AC/DC 600W Enclosed Switching Power Supply

LMF600-20Bxx Series

MORNSUN®

EN62368-1 EN60601-1 GB4943.1 IEC60601-1 BS EN 62368-1

FEATURES

- Universal 80 - 277VAC or 110- 390VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +70℃
- Low standby power consumption, high efficiency, active PFC
- High I/O isolation test voltage up to 4000VAC
- The base plate with conformal coating
- Output short circuit, over-current, over-voltage over-temperature protection
- Remote sense compensation, remote ON/OFF function
- DC_OK function
- Suitable for BF application
- With 5V/1A standby power
- Operating altitude up to 5000m
- Design refer to IEC62368, EN60335, EN61558

LMF600-20Bxx series is one of Mornsun's enclosed AC-DC switching power supply and suitable for all kinds of BF type (be accessible to patients) medical system equipment. It features universal AC input and at the same time accepts DC input voltage, cost-effective, low no load power consumption, high efficiency, high reliability and double or reinforced insulation. These converters offer excellent EMC performance and meet IEC/EN/UL62368, EN60335, EN61558, IEC/EN60601, GB4943 standards and they are widely used in areas of industrial, LED, street light control, electricity, security, telecommunications, smart home etc.

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)	Remote Sense Compensation (mV)	Standby (Vo/Io)*
EN/CCC/IEC	LMF600-20B12	600	12V/50A	11.8-12.6	92	50000	500	5V/1A
	LMF600-20B15		15V/40A	14.7-15.8				
	LMF600-20B24		24V/25A	23.5-25.2	94			
	LMF600-20B27		27V/22.3A	26.4-28.5				
	LMF600-20B36		36V/16.7A	35.3-37.8				
	LMF600-20B48		48V/12.6A	47.0-50.4				

Note: 1.*Under any conditions, the total power of the product should not exceed the 600W rated power, and the output current cannot exceed the rated output current;
2.*Standby power: provide 5V/1A independent output, it is recommended to use with the main circuit.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		80	--	277	VAC
	DC input		110	--	390	VDC
Input Voltage Frequency			47	--	63	Hz
Input Current	115VAC		--	--	7.5	A
	230VAC		--	--	3.5	
Inrush Current	115VAC/230VAC	Cold start	--	--	15	
Power Factor	115VAC	Full load	--	0.99	--	--
	230VAC		--	0.99	--	
Leakage Current	240VAC		<0.1mA			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	12V/15V/24V/27V/36V/48V	--	±1	--	%
		5V Standby	--	±2	--	
Line Regulation	Rated load	12V/15V/24V/27V/36V/48V	--	±0.3	--	
		5V Standby	--	±0.5	--	
Load Regulation	0% - 100% load	12V/15V/24V/27V/36V/48V	--	±0.5	--	
		5V Standby	--	±2	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	12V/15V	--	150	--	mV
		24V/27V/36V/48V	--	200	--	
Minimum Load			--	0	--	%
Stand-by Power Consumption	Room temperature, 230VAC, RC+/RC- add +5V signal		--	0.5	--	W
Hold-up Time	230VAC		15	--	--	ms
Short Circuit Protection	Recovery time 10s after the short circuit disappear.		Hiccup mode, constant current works 1s, turn off 10s, continuous, self-recover			
Over-current Protection			110% - 250% Io, the output turned off after working normally for 1s, self-recover			
Over-voltage Protection	12V		≤16VDC (Hiccup, self-recover)			
	15V		≤20VDC (Hiccup, self-recover)			
	24V		≤32VDC (Hiccup, self-recover)			
	27V		≤35VDC (Hiccup, self-recover)			
	36V		≤47VDC (Hiccup, self-recover)			
	48V		≤60VDC (Hiccup, self-recover)			
Over-temperature Protection			Output voltage turn off, self-recover after the temperature drops.			

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 Enclosed Switching Power Supply Application Notes for specific information.

