

HESSI HIGH VOLTAGE POWER SUPPLY ELECTRICAL SPECIFICATION

1.0 Scope

This document establishes the electrical requirements for a high voltage power supply that will be part of the HESSI instrument and used to supply high voltage to the germanium detectors. The power supply may be hereafter referred to as the unit.

2.0 Requirements

2.1 Materials

Materials, coatings, and markings that crack, peel, or scale with age or when exposed to environmental conditions shall not be used. All internal electronic assemblies shall be encapsulated or conformally coated with a material whose outgassing is less than 1% total weight loss and .1% volatile condensable materials.

2.2 Workmanship

The unit shall be clean and free of foreign materials. Vacuum impregnation shall be used with encapsulation materials. There shall be no loose electrical connections, loose fasteners, nor other evidence of poor workmanship which may compromise the unit performance and intended use. All assembly activities shall be in accordance with NHB 5300.4 and appropriate NASA and military guidelines.

2.3 Assembly

The unit shall be assembled under controlled and repeatable conditions by suitably qualified personnel in accordance with standard processes pertaining to the assembly of space flight hardware. Records shall be kept to detail activities, materials, inspection, and tests.

2.4 Markings

Each unit's serial number shall be uniquely assigned and permanently marked at an external location.

2.5 Connectors

The input connector shall be a nine pin "D" connector. The output connector shall be **compatible with the detector input connector**.

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2.6 Inputs

The inputs to the unit shall be ± 12 Volts $\pm 10\%$ and its corresponding return, +28 Volts DC $\pm 10\%$ and its corresponding return, and a 0 to 5 Volt DC programming voltage.

2.7 Low Voltage Output

The unit shall provide a 0-5 Volt DC output corresponding to 0 - full scale output voltage.

2.8 High Voltage Output

The unit shall provide 0 to – 5000 Volts DC output at up to 50 μ A output current, linearly programmable with a 0-5 Volt DC programming voltage.

The output voltage shall be current limited by a 100K to 1 Megohm resistor.

2.9 Transient Characteristics

The output voltage overshoot shall not exceed 1% of the output voltage during any change in programming voltage.

2.10 Time Constant

The output voltage time constant shall not be less than .1 second nor greater than 10 seconds during any change in programming voltage. The rate of change of the output voltage shall not exceed 75000Volts per second.

2.11 Undervoltage

The unit shall survive without permanent degradation conditions which drop the 28 Volts to zero and back.

2.12 Input Current

The input current on the 28 Volts shall not exceed 50 milliamps. The input current on the ± 12 Volts shall not exceed 20 milliamps each.

2.13 Regulation

The output voltage shall be regulated to remain within 2% of the commanded value within the temperature range of -30 °C to $+50$ °C and a load range of 200 to 400 Megohms, and input voltage variations of ± 10 %.

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2.14 Output Ripple

The output voltage ripple shall not exceed 250 microvolts peak to peak at 50 microamps output current. The ripple shall not exceed .25 microvolts peak to peak at the detector with the detector high voltage filter circuit connected.

2.15 Altitude

The unit shall operate from sea level to deep space.