AC/DC1000W Enclosed Switching Power Supply

LM1000-20Bxx (-QQ) Series

MORNSUN®

IEC62368-1 GB4943.1 EN62368-1 BS EN62368-1

FEATURES

- Universal 90 - 264VAC or 130 - 390VDC Input voltage
- Operating ambient temperature range: -30℃ to +70℃ (-40℃ start-up available)
- High I/O isolation test voltage up to 4000VAC
- High efficiency up to 92%
- Output short circuit/over-current/over-voltage, over-temperature protection
- Operating altitude up to 5000m
- LED indicate the power on
- 3 years warranty

LM1000-20Bxx series is one of Mornsun's enclosed AC-DC switching power supply. They feature universal AC input and at the same time accepts DC input voltage, cost-effective, high efficiency, high reliability and reinforced insulation. These converters offer excellent EMC performance and meet UL/IEC/EN62368, GB4943 standards and they are widely used in areas of industrial.

Selection Guide

Certification	Part No.*	Cooling Method	Output Power (W)*	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (uF)
EN/IEC/ CCC/BIS	LM1000-20B12	Forced air cooling	999.6	12V/83.3A	11.4-13.2	90	40000
	LM1000-20B15		1000.5	15V/66.7A	14.25-16.5	90	20000
	LM1000-20B24		1000.8	24V/41.7	22.8-26.4	92	10000
	LM1000-20B36		997.2	36V/27.7A	34.2-39.6	92	6000
	LM1000-20B42		999.6	42V/23.8A	39.7-45.5	92	4000
	LM1000-20B48		998.4	48V/20.8A	45.6-52.8	92	4000
EN/IEC/CCC	LM1000-20B54		999	54V/18.5A	51.3-56.7	92	3000

Note:
1. Use suffix "QQ" for both sides conformal coating;
2. The product picture is for reference only. For details, please refer to the actual product.
3. *Under any 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.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)		100	--	240	VAC
	AC input		90	--	264	
	DC input		130	--	390	VDC
Input Voltage Frequency	Rated input (Certified voltage)		50	--	60	Hz
			47	--	63	
Input Current	Rated input (Certified voltage)		--	12	--	A
	115VAC		--	12	--	
	230VAC		--	7.5	--	
Inrush Current	115VAC	Cold start	--	35	--	
	230VAC		--	55	--	
Start-up Delay Time	115VAC/230VAC, rated load, room temperature		--	1.5	--	s
Input Fuse	Built-in fuse			25	--	A
Input Under-voltage Protection	Under-voltage protection start (Input voltage drops from high to low)		65	--	80	VAC
	Under-voltage protection release (Input voltage rises from low to high)		73	--	87	
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range		--	±1	--	%
Line Regulation	Rated load		--	±0.5	--	%
Load Regulation	0% - 100% load		--	±0.5	--	
Minimum Load			0	--	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	12/15V	--	--	240	mV
		24V	--	--	240	
		36/42/48/54V	--	--	360	
Temperature Coefficient			--	±0.03	--	%/℃
Hold-up Time	115VAC/230VAC, rated load		10	12	--	ms
Short Circuit Protection	Recovery time <10s after the short circuit disappear.		Hiccup, continuous, self-recover			
Over-current Protection	230VAC, rated load		125% - 300% Io, hiccup, self-recover after the over-current disappear			
Over-voltage Protection	12V output		≤18VDC (Hiccup, self-recover)			
	15V output		≤24.5VDC (Hiccup, self-recover)			
	24V output		≤33.6VDC (Hiccup, self-recover)			
	36V output		≤48.6VDC (Hiccup, self-recover)			
	42/48V output		≤63VDC (Hiccup, self-recover)			
	54V output		≤70VDC (Hiccup, self-recover)			
Over-temperature Protection	230VAC, rated load	12/15/24/36/48V	--	--	75	℃
		42/54V	--	--	85	

