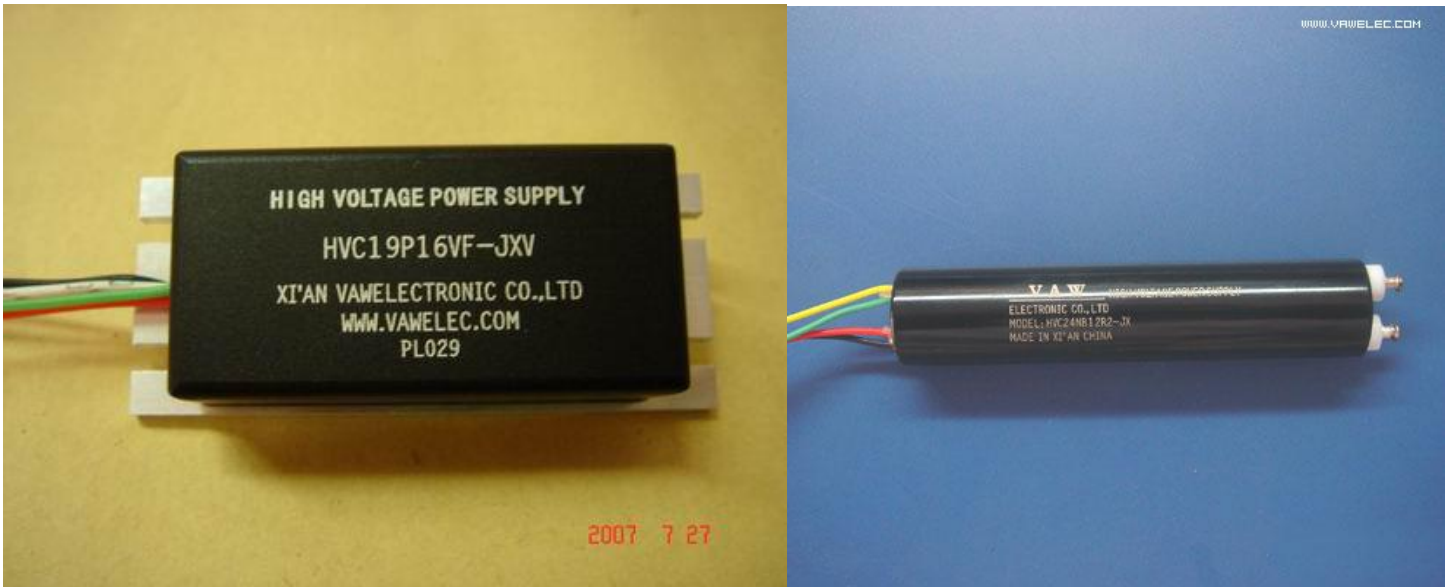


Special High Voltage Power Supply Module for Nuclear Detection



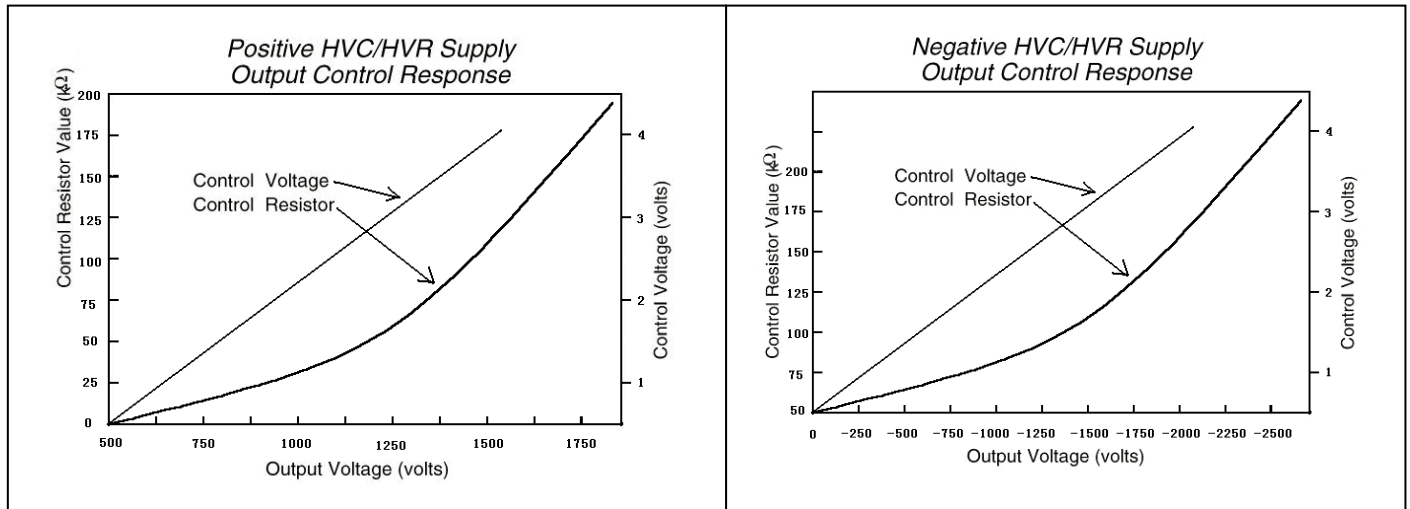
1 Lead Wire

Input terminal: red wire: positive terminal of input power (yellow wire: negative terminal of input power); black wire: input power ground green wire: control terminal of input voltage

Output terminal: HV terminal (white wire): high voltage; GND terminal (black wire): ground (connected with input power ground).

2 Technical Data

- (1) Working temperature: $-55^{\circ}\text{C} \sim +225^{\circ}\text{C}$
- (2) Input voltage: $+10\text{V} \sim +33\text{V} (\pm 10 \sim \pm 16.5\text{V})$
- (3) Input current: **12mA @ 1600V with 22M load (24VIN); 50mA @ 2400V with 7M load (24VIN)**
- (4) Output voltage: $0\text{V} \sim -2400\text{V} (+500 \sim +2400\text{V})$
- (5) Output current: 500uA
- (6) Temperature stability: lower than $\pm 40\text{PPM}/0\text{C}$, typical $\pm 20\text{PPM}/0\text{C}$
- (7) Linear adjust rate: $\pm 0.1\%$ (10% linear variation)
- (8) Load adjust rate: $\pm 0.05\%$ (50% linear variation)
- (9) Shock resistance: 25G, 0-300Hz
- (10) Output ripple: negative: 1.0Vp-p, typical 200mVp-p; positive: 100mVp-p, typical 50mVp-p
(With recommended filter: 2mVp-p, typical 0.5mVp-p)
- (11) Output features: As shown in following diagram



