AC/DC Converter
FA40-220SXXW2N4 Series

Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption≤0.25W (Input nominal voltage)
- ◆ Transfer efficiency 86%(typical)
- ◆ Switching frequency 65KHz
- ◆ Protections: short circuit, over current
- ◆ Isolation Voltage 4000Vac
- ◆ Meet IEC62368/UL62368/EN62368 test standards
- ◆ Fully enclosed plastic housing, compliant with UL94V-0
- ◆ PCB Mounting
- ◆ Maximum working insulation voltage: 1500VDC
- ◆ Device creepage distance and electrical clearance: 6.7mm
- ◆ CTI Level III

Application Field

FA40-220SXXW2N4 *Series-----a compact size, high efficient power converter offered by Aipu.*
It features universal input voltage range, taking both DC and AC input, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, safer isolation, with good EMC performance. EMC and Safety specification meet international EN55032、IEC/EN61000 standard. It is widely used in power, industrial, instrument, smart home applications. Please refer to this datasheet when module being used in a bad EMC environment.

Typical Product List

Certificate	Part No.	Output Specification			Max. Capacitive Load	Ripple & Noise 20MHz (Max)	Efficiency @full load 220Vac (TYP)
		Power	Voltage	Current			
		(W)	Vo1(V)	Io1 (m A)	u F	mVp-p	%
/	FA40-220S05W2N4	40	5	8000	5000	100	79
	FA40-220S12W2N4	40	12	3333	1000	120	83
	FA40-220S24W2N4	40	24	1667	800	150	85

Note 1:The typical value of output efficiency is based on product is full loaded and burned-in after half an hour.
Note 2: Fluctuation range of full load efficiency (%,TYP) is ±2%. Full load efficiency=Total output power / module's Input power.
Note 3: Ripple& Noise is tested by Twisted Pair Method, details please see Ripple& Noise Test at back.
Note 4: Due to space limitations, above is only a part of our product list, please contact our sales team for more items.

Input Specifications

Items	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	220	305	VAC
	DC input	120	310	430	VDC
Input Frequency Range	-	47	50	63	Hz
Input Current	115VAC	/	/	0.8	A

	220VAC	/	/	0.5	
Surge Current	115VAC	/	/	10	
	220VAC	/	/	20	
Leakage Current	-	0.5mA TYP/230VAC/50Hz			
Recommended External Input Fuse	-	3.15A/250VAC, slow-fusing			
Hot Plug	-	Unavailable			
Remote Control Terminal	-	Unavailable			

Output Specifications

Items	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	Full input voltage range, any load	-	±2.0	±4.0	%
Line Regulation	Nominal load	-	-	±0.5	%
Load Regulation	Nominal input voltage, 20%~100% load	-	-	±3.0	%
No Load Power Consumption	Input 115VAC	-	-	0.25	W
	Input 220VAC	-	-		
Minimum Load	Single Output	0	-	-	%
Start-up Delay Time	Nominal input voltage (full load)	-	1000	-	mS
Power-off Holding Time	Input 115VAC(full load)	-	200	-	mS
	Input 220VAC(full load)	-	100	-	
Dynamic Response	25%~50%~25% 50%~75%~50%	－5.0	-	＋5.0	%
		-	-	5.0	mS
Output Overshoot	Full input voltage range	≤10%Vo			%
Short-Circuit Protection		Continuous, Self-recovery			Hiccup
Drift Coefficient	-	-	±0.03%	-	%/℃
Over-current Protection	Input 220VAC	≥130% Io self-recovery			Hiccup

