AC/DC Converter
FA20-220SXXP2D4 Series

Typical Features

- ◆ Wide Input Voltage Range 85-265VAC/120-380VDC
- ◆ No load power consumption ≤0.15W
- ◆ Efficiency 88%(typ.)
- ◆ Operating Temperature from -40℃ to +75℃
- ◆ Switching Frequency 65KHz
- ◆ Short-circuit, Over-current & Over-voltage protections
- ◆ Isolation voltage 4000VAC
- ◆ Altitude during operating 4000m Max
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ Conform to CE & RoHS regulation
- ◆ Pass LPS (Limited Power Source) Test
- ◆ Encapsulated in plastic case, flame class UL94 V-0
- ◆ PCB DIP Mounting

CE RoHS

Application Field

FA20-220SXXP2D4 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, smart home devices, etc. The additional circuit for EMC is recommended in this data sheet for the application with high EMC requirement.*

Typical Product List

Certificate	Part No.	Output Specification			Capacitive Load @220VAC (MAX)	Ripple& Noise 20MHz (MAX)	Efficiency@ Full Load 220VAC (Typical)
		Power	Voltage	Current			
		(W)	Vo(V)	Io (mA)	uF	mVp-p	%
CE	FA20-220S05P2D4	20	+5.0	4000	10000	50	82%
CE	FA20-220S09P2D4	20	+9.0	2222	6000	80	83%
CE	FA20-220S12P2D4	20	+12	1666	5000	80	84%
CE	FA20-220S15P2D4	20	+15	1333	3000	80	85%
CE	FA20-220S24P2D4	20	+24	833	2000	100	88%
-	FA20-220S48P2D4	20	+48	416	600	100	88%

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 ±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 - Please contact Aipu sales for other output voltages requirement in this series but not listed in this table.

Input Specifications

Item	Operating Condition	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
Input Current	100VAC	-	-	0.4	A
	220VAC	-	-	0.25	
Surge Current	100VAC	-	-	16	
	220VAC	-	-	28	
No Load Power Consumption	Input 115VAC	-	0.08	0.15	W
	Input 230VAC	-			
Leakage Current	-	0.5mA TYP/230VAC/50Hz			
External Fuse Recommend	-	2A/250VAC Time-delay fuse			
Hot Plug	-	Unavailable			
Remote Control	-	Unavailable			

Output Specifications

Item		Operating Condition		Min.	Typ.	Max.	Unit
Voltage Accuracy		Full input voltage range, Any load	Vo	-	±1.0	±2.0	%
Line Regulation		Nominal Load	Vo	-	-	±0.5	%
Load Regulation		Nominal input voltage, 20%~100% load	Vo	-	-	±1.0	%
Minimum Load		Single Output		0	-	-	%
Turn-on Delay Time		Input 115Vac (full load)		-	500	-	mS
		Input 220Vac (full load)		-		-	
Power-off Hold-up Time		Input 115VAC (full load)		-	14	-	mS
		Input 220VAC (full load)		-	70	-	
Dynamic Response	Overshoot range	25%~50%~25% 50%~75%~50%		-5.0	-	+5.0	%
	Recovery time			-5.0	-	+5.0	mS
Output Over-shoot		Full input voltage range		≤10%Vo			%
Short circuit protection				Continuous, Self-recovery			Hiccup
Drift Coefficient		-		-	±0.03%	-	%/℃
Over Current Protection		Input 100-265VAC		≥130% Io, Self-recovery			Hiccup
Over Voltage Protection		Output 5VDC		≤10			VDC
		Output 9VDC		≤12			
		Output 12VDC		≤18			
		Output 15VDC		≤20			

	Output 24VDC		≤30		
	Output 48VDC		≤60		
Ripple & Noise	-	-	80	100	mV
	The ripple and noise are tested by the twisted pair method (refer to the following Test Instructions).				

