

Typical Features

- ◆ Wide input voltage range 85-265VAC/120-380VDC
- ◆ Standby power consumption $\leq 0.3W@220VAC$
- ◆ Efficiency up to 86% (Typ.)
- ◆ Operating temperature from $-40^{\circ}C$ to $+85^{\circ}C$
- ◆ Switching frequency 65KHz
- ◆ Output short circuit & over current protections
- ◆ Isolation voltage 4000VAC
- ◆ Altitude during operating 2000m Max
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ With CE certificate
- ◆ PCB DIP mounting



EN62368-1

Application Field

FA40-220SXXW2D4 Series ---- Compact size, high efficiency modular power supplies with global adapted input voltage range (both AC & DC available), low ripple, low temperature rise, low standby power consumption, high efficiency, high reliability, safety isolated and good EMC performance. This series of products can be widely used in the fields of Electric power, Industrial, Instrument and Smart home devices, etc. The additional EMC circuit diagram is recommended for the application with high EMC requirement.

Typical Product List

Certificate	Part No.	Input Voltage Range		Output Specification			Max Capacitive Load @220VAC (uF)	Ripple & Noise @20MHz (Max) mVp-p	Efficiency @full load, 220VAC (Typ.) (%)
		Nominal	Range	Power	Voltage	Current			
		(VAC)	(VAC)	P(W)	Vo (V)	Io (mA)			
CE	FA40-220S05W2D4	220	85-265	40	5	8000	5000	100	79
CE	FA40-220S12W2D4				12	3333	1000	120	84
-	FA40-220S15W2D4				15	2667	1000	120	84
CE	FA40-220S24W2D4				24	1667	1000	150	86

Note 1: The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 2: The full load efficiency should be in $\pm 2\%$ of the typical value in this table. The efficiency is calculated by the way that the full output power is divided by the input power.

Note 3: The Ripple and Noise is tested by the Parallel-line method (refer to the following test instruction).

Note 4: Please contact Aipu sales for other output voltages requirements of this series but not listed in this table.

Input Specifications

Items	Test Conditions	Min.	Typ.	Max.	Unit
Input voltage range	AC input	85	220	265	VAC
	DC input	120	310	380	VDC

Input frequency range	-	47	50	63	Hz
No load power consumption	Input 115VAC	-	-	0.3	W
	Input 220VAC	-	-		
Input current	Input 115VAC	-	-	0.8	A
	Input 220VAC	-	-	0.5	
Surge current	Input 115VAC	-	-	10	A
	Input 220VAC	-	-	20	
Leakage current	-	0.5mA TYP/230VAC/50Hz			
Recommended external fuse	-	3.15A/250VAC, Time-delay fuse			
Hot plug	-	Unavailable			
ON/OFF Control	-	Unavailable			

Output Specifications

Items		Test Conditions	Min.	Typ.	Max.	Unit
Voltage accuracy		Full input voltage range, any load	-	±2.0	±4.0	%
Line regulation		Rated load	-	-	±0.5	%
Load regulation		Nominal input voltage, 20%~100% load	-	-	±3.0	%
Ripple & Noise		5%-100% load, 20MHz bandwidth	-	-	150	mVp-p
Dynamic response	Overshoot range	25%~50%~25%	-5.0	-	+5.0	%
	Recovery time	50%~75%~50%	-	-	5.0	mS
Minimum load		Single Output	0	-	-	%
Temperature drift coefficient		-	-	-	±0.03%	%/°C
Turn-on delay time		Input 115VAC (full load)	-	-	3500	mS
		Input 220VAC (full load)	-	-		
Power-off Hold-up time		Input 115VAC (full load)	-	50	-	mS
		Input 220VAC (full load)	-	80	-	
Output overshoot		Full input voltage range	≤10%Vo			%Vo
Short circuit protection			Continuous, Self-recovery			Hiccup
Over current protection		Input 220VAC	130%Io	-	220%Io	mA
Output voltage Trim		Full input voltage range	90	-	110	%Vo

