

APEX2 Illumination System



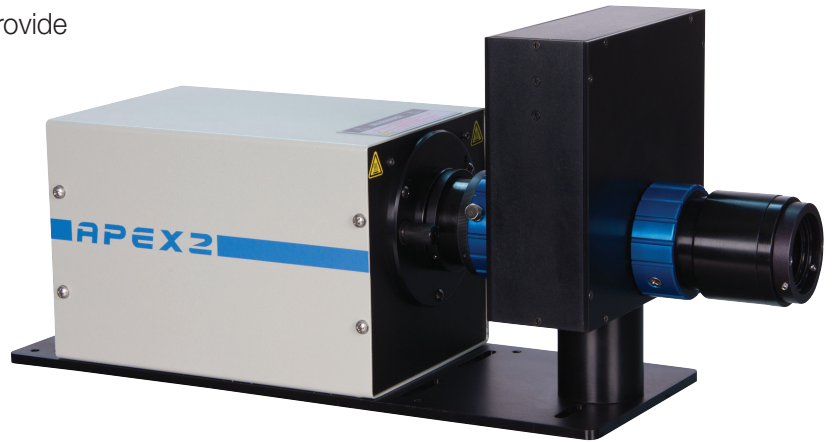
The Oriel® Instruments' APEX2 series is an illumination system using a highly efficient QTH or Xenon lamp to provide cost conscientious solutions for scientific and industrial applications. The APEX2 series includes an integrated, six-position filter wheel (filters sold separately) that can be controlled manually, via USB 2.0, or through Oriel Instruments' Cornerstone Series and MS257 Series Monochromators.

With an integrated power supply, the APEX2 is specifically designed for applications requiring simple turn-key operation and portability. An easily accessible manual shutter provides complete light blockage and eliminates the need to power down the lamp when adjusting the measurement or application. An "adjustment free", drop-in lamp design ensures minimal effort is necessary to replace lamps. For maximum versatility, the APEX2 accepts either Oriel Instruments 1.5" flanges or the Newport Lens Tub (LT), enabling it to couple to a wide assortment of optics and optical components, such as beam expanders, telescopes, microscopes, collimators, fibers or monochromators.

The optional Lock-In Digital Amplifier Stanford Research Systems Kit (LIDA-SRS-KIT) transforms the APEX2 into a modulated light source ideal for time transient studies or lock-in detection.

The APEX2 Advantage

Newport offers six families of arc lamp sources. The APEX2 Series Illumination System is a compact and alignment-free, highly stable, collimated, broadband source. Turn-key operation is achieved by integration of the lamp power supply



and optics. Standard lamps include 100W QTH lamp and 100W Xe Arc lamp. Please contact Oriel Sales for inquiries of other arc lamp options.

Product Features

- Fully integrated, compact, economical system
- Easy lamp replacement - no alignment needed
- Highly collimated, 1.3 inch diameter output beams
- Fixed power operation - no voltage or current adjustments required
- Six position filter wheel built in
- USB 2.0 controllable

Principle of Operation

A typical lamp used in the APEX2 Illumination System is depicted below in Figure 1. The pictured bulb assembly consists of an ellipsoidal reflector, precision-aligned to a xenon bulb to provide a 100W broadband arc source. The QTH version of the lamp uses a 100W QTH lamp in place of the arc, to provide an efficient broadband grey body source. The integrated ellipsoidal reflector offers increased light coupling efficiency by capturing a larger solid emission angle, a simplified drop-in lamp installation, and an alignment-free lamp replacement



Fig 1 Model 6252 Xenon Lamp

For the Xenon lamp, the shortened electrode gap produces a smaller arc that has a higher power density than many traditional 100W Xenon arc sources, which enhances optical throughput.

Figure 2 shows the simple optical path of an APEX2. Light from the focused Xe arc source is simulated using a 63 mm perfect lens. UV fused silica (UVFS) relaying optics are used to optimize the amount of light from the Xe lamp assembly through the 1" diameter filter wheel without