3 Service Requirement

(1) The ambient temperature should not be higher than the working temperature of power supply converter for a long time. The power supply module is able to work reliably for a long time within the range of rated working temperature without thermal damage and the maximum test time lasts for 200 hours for continuous operation. When the ambient temperature is higher than the rated working temperature, aging of components will accelerate and the probability of failure will increase. From statistics in past ten years, we obtained the reliable data as following:

- a) The working time is not limited within the range of rated working temperature. The casual failure period is over three years and casual failure rate less than 1%;
- b) In case of working out of the range of rated working temperature and working temperature is $+25^{\circ}\text{C}$ over the rate working temperature for two hours each time, the failure rate is less than 1% in the first year, about 5% in the

second year and 10% in the third year;

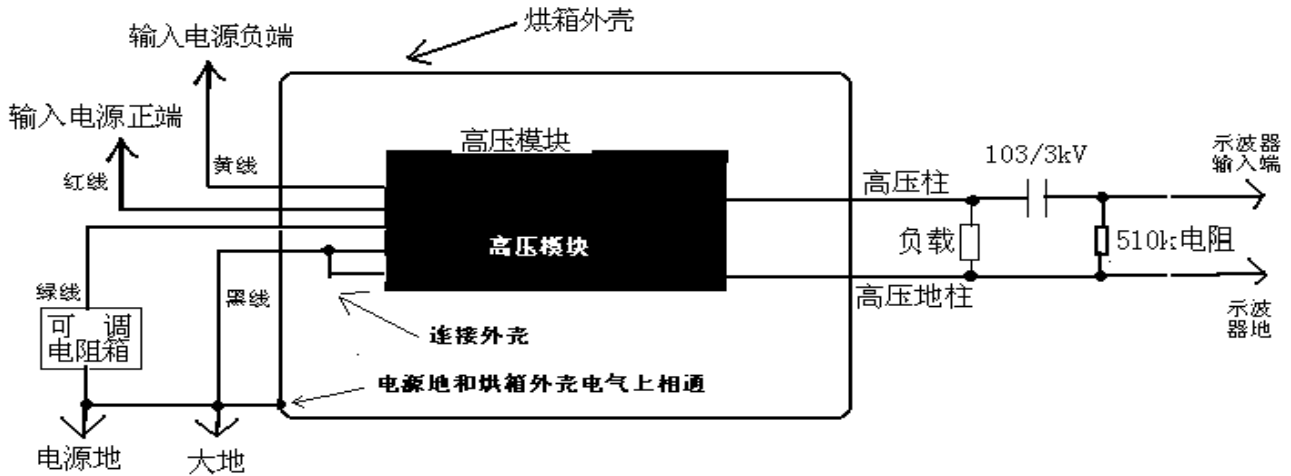
- c) In case of working out of the range of rated working temperature and working temperature is $+50^{\circ}\text{C}$ over the rated working temperature for two hours each time, the failure rate is less than 10% in the first year, about 50% in the second year and 70% in the third year;

(2) Output voltage ground is installed only for the purpose of convenience. In some occasions, if output voltage ground and input power ground are both connected to the line, there will be interference, at the time the input power ground can be shared. During the use, if you want to reduce the high voltage output ripple, you can use resistor and high voltage capacitor we provide to form a RC filter, which will make ripple less than 1 mVp-p in general. The connection is as shown in attached diagram.

(3) When negative high voltage power needs to be controlled with voltage, please connect a resistor (its resistance is equal to the high voltage output value varying from 0V) in series to green control wire, and the high voltage output complies with the curve of control diagram.

4 Attentions

- (1) The test connection diagram is as shown in the following diagram. The high voltage outgoing line should be resistant to high voltage and high temperature;
- (2) Supply DC 0~+4V to the high voltage module before formal test and the high voltage module is not started up, thus the ripple measured by oscillograph comes from the test system. After starting formal test, the ripple of the high voltage module is obtained by removing intrinsic ripple of the test system from the measured ripple;
- (3) The maximum load of the high voltage module is up to 7M and minimum is infinite (with HE3 tube). After control resistance is given, the high voltage output becomes a mere value which does not vary with input voltage. The maximum output value of the high voltage module is related to input voltage and load. The higher the input voltage, the larger the load resistance and the higher the maximum output value. If high voltage varies with input voltage, it is sure that input voltage or load resistance is low. In this case, it is possible to increase load resistance or promote input voltage;
- (4) The load resistor used for test should be resistant to 3KV high voltage;
- (5) In the course of test, if high voltage value and high voltage ripple flash with on/off of drying oven, please check oven's grounding line and leakage;
- (6) When positive and negative input serials power supply module is used, if connect yellow wire (negative terminal of input power) with black wire (input power ground), it is possible to use single power supply module to supply power.



输入电源负端 Negative terminal of input power supply 输入电源正端 Positive terminal of input power supply

