Features:

- Working temperature: C: ambient temp. 0℃～+50℃, shell temp. up to +75℃; I: ambient temp. -20℃～+85℃, shell temp. up to +105℃; M: ambient temp. -55℃ ～ +125℃, shell temp. up to +137℃.
- Output voltage: 100V～ 30000V
- Output current: 1mA ～ 5000mA
- Output power: 0.5W～500W
- Size: Min: L:19.1×W:12.4×H:8.0mm;
  Max: L:124.0×W:50.0×H:16.0mm
- Output voltage has 2 times or 6 times of the continuous adjustment amount.
- Output ripple: 100mV or 0.01% of output
- Conversion efficiency: Typical 80%
- Input voltage: 5V, 6V, 9V , 12V , 15V ,18V, 24V, 36V, 48V
- Integrated LC EMI filter
- Sealed metal casting: impact and moist resistance and electromagnetic radiation protection
- C: (shell) provides rated power without derating at 50℃; (shell) provides 70% of rated power at 65℃
  I: (shell) provides rated power without derating at 85℃; (shell) provides 70% of rated power at 95℃
  J: (shell) provides rated power without derating at 105℃; (shell) provides 70% of rated power at 70℃
- Input, control, and shell are isolated from output and isolation voltage: 5000V
- Overcurrent fault cutoff delay restart
- Overheat protection at 137℃

1 Introduction

CFM series high-precision adjustable high-voltage power supply module developed by our company is used for high-precision analytical instruments including spectrometers, chromatography, mass spectrometry and other high optical measurement, physical and chemical analysis instruments that require high voltage and low current. We can provide customers with customized adjustable DC high voltage power supply. The power supply module is packed using epoxy or thermal silicone. The outlet mode includes contact pin and lead wire. Output voltage, being adjustable, can be controlled by resistance value and voltage value. Output and input can be isolated or commonly grounded. Control can be in common ground with input or output, or control is a separate ground. Output voltage covers a range from100V to 30kv, power from 0.5W to 500W or output current from 1mA to 5000mA. Power density is up to 5W/cm^3. For example, a 24V-input 400V /0.5A power supply's size is L:123 *W: 38 *H: 15mm and a 15V-input 100V / 30mA power supply's size is L: 25.5 *W: 25.8 *H: 10.5mm. Each power supply's output has twice or six times the adjustable range. In the entire adjustment range, the maximum output current is generally constant. Each product has three classes, including civilian class C: working environment temperature: 0℃～ +50℃, which complies with the general working environment requirements; industrial class I: working environment temperature: -20℃～ +85℃, which complies with the most of the

harsh environment (field); military class J: working environment temperature: -55℃~ +125℃, which is waterproof, shock and smoke resistant and complies with GJB367.2-87 harsh requirements. The service life of lass C and I is up to 50,000 hours. The service life of Class J at temperature of -55℃~ +105℃ reaches 50,000 hours, and 5000 hours at 125 ℃.

The output voltage and current designed for CFM series high voltage power module are as follows:

Output voltage (typical)	Output current (typical)						
DC 100V	10mA	100mA	500mA	1A	2A	3A	5A
DC 200V	10mA	50mA	100mA	500mA	1A	1.5A	2.5A
DC 300V	10mA	50mA	100mA	300mA	500 mA	1.0 A	1.5A
DC 400V	10mA	50mA	100mA	300mA	500 mA	700 mA	1.25A
DC 500V	10mA	50mA	100mA	300mA	500 mA	600 mA	1.0A
DC 600V	1mA	50mA	100mA	200mA	300 mA	500 mA	800 mA
DC 800V	1mA	10mA	50mA	100mA	200 mA	400 mA	600 mA
DC 1000V	1mA	10mA	50mA	100mA	200 mA	300 mA	500 mA
DC 1200V	1mA	10mA	50mA	100mA	150 mA	250 mA	400 mA
DC 1500V	1mA	10mA	50mA	80mA	150 mA	200 mA	300 mA
DC 2000V	1mA	10mA	50mA	80mA	100 mA	150 mA	250 mA
DC 2500V	1mA	5mA	10mA	50mA	80 mA	120 mA	200 mA
DC 3000V	1mA	5mA	10mA	20mA	50 mA	100 mA	150 mA
DC 3500V	1mA	5mA	10mA	20mA	50 mA	80 mA	120 mA
DC 4000V	1mA	5mA	10mA	20mA	50 mA	70mA	120 mA
DC 4500V	1mA	5mA	10mA	20mA	50 mA	70 mA	100 mA
DC 5000V	1mA	5mA	10mA	20mA	50 mA	70 mA	100 mA
DC 6000V	1mA	5mA	10mA	20mA	30 mA	50 mA	80 mA
DC 7000V	1mA	5mA	10mA	20mA	30 mA	40 mA	60 mA
DC 8000V	1mA	5mA	10mA	20mA	25 mA	40 mA	60 mA
DC 9000V	1mA	5mA	10mA	15mA	20 mA	35 mA	50 mA
DC 10000V	1mA	5mA	10mA	20mA	30 mA		50 mA
DC 20000V	1mA	5mA	6mA	8mA	10 mA	15 mA	25mA

