Special purpose HV power supply modules for nuclear monitoring field

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Date of issue: March 20, 2005 product model: HVD series

1. Lead wires

Input terminal: red wire – positive terminal of input power supply; (yellow wire – negative terminal of input power supply); black wire - input power supply ground wire; green wire – output voltage control terminal.

Output terminal: white wire – output high voltage terminal; black wire – output ground wire.

2. Main technical parameters

（1）Working temperature range: the widest -55℃ ～ +225℃

（2）Input voltage: +10V~+33V(±10~±16.5V)

（3）Input current: less than 60mA

（4）Output voltage: 0V～-2500V (+500~+2000V)

(5) Output current: 250μA

(6) Temperature stability: lower than ±40 PPM/0 C, typical±20 PPM/0 C

(7) Linear adjusting rate: ±0.1%(10% linear change)

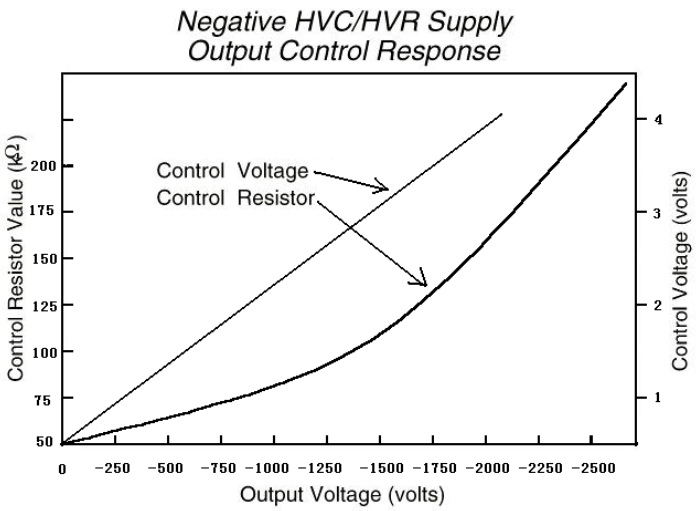
(8) Load adjusting rate: ±0.05(50% load change)

