



## FEATURES

- Special switching power supply designed for professional laser galvanometer industry
- Universal 165 - 264VAC or 180 - 370VDC Input voltage
- Operating ambient temperature range: -30°C to +70°C
- Low standby power consumption, high efficiency
- Output short circuit, over-current, over-voltage protection
- High I/O isolation test voltage up to 3000VAC
- Operating altitude up to 5000m
- Design refer to IEC/UL62368-1, EN60335-1, EN61558-1, GB4943.1

LM60-12A15 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, IEC/UL/EN62368, GB4943 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

Certification	Part No.	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)		Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (μF)	
			(Vo1/Io1)	(Vo2/Io2)			Vo1	Vo2
EN/BS/BIS	LM60-12A15	60	+15V/2.0A	-15V/2.0A	14.25-15.75	82	4000	2000

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	165	--	264	VAC
	DC input	180	--	370	VDC
Input Voltage Frequency		47	--	63	Hz
Input Current	230VAC	--	--	1	A
Inrush Current	230VAC Cold start	--	60	--	
Leakage Current	240VAC	<0.75mA			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	Vo1	±1.0	--	%
		Vo2	±3.0	--	
Line Regulation	Rated load	Vo1	±1.0	--	%
		Vo2	±3.0	--	
Load Regulation	10% - 100% Load (Balanced load)	Vo1	±1.0	--	%
		Vo2	±3.0	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	100	--	mV
Temperature Coefficient	Vo1	--	±0.03	--	%/°C
Start-up Delay Time	Rated input voltage	--	--	3.0	s
Hold-up Time	230VAC	20	--	--	ms
Minimum Load		10	--	--	%
Short Circuit Protection	Recovery time <5s after the short circuit disappear.	Hiccup, continuous, self-recover			
Over-current Protection	Dual output with balanced load	110%-200%Io, hiccup, self-recover			
Over-voltage Protection	Vo1	≤22VDC (Hiccup, self-recover)			

Note: \*The "Tip and barrel method" is used for ripple and noise test, output parallel 47μF electrolytic capacitor and 0.1μF ceramic capacitor, please refer to Enclosed Switching Power Supply Application Notes for specific information.

### General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Isolation Test	Input - output	Electric strength test for 1min, leakage current <5mA	3000	--	--	VAC	
	Input - ⊕		1500	--	--		
	Output - ⊕		500	--	--		
Insulation Resistance	Input - output	Environment temperature: 25±5℃ Relative humidity: <95%RH, non-condensing Testing voltage: 500VDC	50	--	--	MΩ	
	Input - ⊕		50	--	--		
	Output - ⊕		50	--	--		
Operating Temperature			-30	--	+70	℃	
Storage Temperature			-40	--	+85		
Storage Humidity		Non-condensing	10	--	95	%RH	
Operating Humidity			20	--	90		
Power Derating		Operating temperature derating	+50℃ to +70℃	2.5	--	--	%/℃
Safety Standard		IS13252 (Part1) safety approved & EN62368-1, BS EN 62368-1(Report) Design refer to IEC/UL62368-1, EN60335-1, EN61558-1, GB4943.1					
Safety Class		CLASS I					
MTBF		MIL-HDBK-217F@25℃	>300,000 h				

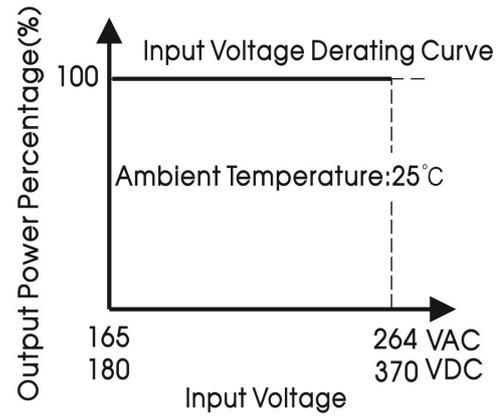
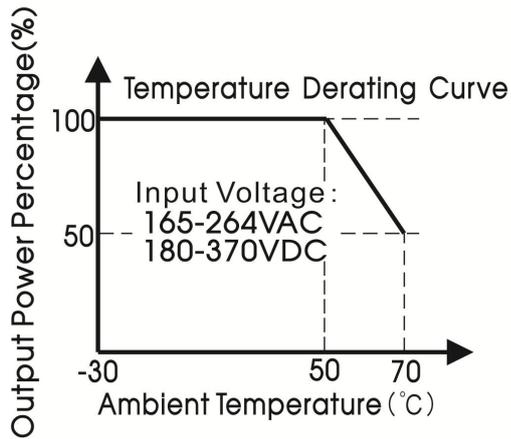
### Mechanical Specifications

Case Material	Metal (AL1100, SGCC)
Dimensions	99.00 x 97.00 x 30.00 mm
Weight	240g (Typ.)
Cooling Method	Air cooling