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	Input - ⏚	Electric strength test for 1min., leakage current <5mA			2000	--	--	VAC
	Input - output				4000	--	--	
	Output - ⏚				1250	--	--	
Insulation Resistance	Input - ⏚	Ambient temperature: 25 ± 5℃ Relative humidity: < 95%RH, no condensation Test voltage: 500VDC			100	--	--	MΩ
	Input - output				100	--	--	
	Output - ⏚				100	--	--	
Operating Temperature					-30	--	+70	℃
Start-up Temperature*					-40	--	+70	
Storage Temperature					-40	--	+85	
Operating Humidity		Non-condensing			--	--	95	%RH
Storage Humidity		Non-condensing			--	--	90	
Power Derating		Operating temperature derating	+45℃ to +70℃	12V	3	--	--	%/℃
			+50℃ to +70℃	Others	2.5	--	--	
		Input voltage derating	90VAC - 100VAC		3	--	--	%/VAC
Leakage Current		240VAC, 60Hz	Touch current		--	--	0.5	mA
Safety Standards		12/15/24/36/42/48V			IEC/BS EN/EN62368-1, GB4943.1, IS13252 (Part1) safety approved; design refer to UL62368-1			
		54V			IEC/BS EN/EN62368-1, GB4943.1 safety approved; design refer to UL62368-1			
Safety Class					CLASS I			
MTBF		MIL-HDBK-217F@25℃			≥300,000 h			
Warranty		Ambient temperature: <70℃			3 years			

Note: *When the product works at a low temperature of -40℃, it can start-up at half-load. Please consult our FAE for specific application.

Functional Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
DC_OK Signal	All input voltage range, all load range	PSU on	3.3	--	5.6	VDC
		PSU off	0	--	1	
LED Signal	Main output status indication	Normal output	Green on			
Remote Sense	S- (Pin3) and S+ (Pin4) of the terminal (CN1) are remote compensation function pins connected to both ends of the output load (S+ is connected to Vo+, S- is connected to Vo-).					
Remote Control Switch*	RC- (Pin5) and RC+ (Pin6) of the terminal (CN1) are the pins of the remote control switch function, and external voltage is required when used (RC+ is connected to Vout, RC- is connected to GND).					
	All input voltage range, all load range	Power on	0	--	0.8	VDC
		Power off	4	--	10	

Note: *When the remote control switch pin is left floating, the power supply is on.

Environmental Characteristics

Item	Operating Conditions	Standard
Low Temperature Working	-30℃	GB2423.1, IEC60068-2-1
High Temperature Working	+70℃	GB2423.2, IEC60068-2-2
Low Temperature Storage	-40℃	GB2423.1, IEC60068-2-1
High Temperature Storage	+85℃	GB2423.2, IEC60068-2-2
Sinusoidal Vibration	10 - 500Hz, 2g, 60 minutes in each direction of X, Y, Z axis	GB2423.10, IEC60068-2-6
Temperature Shock	-30℃ to +70℃	GB2423.22, IEC60068-2-14
Temperature Cycle	-25℃ to +70℃	GB2423.22, IEC60068-2-14
Hot and Humid	+70℃, 85%RH	GB2423.50, IEC60068-2-67
Packaging Drop	1m, one corner, three edges and six sides	GB2423.8, IEC68-2-32

General Specifications

Case Material	Metal (AL5052, SGCC)
Dimensions	187.50mm x 127.00mm x 40.50mm
Weight	990g (Typ.)
Cooling Method	Forced air cooling

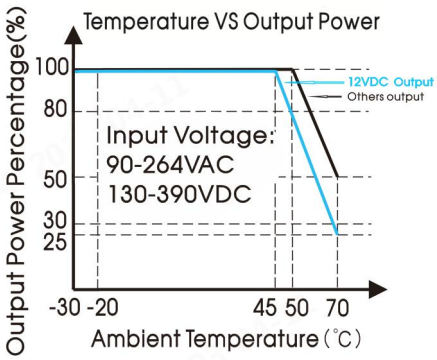
Note: The product is in jump-cycle mode with light load, the fan exists in start or stop state, and this state disappears after 10% Io.