红线 Red wire 黄线 Yellow wire 绿线 Green wire 黑线 Black wire

烘箱外壳 Drying oven shell 高压模块 High-voltage module 高压柱 High-voltage column

示波器输入端 Input terminal of oscillograph 负载 Load 电阻 Resistor

可调电阻箱 Adjustable resistance box 电源地 Power supply ground 大地 Ground

高压地柱 High-voltage ground column 示波器地 Oscillograph ground

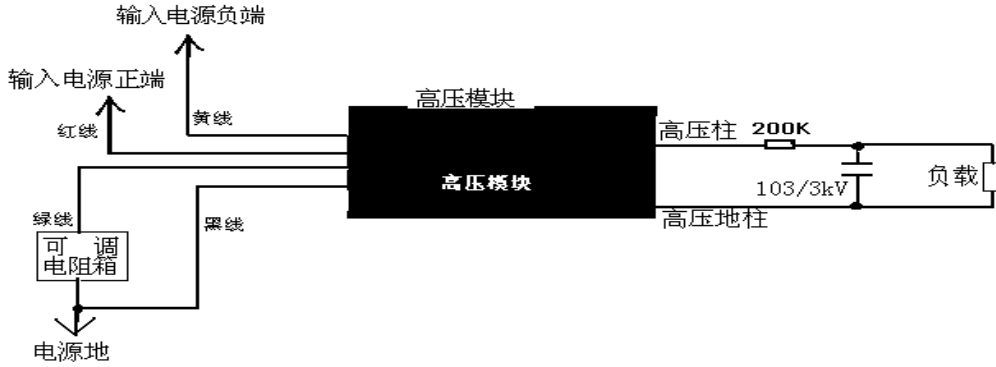
连接外壳 Connected with shell

电源地和烘箱外壳电气上相通 Power supply ground is electrically connected to drying oven shell

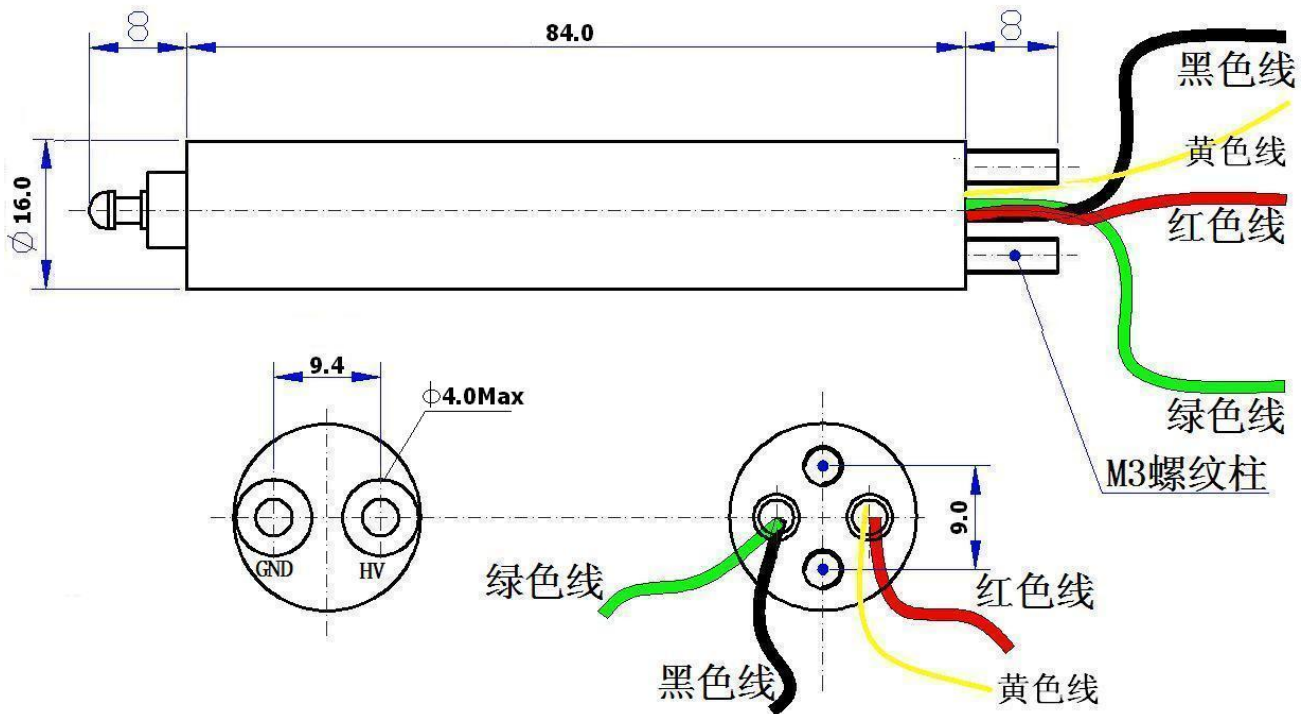
5 Naming Rules

HVC 24 P 24 R 2 --- JX	
Serial code	Class and working temp. range
HVC---- Nuclear detection	C----- Civil 0°C to +50°C
Output max. HV	I-----Industrial -20°C to +85°C
XX-----100*XX	J-----Military -55°C to +125°C
Output polarity	JX-----Special military -55°C to +150°C
P-Positive N-Negative	JXV-----Supper military -55°C to +175°C
Optimal input working voltage	JS----- Aero -55°C to +200°C
07-----7v	JSV----- Super-aero -55°C to +225°C
12-----12V	Internal technique and packaging code
B12-----±12V	1-----Φ22*84 S, 1A ---Φ22*40 one-end outlet, 1B ---Φ22*50, 1C ---Φ22*45
15-----15V	2-----Φ18*84 S 2(R) ---Φ18*84 two-end outlet and fix with lug
B15-----±15V	3-----Φ23*50 one-end outlet 3A ---Φ23*45 one-end outlet, 3B ---Φ23*40 one-end outlet
24-----24v	4-----Φ25.5*58 one-end outlet
90-----90v	5-----Φ16*84 S 5(R) ---Φ16*88 two-end outlet and fix with lug
Control mode	6 -----Φ15*94 S 6(R) ---Φ15*94 two-end outlet and fix with lug
R----Double control with resistor and voltage V---- Voltage control	7 -----Φ16*72 S 7(R) ---Φ16* 68two-end outlet and fix with lug
	F----- 25*50 plane S: Standard

