

## Q.A. Lab Experiment # 4

### kVp Check

#### ***Purpose***

To check variations between the stated kilovolts (peak) and the x-ray beam quality

#### ***Learning Objectives***

After completing this lab, you should be able to:

1. Use the laboratory equipment properly.
2. Set up the control console and ceiling tube mount correctly.
3. Function effectively in group work.
4. Perform the experiment independently.

#### ***Materials Needed***

- Radiographic unit
- kVp meter
- Lead apron

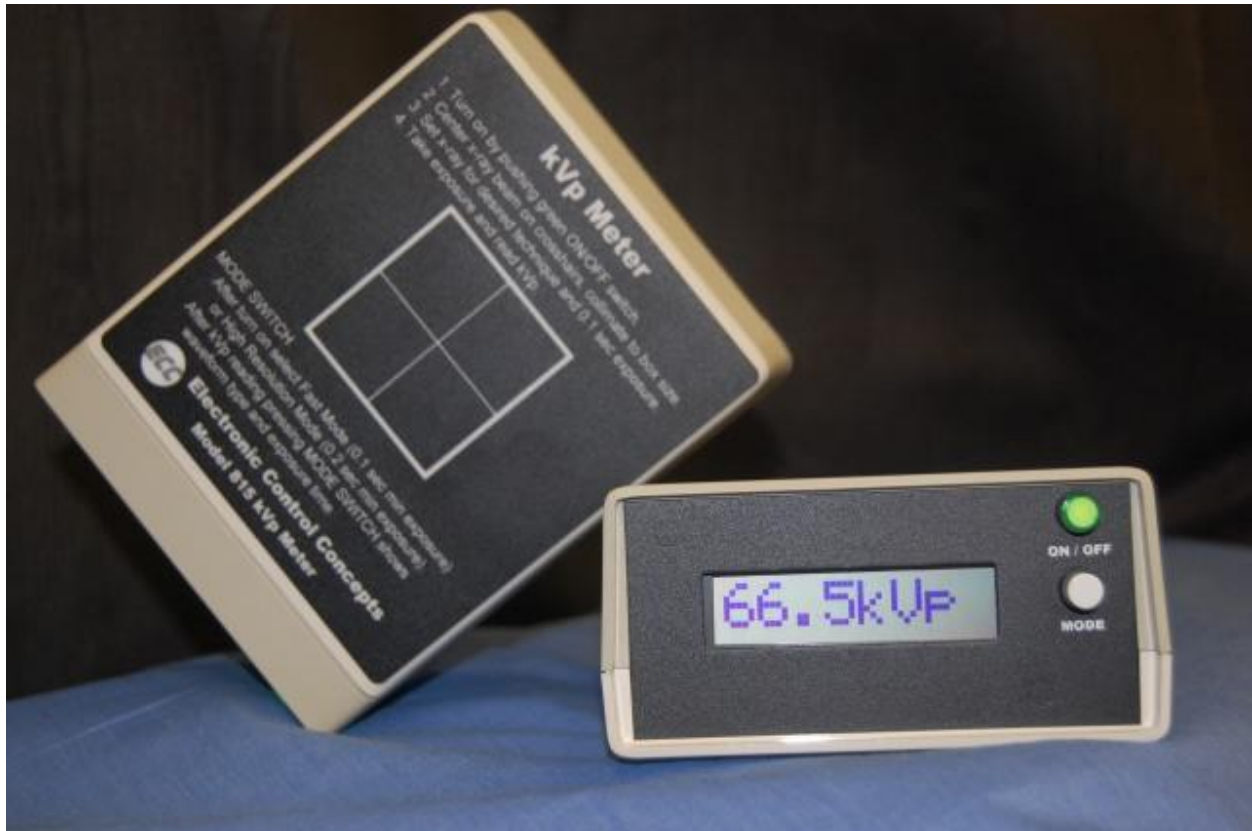
### Pre-Lab Discussion

The x-ray tube voltage (measured in kilovolts [peak]) has a significant effect on image contrast, optical density, and patient dose. Therefore the kilovolts (peak) stated on the control panel should produce an x-ray beam with a comparable and consistent amount of energy. Variations between the stated kilovolts (peak) and the x-ray beam quality must be within  $\pm 5\%$ . For example, if 80 kVp is selected on the control panel, the maximum x-ray beam energy should fall within  $\pm 4$  kVp of this value. The kilovolt (peak) accuracy can be determined using a specialized digital meters. This process should be done in 10-kVp to 20-kVp increments, usually beginning with 50 kVp. This test should be performed after installation and then annually or when service is performed on the x-ray generator or tube. Variations in kilovolt (peak) output may be caused

by variations in the line voltage supplying the x-ray generator, by faulty high-voltage cables, or by problems with the autotransformer/kilovolts (peak) selection circuitry.

**Figure 1**

kVp Meter



### **Instructions kVp check:**

- Set meter at about 40" from focus or as prescribed by manufacturer.
- Set 400 mA and 200 ms on the console
- Measure kVp from 60-120 kVp by performing five exposure at various kVp (eg. 60, 70, 80, 100, 120) settings.
- Calculate error between set and measured value

Variations between the stated kilovolts (peak) and the x-ray beam quality must be within  $\pm 5\%$ .

Set kVp	Variation allowed	Measured kVp	Acceptable kVp Range
60	±5%.		57kVp - 63 kVp
70	±5%.		?
80	±5%.		?
90	±5%.		?
100	±5%.		?
110	±5%.		?
120	±5%.		?

**Corrective Action:**

Any units that exceed 5% variation between the stated kilovolts (peak) and the x-ray beam quality must be corrected.