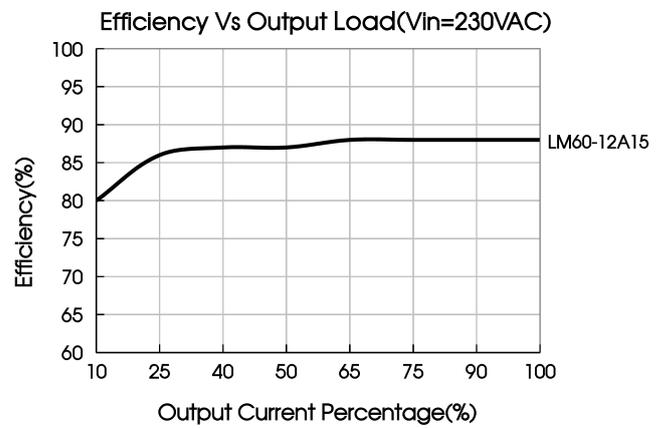
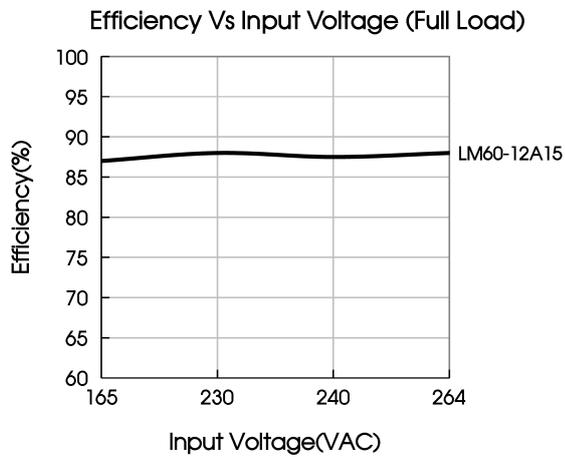
### Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A	
	RE	CISPR32/EN55032	CLASS A	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±1KV/line to ground ±2KV	perf. Criteria A
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

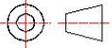
Product Characteristic Curve

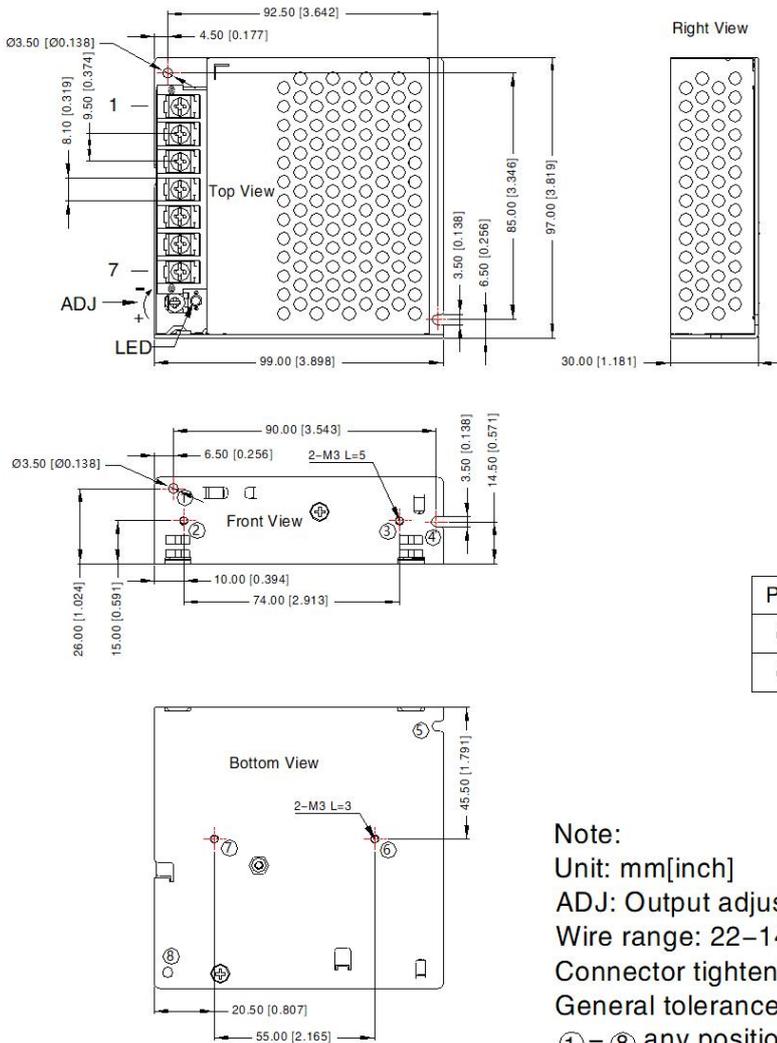


Note: This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.



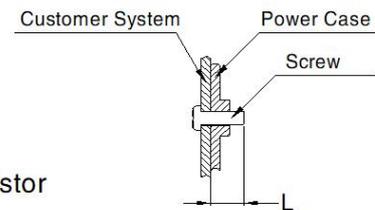
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	AC(L)
2	AC(N)
3	
4	Vo2
5	COM
6	COM
7	Vo1

Position	Screw Spec.	L(max)	Torque(max)
② - ③	M3	5mm	0.4N · m
⑥ - ⑦	M3	3mm	0.4N · m



Note:  
 Unit: mm[inch]  
 ADJ: Output adjustable resistor  
 Wire range: 22-14AWG  
 Connector tightening torque: M3, Max 0.4N · m  
 General tolerances: ± 1.00 [± 0.039]  
 ① - ⑧ any position must be connected to PE

- Note:
- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220119;
  - Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75% RH with nominal input voltage and rated output load;
  - The room temperature derating of 5°C/1000m is needed for operating altitude greater than 2000m;
  - All index testing methods in this datasheet are based on our company corporate standards;
  - 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;
  - We can provide product customization service, please contact our technicians directly for specific information;
  - Products are related to laws and regulations: see "Features" and "EMC";
  - The out case needs to be connected to PE () of system when the terminal equipment in operating;
  - The output voltage can be adjusted by the ADJ, clockwise to decrease;
  - Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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