



## Rapp OptoElectronic Flash Unit

The Rapp OptoElectronic JML-C2 Flash Unit is a pulsed Xenon light source producing an intense flash of UV light for the photolysis of caged compounds in the specimen plane of a microscope. The single case configuration permits easy operation, easy alignment by the user, and easy lamp replacement.

The Rapp OptoElectronic Flash Unit offers the following features:

- \* Point source high efficiency Xenon flash bulb
- \* High pulse energy of up to 220 J/pulse
- \* Moderate repetition rate (0.2 - 8 Hz)
- \* Focus mode
- \* Slots for optical filters
- \* LED illumination tool for alignment
- \* Power supply with built-in lamp housing
- \* UV anti-reflection coated quartz optics
- \* Calibrated photodiode for lamp adjustment
- \* Built-in UV filter
- \* 1.5 meter quartz light guide, 1.25 mm in diameter, NA = 0.22

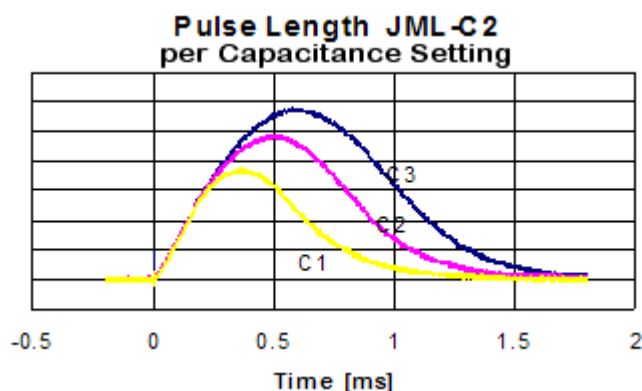
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The Rapp model JML-C2 Xenon flash lamp system is a powerful tool for use in science and industry in initiating photochemical reactions or for illumination. Provided that neither time-resolution in the sub-millisecond range nor high repetition rates are required, this system is able to compete even with very expensive UV laser systems.

Since the essential electronic components are integrated together with the optical elements in a shielded 19-inch housing, electromagnetic interference effects that occur when triggering a gas discharge lamp are greatly reduced or shielded.

The electrical energy is stored in a bank of specially designed flash capacitors. The total energy can be set by choosing:

- 1.) the amount of capacitance connected (front panel switch: C1, C2, and C3)
- 2.) the voltage across the capacitors (front panel multi-turn knob)



The maximum energy available is 220 joules. Since the discharge lasts about one millisecond, this energy is related to a peak power of 220 kilowatts. Energy at the exit of the quartz light guide with UV filter in place measures 15 millijoules per pulse.

The system can be triggered externally, for example, from a data acquisition system, or manually at the front panel.

With a given fiber diameter of 1.25 mm and a numerical aperture of 0.22, the spot size and number of photons/m<sup>2</sup> can be calculated. The light at the exit face plate of the fiber may be demagnified (concentrated) to a 212 μm spot using an NA=1.3 objective (1.25 x 0.22 ÷ 1.3), while using an NA=0.9 objective (1.25 x 0.22 ÷ 0.9) yields a 306 μm spot, which is the minimum. Any further demagnification would only over-illuminate the objective's pupil and will not increase the brightness.

A full shot will yield more than 2 x 10<sup>16</sup> ultraviolet photons into the back focal plane of the microscope. Depending on the objective used, this corresponds to 6 x 10<sup>23</sup> photons/m<sup>2</sup> with 1.3 NA Fluor 40X in oil, or 3 x 10<sup>23</sup> photons/m<sup>2</sup> with a 0.9 NA Achromat 63X in water, in the specimen plane.

For applications requiring shorter pulse lengths or higher repetition rates, we have other flash systems and even lasers available. Please contact us for more information.

For a list of reference publications using Rapp flash systems, please visit <http://www.rapp-opto.com/index6.htm>

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