General Specifications

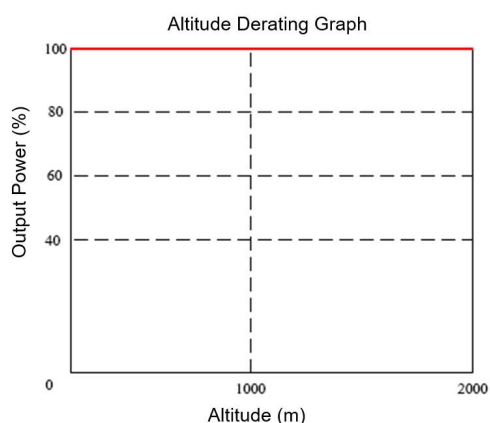
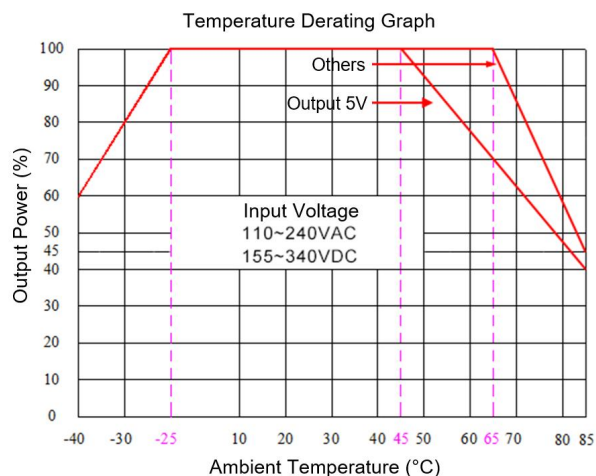
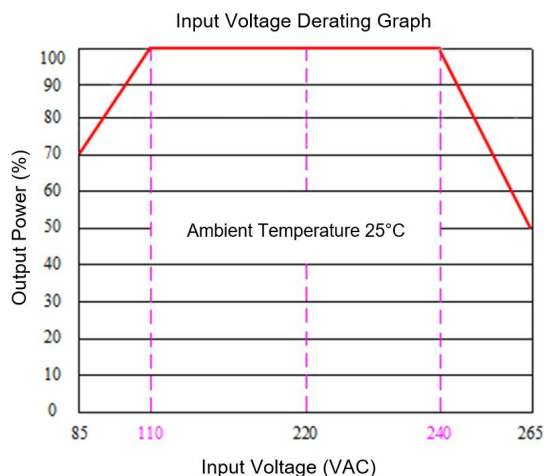
Items	Test Conditions		Min.	Typ.	Max.	Unit
Switching frequency	-		-	65	-	KHz
Operating temperature	Refer to the Temperature Derating Graph		-40	-	+85	℃
Storage temperature	-		-40	-	+105	
Soldering temperature	Wave soldering		260±4℃, timing 5-10S			
	Manual soldering		360±8℃, timing 4-7S			
Relative humidity	-		10	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current <5mA	4000	-	-	VAC

Insulation resistance	I/P-O/P	@DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F@25°C		300	-	-	K Hours
Safety standard	IEC/EN62368					
Vibration	10-55Hz, 10G, 30 Min, along X, Y, Z					
Safety class	CLASS II					
Weight & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H			
	FA40-220SXXW2D4	220g	89.00X63.50X25.00 mm	3.504X2.500X0.984 inch		

EMC Performance

Items			Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2)
		RE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf. Criteria B (with the Recommended Circuit 1)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf. Criteria B (with the 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 & interruptions	IEC/EN61000-4-11	0%~70% Perf. Criteria B

Product Characteristics Graphs



Note 1: The output power should be derated based on the input voltage derating graph at 85~110VAC/120~155VDC & 240~265VAC/340~380VDC.

Note 2: The converter should operate under the condition of nature air, please contact us if it could be used at a closed place.

Recommended Circuit for Application

1. Typical application circuit diagram

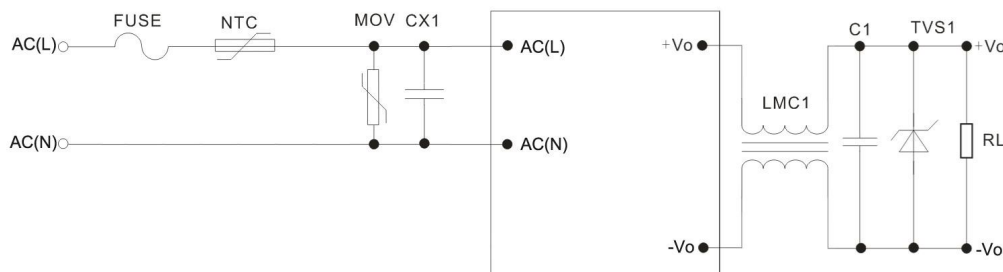


Figure – Circuit 1

FUSE	3.15A/250VAC Time-delay fuse (Necessary)	LMC1	30uH-50uH/10A
MOV	10D561K/3500A	TVS1	See note 1
CX1	X2/104K/275VAC		