Along with the output power, output voltage level, and the isolation between input and output, the power supply module differs in size. In general, the greater the power, the higher the output voltage and the greater the size. The size of isolated module is 20% larger than non-isolated module. We will improve the mechanical size as soon as possible. If you have any question, please feel free to contact us.

Each module has an adjustable terminal that is accessible to connection with external control voltage or control resistance. When the control voltage or the control resistance is zero, the output high voltage is the module's minimum value. As the control voltage rises to 5V or the resistance increases to infinity, the output high voltage rises from the minimum value to the maximum value. The control accuracy is 0.1V. Control end leads to two lines or contact pins, one

is GND, and the other is control end. Control voltage and control resistance are added on the both sides of the two lines. GND can be connected or not connected to any end of the input or output to facilitate control. The current demand of the control terminal is not more than 1mA.

If any connection is required, control, input, output must be connected in the shortest distance at the root of the module so as to minimize the interference between different ground wires.

Comparison Table of Input Voltage and Output Power

Input voltage	Output voltage and current	Output power
DC 5V	100V, 5mA 3000V, 1mA	≤5W
DC 6V	100V, 5mA 3000V, 1mA	≤5W
DC 9V	100V, 20mA 5000V, 2mA	≤20W
DC 12V	100V, 1A 30000V, 2mA	≤100W
DC 15V	100V, 1.2A 30000V, 3mA	≤120W
DC 18V	100V, 1.5A 30000V , 4mA	≤150W
DC 24V	200V, 1.0A 30000V, 5mA	≤200W
DC36	100V, 3A 30000V, 10 mA	≤300W
DC48	100V, 5A 30000V, 15 mA	≤500W

CFM is equipped with a high-voltage ignition protection circuit. If the external high voltage continuously strikes sparks, which will not cause damage to high-voltage power supply.

CFM series power supply module contains an in-built LC network, which can effectively reduce the fluctuations of the input current and the output voltage.

CFM series power-supply module contains the output short circuit and overload automatic turn-off circuit. When

the output lasts 0.1s and exceeds 120% of the rated output power, the module cuts off all outputs. After the over-current fault is eliminated, it automatically enters soft-start mode and restores the output voltage. If the overload duration of output is less than 01s, the module will not act.

All components used in CFM series power supply module strictly pass the in-factory test in accordance with the enterprise and national military product quality standards. The product of class J strictly follows the military power supply production standard, ex-factory inspection and routine testing to ensure the reliability. The product of class C and I strictly follows civil product production standard, ex-factory inspection and routine testing to ensure the service life up to 50,000 hours with failure rate less than 1%.

