AC/DC 500W Enclosed Switching Power Supply

LM500-22BxxUH(-C) Series

MORNSUN®

RoHS

FEATURES

- Universal 176 - 305VAC or 240 - 430VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +85℃
- Semi-potted process, fanless design
- High I/O isolation test voltage up to 4000VAC
- Efficiency up to 95%
- Output short circuit/over-current/over-voltage protection, over-temperature protection
- Operating altitude up to 5000m
- Safety according to UL/EN/IEC/BS EN62368, EN60335, EN61558, GB4943
- 3 years warranty

LM500-22BxxUH(-C) series is one of Mornsun's enclosed fanless semi-potted ultra narrow AC-DC switching power supply, it is suitable for industrial and outdoor occasions where the application environment is relatively harsh. It features universal AC input and at the same time accepts DC input voltage, cost-effective, high efficiency, high reliability, operating altitude up to 5000m. These converters offer excellent EMC performance and meet UL/EN/IEC/BS EN62368, EN60335, EN61558, GB4943 standards and they are widely used in areas of industrial, lighting, electricity, security, telecommunications etc.

Selection Guide

Certification	Part No.①	Output Power (W)②	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)③	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (uF)
EN/CQC (pending)	LM500-22B12UH	500.4	12V/41.7A	11.4-12.6	94	10000
	LM500-22B24UH	501.6	24V/20.9A	22.8-25.2	95	8000
	LM500-22B28UH	501.2	28V/17.9A	26.6-29.4	95	6000
	LM500-22B36UH	500.4	36V/13.9A	34.2-37.8	95	6000
	LM500-22B48UH	499.2	48V/10.4A	45.6-50.4	95	4000
	LM500-22B54UH	502.2	54V/9.3A	51.3-56.7	95	2000

Note:
①Use suffix "C" for terminal with protective cover. The product picture is for reference only. For details, please refer to the actual product;
②Under 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;
③Output voltage adjustable range test conditions: 230VAC/50% Io.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)		200	--	277	VAC
	AC input		176	--	305	
	DC input		240	--	430	VDC
Input Voltage Frequency	Rated input (Certified voltage)		50	--	60	Hz
	AC input		47	--	63	
Input Current	Rated input (Certified voltage)		--	--	6	A
	230VAC		--	--	6	
Inrush Current	230VAC	Cold start	--	60	--	
Start-up Delay Time			--	2	--	s
Input Fuse	Built-in fuse		8A/300V			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	--	±1.0	--	%

Line Regulation	Rated load		--	±0.5	--	%
Load Regulation	0% - 100% load	12V	--	±1.0	--	
		24V/28V/36V/48V/54V	--	±0.5	--	
Minimum Load			0	--	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	12V	--	--	200	mV
		24V/28V/36V/48V/54V	--	--	240	
Temperature Coefficient			--	±0.03	--	%/℃
Hold-up Time	230VAC		--	16	--	ms
Short Circuit Protection	After the short circuit disappears, the recovery time is less than 3s		Hiccup, continuous, self-recover			
Over-current Protection			≥110% Io, hiccup, self-recover			
Over-temperature Protection	Triggered Range: 230VAC, 100% Io, 51℃ to 85℃; 230VAC, >50% Io, 70℃ to 85℃		Turn-off, self-recover after over-temperature fault elimination			
Over-voltage Protection	12V		≤15.6V (Output voltage hiccup)			
	24V		≤31.2V (Output voltage hiccup)			
	28V		≤36.4V (Output voltage hiccup)			
	36V		≤46.8V (Output voltage hiccup)			
	48V		≤62.4V (Output voltage hiccup)			
	54V		≤63.0V (Output voltage hiccup)			