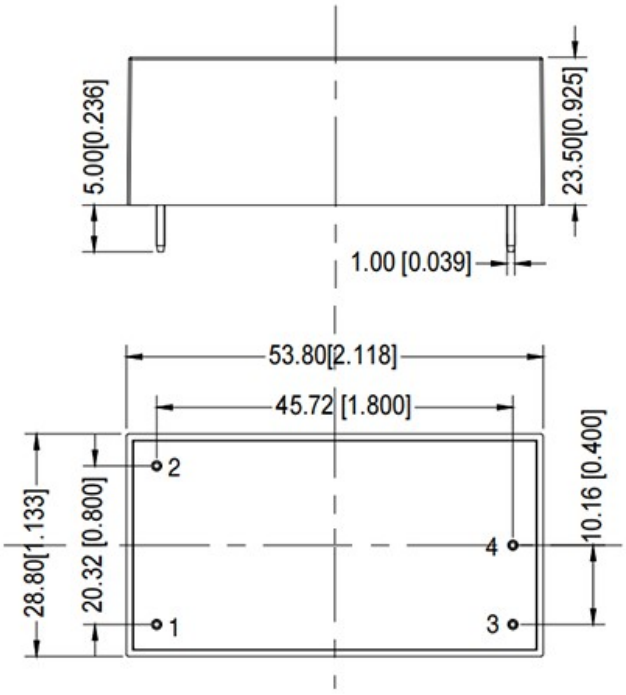
General Specifications

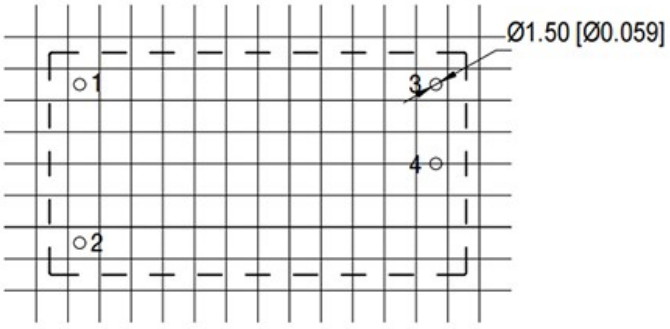
Items	Operating Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	Please refer to the temperature Derating Curve	-40	-	+75	℃
Storage Temperature	-	-40	-	+85	
Soldering Temperature	Wave-soldering	260±4℃, timing 5-10S			
	Manual-soldering	360±8℃, timing 4-7S			
Relative 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, 30 Min, along X, Y, Z			
Safety Class	-	CLASS II			
Flame Class of Case	-	UL94V-0			
MTBF	-	MIL-HDBK-217F@25℃＞300,000H			
Unit Weight	-	50g (TYP.)			

EMC Performance

Total Item		Sub Item	Test Standard	Class/ Performance
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
				Line to line ±2KV / line to ground ±4KV Perf.Criteria B (with the Recommended Circuit 2)
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B (with the Recommended Circuit 1)
		Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

Mechanical Dimensions





PCB layout vertical view
Grid 2.54x2.54 [0.10x0.10]

Pin No.	Description
1	AC(L)
2	AC(N)
3	+Vout
4	-Vout

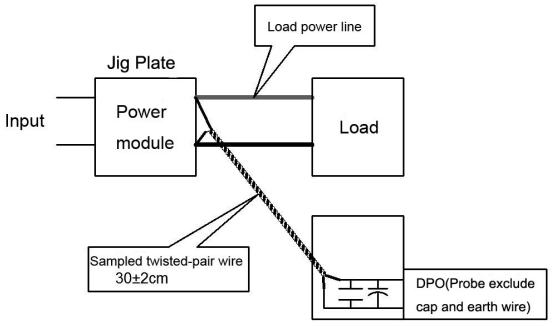
Note:
Unit: mm[inch]
Pin diameter tolerance: ±0.10 [±0.004]
General tolerance: ±0.50 [±0.020]

Packaging Code	Dimensions L x W x H	
P2	53.80X28.80X23.50 mm	2.118X1.133X0.925 inch

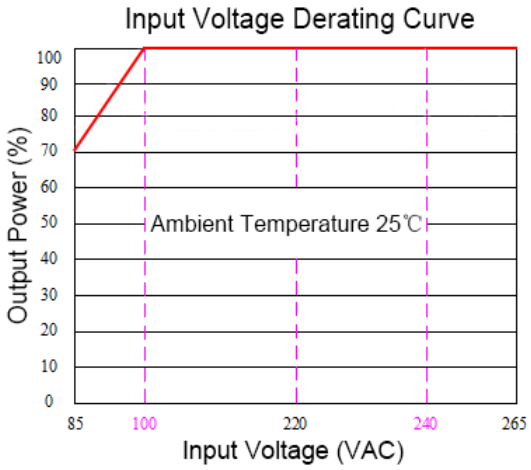
Ripple & Noise Test Instructions (Twisted Pair Method, 20MHz Bandwidth)

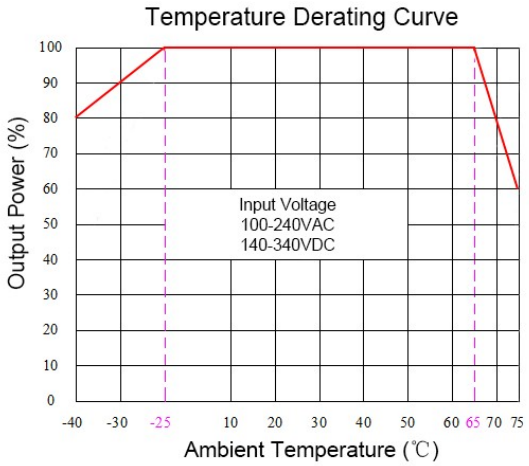
1) The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample Mode.