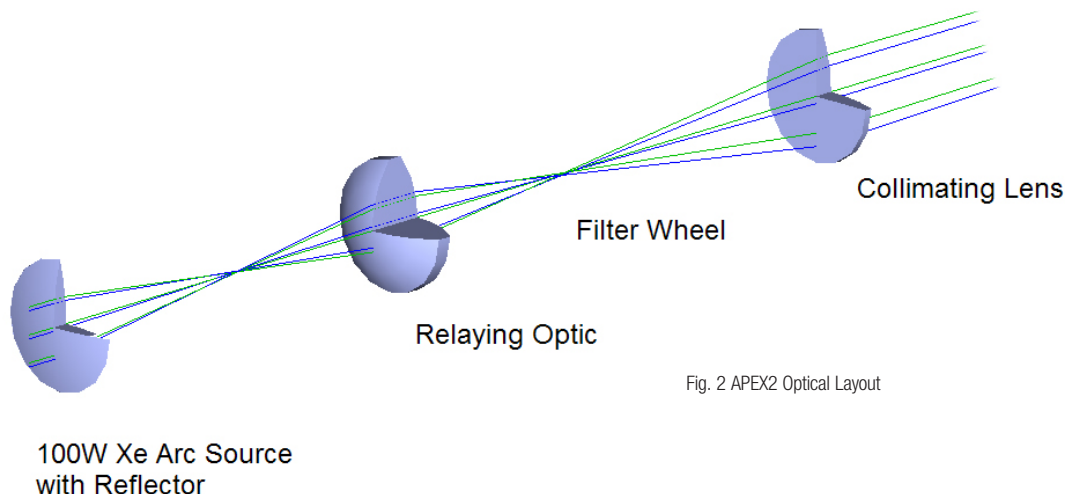


Fig. 2 APEX2 Optical Layout

clipping or affecting localized thermal gradients which can easily fracture filters. A 50 mm collimating UVFS lens then collimates the lamp output at a 3.5° half angle. When combined with an 80-100 mm lens, the output can be re-focused into our Cornerstone Series and MS257 Series Monochromators; or if focusing with a fiber, attach the necessary fiber-coupling adapters directly to the APEX2.

Integrated Filter Wheel

The APEX2 Illumination System incorporates a size position, motorized filter wheel that accepts 1" filters, up to 5 mm thick, and can be sequentially selected manually or through computer control via USB 2.0. The stepper motor has been optimized to provide consistent filter positioning as well as a speed of 1.7 sec/filter. An easy LED display indicator positioned on the rear-facing panel of the filter enclosure shows the present filter position for easy and safe monitoring of the system. Turn-key utility software is provided with the APEX2 to allow full filter wheel control. For easy integration into customer applications, a LabVIEW-based API is also available.

Integrated with Oriel Monochromator

The APEX2 can be readily integrated with an Oriel Monochromator, such as the Cornerstone 130/260 or MS257. The monochromator directly controls the filter wheel, which in turn controls the function from the monochromator, making it fully backward compatible. A ribbon cable is required for power and communication, sold separately.

APEX2 Spectrum

The normalized spectral output of the APEX2 is plotted in logarithmic axis against wavelength for the 200 to 1780 nm range in Figure 3 & 4.