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 <10mA			2000	--	--	VAC
	Input - output				4000	--	--	
	Output - ⏚				1500	--	--	
Insulation Resistance	Input - ⏚	Ambient temperature: 25 ± 5℃ Relative humidity: < 95%RH, no condensation Test voltage: 500VDC			100	--	--	MΩ
	Input - output				100	--	--	
	Output - ⏚				100	--	--	
Leakage Current		277VAC	Touch current		--	--	0.75	mA
Operating Temperature					-40	--	+85	℃
Storage Temperature					-40	--	+85	
Operating Humidity		Non-condensing			20	--	90	%RH
Storage Humidity		Non-condensing			10	--	95	
Power Derating		Operating temperature derating (With aluminum plate)	12V	+45℃ to +70℃	2	--	--	%/℃
				+70℃ to +85℃	1.67	--	--	
			24V/28V/36V /48V/54V	+50℃ to +70℃	2.5	--	--	
				+70℃ to +85℃	1.67	--	--	
		Operating temperature derating (Without aluminum plate)	12V	+25℃ to +30℃	4	--	--	
				+30℃ to +45℃	1.33	--	--	
				+45℃ to +70℃	1.2	--	--	
				+70℃ to +85℃	1	--	--	
			24V/28V/36V /48V/54V	+30℃ to +50℃	1.5	--	--	
				+50℃ to +70℃	2	--	--	
				+70℃ to +85℃	1	--	--	
		Input voltage derating	176VAC - 200VAC		1.66	--	--	%/VAC
			277VAC - 305VAC		0.715	--	--	
Safety Standards					Design refer to UL/EN/IEC/BS EN62368-1, EN60335-1, EN61558-1, GB4943.1			

Safety Class		CLASS I
MTBF	MIL-HDBK-217F@25℃	⩾300,000 h
Warranty	Ambient temperature: <70℃	3 years

General Specifications

Case Material	Metal (AL5052, SGCC)	
Dimensions	232.00mm x 81.00mm x 34.00mm	
Weight	12V/24V/28V/36V	840g (Typ.)
	48V/54V	780g (Typ.)
Cooling Method*	With aluminum plate heat dissipation	

Note: *
1. Cooling mode and power derating parameter product characteristic curve;
2. In order to optimize the heat dissipation performance, when the aluminum plate is used for auxiliary heat dissipation, please note: (1) The size of the aluminum plate is 450mm x 450mm x 3mm; (2) The surface of the aluminum plate must be coated with thermal grease; (3) The product must be tightly attached to the aluminum plate.

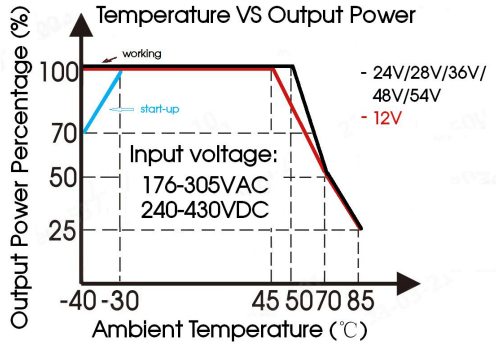
Electromagnetic Compatibility (EMC)

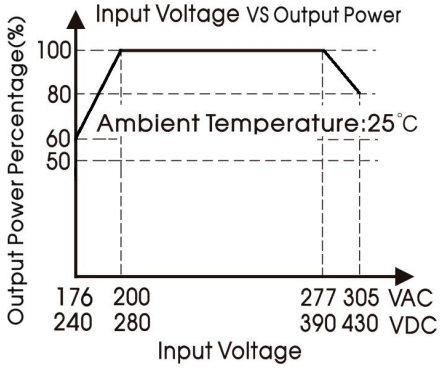
Emissions	CE (Input port)	CISPR32/EN55032	CLASS A	
	RE	CISPR32/EN55032	CLASS A	
Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV/Air ±15KV	perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	
	EFT (Input port)	IEC/EN61000-4-4	±4KV	
	Surge (Input port)*	IEC/EN61000-4-5	Line to line ±2KV/line to PE ±4KV	
	CS	IEC/EN61000-4-6	10Vr.m.s	
	PFMF	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. This power supply does not meet the harmonic current requirements specified in EN61000-3-2.
Please do not use this power supply under the following conditions:
(1) The terminal equipment is used in the European Union.
(2) Supporting terminals are connected to a public power grid with 220VAC or a higher voltage that comply with the requirements of EN61000-3-2.
(3) The power supply is installed in terminal equipment with average or continuous input power greater than 75W.
(4) The power supply belong to a part of lighting system.
Exception: The power supply used in the following terminal equipment does not need to meet EN61000-3-2.
(1) Professional equipment with a total rated input power greater than 1000W.
(2) Symmetrically controlled heating element with a rated power less than or equal to 200W.
3. If no harmonic current is required or customers can solve harmonic current problems by themselves, this product can be used.
4. *With Mornsun filters FC-L10W2, the Surge (Input port) meet line to line ±4KV/line to PE ±6KV.