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Test	Input - ⏚	Electric strength test for 1min., leakage current <5mA		1500	--	--	VAC
	Input - output			4000	--	--	
	Output - ⏚			1500	--	--	
Insulation Resistance	Input - ⏚	Environment temperature: 25 ± 5℃ Relative humidity: <95%RH, non-condensing Testing voltage: 500VDC		50	--	--	MΩ
	Input - output			50	--	--	
	Output - ⏚			50	--	--	
Isolation level	Input - output			2 x MOPP			
	Input - ⏚			1 x MOPP			
Operating Temperature				-40	--	70	℃
Storage Temperature				-40	--	85	
Operating Humidity		Non-condensing		20	--	95	%RH
Storage Humidity				10	--	95	
Power Derating		Operating temperature derating	+50℃ to +70℃	2.5	--	--	%/℃
		Input voltage derating	80VAC-85VAC	2.0	--	--	%/VAC
			85VAC-100VAC	1.33	--	--	
Safety Standard				GB4943.1, IEC60601-1 safety approved & EN60601-1, EN62368-1, BS EN62368-1 Design refer to IEC/UL62368-1, EN61558-2-16, EN61558-1, EN60335-1			
MTBF		MIL-HDBK-217F@25℃		>300,000 h			

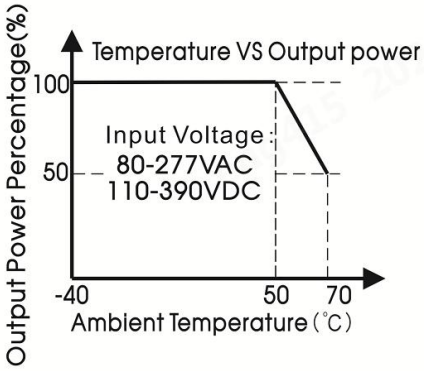
Mechanical Specifications

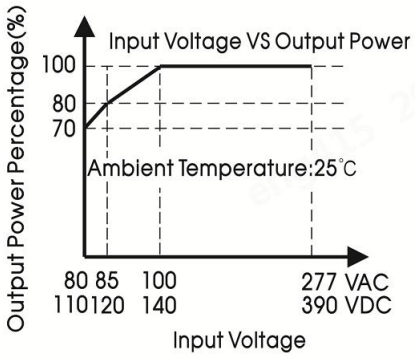
Case Material	Metal (AL1100, SGCC)
Dimensions	101.60mm x 203.10mm x 40.60mm
Weight	950g (Typ.)
Cooling Method	Forced air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 CLASS B	
	Harmonic current	IEC/EN61000-3-2 CLASS A and CLASS D	
	Voltage flicker	IEC/EN61000-3-3	
Immunity	ESD	IEC/EN 61000-4-2 Contact ±8KV/Air ±15KV	perf. Criteria A
	RS	IEC/EN 61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4 ±4KV	perf. Criteria A
	Surge	IEC/EN 61000-4-5 line to line ±2KV/line to ground ±4KV	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

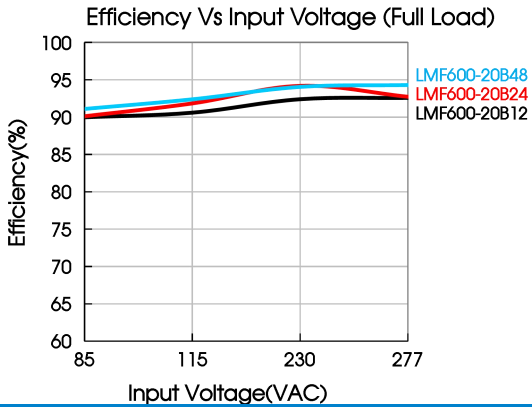
Product Characteristic Curve

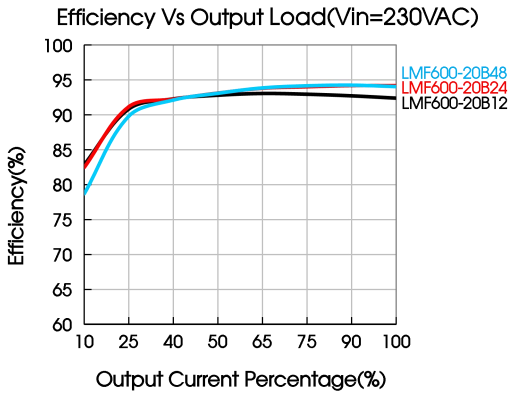




Note: 1. With an AC input voltage between 80-100VAC and a DC input between 110-140VDC the output power must be derated as per the temperature derating curves;

