AC/DC Converter

Patron FA60-220SXXH2N5 Series

Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ Efficiency 89%(Typ.)
- ◆ No-load consumption ≤0.3W
- ◆ Operating temperature from -40℃ to +85℃
- ◆ Output short circuit, over current, over voltage protections
- ◆ Isolation voltage 4200Vac
- ◆ Altitude during operation 5000m Max
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ PCB mounting

Application Field

FA60-220SXXH2N5 *Series*----- *Compact size & high efficiency power supplies provided by Patron. This series of products have the advantages of global adapt input voltage range for both AC and DC available, low ripple, low temperature rise, low standby power consumption, high efficiency & reliability, safety isolated and good EMC performance. Conforming to EMC & Safety standards IEC/EN55032, 61000 & 62368. The products can be widely used in the fields of Electric power, Industry, Instrument and Smart home devices, etc. The additional circuit for EMC is recommended in this data sheet for the application with higher EMC requirement.*

Typical Product List

Certificate	Item No	Output Specification			Max. Capacitive Load（220Vac）	Ripple& Noise 20MHz (Max)	Efficiency@ Full Load, 220Vac
		Power	Voltage	Current			
		(W)	Vo（V）	Io（A）	uF	mVp-p	% (Typ.)
-	FA60-220S05H2N5	50	5	10	20000	150	87
	FA60-220S12H2N5	60	12	5	5000	150	89
	FA60-220S15H2N5	60	15	4	3000	150	89
	FA60-220S24H2N5	60	24	2.5	1800	150	89

Note 1 - Please contact Patron sales for other output voltages requirement in this series but not listed in this table.

Note 2 - The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 3 - 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.

Input Specifications

Item	Operating Condition	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	-	-	1.8	A
	220VAC	-	-	1.0	
Surge Current	115VAC	-	30	-	A
	220VAC	-	60	-	

Leakage Current	-	0.5mA TYP/230VAC/50Hz
External fuse recommended	-	3.15A/300VAC Time-delay fuse
Hot plug	-	N/A
Remote control	-	N/A

Output Specifications

Item		Operating Condition		Min.	Typ.	Max.	Unit
Voltage Accuracy		Full input voltage range, any load	Vo	-	±2.0	±3.0	%
Line Regulation		Rated Load	Vo	-	-	±1.0	%
Load Regulation		Rated input Voltage 20%~100% load	Vo	-	-	±1.5	%
No-load power consumption		Input 115Vac		-	-	0.45	W
		Input 220Vac		-	0.3		
Minimum load		Single Output		0	-	-	%
Turn-on Delay Time		Rated input voltage (Full load)		-	1500	-	mS
Power-off Hold up Time		Input 115Vac (Full load)		-	8	-	mS
		Input 220Vac (Full load)		-	65	-	
Dynamic Response	Overshoot range	25%~50%~25% 50%~75%~50%		-10.0	-	+10.0	%
	Recovery time			-	5.0	-	mS
Output Overshooting		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
Ripple & Noise		Full input voltage range		-	80	150	mV
		The ripple and noise are tested by the twisted pair method (refer to the following test Instructions).					
Over Voltage Protection		5VDC Output		≤6.3			VDC
		12VDC Output		≤16.0			
		15VDC Output		≤25.0			
		24VDC Output		≤35.0			

