High Voltage Tester

WARNING: This device can produce in excess of 15kV output voltage. While current is limited to the microampere range, external components and cables can be charged to considerable voltage. If you are unfamiliar with safe testing procedures using high potting or high voltage testing equipment, do not use this device. This device is not a toy. It is for high voltage experienced users.

Safe procedures include ***but are not limited to*** allowing external devices to "bleed down" or discharge after testing. This device contains internal bleeder resistors. If left connected and turned down or turned off, or if power is removed, this HV tester drains any charge from external components or cables. Even though it will discharge external systems or components, the operator should always crow bar or short external devices between all pins to be completely sure they are discharged!

Avoid testing high capacitance components and systems. While this tester has very low source current, considerable energy can be built up and stored in external devices. This effect is much like trickle charging a battery. Even if voltage is turned down or the unit turned off large external capacitances can take a bit of time to fully bleed down. Always remember energy stored in a high capacitance external device might be dangerous to you and your equipment!

OPERATION

This device operates from any 300mA or larger 12 to 18Vdc supply. The center pin is positive. The maximum safe input operating voltage is 18Vdc. This tester is reverse polarity protected.

This unit employs a closed loop voltage regulator wrapped around a standard negative ion generator module. The output of that module is filtered by a high voltage filter capacitor.

The HV system is POSITIVE ground. The RED binding jack represents floating high voltage, red is NOT POSITIVE. Red in this case is a safety warning, not a polarity sign! The black binding post is the HV supply positive polarity grounded terminal. It is common with the 12V supply negative or ground rail.

ALWAYS TREAT THE RED POST AS HOT, but always be mindful it is actually a filtered negative polarity!

The front panel meter is 0-15kV. The large tics or pickets are 2500 volts or 2.5kV. The small tics or pickets are each 500 volts. The meter is better than 5% accuracy at light loads.

This unit has fold back current limiting, plus a current limiting output resistance. It has a bright red

LED load current indicator. This indicator begins to light at approximately 50uA. It is a good indicator of voltage breakdown.

TESTING COAXIAL CABLES and CONNECTORS

Cables and connectors are tested center to shield. Reasonable quality UHF connectors, when properly installed on any good cable of any standard size, should hold off at least 4kV from center to shield. This is almost half scale. If your standard size (not miniature) cables with UHF connectors do not hold off over 4kV, you most likely have an assembly problem. The common problem is poor cable end prep or loose strands, or something damaged from soldering.

The breakdown point in a connector or cable should be the air gap between center pin and shield. They should show no leakage up to breakdown.

If a connector by itself does not hold off the following voltages, the connector has a problem:

Type F voltage> 1.5kV or the first three minor pickets
N or BNC voltage> 2.5kV or the first major picket
UHF or HVN voltage> 5kV or two major pickets
Type C or better HVN voltage> 7.5kV or midscale

Coaxial cables should hold off more voltage than the mating connector. We almost never want the cable to be the weakest dielectric.

After testing, be absolutely sure you allow the system to bleed down. As an additional precaution discharge the center pin to the shield with a well-insulated handle tool!

TESTING VACUUM TUBES

Vacuum tubes can be tested for breakdown from grid and filament to anode, or between electrode. DO NOT test larger oxide cathode tubes from the grid or anode to the cathode or filament to the point where tubes arc. The internal arc can pit or damage the oxide. Some 572B’s have oxide coated filaments. Note it is not the tester current that is the issue, it is charging the grid or anode capacitance to high voltages and letting it arc to the cathode or filament oxide coating.

Thoriated tungsten emitter tubes are not easily damaged at all. They are pretty tough. 811A tubes are pretty much immune to testing damage.

Grids and cathodes can be fragile. The safest way to test transmitting tubes is to look for at least 1kV breakdown from grid to cathode or filament and use a 100k to 500K series resistor. The grid should always be connected to the cathode during anode breakdown tests. Anode breakdown should be at least twice, and preferably three or four times, the anode dc operating voltage.