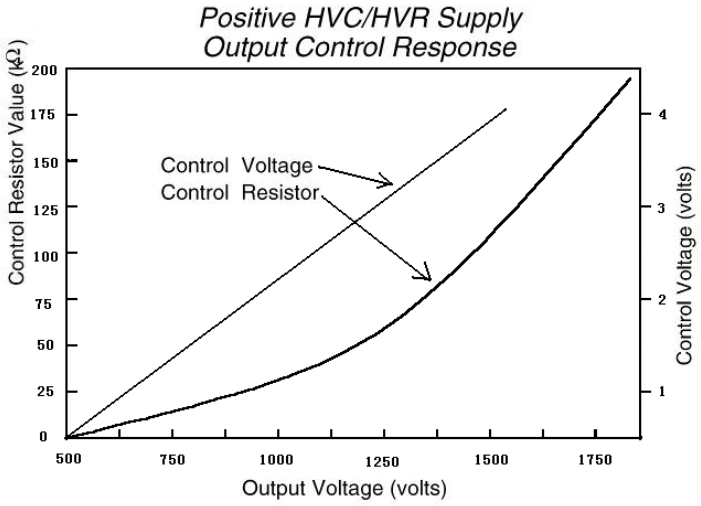
(9) Shock resistance: 25G，0~300Hz

(10) Output ripple: negative - 1.0Vp-p，typical 200m Vp-p

Positive - 100mVp-p，typical 50mVp-p

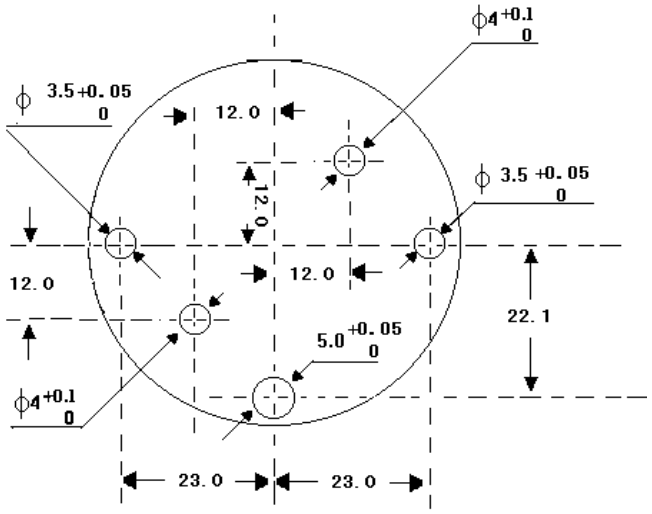
(with recommended filter: 5mVp-p，Typical 1mVp-p)

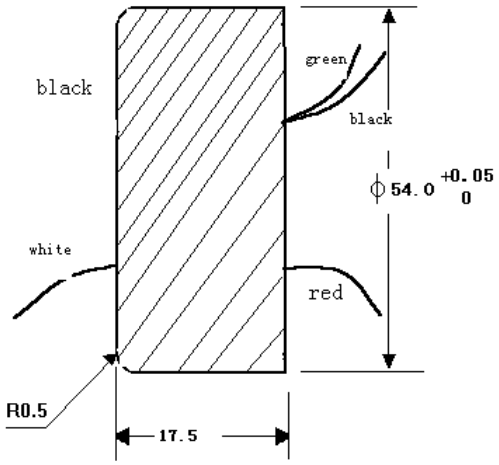




（11）Output characteristic

(12) Mechanical dimension:





3. Operating requirement

（1）Never let the environmental temperature be higher than the highest working temperature of the module for a long time. The module can work reliably for a long time without any heat damage within rated working temperature range. The maximum laboratory time is 200h continuous working. However, after working environmental temperature is higher than the rated working temperature, the damage and aging of elements and materials would speed up and the probability of their failure would double. Via 10 years of Statistics, following reliability data have been achieved:

1）For the case working within the rated temperature range and no limit to working time, the accidental failure period was longer than 3 years and the accidental failure rate was less than 1%

2）For the case working exceeding the rated temperature range and working every time for 2h exceeding the rated temperature by +25℃, the failure rate was less than 1% in the first year, was around 5% in the second year and around 10% in the third year.

3）For the case working exceeding the rated temperature range and working every time for 2h

exceeding the rated temperature by +50℃, the failure rate was less than 10% in the first year, was around 50% in the second year and around 70% in the third year.

（2）The output voltage grounding is only for wiring convenience. In some case, if both output voltage grounding and input power supply grounding are connected to the line, some interference would appear, here, the input power supply ground wire can be shared.

（3）If it is required to make the HV output ripple smaller for application, just wire a RC filter using the self-contained resistances and HV capacitances; in such way, the ripple can less than 1 mVp-p in general. See the attached drawing for the wiring method for the RC filter.

（4）If it is required to use voltage control mode for negative HV power supply, just connect a resistance in series with the green control wire (the resistance magnitude is just the value for the HV output to begin to change from zero volt when executing the resistance control mode), here, the HV output just conforms to control drawing curve.

