AC/DC 90W Enclosed Switching Power Supply

LM90-20Axx Series

MORNSUN®

RoHS

FEATURES

- Special power supply for laser galvanometer industry
- Universal 85 - 264VAC or 120 - 370VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -30℃ to +70℃
- High I/O isolation test voltage up to 4000VAC
- High efficiency, low ripple & noise
- Output short circuit, over-current, over-voltage protection
- Operating altitude up to 5000m
- 3 years warranty

LM90-20Axx series is one of Mornsun's dual output non-isolation enclosed AC-DC switching power supply. It features universal AC input and at the same time accepts DC input voltage, cost-effective, high efficiency, high reliability and double or reinforced insulation. These converters offer excellent EMC performance and meet IEC/EN61000-4, CISPR32/EN55032 standards and they are not only specific used in the laser galvanometer industry, but also widely used in current sensors, motors and other fields.

Selection Guide

Part No.*	Cooling Method	Output Power (W)	Nominal Output Voltage and Current		Output Voltage Adjustable Range (V) (Vo1)*	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (uF)	
			Vo1/Io1	Vo2/Io2			Vo1	Vo2
LM90-20A15	Air cooling	90	+15V/3000mA	-15V/3000mA	13.5-16.5	86	5000	3000
LM90-20A24			+24V/1875mA	-24V/1875mA	21.6-26.4	88	2200	1500

Note:
1. The product picture is for reference only. For details, please refer to the actual product;
2. Under any steady-state conditions, the total power of the product should not exceed the rated power. When the output voltage is increased, the total output power cannot exceed the rated output power, when the output voltage is decreased, the output current cannot exceed the rated output current;
3. *Output voltage adjustable range test conditions: 230VAC, 50% Io.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)		100	--	240	VAC
	AC input		85	--	264	
	DC input		120	--	370	VDC
Input Voltage Frequency	Rated input (Certified voltage)		50	--	60	Hz
	AC input		47	--	63	
Input Current	Rated input (Certified voltage)		--	--	4	A
	115VAC		--	--	4	
	230VAC		--	--	2	
Inrush Current	115VAC	Cold start	--	30	--	
	230VAC		--	60	--	
Start-up Delay Time	rated load		--	--	1	s
Input Fuse	Built-in fuse		--	6.3	--	A
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range (Balanced load)	Vo1	--	±1	--	%
		Vo2	--	±3	--	
Line Regulation	Rated load (Balanced load)	Vo1	--	±1	--	
		Vo2	--	±1.5	--	

Load Regulation	10% - 100% load (Balanced load)	Vo1	--	±1	--	%
		Vo2	--	±3	--	
Cross Regulation	Full input voltage range (no-balanced load)		--	--	10	
Minimum Load	Balanced load		10	--	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value) (Balanced load)	Vo1	--	--	100	mV
		Vo2	--	--	100	
Temperature Coefficient			--	±0.03	--	%/℃
Hold-up Time	115VAC		--	8	--	ms
	230VAC		--	20	--	
Short Circuit Protection	Recovery time <3s after the short circuit disappear.		Hiccup mode, continuous, self-recover			
Over-current Protection	Balanced load		⩾120% Io, hiccup, self-recover			
Over-voltage Protection	+15V output		⩽22V (Hiccup, self-recover)			
	+24V output		⩽33.6V (Hiccup, self-recover)			

Note: *The "Tip and barrel method" is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information.

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input - ⏚	Electric strength test for 1min., leakage current <5mA	2000	--	--	VAC
	Input - output		4000	--	--	
	Output - ⏚		500	--	--	
Insulation Resistance	Input - ⏚	Ambient temperature: 25 ± 5℃ Relative humidity: < 95%RH, no condensation Test voltage: 500VDC	50	--	--	MΩ
	Input - output		50	--	--	
	Output - ⏚		50	--	--	
Operating Temperature			-30	--	+70	℃
Storage Temperature			-40	--	+85	
Operating Humidity		Non-condensing	--	--	95	%RH
Storage Humidity			--	--	75	
Switching Frequency			--	65	--	kHz
Power Derating	Operating temperature derating	+50℃ to +70℃	2.5	--	--	%/℃
	Input voltage derating	85VAC - 100VAC	2	--	--	%/VAC
	Altitude derating	2000m - 5000m	5	--	--	℃/Km
Leakage Current	240VAC, 60Hz	Touch current	<0.5mA			
Safety Standards			Design refer to UL/EN62368-1			
Safety Class			CLASS I			
MTBF	MIL-HDBK-217F@25℃		⩾300,000 h			
Warranty	Ambient temperature: <70℃		3 years			

Environmental Characteristics

Item	Operating Conditions	Standard
High and Low Temperature Working	+70℃, -30℃	GB2423.1, IEC60068-2-1
Sinusoidal Vibration	10 - 500Hz, 5g, 60 minutes in each direction of X, Y, Z axis	GB2423.10, IEC60068-2-6
Low Temperature Storage	-40℃	GB2423.1, IEC60068-2-1
High Temperature Storage	+85℃	GB2423.2, IEC60068-2-2
Robustness Of Terminations And Integral Mounting Devices		GB2423.29、IEC60068-2-21

General Specifications

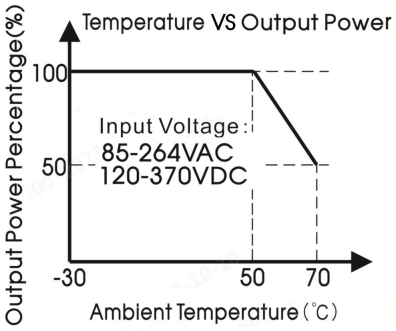
Case Material	Metal (AL1100, SGCC)
Dimensions	129.00 x 97.00 x 30.00mm
Weight	305g (Typ.)
Cooling Method	Air cooling