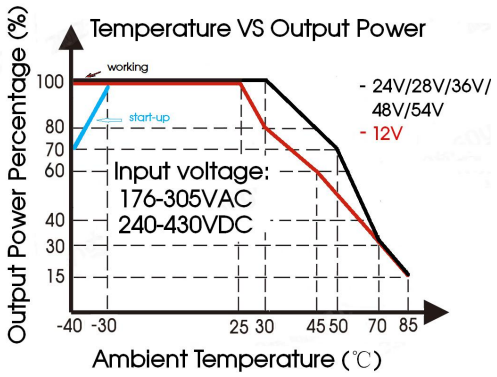
Product Characteristic Curve

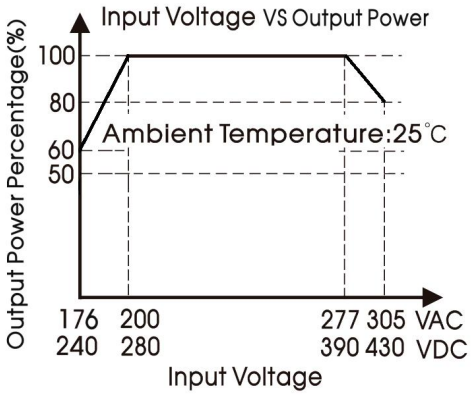
With aluminum plate:



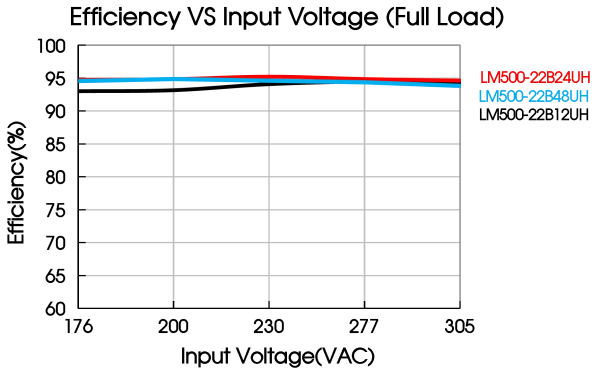


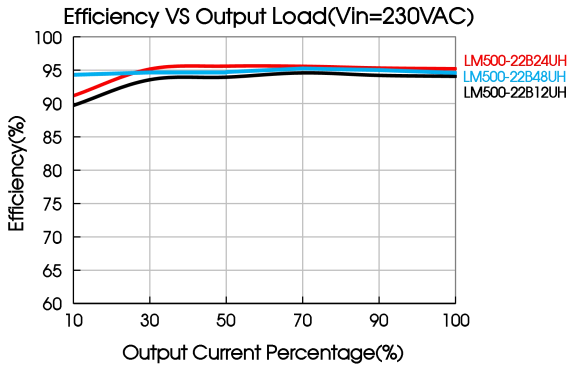
Without aluminum plate:



