

## FP Series High-Voltage Power-Supply Module for Laser Radar

### Features:

- : High operating temperature: Max (-55°C ~ +175°C, shell temperature up to +204°C)
- : High output voltage and continuously adjustable: 0 ~ ±125V
- : Big output current: 5mA
- : Small output ripple coefficient: less than 0.01% typical 30mV
- : High conversion efficiency: typical 80%
- : High temperature stability: less than 40PPM/°C
- : Multiple selection of input range: +5V, +12V, +15V, +24V, +28V
- : Sealed metal casting (impact and moist resistance and electromagnetic radiation protection)
- : Small size: L33.0×W22.0×H7.8mm
- : Integrated LC EMI filter
- : Provide rated power without deduction at 175°C (shell) and provide 50% of rated power at 204°C (shell)



### Description:

FP series high-voltage power-supply module is specially designed for laser radar device working in the harsh environment. It is a power supply system especially applicable to petroleum survey logging tool, petroleum drilling instrument, geophysical detecting instrument, vehicles, telecommunication, network infrastructures, enterprise and high-performance calculation.

FP series power-supply module is portable with its size of only L33.0×W22.0×H8.5mm and saves space for portable laser radar. Simply designed, its static working current is only 10mA and load conversion efficiency up to 80%. This is suitable to power supply characteristics of battery of portable device. It is resistant to high temperature, shock and moisture when working in harsh environment, thus it is able to normally work at an ambient temperature of 175°C. Shock resistance frequency: 20-50Hz/50Hz-2KHz and amplitude/rate: 0.5mm/10g. Shock resistance reaches three times per amplitude. Spike rate: 100g and duration: 6ms

FP series power-supply module has five selections for input range and given rated voltage is its central value in working. When input voltage is equal to rated input voltage, conversion efficiency of power supply reaches maximum. When it deviates from rated value, the module is also able to work normally, but its conversion efficiency is low. Considering that its power source may be not steady, it allows several input ranges including +5V(4.5~9V), +12V(7.5~15V), +15V(10~20), +24V(15~30V), and +28V(18~36V). Within the entire range of working temperature and conversion between full load and no-load, and when input voltage fluctuates from minimum voltage to maximum voltage, output voltage fluctuates within 0.3V.

Output high voltage of FP series power-supply module is continuously adjustable from zero to the highest and there are voltage-control type and resistance-control type. Control voltage ground and input ground of voltage-control type are connected. When the range of control voltage applied to control end (ADJ) is 0~5.0V, output high voltage has linear variation with control voltage. When control voltage is 0V, output high voltage reaches the minimum value and when control voltage is 5.0V, output high voltage reaches the maximum value. When control voltage is higher than 5.0V, output high voltage still has linear variation with control voltage, but its performance and reliability will reduce sharply, for this reason, control voltage should be less than 5.5V.

For FP series, control resistance of resistance-control type is connected between adjustment control end (ADJ) and input ground and output high voltage increases with increment of control resistance, but not in linear. The more the control resistance is larger, gentler the high voltage changes with it. When control resistance is infinite, namely control end is suspended, output high voltage reaches its maximum value. Normally it is ok to connect a 200K adjustable resistance. Resistance-control type can also use voltage to control output high voltage. First connect a resistance in series at control end

and apply control voltage. The bigger the resistance is connected, the higher the minimum output voltage will be! When the range of control voltage is 0~5.0V, output high voltage has linear variation with control voltage. When control voltage is 0V, output high voltage reaches the minimum value and when control voltage is 5.0V, output high voltage reaches the maximum value. When control voltage is higher than 5.0V, output high voltage still has linear variation with control voltage, but its performance and reliability will reduce sharply, for this reason, control voltage should be less than 5.5V. Its difference with voltage-control type is that its minimum output high voltage has self adjustment, which can promote the precision of adjustment.

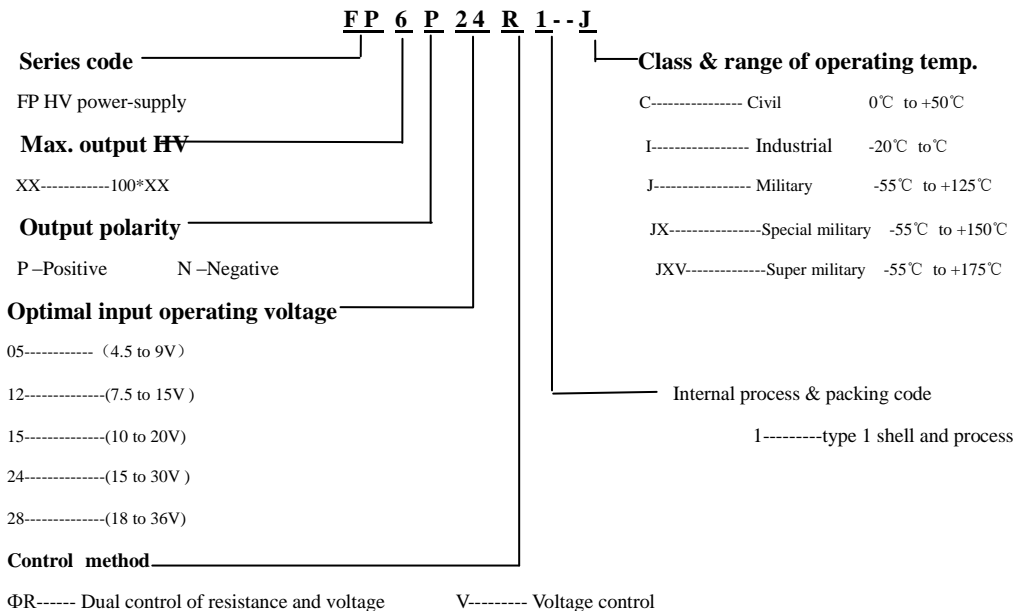
FP series power-supply module is specially designed for applications in the circumstance of light load. The efficiency is up to 75% when output is 1.2W and 85% when output is 5W. In order to achieve light load and high efficiency, the input range of circuit not like other series of three times high-low ratio reduces to two times high-low ratio.