General Specifications

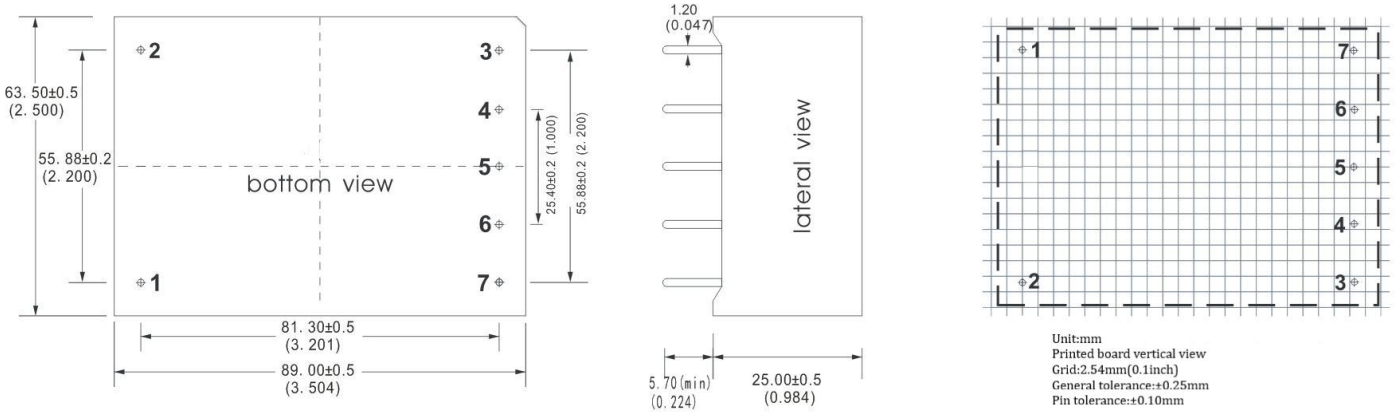
Items	Operating Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	-	-40	-	+105	℃
Storage Temperature	-	-40	-	+110	

Soldering Temperature	Wave soldering	260±4℃, timing 5-10S			
	Manual soldering	360±8℃, timing 4-7S			
Relative Humidity	-	10	-	90	%RH
Isolation Voltage	Input-Output, test 1min, leakage current≤5mA	4000	-	-	VAC
Insulation Resistance	Input-Output @DC500V	100	-	-	MΩ
Safety Standard	-	EN62368, IEC62368			
Vibration	-	10-55Hz,10G,30Min, alongX,Y,Z			
Safety Class	-	CLASS Ⅱ			
MTBF	-	MIL-HDBK-217F@25℃＞300,000H			
Cooling Method		Free air convection			

Electromagnetic Compatibility(EMC) Characteristics

Total Items		Sub Items	Standard	Class
EMC	EMI	CE	CISPR22/EN55032	CLASS B (Recommended Circuit 2)
		RE	CISPR22/EN55032	CLASS B (Recommended Circuit 2)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (Recommended Circuit 1)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (Recommended Circuit 1)
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±1KV Perf.Criteria B
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B
		Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

Packing Dimension

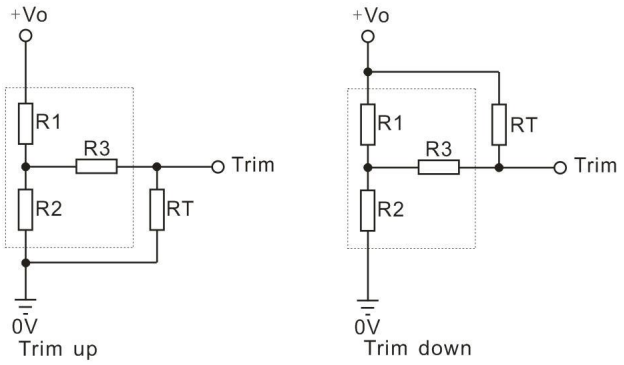


Packing Code	L x W x H	
W2	89.0X63.5X25.0mm	3.504X2.500X0.984inch

Pin Definition

Pin-out	1	2	3	4	5	6	7
Single(S)	AC(L)	AC(N)	Trim	NP	-Vo	NP	+Vo

Trim Pin Voltage Regulation Application Circuit



Circuit of Trim(dotted area is the inside of AC/DC Converter)

