
Engineering Note

Topic: PX-2 Pulsed Xenon Lamp Stability

Product Affected: PX-2 Pulsed Xenon Light Source

Date Issued: 7/08/2002

Description

Several factors determine the effective stability of the PX-2 Pulsed Xenon Lamp (i.e., rep rate, fiber diameter, time frame, wavelength, etc.). This document addresses the more common modes of operation and the resulting stability.

Long-term Stability

The long-term stability of the PX-2 was determined by coupling its output to a UV-VIS S2000 Spectrometer using a 50- μ m fiber. The PX-2's rep rate was 122 Hz. The parameters for the S2000 Spectrometer were as follows:

- 16 ms integration time,
- Pixel boxcar of 15, and
- 16 scans averaged.

A scan was collected every 5 minutes for 4 hours. The results of several selected wavelengths are shown in Figure 1. The results are typical of other flash lamps in which the stability of the longer wavelengths is better than the shorter ones. The short-term positive increase was observed on three similar experiments. The cause of this phenomenon is unknown but is theorized to be a thermal effect due to heating.

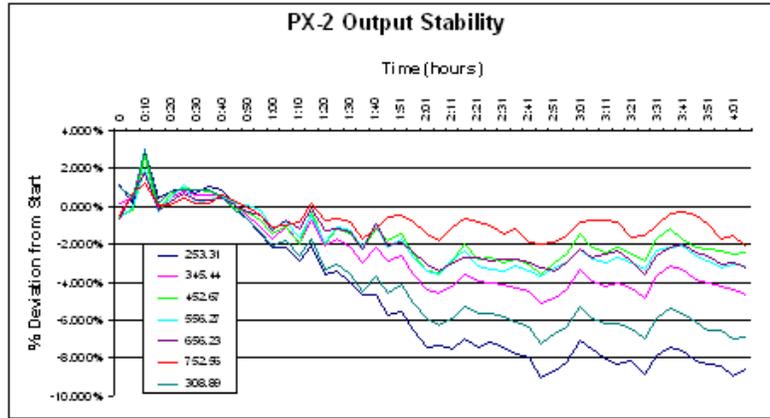


Figure 1: Long-term Stability of the PX-2 Pulsed Xenon Lamp

Pulse-to-pulse Stability

The amount of light through a fiber was measured with a large-area photodiode. Figures 2 and 3 show the pulse-to-pulse stability of the PX-2 at two different rep rates. As expected, the stability improves with the slower rep rate. Figure 4 shows a graph of the stability versus rep rate for the PX-2.

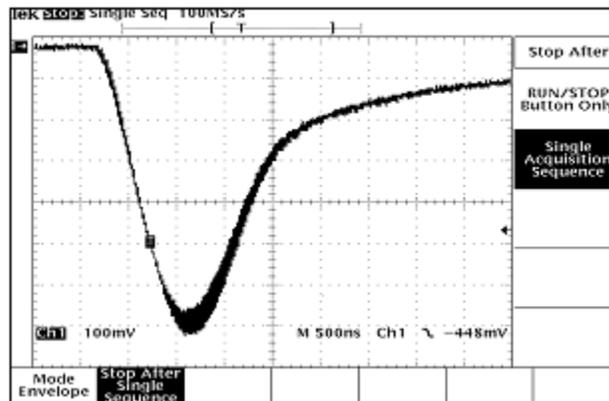


Figure 2: Oscilloscope Trace of Pulse-to-pulse Variation into 600 μ m Fiber @ 200 Hz Rep Rate

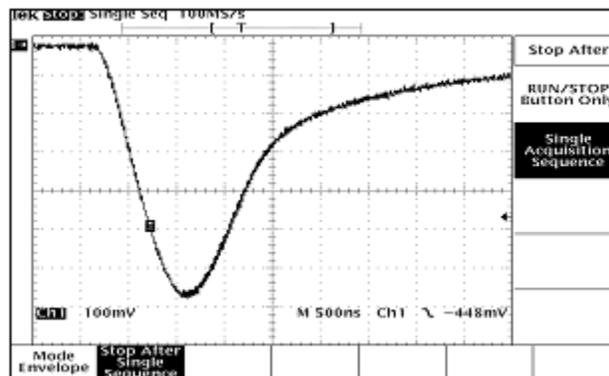


Figure 3: Oscilloscope Trace of Pulse-to-pulse Variation into 600 μ m Fiber @ 10 Hz Rep Rate

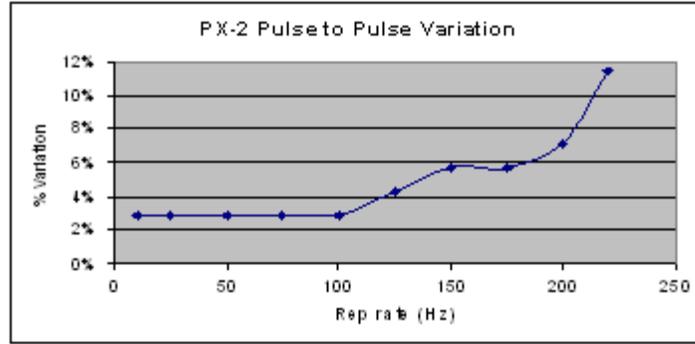


Figure 4. Rep Rate Dependence of Pulse-to-pulse Variation through a 400 μ m Fiber

Note

The average output power was not rate-dependent.