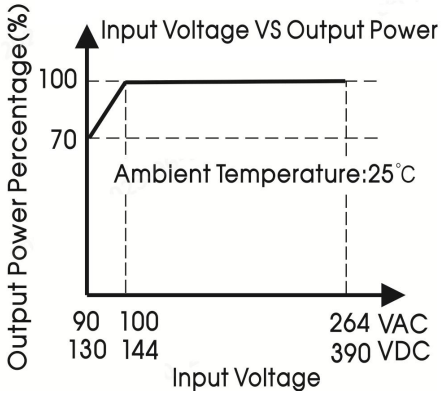
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	150K - 30MHz	CLASS A
	RE	CISPR32/EN55032	30MHz - 1GHz	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	0.15 - 80MH, 10Vr.m.s	
	PFMF	IEC/EN61000-4-8	30A/m	
	Voltage variations*	IEC61000-6-2/IEC61000-4-11	70% Un, 25/30 cycle(50/60Hz) 40% Un, 10/12 cycle(50/60Hz) 0% Un, 1 cycle	perf. Criteria B
	Short interruptions*	IEC61000-6-2/IEC61000-4-11	0% Un, 250/300 cycle(50/60Hz)	perf. Criteria C

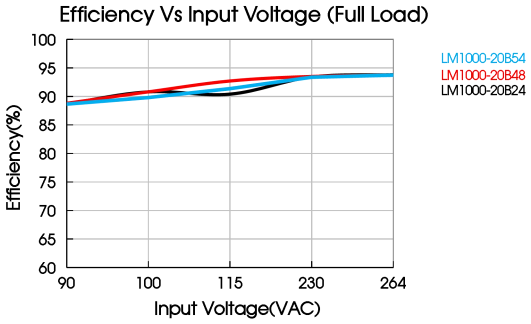
Note:
1. perf. Criteria:
   A: The equipment shall continue to operate as intended without operator intervention;
   B: After the test, the equipment shall continue to operate as intended without operator intervention;
   C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions and (or) information stored in non-volatile memory or protected by backup batteries should not be lost.
2. *Un is the maximum input nominal voltage.

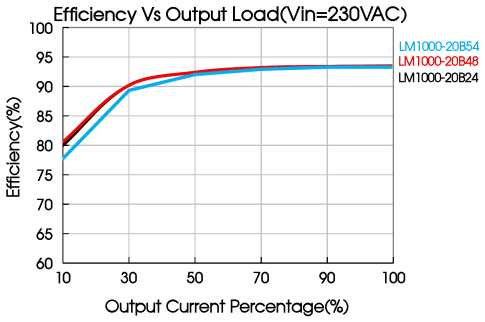
Product Characteristic Curve





Note: 1. With an AC input voltage between 90 -100VAC and a DC input between 130-144VDC 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.