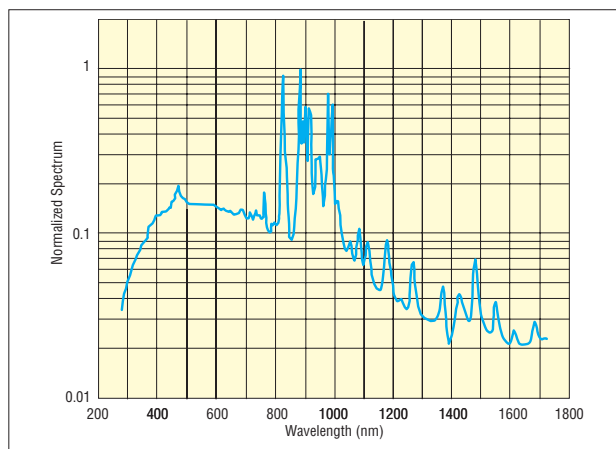


Fig. 3 Spectral Output of the Xe Lamp

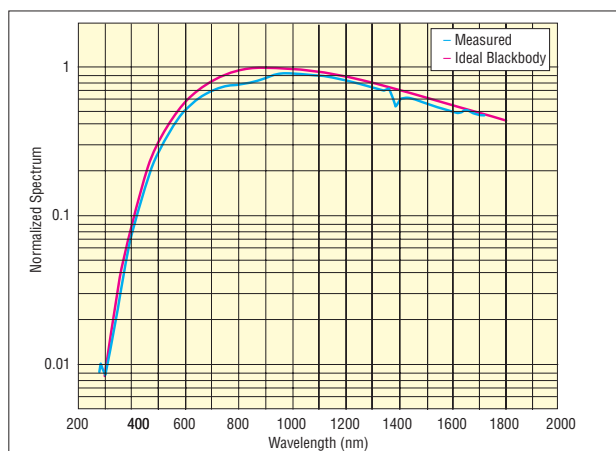


Fig. 4 Spectral Output of the QTH Lamp

Mounting

APEX2 uses four adjustable feet with a 0.5 inch (13 mm) height adjustment to level the unit. For convenient mounting to an optical table, the feet may be removed and the mounting holes on the base plate can bolt the APEX2 to an optical table. The mounting holes on the base plate support both metric and imperial optical tables.

Safety Considerations

Arc lamps emit UV radiation. Personnel working around these sources should wear protective eyewear and gloves. UV radiation can cause burns of the eyes and skin.

Ordering Information

APEX2-XE	Xenon modular light source with integrated filter wheel
APEX2-QTH	QTH modular light source with integrated filter wheel

Monochromator Mounting Kits

APEX2-CS1-KIT	Mounting Kit for APEX2 to Cornerstone 130
APEX2-CS2-KIT	Mounting Kit for APEX2 to Cornerstone 260
APEX2-MS1-KIT	Mounting Kit for APEX2 to MS257

Fiber Optics Mounting

77776	Fiber Bundle, Focusing Assembly, FS Aspheric, F/2.2, 800 μ m spot
77760	Fiber Adapter, 11 mm to SMA
77675	Fiber Adapter, 11 mm to ST

PARAMETER	APEX2-XE	APEX2-QTH
Function	Light Source	Light Source
Configuration	Modular design (2 box approach: Box 1 = source; Box 2 = accessory compartment) and universal fit. External control of filter wheel via PC or monochromator	
Light Source	Reflector integrated 100W Xe lamp	Reflector integrated 100W QTH lamp
Replacement Lamp	6252	6338
External Voltage Control	N/A	QTH lamp goes full power with internal mode. External mode requires external 0-5 V DC control signal. 0 V: 0 Watts 5 V: 100 Watts
Filter Wheel	Built-in motorized filter wheel can install up to 6 individual 1" standard filters. Stand alone or control via PC using USB 2.0. Compatible with all Cornerstone Series and MS257 ¹ Monochromators. Built in LED displays filter position while in stand alone.	
Filter Dimensions (diameter / maximum thickness)	1 inch / 0.230 inch (6.00 mm)	1 inch / 0.230 inch (6.00 mm)
Filter Wheel Speed	1.7 seconds/filter	1.7 seconds/filter
Lamp Hours	750 hours	500 hours
Lens Material	Fused Silica (200-2500 nm)	Fused Silica (200-2500 nm)
Connection Aperature	1.5 inches (38 mm)	1.5 inches (38 mm)
Divergence (Half Angle)	4.0 ¹ ± 0.5°	5.0° ± 0.5°
Optical Power ² (Watts)	9.2 ± 0.4	9.4 ± 0.4
Spot Size ³ (mm)	33 ± 2	38 ± 2
Light Ripple (RMS)	<0.2%	<0.7%
Temporal Stability	<1%	<1%

GENERAL

AC Input	100-120 V / 1.5A (slow blow); 200 - 240V / 0.8A (slow blow); 50/60 Hz
Operating Environment	5°C to 40°C; <80% relative humidity RH non-condensing; <3000 m altitude indoor use only; installation category II; pollution degree 2
Storage Temperature Range	0° to 50°C; relative humidity does not exceed 30%
Shutter	Manual shutter
Open Axis Height	4 inches (101.6 mm)
Weight	13 pounds; 5.9 kg.
Coupling	1.5 inch series female flanges
Size	Length: 19.875 inches (504 mm) Width: 6.625 inches (186.3 mm) Height: 8.925 inches (226.7 mm)
Safety	Built in interlock that shuts lamp temps off when cover is removed or if the internal temperature exceeds normal operating conditions
Compliance	CE
CE Certification	Safety: EN61010-1:2010; EN61326-1:2013

Software Function

Utility Software	Control Filter Wheel (Universal USB filter wheel utility)
Driver	Windows XP 32-bit, Windows 7, 32 and 64 bit driver

Notes:

1. Filter wheel recognizes connection to MS257 and restricts available filters to five possible positions
2. Aperature is fully opened
3. Beam spot size measured at 28.5 mm