Type Selection:

CFM2MA - 36 S 2500-C

Class

C: Civil 0 C to +50 C

I: Industrial -20 C to + 85 C

J: Military -55 C to +125 C

Series code

CFM series

Output current mA

0.5	1	2	3	5	6
8	10	15	20	25	30
35	40	50	60	70	80
100	120	150	200	300	400
500	600	700	800	1000	1250
1500	2000	2500	3000	5000	

Max output voltage

100	200	300	400	500
600	800	1000	1200	1500
2000	2500	3000	3500	4000
4500	5000	6000	7000	8000
9000	10000	20000	30000	

Input voltage

5 （4.5～6V）	6 （ 5～7V）	9（8～10V）
12 （10～14V）	15（12～18V）	18（15～21V）
24 （20～28V）	36（32～40V）	48（44～52V）

Output mode

S single

Technical Parameters

(1) Operating temperature: C: ambient temp. -0℃～+55 ℃, max. shell temperature: +75 ℃
I: ambient temp. -20℃～+85 ℃, max. shell temperature: +105 ℃
M: ambient temp. -55℃～+125 ℃, max. shell temperature: +137 ℃

(2) Input voltage: 5V, 6V, 9V, 12V, 15V，18V , 24V, 36V , 48V.

(3) Output voltage: 100V, 200V, 300V, 400V, 500V, 600V, 800V, 1000V, 1200V, 1500V, 2000V, 2500V , 3000V

3500V, 4000V, 4500V, 5000V, 6000V, 7000V, 8000V, 9000V, 10000V, 20000V, 30000V

(4) Output ripple: Less than 100mV or 0.01% of output
(5) Output current: 1mA ~ 5000mA
(6) Output power: 0.5W ~ 500W
(7) Temperature stability: Less than ±40PPM/0 C
(8) Load adjustment rate: ±0.1%(50% load change)
(9) Linear adjustment rate: ±0.2%(10% linear change)
(10) Shock resistance: 25G, 0 ~ 300Hz
(11) Conversion efficiency: 75-85%
(12) Dimension: min: L:19.1×W:12.4×H:8.0MM, max: L:124.0×W:50.0×H:16.0MM.
(13) Isolation voltage between input, output and control: 5000V
(14) Storage temperature: -65℃～+150℃
(15) Output form of voltage: lead wire or contact pin

Service Requirement:

As the power supply module has 20% power consumption at most under the condition of full-load operation and its size is small, good heat-conducting medium such as thermally conductive silicone is necessary to be added between the shell of the power supply module and the radiator so as to ensure the temperature of the module shell to be less than 137℃ (M) , 105℃ (I) and 75℃ (C). If the radiator cannot be added to the module in the place where the space is limited, the module is usually installed on the framework of instrument or equipment, using the framework as a radiator.

Module's shell maintains 5KV isolation with input, output, and control circuit. There is a 1000PF AC channel between the shell and input. The shell is made of reverse magnetic metal material, which can shield the radiation generated by high-frequency voltage inside the module. In addition, the shell can sense the internal voltage and current generated due to high-voltage high-frequency oscillation. The shell and 1000PF capacitor at the input terminal make induction current flow back to input, thus there is AC current flowing on the shell. During the use, it usually requires that the shell and radiator be suspended. The connection of the shell with the radiator on one hand can form a large antenna to increase the radiation and on the other hand can form interference between ground wires.

If the shell must be connected to the input ground, it must be connected at the place less than 1cm where input ground goes into the module. The line of make point is better to be short from the module.

Input, output and control of the module have three ground wires and if they are needed to be connected together, connection should be done at the place less than 1cm where the lead wires go out of the module. The closer that wire at connection point is to the module, the less the interference will be.

If you have to add a filter to the high-voltage output, it is generally added as close as possible to the module, which can reduce the length of the pulsating line of high-voltage output so as to reduce high-voltage radiation.

Outline:

With the output power, the output voltage level, the input and output isolated from the power of the volume is different, In general, the greater the power, the higher the output voltage and the greater the size. The size of isolated module is larger than non-isolated module by 20%. We will improve the mechanical size as soon as possible. If you have any question, please feel free to contact us.

2 Two lead wires and contact pin

Input terminal: 1:Red wire: positive terminal of input power supply 2: Black wire: GND of input power supply

Control terminal: 3:Green wire: control terminal of input power supply 4: Brown wire: control GND

Output terminal: 5: white: high voltage + 6:Blue wire: high voltage -

After selecting a model in accordance with our product naming rules, please contact us for more detailed information

Product performance, reliability and information are subject to change without prior notice

March 14, 2017