$$up: RT=\frac{aR2}{R2-a}-R3 \quad a=\frac{Vref}{Vo-Vref}*R1$$

$$down: RT=\frac{aR1}{R1-a}-R3 \quad a=\frac{Vo-Vref}{Vref}*R2$$

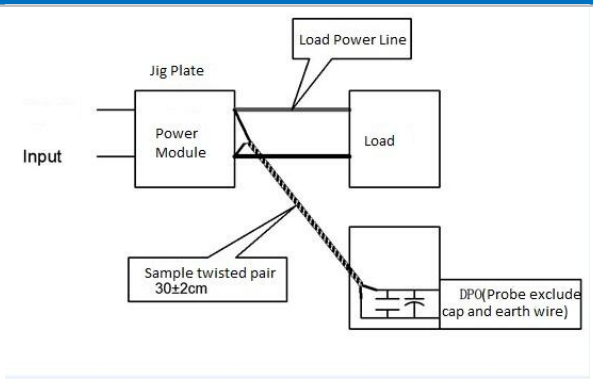
AC/DC Converter	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)	+Vo(V)
FA40-220S05W2N4	5.1	5.07	1	2.5	Adjusted output voltage amplitude ≤±10%
FA40-220S12W2N4	39	10.2			
FA40-220S24W2N4	39	4.52			
Note: RT is Trim resistor, a is a custom parameter					

Ripple& Noise Test: (Twisted Pair Method 20MHZ bandwidth)

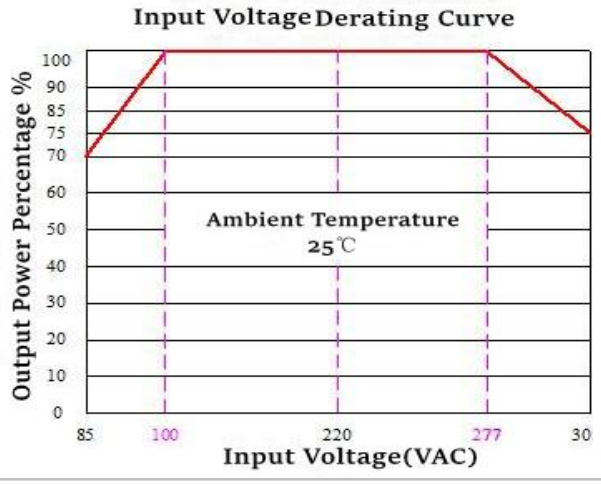
Test Method:

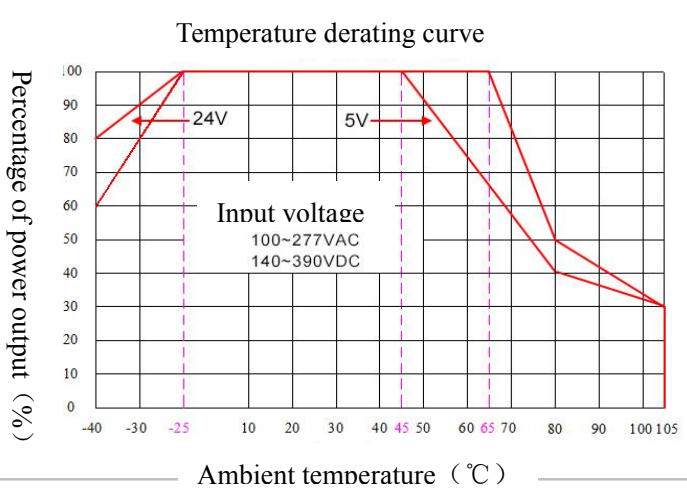
(1) 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

