

FHA30 Series High Temperature AC-DC Power Converter

Features:

- : High operating temperature: Ambient temperature: $-55^{\circ}\text{C} \sim +175^{\circ}\text{C}$ and max. shell temperature up to $+185^{\circ}\text{C}$
- : Output power: 30W
- : Size: $L84.0 \times W50.0 \times H25\text{mm}$, **This dimension does not include the size of the mounting base**
- : Multiple outputs up to 4 outputs and at most 3 isolated output ground wires:
 - (3.3V, 5V, 7V, 9V, 12V, 15V, 18V, 24V, 36V, 48V)
- : Output ripple: max. 50mV, typical 20mV
- : High conversion efficiency: typical 82-87%
- : Input range: AC: $70 \sim 150\text{V}$, $85\text{V} \sim 247\text{V}$, $120 \sim 247\text{V}$
- : Sealed metal casting (impact and moist resistance and electromagnetic radiation protection)
 - : Operating frequency: 66.6KHZ
 - : Integrated LC EMI filter
 - : Provide rated power without deduction at 175°C (shell); provide 80% rated power at 185°C (shell); provide 50% rated power at 204°C (shell)
 - : Over-heat protection at 210°C
 - : Over-voltage and over-current failure cut-off delay restart
 - : Output short circuit and overload cutoff protection



Description:

FHA30 series 30W high-temperature DC-DC power converter, designed for electronic equipment working in the harsh environment, can work for 1,000 hours at shell temperature 150°C , for 400 hours at shell temperature 175°C and for 48 hours at shell temperature 204°C . With features of being resistant to high temperature, impact and humidity, it is particularly suitable for being used as power supply for the oil, military, geophysical exploration, nuclear monitoring, satellites and aircrafts, etc. It has three alternative input ranges including AC $70 \sim 150\text{V}$ (0Hz-400Hz), AC $85 \sim 247\text{V}$ (0Hz-400Hz), and AC $120 \sim 247\text{V}$ (0Hz-400Hz). It provides single, dual and triple fixed-voltage outputs and outputs are isolated from each other. Thus the mutual interference between outputs is largely reduced. They can be connected to form output different groups as per requirement. These three output modes are allowed to be connected to form output combinations of different types as per requirement. Within the entire temperature range and conversion between full load and no-load, the output voltage fluctuation is within 2%.

The output voltage types designed for FHA30 series 30W high-temperature AC-DC power-supply converter include 3.3V, 5V, 9V, 12V, 15V, 24V, 36V and 48V. The output can be either type of them and combinations of any two or three types. MOUT represents the main output terminal, OUT1 and OUT2 represents the auxiliary output terminals. During the use, the voltage output by MOUT is the most stable and its output voltage and ripple do not vary with the variation of itself and auxiliary output. With the precondition that MOUT outputs constant power, the voltage of auxiliary output

terminals OUT1 and OUT2 drops at 2% max. with the rise of their output power. If auxiliary output terminals OUT1 and OUT2 output constant power, their output voltage will rise with the rise of power output by MOUT. For this feature, the output should be specified in using and selecting types. If the model is FHA30-220S12-S24-S5, it will output three channels 12V, 24V, and 5V isolated from each other. Of which, 12V is from MOUT, 24V from OUT1 and 5V from OUT2. That is our model FHA30-DCINSMOUT-SOUT1-SOUT2.

In the course of using multi-channel output converter, if the output (main or auxiliary) of a channel dynamically changes, it will cause the auxiliary output voltage to fluctuate accordingly. If the fluctuation is greater than 50mA, measures must be taken. The voltage fluctuation above 50mA appears when output power varies between the rated power of above 10% and below 70%. The fluctuation increases along with the rise of proportion of high and low output power. The fluctuation frequency is equal to the frequency of power variation. The secondary filtering is thus considered to be done. If the fluctuation frequency of power is less than 10KHz, there will be trouble in filtering. Then it is necessary to reduce the number of output channels of main converter and add secondary DC/DC converter to re-convert additional voltage. If the fluctuation frequency of power is greater than 10KHz, the simple filtering is able to remove the fluctuation.