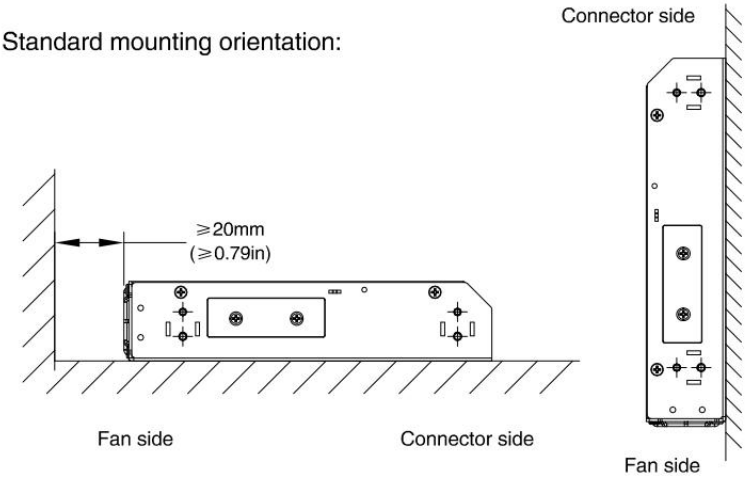


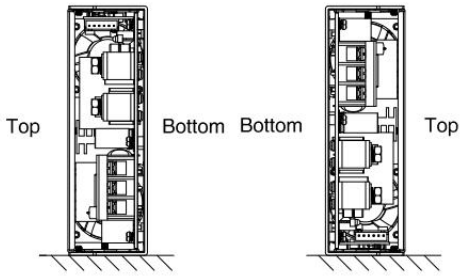


Installation Diagram

Installation Method

Standard mounting orientation:

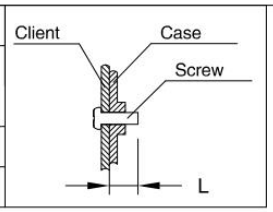




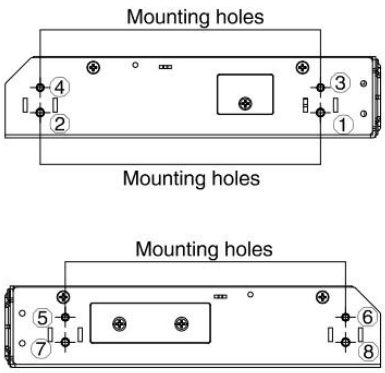
Note: The fan panel cannot be blocked by other objects, and a distance of at least 20mm must be maintained, otherwise it will affect the heat dissipation and performance of the power module.

Position of mounting holes:

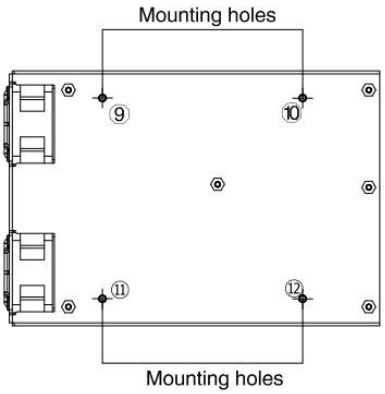
Installation position	Screw specification	L(max)	Torque(max)
①－②	M4	4mm	0.9N · m
⑦－⑧			
③－⑥	M3	4mm	0.4N · m
⑨－⑫	M3	3mm	0.4N · m



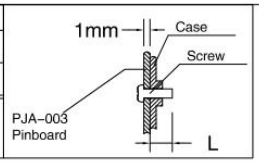
Side view

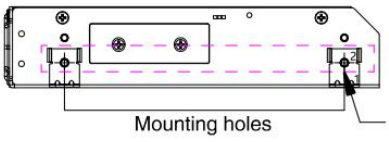


Bottom view

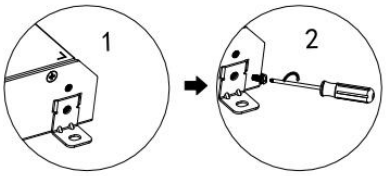


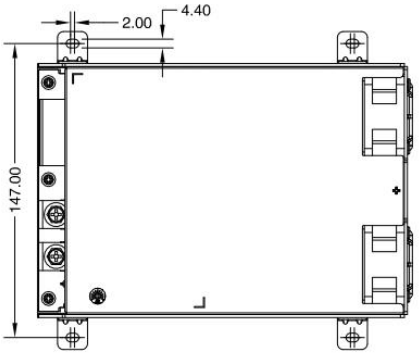
Accessory	Name	Number
1	PJA-003 Pinboard	4
2	M4 screw	4
Parameter	L(max)=4mm Torque(max)=0.9N · M	





