

## CHAPTER 5

### DISCUSSION

The OAEP 1409 high voltage power supply is a standard triple-width NIM module that provides either polarity of output voltage from 1 to 2500V and current from 0 to 2mA. The adjusted output voltage is available through two SHV rear-panel connectors. This unit operates on 220-V ac input power, furnished through a power line cord in which both side of line are fused. Toggle switch on front-panel is used to energize the unit and an indicator lamp shows when the power is on. A front-panel zero-center indicating meter shows the polarity and approximate value of the adjusted output voltage and two adjacent indicator lamps will show the output polarity when the power cord is plugged into line source. A 3-turn precision potentiometer on front panel is used to adjust the output level. Built-in overload and short-circuit protection is used to shut down the output voltage and reset push-button on front-panel is used to restart the output voltage.

From the result of the performance test of this high voltage power supply, it has been found that only temperature stability and output ripple do not meet the requirement. The problems arising in temperature stability come from the voltage drift in feedback network and also the drift of the input offset voltage of the IC comparator.

The problems arising in output ripple come from two sources, The first one is the voltage spike occurring in the inverter that can not be reduced completely to zero since the stray-inductance of capacitor C11 in clamp circuit is too large; The last one is the 50Hz hum coupling from a.c. line which can not be filtered out. However, these problems are not too serious since it still lies in acceptable limit.

The linearity test shows that error between dial setting on the front-panel and the output voltage is better than 1 % through the output voltage range from 50 to 2500V. This is very useful in fine setting of output voltage because the front-panel meter is used only as a rough indicator of output voltage. The regulation and stability test show that this OAEP 1409 high voltage power supply provides the well-regulated and highly stable voltage that meets the requirement for proper operation of photomultiplier tubes, ionization chamber, and lithium-drifted semiconductor detectors.

The dimension of the OAEP 1409 high voltage power supply is still quite large owing to the size of the filter capacitor used in this unit. However the power consumption from the a.c. line is only 18W and the unit price of the OAEP 1409 amounts to one-third of the comparable high voltage power supply purchased from abroad.