In the course of using, when an output power (main or auxiliary) of a channel varies between the rated power of above 10% and below 70%, its voltage fluctuation generally is less than 50mV. This fluctuation is free of consideration in general.

Our design concept is that if the required output voltage is above three channels, then FHA30 chooses OUT2 to output 24V, 36V and 48V. Following OUT2, connect our DC/DC converter with input voltage of 28V(16~48V) or 48V (24~72V) to conduct secondary conversion.

For this converter with range of wide input voltage of 85V-247V, if the input voltage is less than 120V, it only output 20W power and when input voltage is greater than 120V, it outputs full rated power 30W.

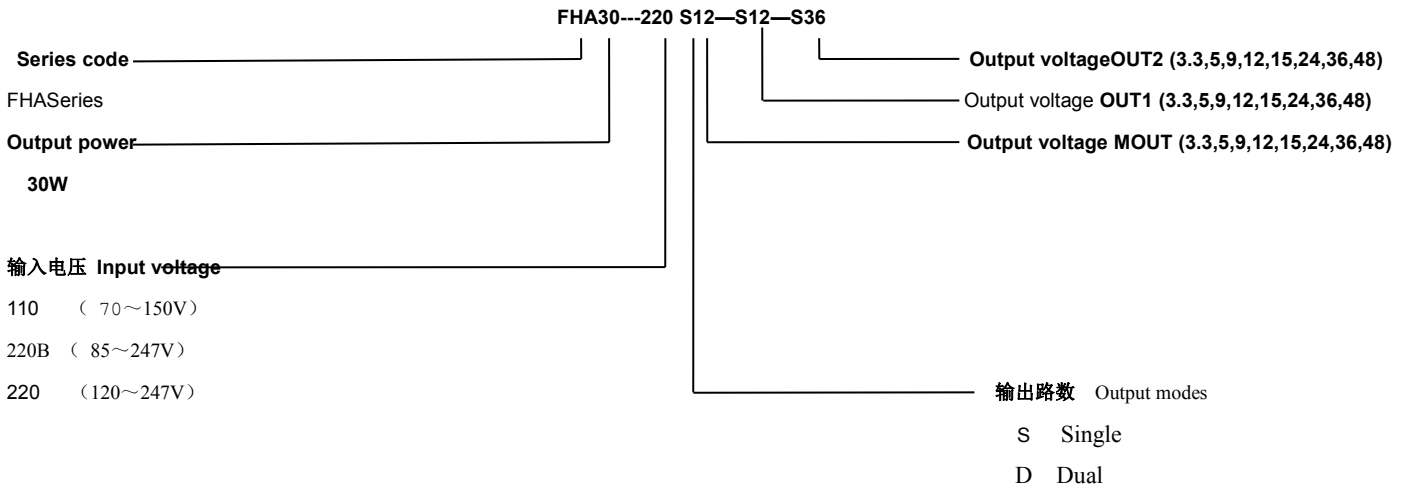
The operating frequency of FHA30 series power-supply converter adopts universal 66.6KHz, which can pass various EMI standard test. Under the circumstance without any filtering, its output voltage ripple is less than 50mV. Within the entire range of temperature, the temperature stability of frequency is $\pm 8\%$.

FHA30 series power-supply converter contains an in-built LC network, which can effectively reduce the fluctuations of the input current and the output voltage.

FHA30 series power-supply converter 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 converter 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 converter will not act.

Key components used for FHA30 series power-supply converter are purchased in military level and completely pass the in-factory test in strict accordance with the national military product quality standard. The factory test includes 24 ~ 72-hour live aging and screening under the temperature of +175°C. All finished products have experienced 8-hour full-load operation under the temperature of +185 °C 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



NOTE: “—” in model refers to the meaning of isolation. If the single-channel output is adopted, there is no—SOUT1—SOUT2; if double-channel output is adopted, there is no —SOUT2.