Note 1:

1) A 1uF ceramic capacitor is recommended for C1 to suppress the high frequency noise, the withstand voltage should be derated at least 80%.

2) 600W TVS is recommended to protect the output circuit under abnormal condition. SMBJ7.0A for 5V output; SMBJ12.0A for 9V output; SMBJ20A for both 12V & 15V outputs; SMBJ30.0A for 24V output and SMBJ64A for 48V output.

2. Recommended EMC circuit diagram for high EMC requirement

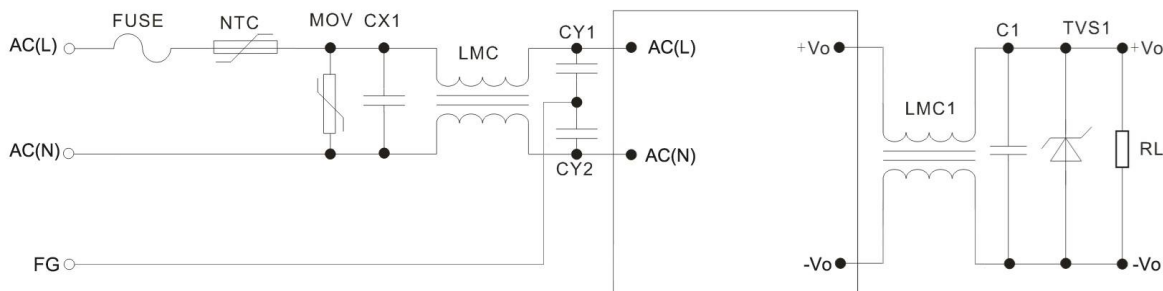


Figure – Circuit 2

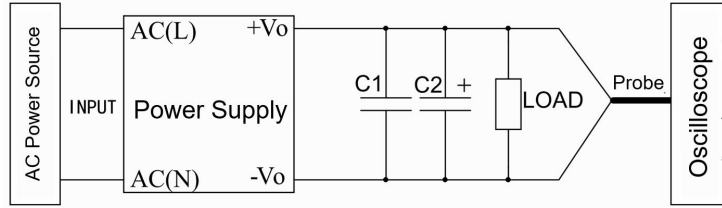
FUSE	3.15A/250VAC Time-delay fuse (Necessary)	LMC1	30uH-50uH/10A
MOV	10D561K/3500A	CY1/CY2	Y1/102M/400VAC
CX1	X2/104K/275VAC	TVS1	See note 2
LMC	15mH-30mH/1A		

Note 2:

1) A 1uF ceramic capacitor is recommended for C1 to suppress the high frequency noise, the withstand voltage should be derated at least 80%.

