

## FH30H 30W Isolation Adjustable High Voltage Power Supply Module

### Features:

: Working temperature: M level: ambient temp  $-55^{\circ}\text{C} \sim +175^{\circ}\text{C}$ , max. shell temp:  $+185^{\circ}\text{C}$

I level ambient temp  $-20^{\circ}\text{C} \sim +85^{\circ}\text{C}$ , max. shell temp:  $+105^{\circ}\text{C}$

: Output power: 30W

: Size: L99.7×W: 25.4×H: 14.2mm

: Output voltage: 50-100V, 100-200V, 150-300V, 200-400V,

250-500V, 300-600V, 400-800V, 500-1000V, 625-1250V, 750-1500V, 1000-2000V, 1250-2500V, 1500-3000V, 2000-4000V, 2500-5000V

: Output current has one times of continuous adjustable amount

: 1.8mA static working current

: 5uA cut-off holding current

: Output ripple: max 100mV, typical 50mV

: Conversion efficiency: 80%

: Input range:  $10 \sim 30\text{V}$ ,  $16 \sim 48\text{V}$ ,  $24 \sim 72\text{V}$ ,  $36 \sim 108\text{V}$ ,  $70 \sim 210\text{V}$ ,  $120 \sim 360\text{V}$

: Integrated LC EMI filter

: Sealed metal casting: impact and moist resistance and electromagnetic radiation protection

: Provide rated power without deduction at  $210^{\circ}\text{C}$  (shell temperature)

: M level: provide rated power without derating at  $175^{\circ}\text{C}$  (shell); provide 80% of rated power at  $185^{\circ}\text{C}$  (shell)

I level: provide rated power without derating at  $95^{\circ}\text{C}$  (shell); provide 80% of rated power at  $105^{\circ}\text{C}$  (shell)

: Input, control, and shell isolated from output and isolation voltage: 5000V

: Overcurrent fault cutoff delay restart

### Introduction

FH30H series isolation high-voltage power supply module is derived from FH series DC/DC module, with output power up to 30W and output voltage covering from 100V to 5000V. The output voltage of each module comes with two times of continuous adjustable amount from the minimum to the maximum, and input, output and adjusting terminals are 5KV mutually isolated from each other. M level, designed for electronic equipment working in the harsh environment, can continuously work for 2,000 hours at shell temperature  $150^{\circ}\text{C}$ , for 750 hours at shell temperature  $175^{\circ}\text{C}$  and for 400 hours at shell temperature  $185^{\circ}\text{C}$ . With features of being resistant to high temperature, impact and humidity, it is particularly suitable for being used as power supply for petroleum prospecting logging tool, petroleum drilling instrument, geophysical detecting instrument, vehicles, telecommunication, network infrastructures, enterprise and high-performance calculation, etc. I level, designed for general industrial applications, can be used at temperature  $-20^{\circ}\text{C} \sim +85^{\circ}\text{C}$  and its service life is up to 50,000 hours.

The output voltage of FH30H series isolated high voltage power supply module is 100V, 200V, 300V, 400V, 500V,



600V, 800V, 1000V, 1250V, 1500V, 2000V, 2500V, 3000V, 4000V, and 5000V. Each module has an adjustable end for connecting an external control voltage or control resistor. When the control voltage or control resistance is zero, the output high voltage is the module's maximum value. As the control voltage increases to 2.5V or resistance increases to infinity, the output high voltage drops from the maximum value to half of the maximum value. For example, FH30H-48S2500 module, its output high voltage is continuously adjustable from 1,250V to 2,500V. But regardless of what value of the output high voltage is adjusted, the module's maximum output power is 30W. Control end remains a 5kV Isolation voltage against the module input and output, with control accuracy of 0.1V. Control end leads to two lines, one is GND, and the other is control end. Control voltage and control resistance are added between 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.

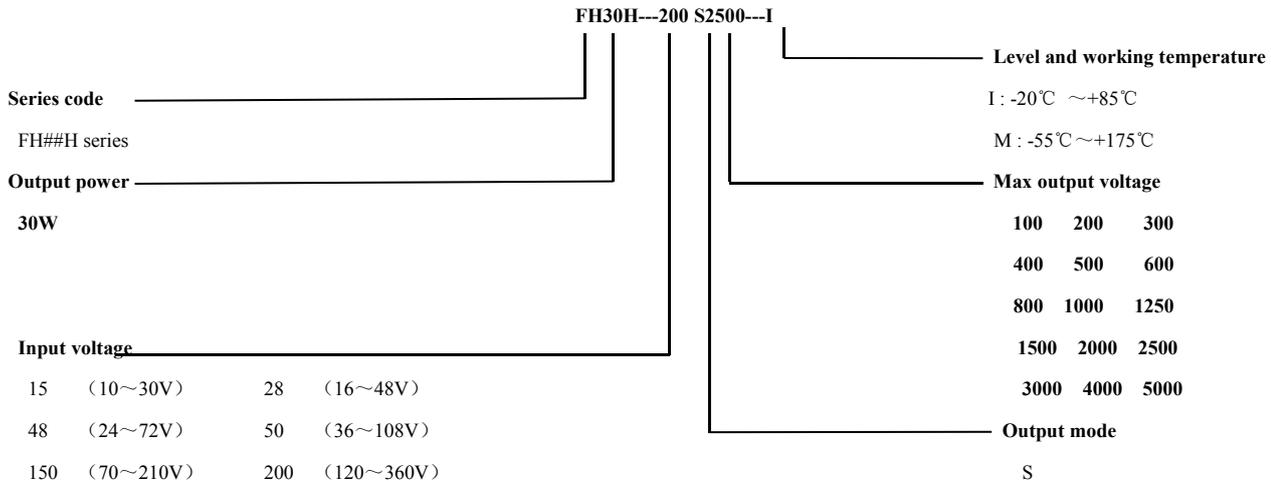
The output high voltage is isolated from the control circuit and the input circuit, so it can be connected to the control or input circuit to form positive or negative voltage. If any connection is required, control terminal, input terminal, output terminal must be connected in the shortest distance at the root of the module so as to minimize the interference between different ground wires.