As FP series power-supply module adopts high-frequency working frequency and provides good condition for filtering. In the circumstance of adding no filtering, its output voltage ripple is less than 100mV. The temperature stability of frequency within the entire range of temperature is ±1%.

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

Key components used for FP series power-supply module are purchased in military level and completely pass the in-factory test in strict accordance with enterprise standard and the national military product quality standard. All finished products have experienced 8-hour full-load operation under the temperature of +50 °C (civil level), + 85 °C (industrial level) and +125 °C (military level) before delivery so as to fully check the damage to the components during the production process and hence ensure the reliability of products.

**Type Selection:**



**Technical Parameters:**

- (1) Operating temperature: -55 °C ~ +175 °C Max. shell temperature: +204 °C.
- (2) Input voltage: 4.5~9V, 7.5~15V, 10~20V, 15~30V, 18~36V
- (3) Output voltage: 0~±1250V
- (4) Conversion efficiency: 75-85%
- (5) Output current: 5mA

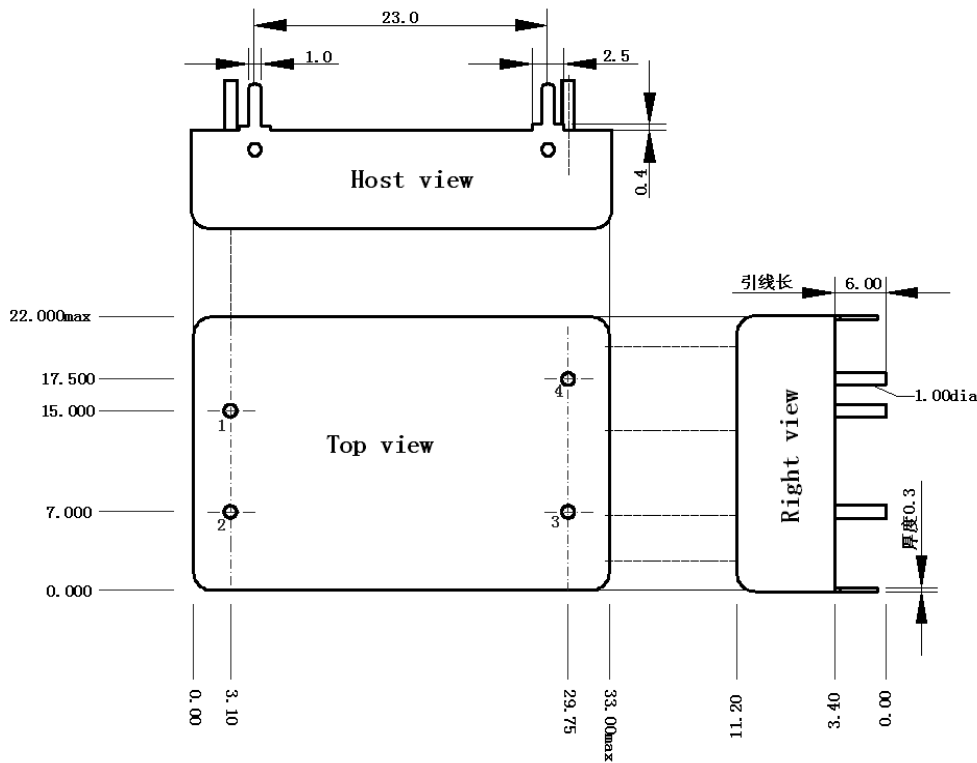
- (6) Output ripple: 100mVp-p (typical 30mVp-p)
- (7) Temperature stability: less than  $\pm 40\text{PPM}/^\circ\text{C}$  (typical  $\pm 20\text{PPM}/^\circ\text{C}$ )
- (8) Linear regulation:  $\pm 0.1\%$  (10% linear variation)
- (9) Load regulation:  $\pm 0.05$  (50% load change)
- (10) Shock resistance: 25G, 0 ~ 300Hz
- (11) Static power consumption: less than 0.1W
- (12) Output power: 6W
- (13) Dimension: L33.0×W22.0×H7.8mm

**Service Requirement:**

As this module is suitable to light load and has high efficiency, it is unnecessary to add radiator. But from the point of view of thermal reliability, its service life will prolong by one times when the temperature reduces by 8°C. Thus if the condition allows, the heat of module shell should be radiated as far as possible so as to ensure the minimum temperature difference between temperature of module shell and ambient temperature. The input and output of module are commonly grounded, but they are isolated from shell. In order to reduce switching spike and radiation, it should be connected to input ground during using. In this way, the power supply will be more stable and ripple become smaller. Attention should be paid to insulation between wires on printing circuit board and shell.

To strengthen the shock resistant performance, four soldering terminals of shell should be welded on printing circuit when installing the module on printing circuit board. Power-supply module is to be possibly damaged when fixed with only four pins in strong shock condition.

**Outline Diagram:**



**Definition of Pins**

Pin No.	Definition of Pins
1	Input negative (IN-)
2	Input positive (IN+)
3	Output High voltage (HV)
6	Control end (ADJ)

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

November 15. 2012