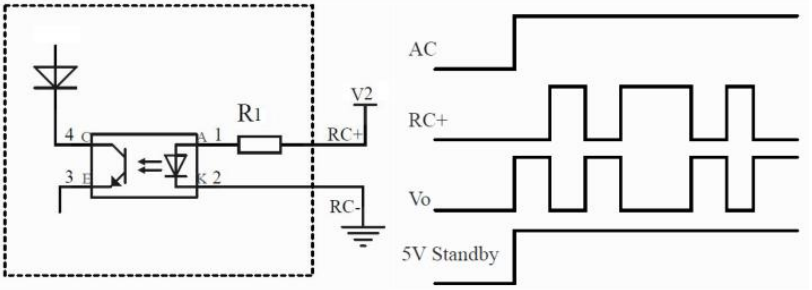
2. This product is suitable for applications using forced air cooling; for applications in closed environment please consult Mornsun FAE.





Typical Application

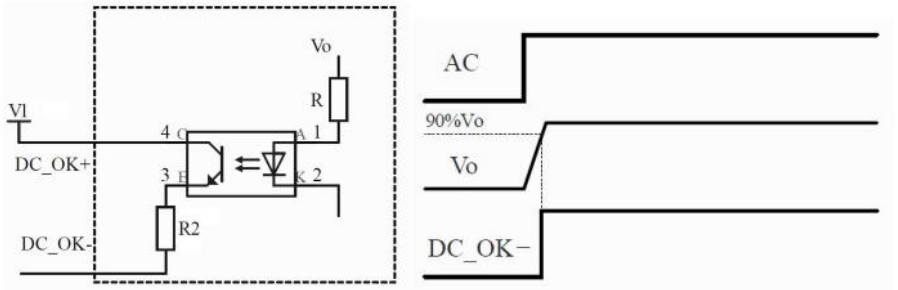
1. Remote ON/OFF



R1 (Product inside)	2KΩ, $\frac{1}{12}$ W
V2 (User side)	5V-15V

Note: 1. When the product is working normally, apply voltage (5-15V) to RC+ and RC- to trigger the remote ON/OFF function, and the output voltage will be off. Withdraw the voltage, the output voltage will be re-established;
2. 5V standby power supply is not controlled by remote ON/OFF function.

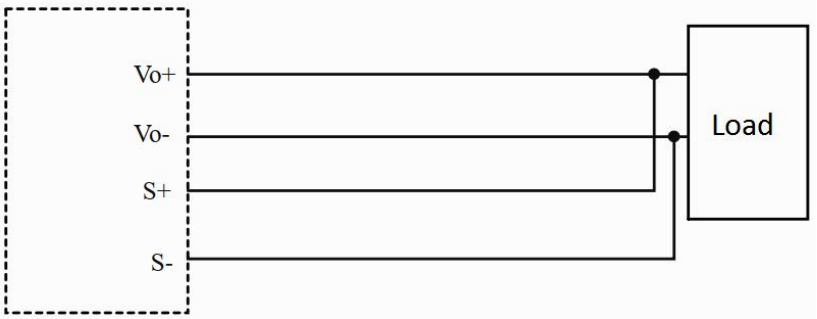
2. DC_OK



R2 (Product inside)	1KΩ, $\frac{1}{12}$ W
V1 (User side)	5V-15V

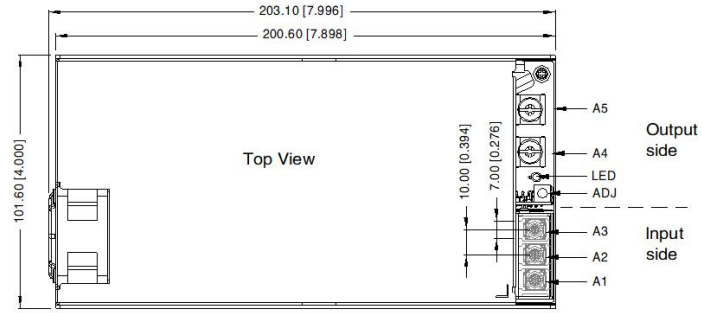
Note: 1. When the output voltage of the product reaches 90% of the rated value, DC_OK+ will be connected to DC_OK- ;
2. It is recommended that users apply a certain voltage between DC_OK+ and DC_OK- to detect the signal.