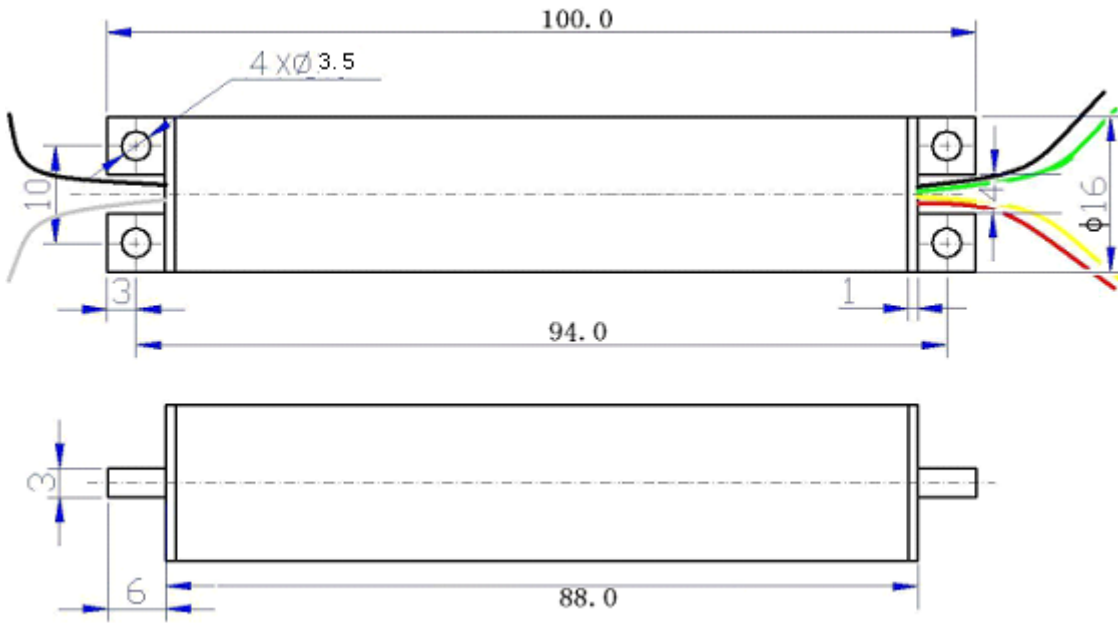
6 Connection of Recommended Filter



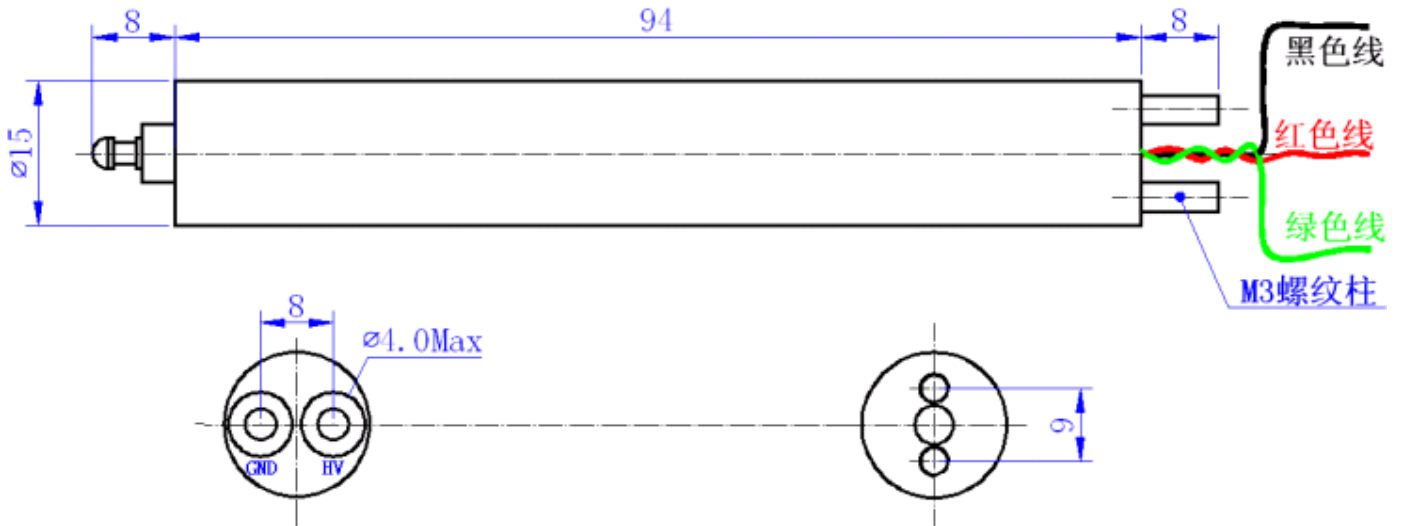
7 Mechanical Dimension (imported imitation $\phi 22 \times 84 \text{mm}$)