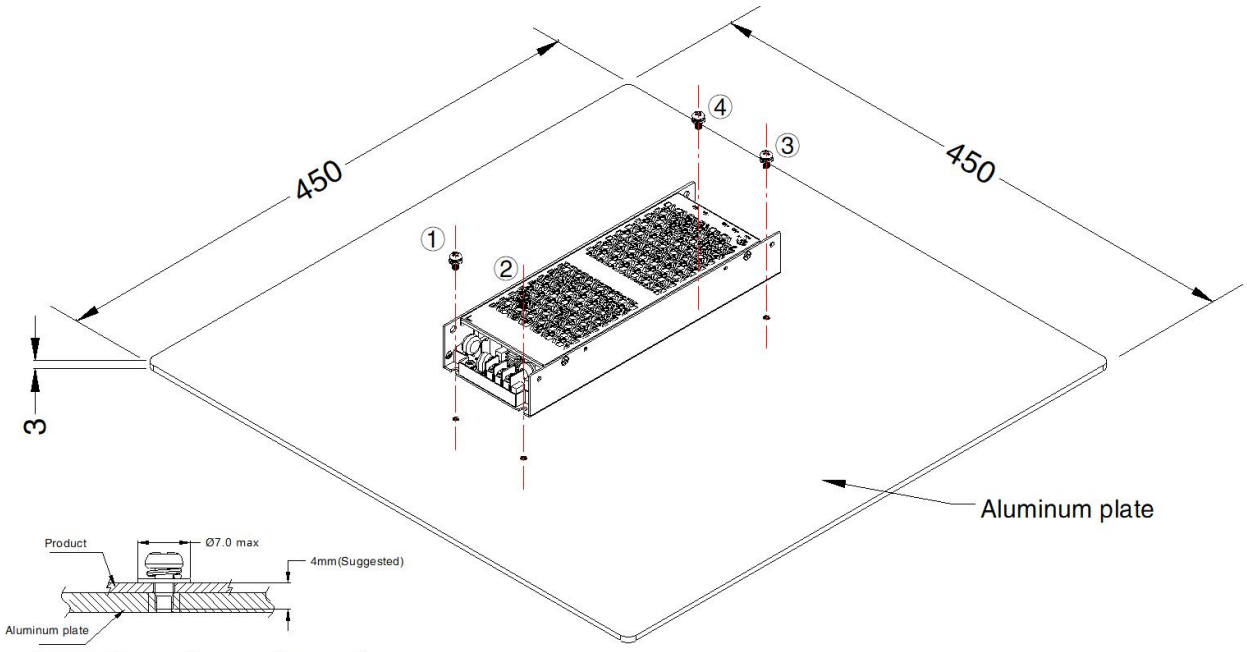


Note: 1. With an AC input voltage between 176 -200VAC/277-305VAC and a DC input between 240-280VDC/390-430VDC the output power must be derated as per the temperature derating curves;
2. In order to distinguish the temperature derating corresponding to long-term steady-state operation, it should be noted that: when the product is started at a low temperature of -40℃, the temperature derating should be reduced by 30% for starting test and can be started within 3s;
3. This product is suitable for applications using nature air cooling; for applications in closed environment please consult Mornsun FAE.





Installation Diagram

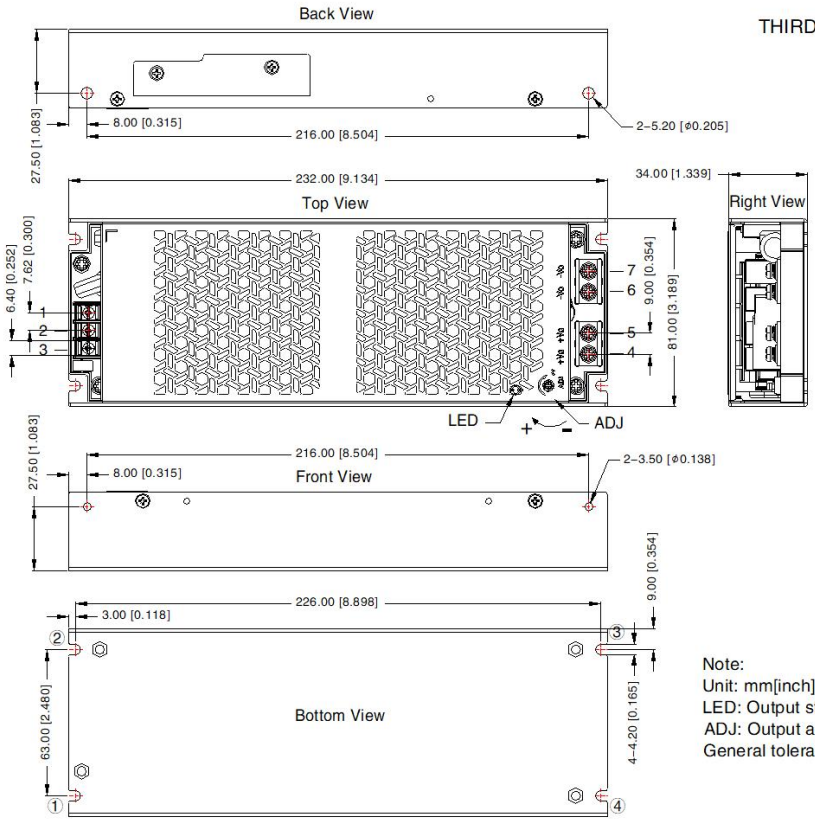


Position	Screw Spec.	L(Suggested)	Torque(max)
① – ④	M3	4MM	0.4N • m

Note: 1. In order to meet the "Derating Curve", the product testing must be installed onto an aluminum plate. The size of the suggested aluminum plate is shown as above. And for optimizing thermal performance, it is necessary to apply thermal grease on the bottom of the product.
2. It is suggested to install the product with M3 combination screws, and the product must be firmly installed at the center of the aluminum plate.