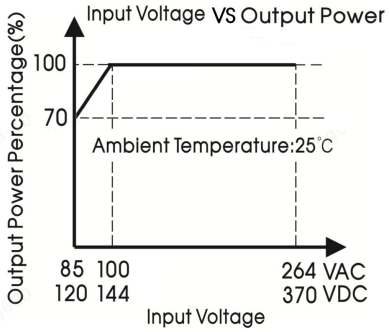
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A	
	RE	CISPR32/EN55032	CLASS A	
	Harmonic current*	IEC/EN61000-3-2	CLASS A	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	
	EFT	IEC/EN61000-4-4	±4KV	
	Surge	IEC/EN61000-4-5	line to line ±2KV/line to PE ±4KV	
	CS	IEC/EN61000-4-6	10Vr.m.s	
	MS	IEC/EN61000-4-8	30A/m	
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

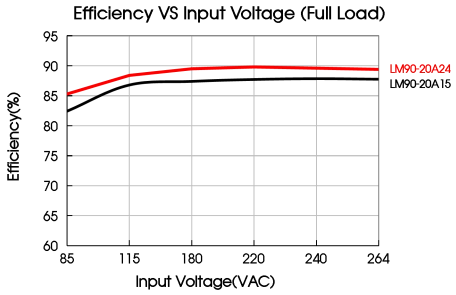
Note:
1. perf. Criteria:
A: The equipment shall continue to operate as intended without operator intervention;
B: After the test, the equipment shall continue to operate as intended without operator intervention.
2. *Harmonic current testing conditions: 230VAC,100% Io.

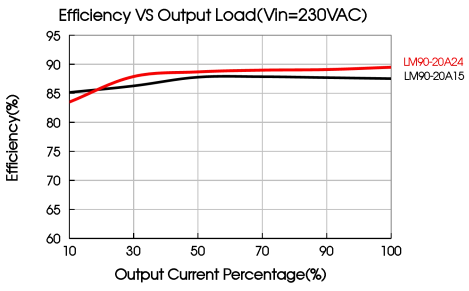
Product Characteristic Curve



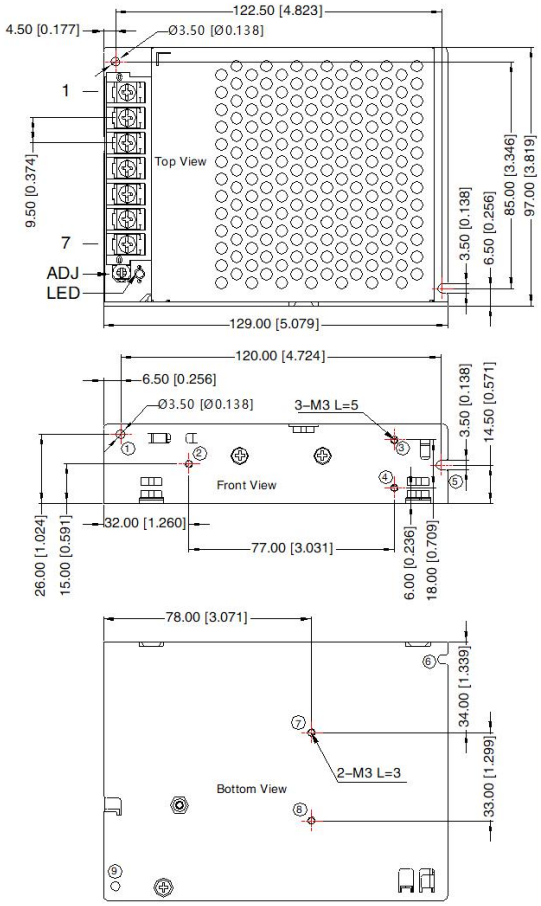


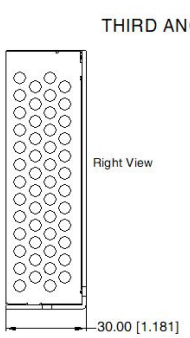
Note:
1. With an AC input voltage between 85-100VAC and a DC input between 120-144VDC the output power must be derated as per the temperature derating curves;
2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.





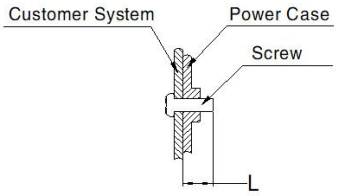
Dimensions and Recommended Layout





Pin–Out	
Pin	Mark
1	AC(L)
2	AC(N)
3	⏚
4	COM
5	Vo1
6	Vo2
7	COM

Position	Screw Spec.	L(max)	Torque(max)
②–④	M3	5mm	0.4N·m
⑦–⑧	M3	3mm	0.4N·m



Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
Wire range: 22–12AWG
Connector tightening torque: M3.5, Max 0.8N·m
General tolerances: ± 1.00[± 0.039]
①– ⑨any position must be connected to the earth(⏚)

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220120;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity <75%RH with nominal input voltage and rated output load;
3. The room temperature derating of 5℃/1000m is needed for operating altitude greater than 2000m;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. In order to improve the efficiency at high input voltage, there will be audible noise generated, but it does not affect product performance and reliability;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;
9. The output voltage can be adjusted by the ADJ, clockwise to increase;
10. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
11. The power supply is considered a component which will be installed into a terminal equipment. All EMC tests should be confirmed with the final equipment. Please consult our FAE for EMC test operation instructions.

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