the lamp housing. This design provides an effective EMI shield which contains the EMI pulse, providing a safer and more convenient environment in which to do your research