Dimensions and Recommended Layout

LM500-22BxxUH Series



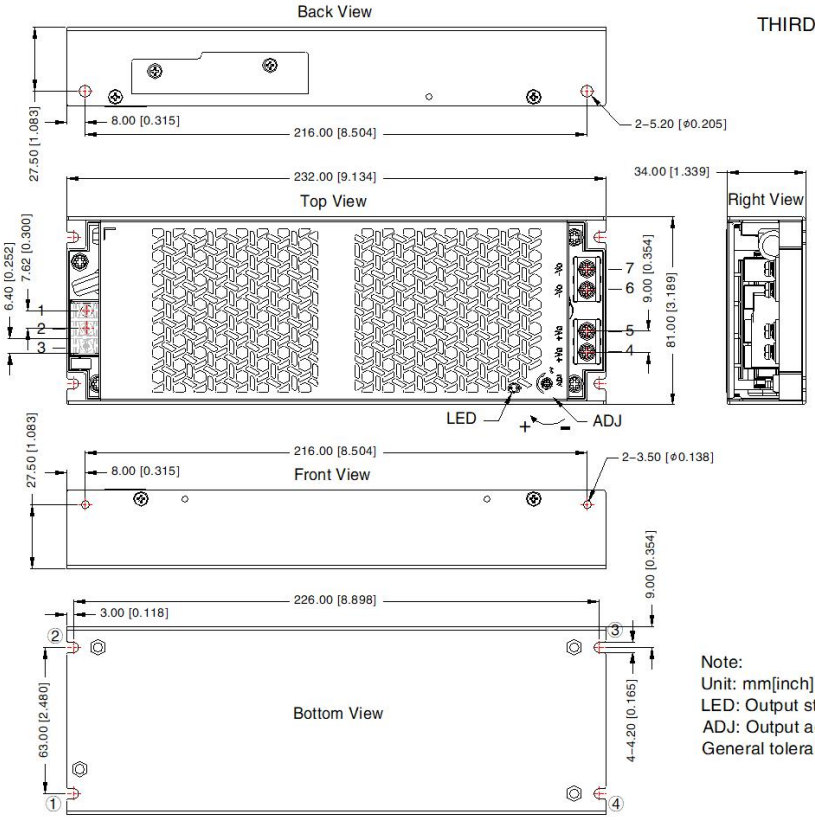
Pin-Out	
Pin	Mark
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	+Vo
6	-Vo
7	-Vo

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

Connector wires range

Pro. No	Input connector	Output connector (single wire)	Output connector (double wires)	Output connector (double wires) Pic.
12V	22-14AWG	No suggested	14-10AWG	-Vo double wires +Vo double wires
24V		14-10AWG	16-10AWG	
28/36/48V		14-10AWG	18-10AWG	
54V		16-10AWG	20-10AWG	
Screw/torque	M3.0, Max 0.5N · m	M4.0, Max 0.9N · m		

LM500-22BxxUH-C Series



Pin–Out	
Pin	Mark
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	+Vo
6	–Vo
7	–Vo

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

Connector wires range

Pro. No	Input connector	Output connector (single wire)	Output connector (double wires)	Output connector (double wires) Pic.
12V	22–14AWG	No suggested	14–10AWG	–Vo double wires; +Vo double wires
24V		14–10AWG	16–10AWG	
28/36/48V		14–10AWG	18–10AWG	
54V		16–10AWG	20–10AWG	
Screw/torque	M3.0, Max 0.5N · m	M4.0, Max 0.9N · m		

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220682;
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. All index testing methods in this datasheet are based on our company corporate standards;
4. Working at no-load or light load, product will be audible noise generated, but it does not affect product performance and reliability;
5. The room temperature derating of 5℃/1000m is needed for operating altitude greater than 2000m;
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. If product involves multi-brand materials and there are differences in color etc, please refer to the standards of each manufacturer;
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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