Technical Parameters

- (1) Operating temperature: -55℃ ~ +175℃ Max. shell temperature: +185℃.
- (2) Input voltage: AC70V~150V, AC85V~247V, AC120V~247V
- (3) Input AC frequency: 0Hz~400Hz
- (4) Output voltage: Multiple outputs up to 4 outputs and at most 3 mutually-isolated output ground wires: Free combination of 3.3V, 5V, 7V, 9V, 12V, 15V, 18V, 24V, 36V, 48V
- (5) Output ripple: 50mVp-p (typical 20mVp-p)
- (6) Output power: 30W
- (7) Temperature stability: less than ±2.5% (typical ±1%)
- (8) Shock resistance: 25G, 0 ~ 300Hz
- (9) Conversion efficiency: 80-85%
- (10) Static power consumption: 0.8W Max.
- (11) Dimension: L84.0×W50.0×H25.0mm, **This dimension does not include the size of the mounting base**
- (12) Isolation voltage between input and output: 1000V
- (13) Output form of voltage: high temperature 17-pin socket

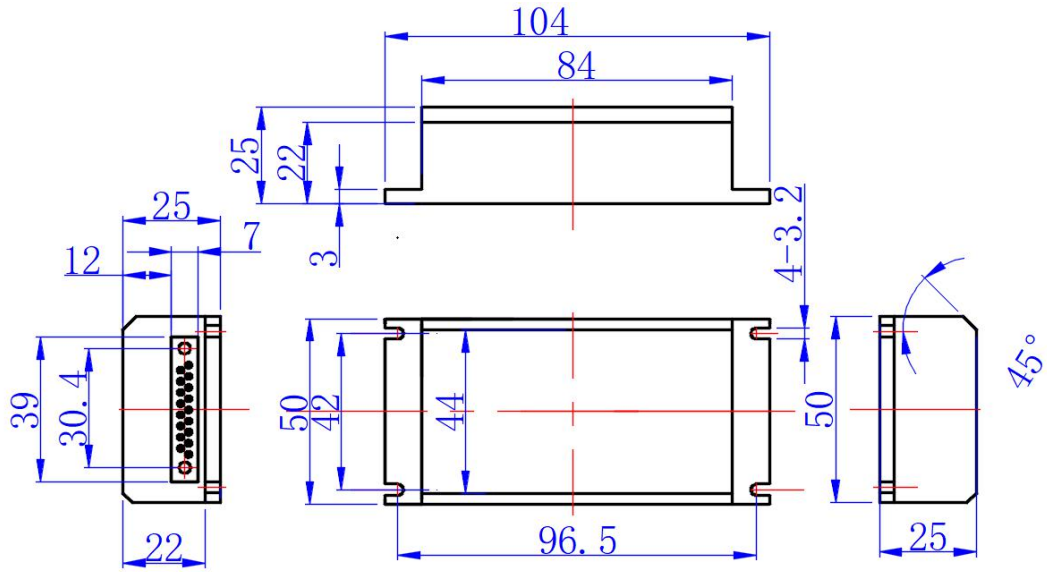
Service Requirement

As the power converter has nearly 5W power consumption under the condition of full-load operation and its size are small, good medium is necessary to be added between the shell of the power converter and the radiator so as to ensure the temperature of the converter shell to be less than 204℃.

The shell of the converter is isolated from the input and output. During the use, it is directly installed on radiator. If the ripple cannot be filtered with capacitance or LC network, then this ripple is electro magnetic interference (EMI). Thus, an EMI filtering converter is necessary to be added to input and output terminals of FHA30. To function properly, the shell of filtering converter should be suspended not to connect with radiator, input GND and output GND. If it is connected to either of them, EMI filtering converter will not function properly. As we have added EMI network to input and output terminals inside converter, so long as the shell is suspended, it will function. If the ripple is still large, it is needed to externally connect input or output EMI filter outside the shell. To suspend shell, it ordinarily put heat-conducting pad, ceramics backing or silicon rubber pad between the shell and radiator.

We shall provide 17-pin plug for use, please do not use uncertified plug.

Outline Diagram



- Note: 1、 Mounting hole and mounting hole spacing dimension tolerance is $\pm 0.1\text{mm}$
2、 The tolerance of external dimension is $\pm 0.2\text{mm}$

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

June 11,2022