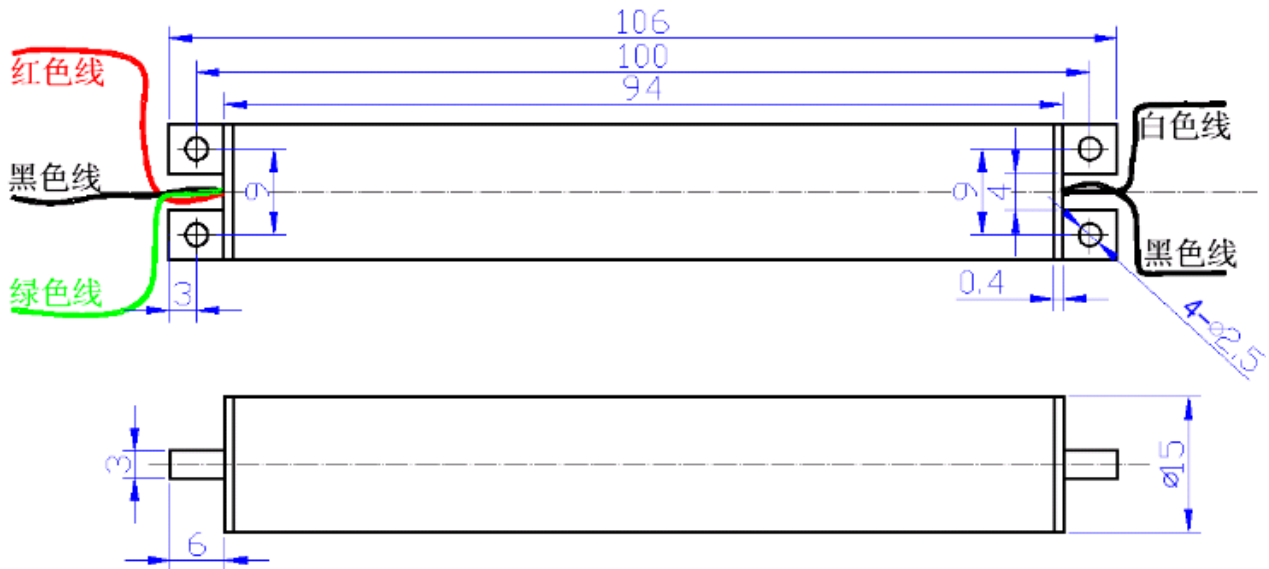
Packaging 5#



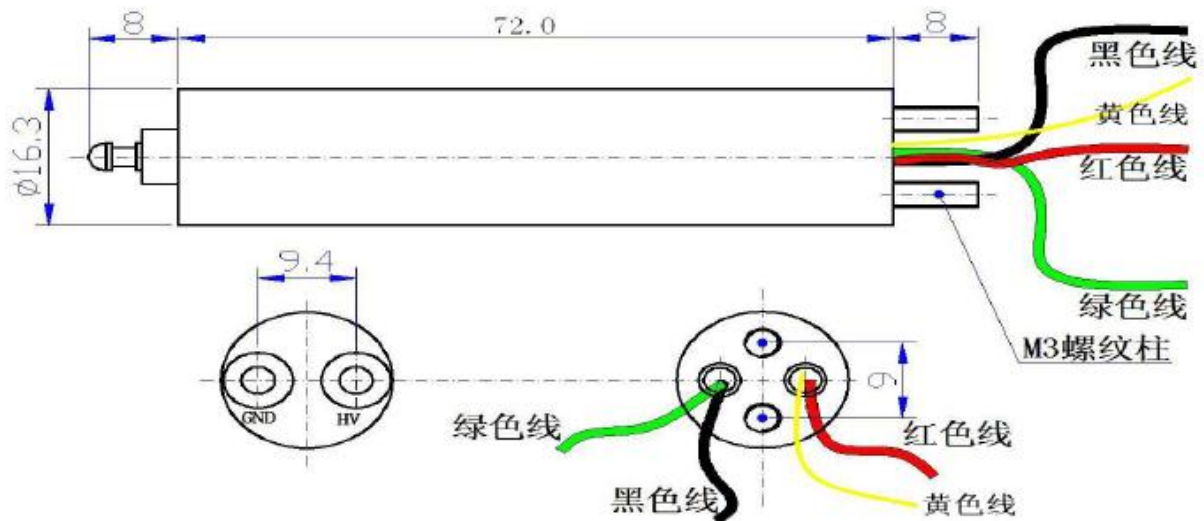
Packaging 5 (R)



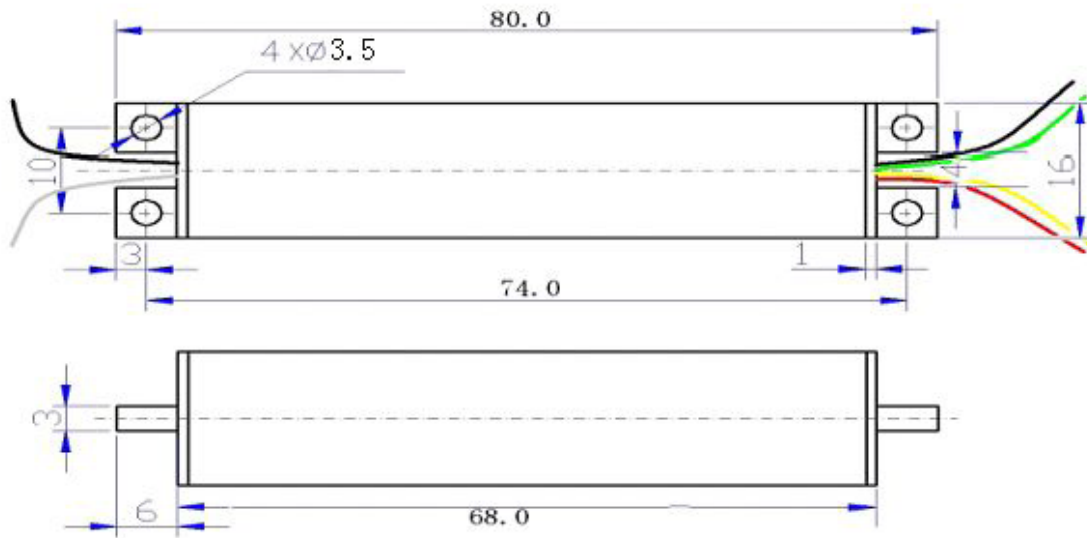
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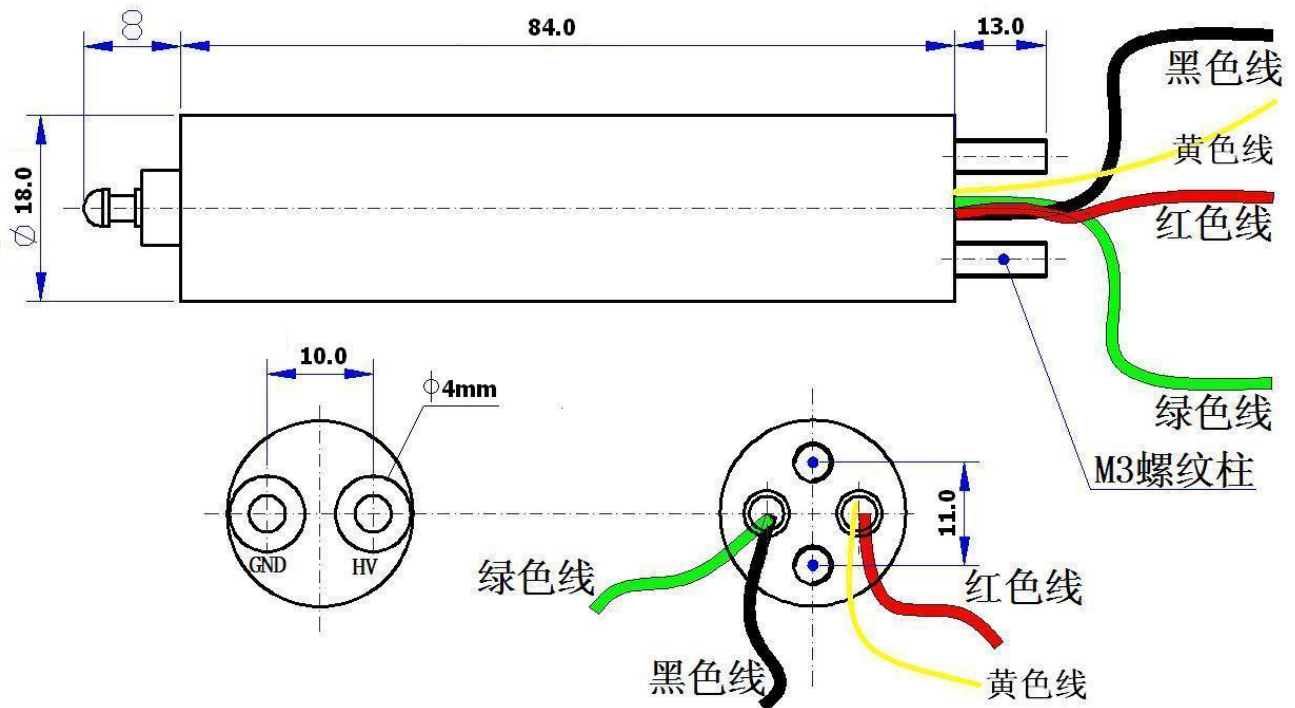
Packaging 6(R)