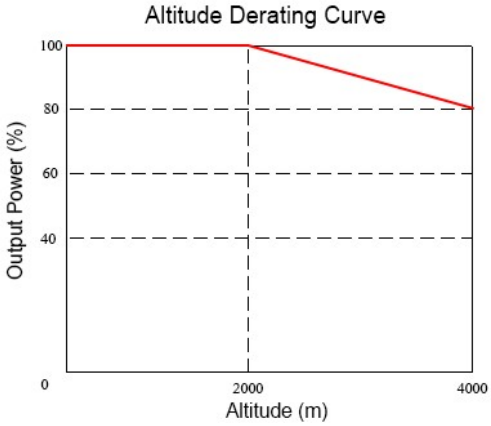
2) The test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be started after input power on.



Product Performance Curve





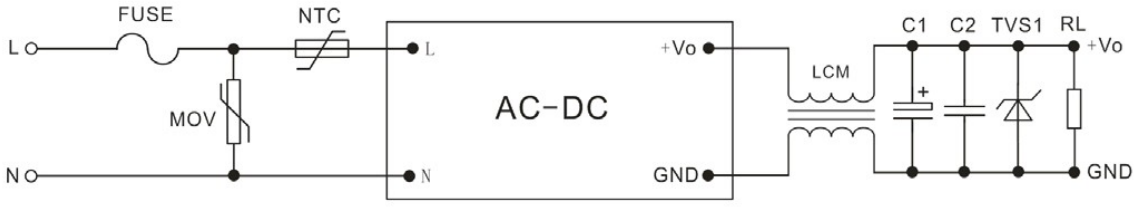


Note 1 - The output power should be derated based on the input voltage derating curve at 85~100VAC /240~265VAC /120~140VDC /340~380VDC.

Note 2 - This product should operate at a natural air condition, please contact us if it need be used at a closed space.

Recommended Circuits for Application

1. Typical Application Circuit



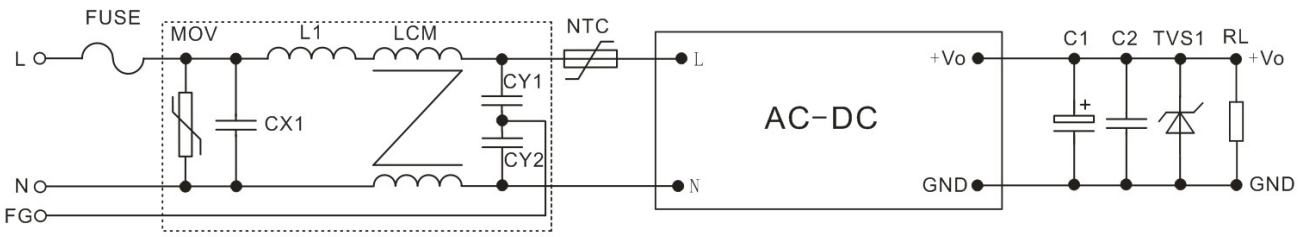
Circuit 1

FUSE	2A/250VAC (necessary)	C2	SMD capacitor 0.1uF/50V
MOV	14D511K/4500A	LCM	Common-mode Choke 180uH/4A
NTC	5D-9	C1	Electrolytic capacitor 220uF

Note 1 - A high frequency low impedance electrolytic capacitor is recommended for C1 which can decrease the output ripple, the capacitor withstand voltage should be more than 1.2X of output voltage.

Note 2 - TVS1 is the transient voltage suppressor which is recommended to protect the output circuit while the converter outputs at the abnormal condition. SMBJ7.0A is recommended for 5V output, SMBJ12.0A for 9V output, SMBJ20.0A for 12V output, SMBJ30.0A for 24V output and SMBJ64.0A for 48V output.

2. Recommended EMC Circuit



Circuit 2

FUSE	2A/250VAC (necessary)	CY1, CY2	Y1/102M/400VAC
MOV	14D511K/4500A	L1	820uH/0.5A
NTC	5D-9	LCM	15-25mH/0.5A
CX1	X2/104K/275VAC		

Application Notice

1.The products should be used according to the specifications in this datasheet, otherwise it could be permanently damaged.

2. A fuse should be connected at input.

3. The product performance in this datasheet cannot be guaranteed if it works at a lower load than the minimum load defined.

4. The product performance in this datasheet cannot be guaranteed if it works at over-load condition.

5. Unless otherwise specified, all values or indicators in this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

6. All values or indicators in this datasheet had been tested based on Aipupower test specifications.

7.The specifications are specially for the parts listed in this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.

8. Aipupower can provide customization service.

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