4. Testing nots

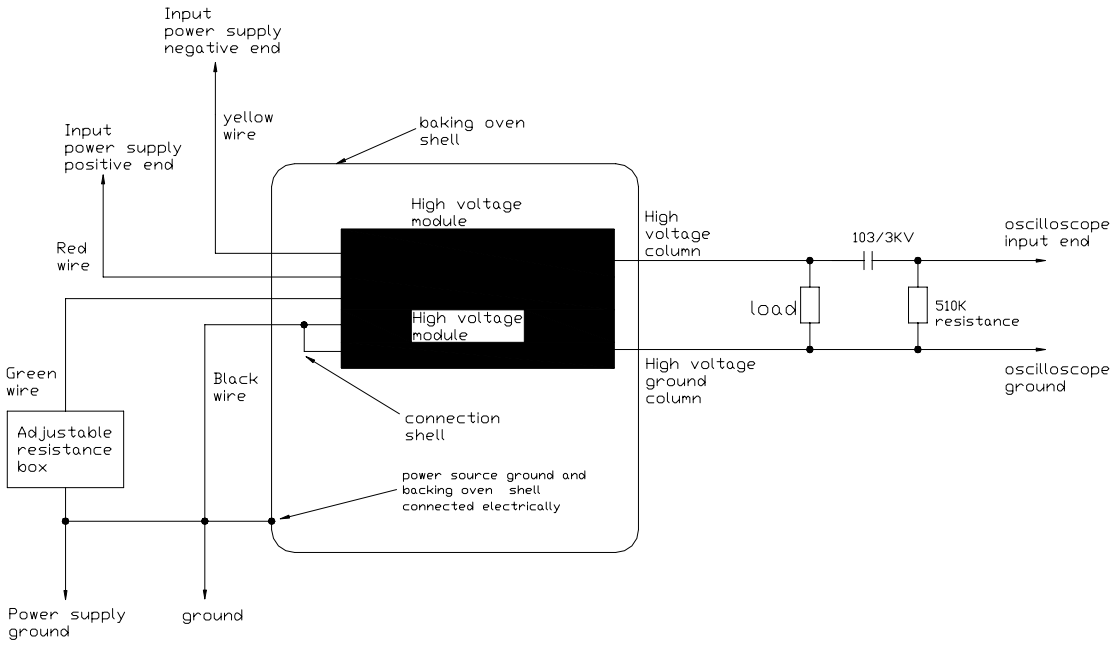
（1）The testing wiring drawing is shown in following figure. The HV lead wire shall adopt HV and HT resistant wire.

（2）Before testing formally, supply the HV module with 0~+4V DC (Turn on DC power supply), at the moment the module does not start yet and the ripple measured by the oscilloscope is inherent in the testing system itself. After normal measurement, the ripple measured by the oscilloscope minus the ripple inherent in the testing system is just the ripple of the HV module.

（3）The minimum load of the HV module could be 7M, the maximum one could be infinitely great(with HE3 tube). When control resistance value is given, The HV output will be a unique value and no longer change along with the input voltage change. However, the maximum output value of the HV module is relative to input voltage and load (the greater the input voltage and/or the load resistance, the higher the maximum output value of the HV module would be). If HV output changes along with the change of input voltage, surly because of small input voltage and/or small load resistance, on this occasion, either increase load resistance value or enhance input voltage.

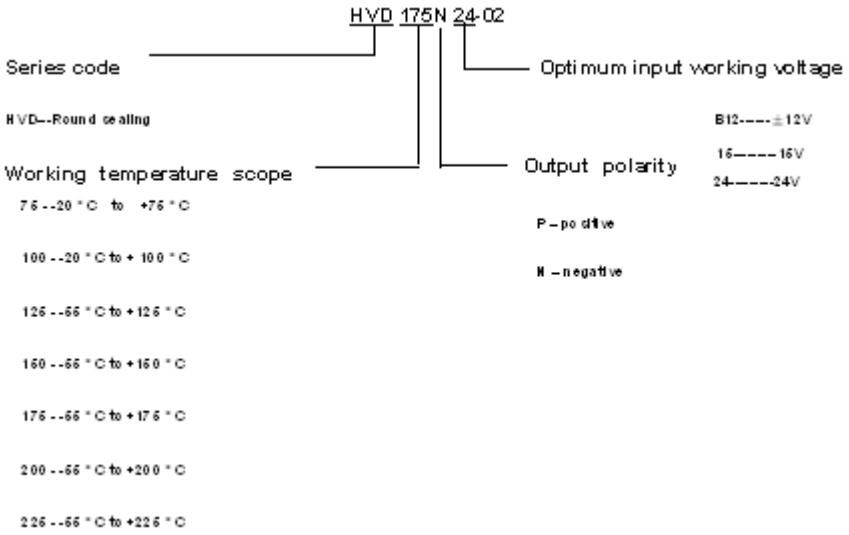
（4）When conducting testing, use HV (3KV) resistant resistance for load resistance.