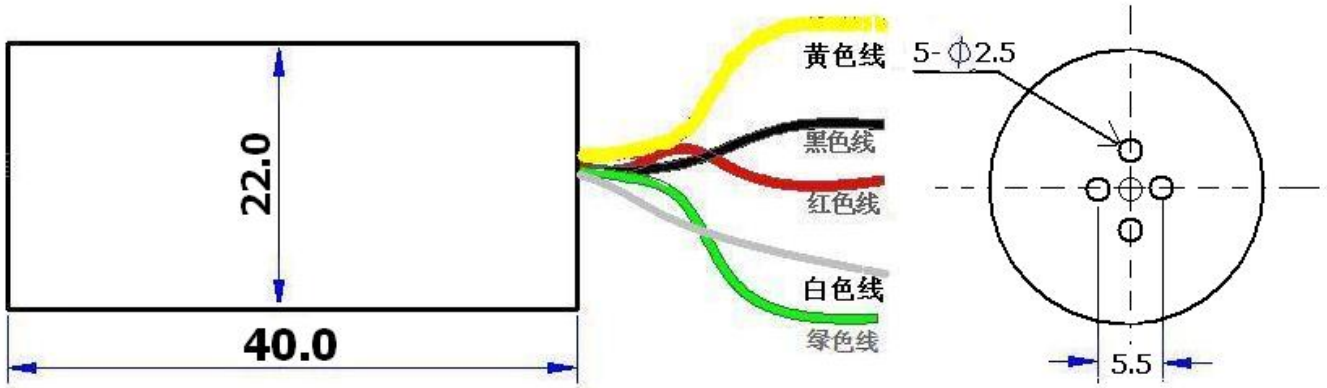
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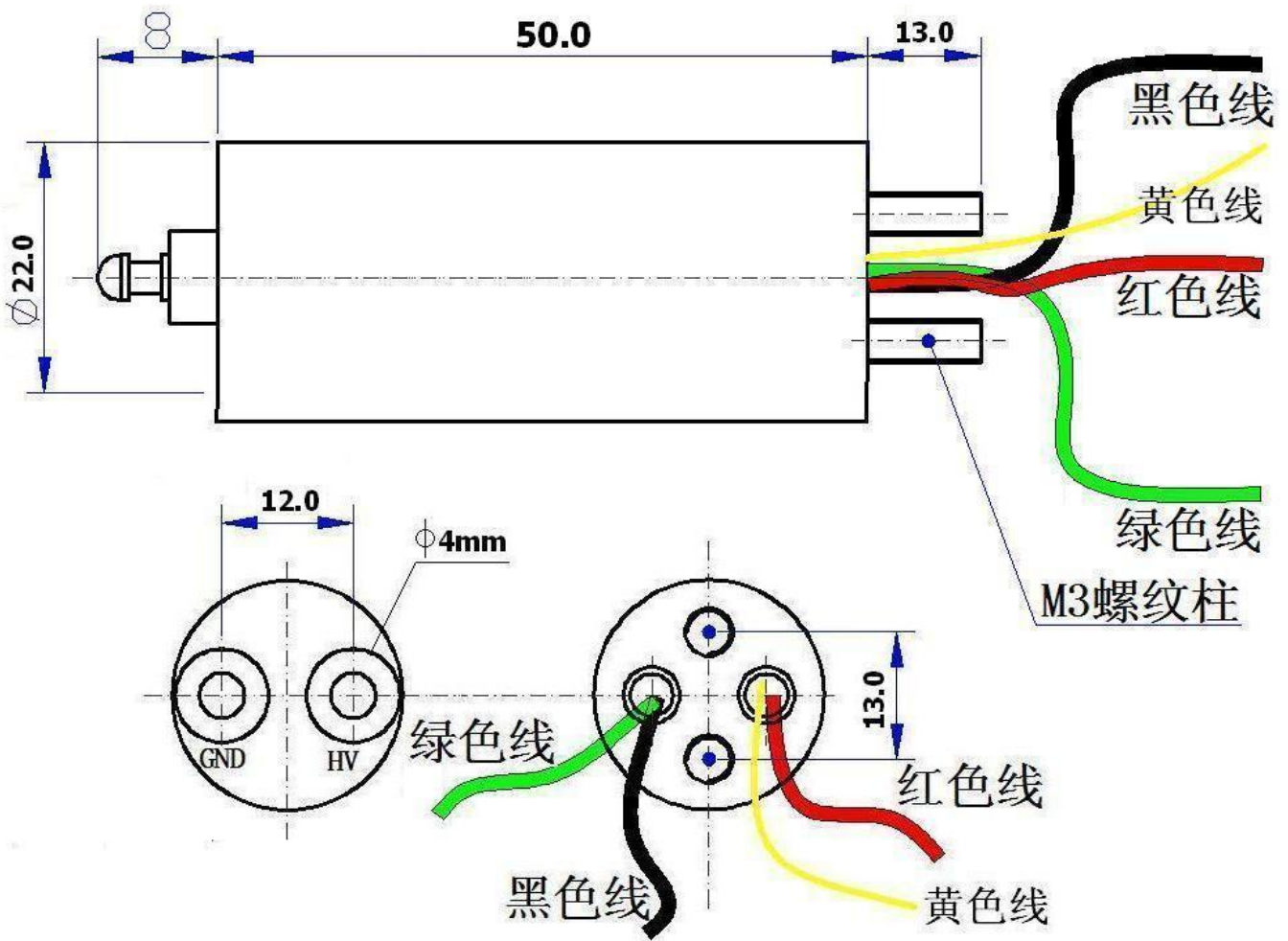
Packaging 7(R)