General Specifications

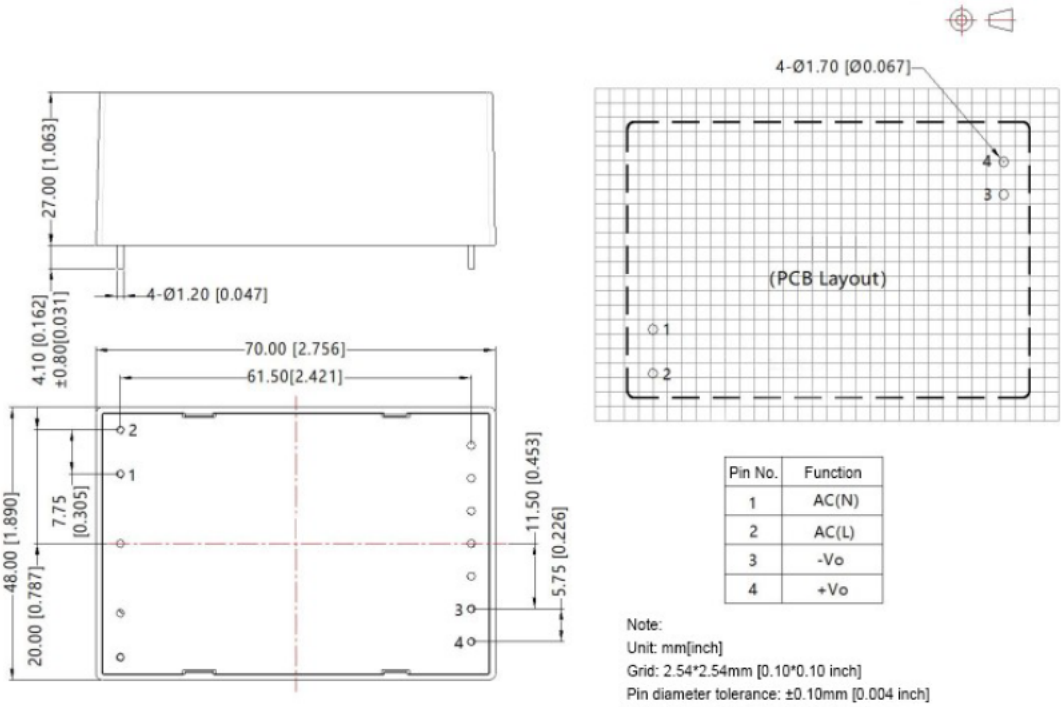
Item	Operating Condition	Min.	Typ.	Max.	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	Refer to the temperature derating curve	-40	-	+85	℃
Storage Temperature	-	-40	-	+85	
Soldering Temperature	Wave-soldering	260±4℃, time 5-10S			
	Manual-soldering	360±8℃, time 4-7S			
Relative Humidity	-	10	-	90	%RH

Isolation Voltage	I/P-O/P	Test 1min, leakage current≤5mA	4200	-	-	VAC
Insulation Resistance	I/P-O/P	@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		-	UL94 V-0			
MTBF		-	MIL-HDBK-217F@25℃＞2,799,000H			
Product Weight		Part No.	Weight (TYP.)			
		FA60-220S05H2N5	150g			
		FA60-220S12H2N5	150g			
		FA60-220S15H2N5	150g			
		FA60-220S24H2N5	150g			

EMC Performances

Total Item		Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with recommended circuit 1)
		RE	CISPR32/EN55032	CLASS B (with recommended circuit 1)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (with recommended circuit 1)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (with recommended circuit 1)
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	Line to line ±2KV / line to ground ±4KV Perf.Criteria B (with recommended circuit 1)
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B
		Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%~70% Perf.Criteria B

Mechanical Dimensions



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

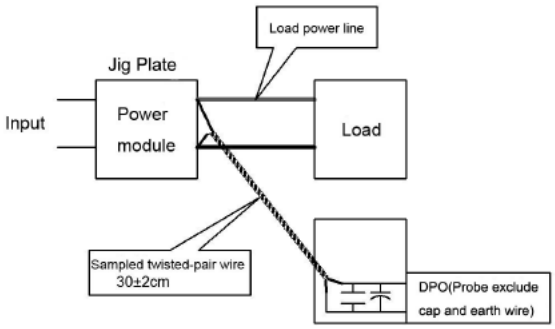
Note:
Unit: mm[inch]
Grid: 2.54*2.54mm [0.10*0.10 inch]
Pin diameter tolerance: ±0.10mm [0.004 inch]
General tolerance: ±0.50mm [0.020 inch]

Packaging Code	L x W x H	
H2	70.00 X 48.00 X 27.00 mm	2.756 X 1.890 X 1.063 inch

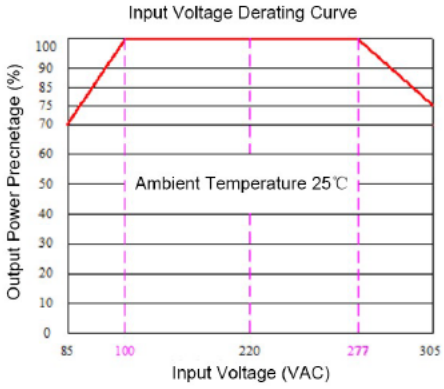
Ripple& Noise Test Instruction (Twisted Pair Method 20MHZ bandwidth)