（5）In course of testing, if both the HV value and HV ripple twinkle along with oven turning on/off, please check oven ground wire and electric leakage.

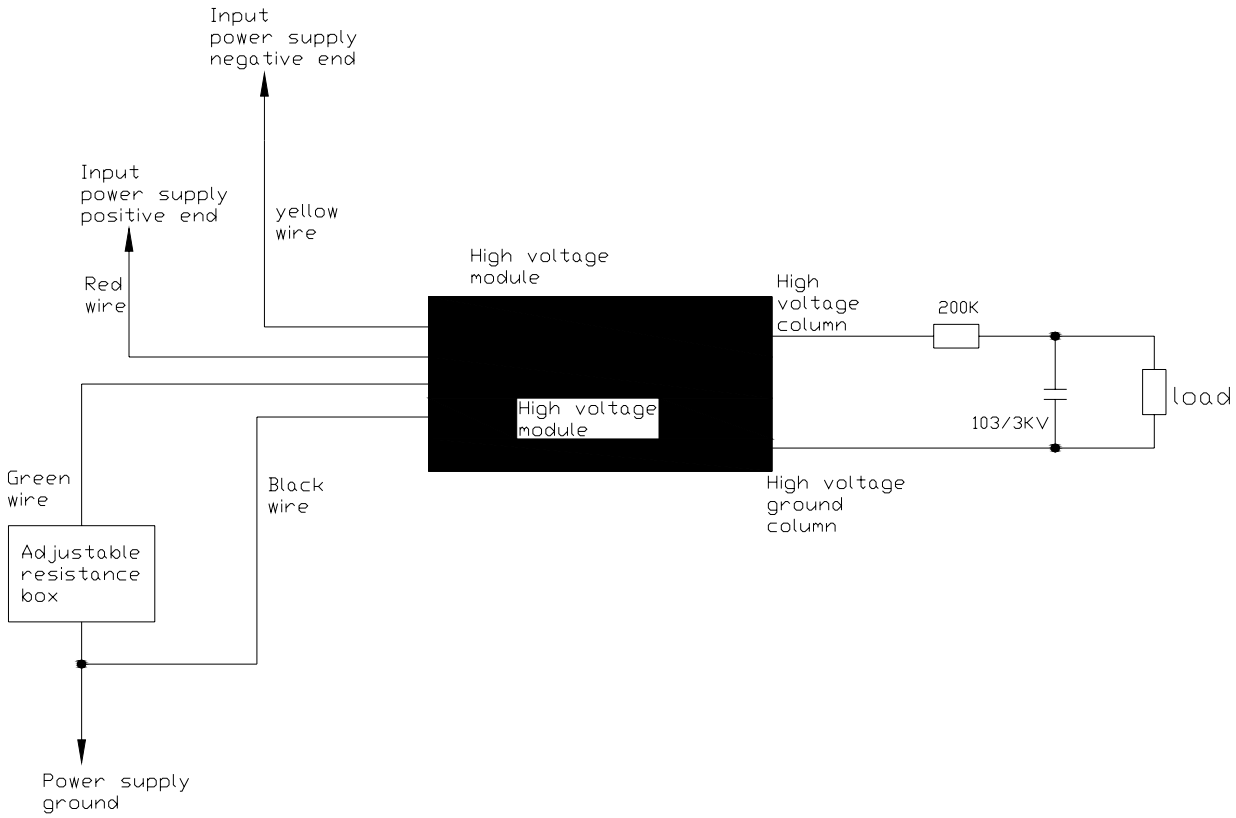


（6）When the positive/negative input series power supply module is operating, if connecting the yellow wire (negative terminal of input power supply) with the black wire (input power supply ground wire), current supply can be achieved by virtue of a single power supply.

5. Recommended filter wiring method:



6. Denomination rules:


Input
power supply
negative end
Input
power supply
positive end
yellow
wire
Red
wire
High voltage
module
High
voltage
column
200K
load
103/3KV
High voltage
module
Green
wire
Black
wire
High voltage
ground
column
Adjustable
resistance
box
Power supply
ground