(2) Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



Product Characteristic Curve

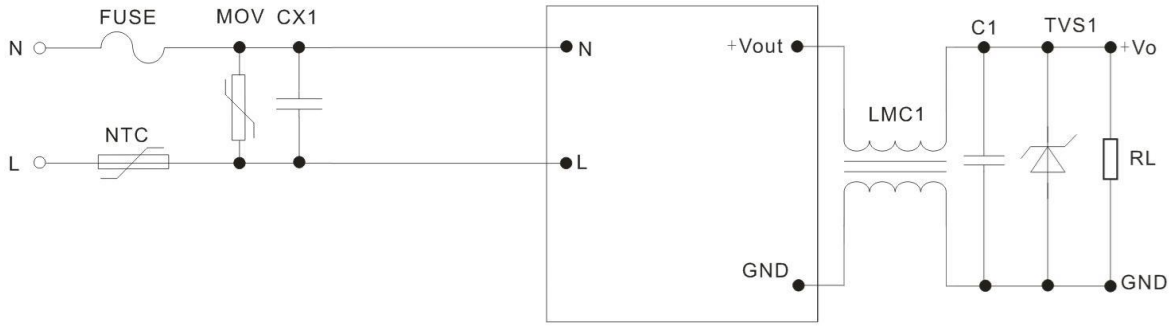




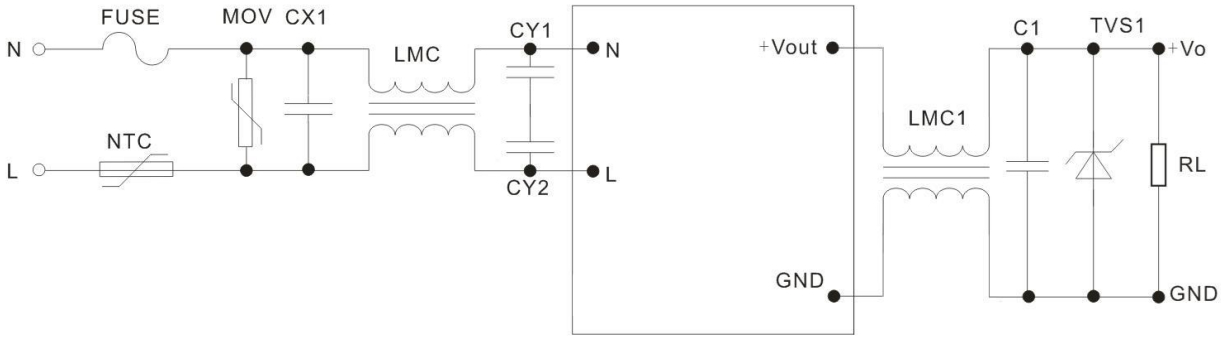
Note 1: Input Voltage should be derated base on Input Voltage Derating Curve when it is 85~110VAC/277~305VAC/120~155VDC/ 390~430VDC.
Derating of FA40-220S05W2N4 based on 5V curve.

Note 2: Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact with us.

Typical EMC Application and Recommend Circuit



Recommended Circuit 1



Recommended Circuit 2

Note 1:

1. Output filter capacitor C1 removes high-frequency noise. It is recommended to use a 1 μ F ceramic capacitor with a voltage drop greater than 80%.
2. TVS tube is recommended to protect the subsequent circuit (when the module is abnormal). 600W model is recommended. 5V output recommended: SMBJ7.0A, 9V output recommended: SMBJ12.0A, 12V output recommended: SMBJ20A, 15V output recommended: SMBJ20.0A, 24V output recommended: SMBJ30.0A, 48V output recommended: SMBJ64A
3. MOV is a varistor, recommended model: 10D561K, which is used to protect the module from damage during lightning surges.
4. The general application requirements of customers use the recommended circuit in Figure 1. If there are higher EMC requirements, please use the recommended circuit in Figure 2. The specific recommended values of Recommended Circuit 2 are as follows:

1) MOV varistor: recommended model: 10D561K, which is used to protect the module from damage during lightning surge.
2) NTC thermistor: 10D-9;
3) Safety capacitors CY1, CY2: 1000pF/400VAC;
4) Safety capacitor CX: 0.1 μ F/275VAC;
5) Common mode inductor LCM: 15mH-30mH;
6) Common mode inductor LCM1: 30uH-50uH;
7) FUSE (fuse): must be connected, recommended specification is 3.15A/250V, slow break.

Note:

1.The product should be used under the specification range, otherwise it will cause permanent damage to it.

2.Product's input terminal should connect to fuse;

3.If the product operated below the minimum load request, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;

4.If the product worked beyond the load range, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;

5.Unless otherwise specified, data in this datasheet are tested under conditions of **Ta=25℃**, **humidity<75%** when inputting nominal voltage and outputting rated load(pure resistance load);

6.All index testing methods in this datasheet are based on our Company's corporate standards.

7.The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, please directly contact our technician for specific information;

8.We can provide customized product service;

9.The product specification may be changed at any time without prior notice.

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