Mornsun mounting 1：
PJA-003 Pinboard



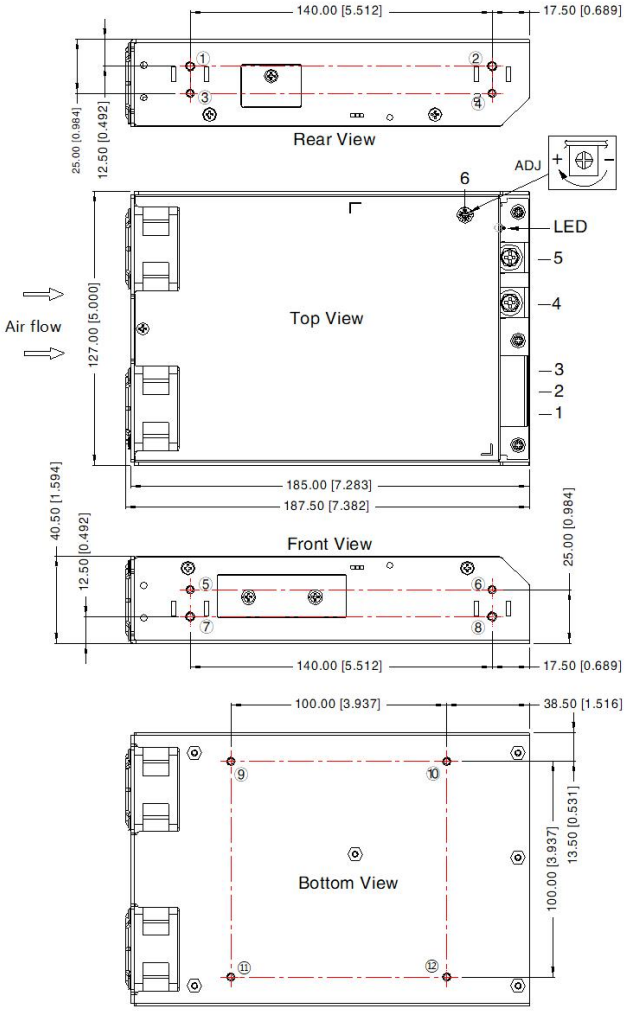


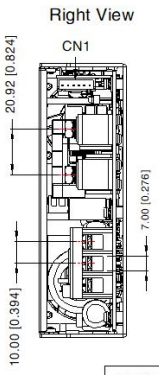
Installation steps:

1. Install the Pinboard in the position shown in Figure 1 and align the card position.
2. Use a screwdriver to intall the M4 screw to the position as shown in Figure 2.

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION

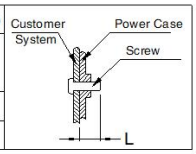




Pin-Out	
Pin	Mark
1	AC(L)
2	AC(N)
3	⏚
4	-Vo
5	+Vo
6	ADJ Output adjustable resistor

CN1	Pin-Out		Customer Connector
1 2 3 4 5 6	Pin	Mark	Connector: JST XHP or equivalent Terminal: JST SXH-001T or equivalent
	1	DC_OK Signal	
	2	DC_OK GND	
	3	-S	
	4	+S	
	5	RC-	
	6	RC+	

Position	Screw Spec.	L(max)	Torque(max)
①-②	M4	4mm	0.9N · m
⑦-⑧			
③-⑥	M3	4mm	0.4N · m
⑨-⑫	M3	3mm	0.4N · m



Connector wires range:

Pro. No	Input connector	Output connector	Customer output Spade terminal
12V	16-14AWG	4AWG	Max 13.00[0.512] 5.30[0.209] Max 7.00[0.276]
15V		6-4AWG	
24V		8-4AWG	
36V		12-6AWG	
48V/54V		14-6AWG	
Screw/torque	M4, Max 0.9N · m	M5, Max 1.6N · m	

Note:
Unit: mm[inch]
General tolerances: ±1.00[±0.039]
LED: Output status indicator LED

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220175;
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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