Packaging 2#

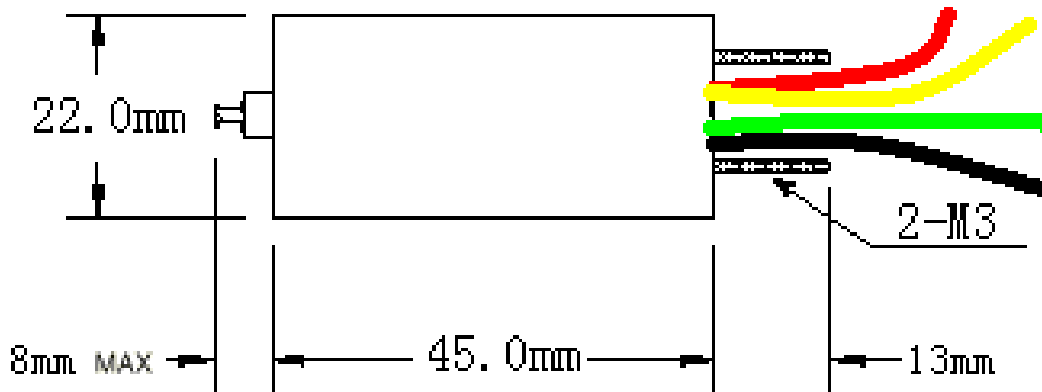


Packaging 1A

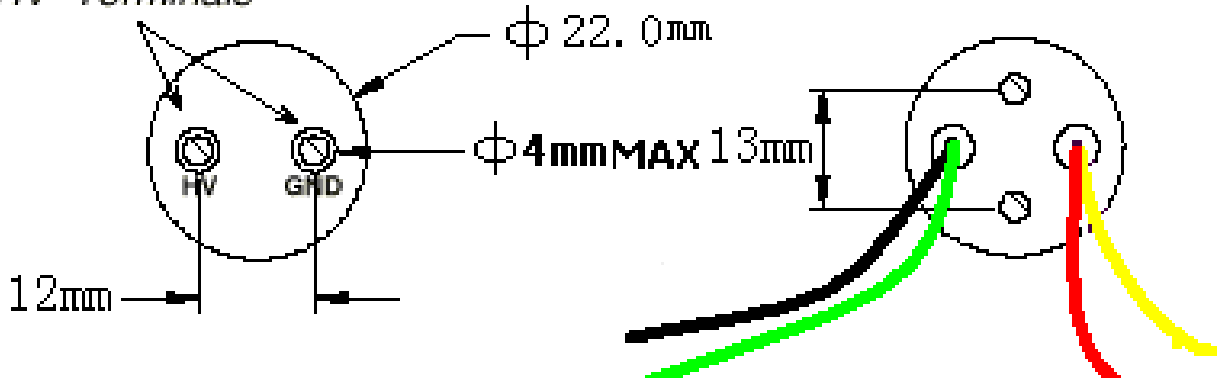


Packaging 1B

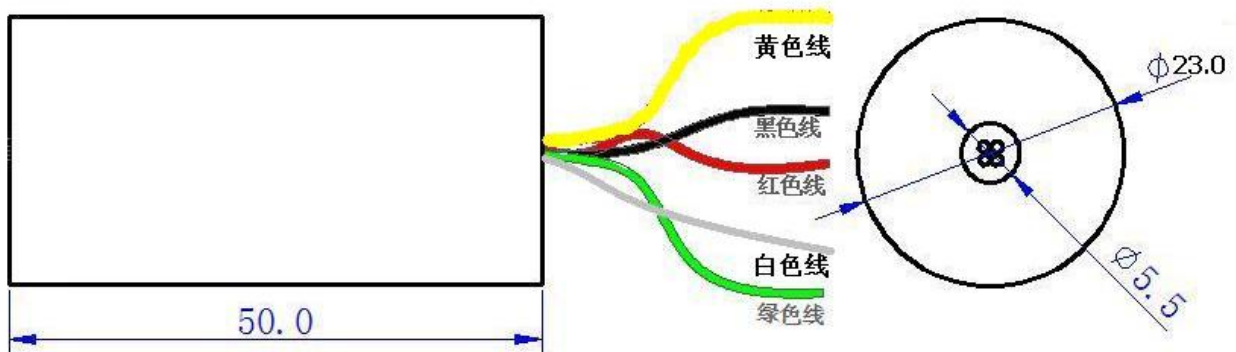
M3螺纹柱 M3 thread column



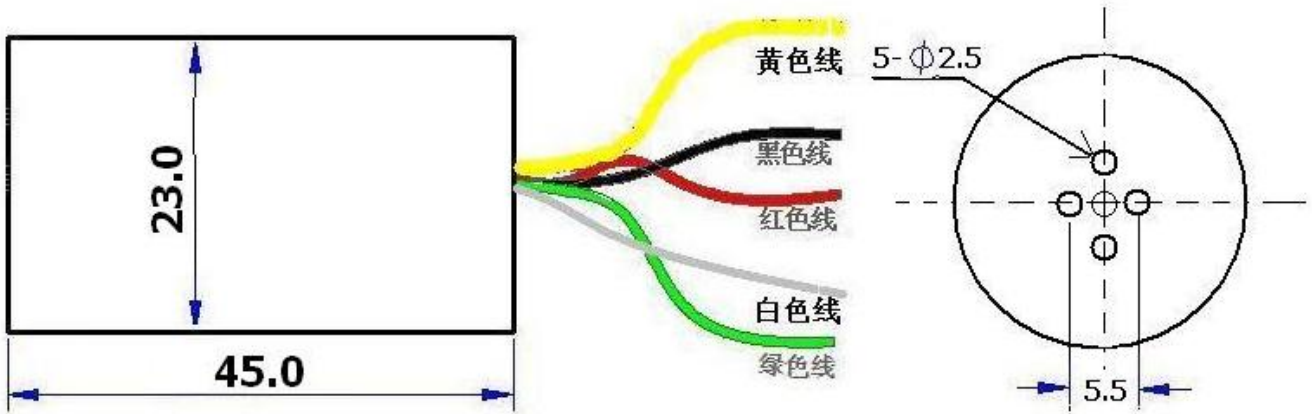
HV Terminals



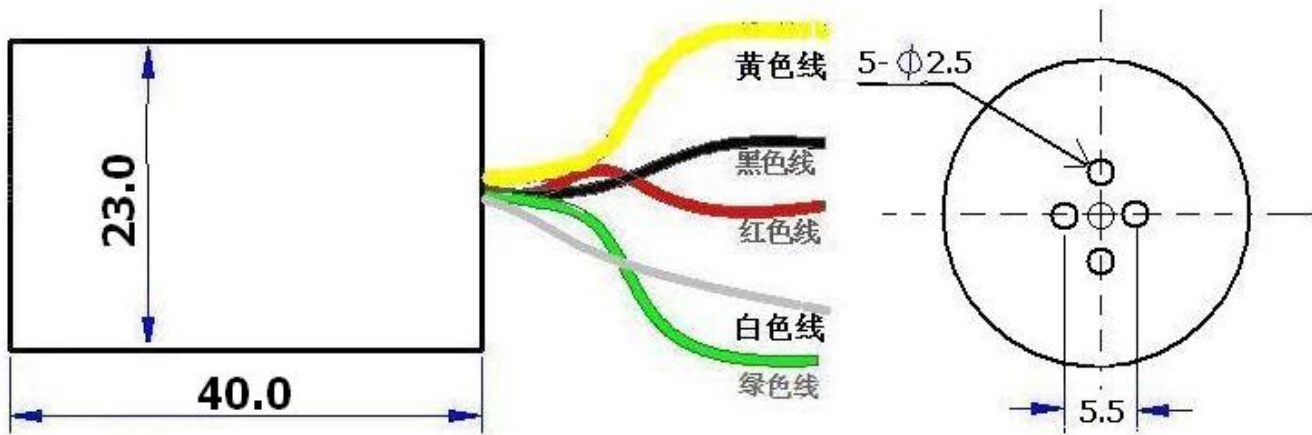
Packaging 1C



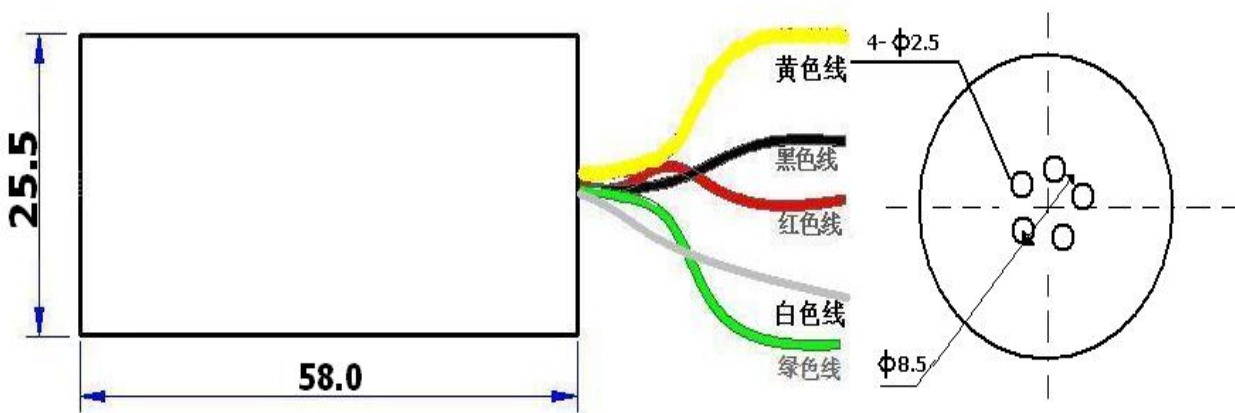
Packaging 3#



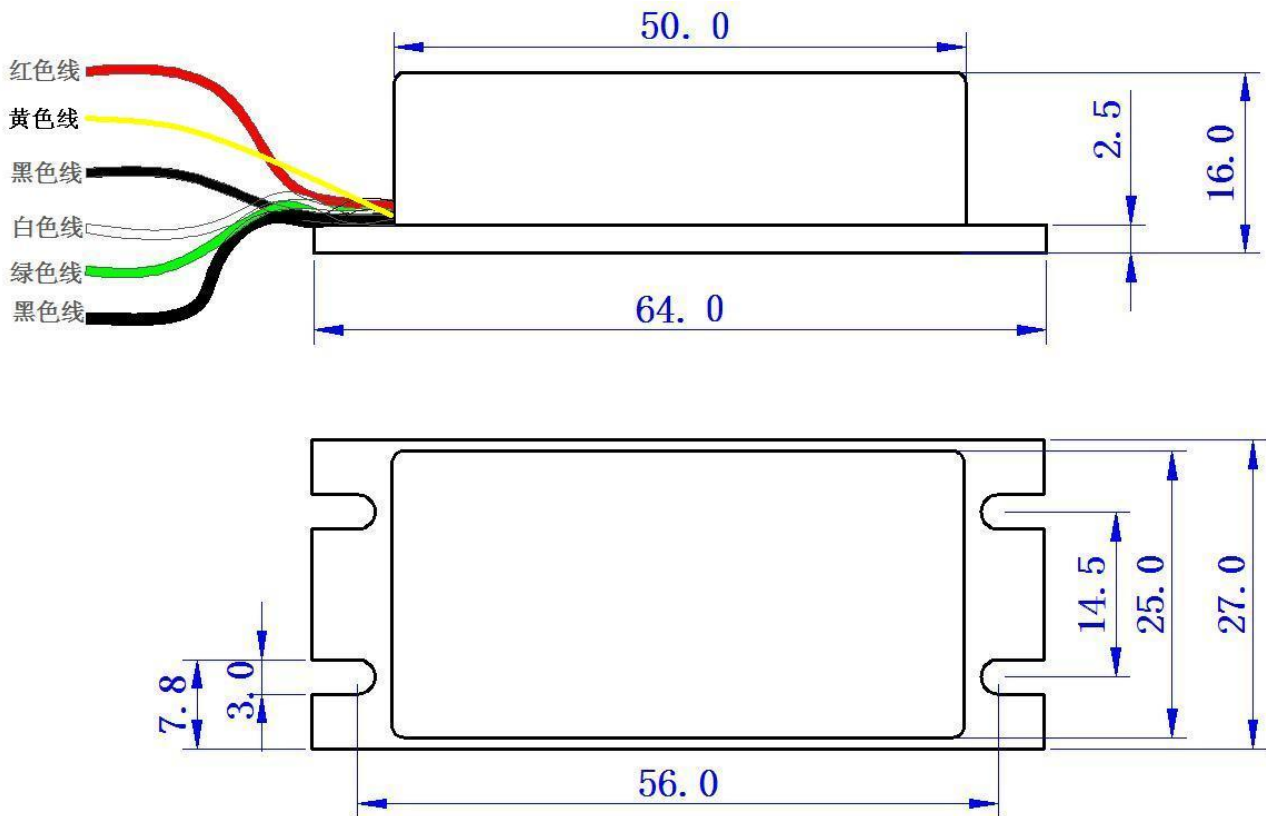
Packaging 3A



Packaging 3B



Packaging 4#



Packaging F

8 Packaging and Appearance Description

HVC serial product was earliest developed and produced in batches by us. With constant improvement made in the course of production, this series product at present has the most reliable performance in terms of statistical data and clients' use experience.

For historical reasons, this serial product has many appearances which have not fitted in with the current technology, but they are still being used in many products. To provide better services for clients, we will continue to produce this serial product. But the products with the smallest size are better to be chosen for new instrument.

JSV serial products currently are provided with shell 1# only and JS products are provided with shells 1#, 2# and 2(R); C, I and J serial products are provided with shells 1A and 3B only; shell 4# only provides Venus power supply module. Other types are free from restriction.

Products with shell 2# and 2(R) are produced in large quantity and have the most reliable performance; products with shell 5# and 5(R) are the most standard type; products with shell 6# and 6(R) are the thinnest type; products with shell 1A and 3B are the shortest type; products with shell 4# has the highest output current; products with shell 1# the cheapest type and products with shell F are easiest to be fixed. You can select product types according to the characteristics previously described.