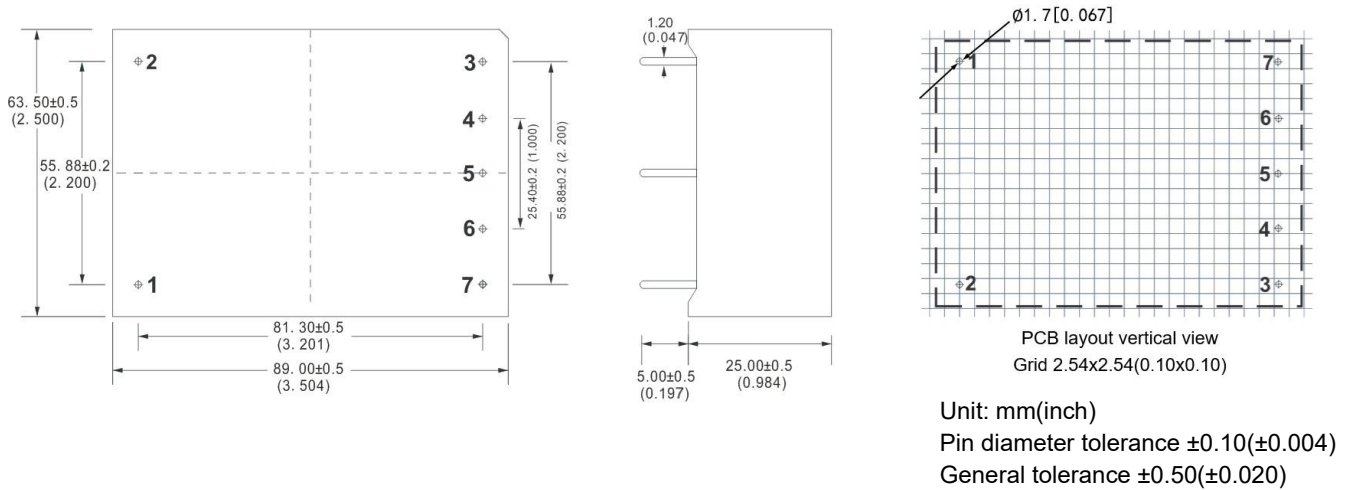
2) 600W TVS is recommended to protect the output circuit under abnormal condition. SMBJ7.0A for 5V output; SMBJ12.0A for 9V output; SMBJ20A for both 12V & 15V outputs; SMBJ30.0A for 24V output and SMBJ64A for 48V output.

Ripple & Noise Test Instruction (Parallel-line Method, 20MHZ bandwidth)



1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high-frequency low-resistance electrolytic capacitor C2(10uF) are connected in parallel with the probe.
2. Refer to the test diagram, the converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The test can start at the converter output terminals after input power on.

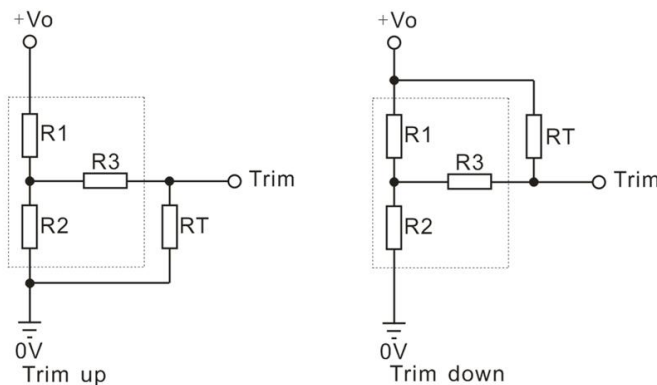
Mechanical Dimensions



Pin-out Function Description

Pin No.	1	2	3	4	5	6	7
Function	AC(L)	AC(N)	Trim	No Pin	-Vo	No Pin	+Vo

Trim Application Circuit & Trim Resistance Calculation



$$\begin{aligned} \text{up: } RT &= \frac{aR2}{R2-a} - R3 & a &= \frac{V_{ref}}{V_o - V_{ref}} * R1 \\ \text{down: } RT &= \frac{aR1}{R1-a} - R3 & a &= \frac{V_o - V_{ref}}{V_{ref}} * R2 \end{aligned}$$

Output voltage Trim up & down circuit diagrams (the components in the dotted area are inside of the converter)

Part No.	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)	+Vo(V)
FA40-220S05W2D4	5.1	5.07	1	2.5	The output voltage can be changed $\leq\pm 10\%V_o$ by the Trim function.
FA40-220S12W2D4	39	10.2			
FA40-220S15W2D4	36	7.11			
FA40-220S24W2D4	39	4.52			
Note: RT is the Trim resistor, α is a custom parameter.					

Application Notice

1. The product should be used according to the specification, otherwise it could be permanently damaged.
2. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.
3. The product performance cannot be guaranteed if it works under over-load condition.
4. Unless otherwise specified, all values or indicators on this datasheet are tested at $T_a=25^{\circ}\text{C}$, humidity $<75\%\text{RH}$, nominal input voltage and rated load (pure resistance load).
5. All values or indicators on this datasheet have been tested based on Aipupower test specifications.
6. The specifications are specially for the parts listed on this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.
7. Aipupower can provide customization service.

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