3. Remote Sense Compensation

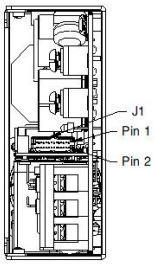


Note: 1. The left side represents the internal schematic diagram of the product, the right side represents the customer system;
2. Twisted pair wires are needed for S+/S-;
3. If the Pin14 terminal function is used for long-term matching, please glue to secure it.

Dimensions and Recommended Layout

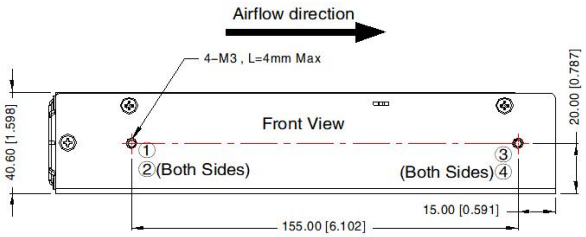


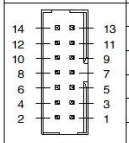
THIRD ANGLE PROJECTION

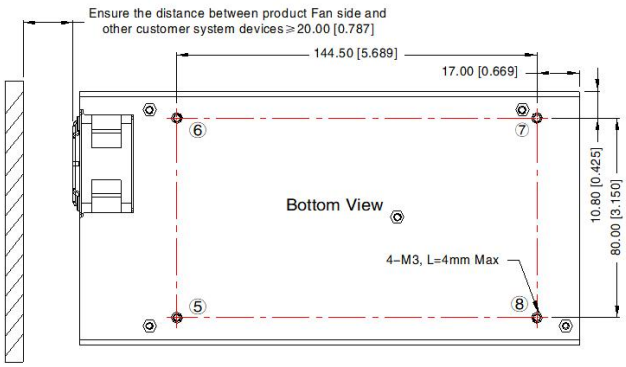


Right View

Pin–Out	
Pin	Mark
A1	PE
A2	AC(L)
A3	AC(N)
A4	+Vo
A5	–Vo

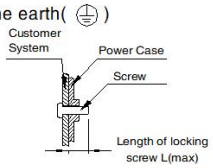


Signal connector J1					
Fig.	Pin	Mark	Pin	Mark	Customer Connector
	1	–S	2	+S	MOLEX P/N: Housing: 51110–1450 (without locking ramp) Terminal:50394 or 51110–1451 (with locking ramp) Terminal:50394 or equivalent
	3	NC	4	NC	
	5	DC_OK–	6	DC_OK+	
	7	+5VSB	8	5VSB_RTN	
	9	RC+	10	RC–	
	11	+5VSB	12	+5VSB	
	13	5VSB_RTN	14	5VSB_RTN	

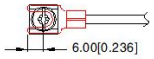


①– ⑧ any position must be connected to the earth(⏚)

Position	Screw Spec.	Length of locking screw L(max)	Torque(max)
①–⑧	M3	4mm	0.4N · m



Connector wires range

Pro. No	Input connector	Output connector	Output connector (triple wires) Pic.
12V/15V	22–14AWG	8AWG	
24V		12–8AWG	
27V/36V/48V		14–8AWG	
Screw/torque	M4, 1.2N · m(Max)	M5, 2.4N · m(Max)	

Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
General tolerances: ± 1.00[± 0.039]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220209;
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. CAUTION: Double pole, neutral fusing. Disconnect mains before servicing."/"ATTENTION: Double pôle/fusible sur le neutre. Débrancher lalimentation avant lentretien;
11. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
12. 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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