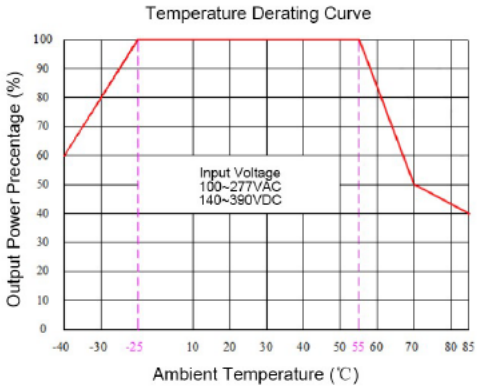
1) Ripple noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample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

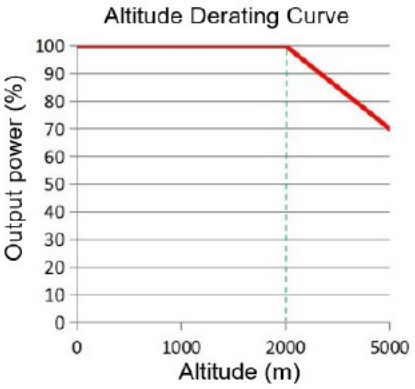
2) The output ripple noise test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location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



Product Performance Curves



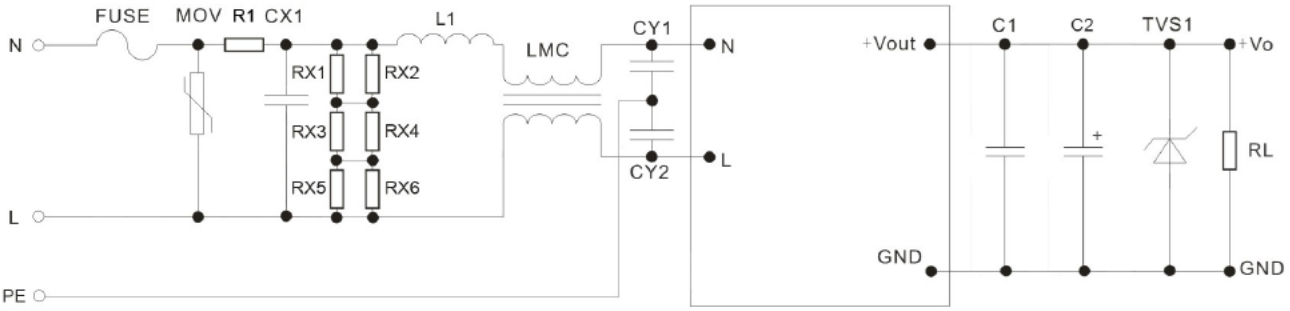




Note 1 - The output power should be derated based on the input voltage derating curve at 85~100VAC/277~305VAC &120~140VDC/390~430VDC.

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

Recommended typical EMC Circuit



Circuit 1

Component No.	FA60-220S05H2N5	FA60-220S12H2N5	FA60-220S15H2N5	FA60-220S24H2N5
FUSE (Necessary)	3.15A/300V (Time-delay fuse)			
MOV	14D561K/4500A			
R1 (Necessary)	2.0Ω/3W (Wire-wound resistor)			
CX1	X2, 334K/305VAC			
RX1、RX2、RX3、RX4、RX5、RX6	1206/1.0M			
L1	1.2mH/1.5A			
LMC	20mH/1.5A			
CY1、CY2	Y1/1nF/400VAC			
C1	1uF/ 50V			
C2	470uF/16V	330uF/25V	330uF/25V	220uF/35V
TVS1	SMBJ10A	SMBJ20A	SMBJ30A	SMBJ40A

Application Notice

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

2. A fuse should be used at input.

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

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

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

6. All values or indicators in this manual had been tested based on Patron test specifications.

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

8. Patron can provide customization service.