FH30H series power supply module contains an in-built LC network, which can effectively reduce the fluctuations of the input current and the output voltage.

FH30H 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 0.1s, the module will not act.

Key components used for M level of FH30H series power-supply module strictly pass the in-factory test in strict accordance with the enterprise and national military product quality standards. The factory test includes 24~72-hour live aging and screening under the temperature of +175°C. The finished product of M level has experienced 8-hour full-load operation under the temperature of +185 °C before delivery so as to ensure the reliability of product. The product of I level is produced strictly in accordance with civil product standard. The routine inspection and test including 8-hour factory test with full load at shell temperature +105°C shall be carried out to ensure the product's service life of 50000 hours with fault rate less than 1% at the temperature of -20°C ~ +85°C.

### Type Selection



### Technical Parameters

- (1) Operating temperature: M: ambient temp. -55°C ~ +175 °C, max. shell temperature: +185 °C  
I: ambient temp. -20°C ~ +85 °C, max. shell temperature: +105 °C
- (2) Input voltage: 10V-30V, 16V-48V, 24V-72V, 36-108V, 70-210V, 120-360V
- (3) Output voltage: 50-100V, 100-200V, 150-300V, 200-400V, 250-500V, 300-600V, 400-800V, 500-1000V, 625-1250V, 750-1500V, 1000-2000V, 1250-2500V, 1500-3000V, 2000-4000V, 2500-5000V
- (4) Output ripple: Less than 100mVp-p (typical 50mV)
- (5) Output power: 30W
- (6) Temperature stability: Less than 40PPM/0 C
- (7) Load adjustment rate: ±0.1%(50% load change)
- (8) Linear adjustment rate: ±0.2%(10% linear change)
- (9) Shock resistance: 25G, 0 ~ 300Hz
- (10) Conversion efficiency: 75-85%
- (11) Static power consumption: 0.8W Max.
- (12) Dimension: L99.7×W25.4×H14.2mm
- (13) Isolation voltage between input, output and control: 5000V
- (14) Storage temperature: -65°C ~ +150°C
- (15) Output form of voltage: lead wire

### Service Requirement

As the power supply module has nearly 10W power consumption 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 185°C (M) or 105°C (I). 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.

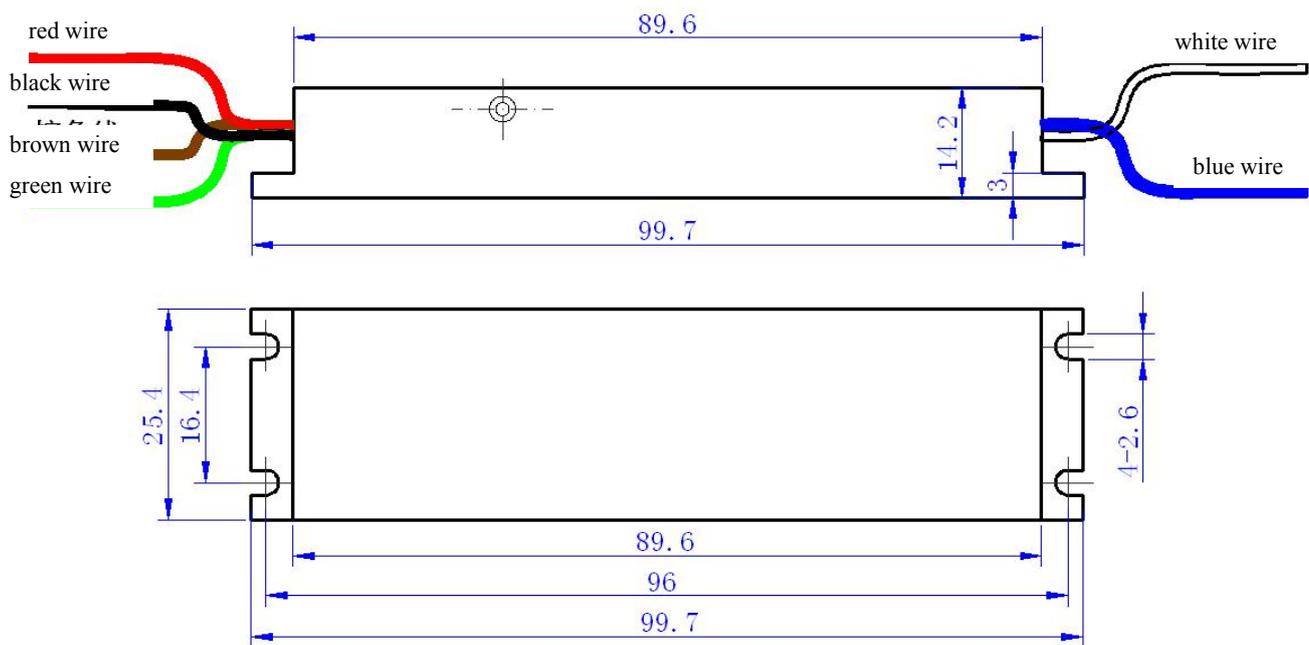
If the shell must be connected to the input ground, it must be connected at the place less than 1cm where input ground goes into the module. The line of make point is better to be short from the module.

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 plate 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 Diagram

Outline Diagram of FH30H



### 2 lead wires

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

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

**Output terminal:** white: high voltage +    Blue wire: high voltage -

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

**March 14th, 2017**