EV-14 DAEDALON Kilovolt Power Supply

INTRODUCTION:

The EV-14 Kilovolt Power Supply is an adjustable, line-regulated power supply for photomultiplier tubes, e/m tubes, Maltese Cross, Luminescence tubes as well as other similar vacuum tubes. The output is isolated from the chassis so that it connects as a positive or negative supply. The output displays on a digital panel meter for accuracy. The output voltage is adjusted with a three-turn panel potentiometer, which permits adjustment of the output to better than 1%. There is a slide switch on the rear panel that controls the maximum available voltage. The limiting voltage can be set to 5,000 Vdc or 2,500 Vdc. An internal high frequency potted module supplying the filtered output produces the output high voltage. The output ripple voltage is at high frequency, which is more easily filtered than line frequency. This permits the use of a smaller capacitor across the output, which makes the output inherently safer to use. The output voltage is available on shielded banana jacks on the rear panel. The output is current limited for safety.

The Power Supply has a 6.3 Vac 2A filament power supply for the vacuum tube filament if it should be needed.

OPERATION:

The front panel of the Power Supply is shown in Figure One. The Power Switch on the lower left of the panel turns on the high voltage and filament power supplies. Above the power switch, an LED indicates the supply is on.

1. Select the output voltage needed using the rear panel slide switch.
2. Connect the supply to the load. The output jacks are on the rear panel for safety. The negative output is the black jack and the positive is the red jack. Neither jack is connected to earth ground. It is desirable to ground the circuit at some point to avoid unexpected static voltages. For convenience, the white banana jack on the rear panel is connected to the line power ground. If your line power has a grounding pin, this white jack will connect the output circuit to earth ground. The output jacks are shielded banana jacks. The connecting cables should use shielded banana plugs. Care should be taken with the location of the output leads. Inexpensive patch cords are not rated for the high voltage output of the EV-14 and their insulation may break down. Such a breakdown will not damage the supply, but may damage the experimenter touching or holding the leads.
2. After the leads are connected to the load and separated to avoid the possibility of insulation breakdown, verify that the power switch is off, and connect the supply to line power. If the load is a vacuum tube, connect the filament connection to the 6.3Vac banana jacks on the rear panel.

WARNING

The output of this power supply is hazardous. It should not be used without adequate supervision. The output is current limited to minimize danger to the user, but receiving a shock from the output is an extremely painful experience and may be physically harmful. There is no way to protect the user from the danger of the high voltage output of the supply. Your safety remains your responsibility.

3. Turn the *VOLTAGE ADJUST* knob to its fully counterclockwise position. This sets the output to its lowest value. Turn on the Supply. If the load is a vacuum tube, verify that the filament is lit. Some vacuum tubes may be damaged if the high voltage is present when the filament is cold. If the filament is not lit, turn off the Supply and recheck the leads.
4. If all appears correct, turn up the voltage. The *VOLTAGE ADJUST* knob is a three-turn potentiometer and the voltage increases slowly and linearly with rotation. The voltmeter samples the voltage every one third of a second, so make adjustments slowly when close to the desired voltage.
5. If the load impedance changes, the output voltage will change slightly as well. It can be reset to its original value with the *VOLTAGE ADJUST* control.

Typical Output

A typical voltage-current output is shown in Figure Two. This curve shows the load regulation characteristic of the supply. In this graph, Vi is the output voltage in kilovolts and Ii is the output current in milliamps. The rapidly falling voltage when the current limit is exceeded is a substantial safety feature should a person come in accidental contact with the output connections.

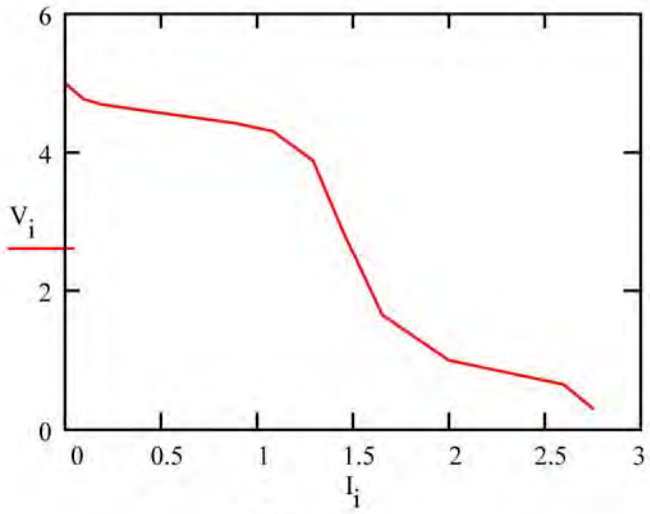

Figure 2

Fitting a least squares line to the data points up to 1mA gives an internal impedance of 0.54 megohms.
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SPECIFICATIONS

Output	
Voltage	500-5000 Vdc
Selected Maximum	2.5 or 5 kVdc
Ripple Voltage	10V rms at 0.1mA
Ripple Frequency	>15kHz. (Inaudible at full output)
Voltage Adjust	3 turn front panel potentiometer
Current	1mA 5000Vdc
Current Limiting	Output protected by current limiting that drops output voltage to a low value until short circuit is removed.
Line Regulation	±.04% for ±5Vac line voltage.
Load Regulation	0.54V / ・ A
Dimensions	9.5 h x 26 w x 22 d cm (3.8 x 10 x 8.5 in)
Mass (Weight)	2.3 kg (5 lbs)