AC/DC 1500W Enclosed Switching Power Supply

LM1500-22Bxx Series

MORNSUN®



Report EN62368-1 | UKCA BS EN 62368-1 | IS13252(Part 1):2010/ IEC 60950-1:2005 R-41202800 www.bis.gov.in | RoHS | 3 years Warranty

FEATURES

- Universal 180 - 277VAC or 250 - 380VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +70℃
- High reliability, efficiency up to 94%
- DC OK function
- High I/O isolation test voltage up to 4000VAC
- Output short circuit, over-current, over-voltage, over-temperature protection
- Operating altitude up to 5000m
- OVC Ⅱ (designed to meet EN62368)
- Safety according to IEC62368
- Conformal coating on both sides of the substrate
- 3 years warranty

LM1500-22Bxx series is one of Mornsun's 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/EN/BS EN62368, GB4943 standards and they are widely used in areas of industrial, LED, street light control, security, telecommunications, smart home etc.

Selection Guide

Certification	Part No.	Cooling Method*	Output Power (W)*	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range ADJ(V)	Efficiency at 230VAC (%) Typ.*	Max. Capacitive Load (uF)
EN/BIS	LM1500-22B05	Forced air blowing	1000	5V/200A	4.5-5.5	86.0	60000
	LM1500-22B12		1500	12V/125A	11.4-13.8	91.0	40000
	LM1500-22B15			15V/100A	14.25-17.25	91.0	20000
	LM1500-22B24			24V/62.5A	22.8-27.6	93.0	10000
	LM1500-22B27			27V/55.6A	25.65-31.05	93.0	8000
	LM1500-22B36			36V/41.67A	34.2-41.4	93.0	6000
	LM1500-22B48			48V/31.25A	45.6-55.2	94.0	5000
	LM1500-22B54			54V/27.78A	51.3-58	94.0	4000

Note:
1. *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;
2. *Wind blows from the outside into the product, for details about the direction of cooling air, see the dimensions diagram.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)		200	--	240	VAC
	AC input		180	--	277	
	DC input		250	--	380	VDC
Input Voltage Frequency	Rated input (Certified voltage)		47	--	63	Hz
	AC input		47	--	63	
Input Current	200VAC		--	10	--	A
	230VAC		--	8	--	
Inrush Current	230VAC		--	40	--	
Power Factor	230VAC		--	--	0.95	--
Leakage Current	240VAC，60Hz	Earth leakage current	--	--	5	mA
		Touch current	--	--	0.5	
Hot Plug			Unavailable			

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Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	5V	--	±2.0	--	%
		12V/15V/24V/27V/36V/48V54V	--	±1.0	--	
Line Regulation	Rated load		--	±0.5	--	
Load Regulation	0% - 100% load	5V	--	±1.0	--	
		12V/15V/24V/27V/36V/48V54V	--	±0.5	--	
Minimum Load			0	--	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	5V/12V/15V/24V/27V	--	--	150	mV
		36V/48V54V	--	--	200	
Temperature Coefficient			--	±0.03	--	%/℃
Hold-up Time	230VAC, rated load		--	12	--	ms
Short Circuit Protection	Recovery time <30s after the short circuit disappear.		Turn off, continuous, self-recover			
Over-current Protection	230VAC, rated load	Normal temperature, high temperature	130% - 200% Io, hiccup, constant current mode, shut down after 1s, self-recover			
		Low temperature	⩾130% full load after derating, hiccup, constant current mode, shut down after 1s, self-recover			
Over-voltage Protection	5V		⩽6.75VDC (Output voltage hiccup, self-recover)			
	12V		⩽16.2VDC (Output voltage hiccup, self-recover)			
	15V		⩽25VDC (Output voltage hiccup, self-recover)			
	24V		⩽35VDC (Output voltage hiccup, self-recover)			
	27V		⩽35VDC (Output voltage hiccup, self-recover)			
	36V		⩽50VDC (Output voltage hiccup, self-recover)			
	48V		⩽63VDC (Output voltage hiccup, self-recover)			
	54V		⩽63VDC (Output voltage hiccup, self-recover)			
Over-temperature Protection	230VAC, 100% load	Over-temperature protection start	--	70	--	℃
		Over-temperature protection release	50(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 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				-40	--	70	℃
Storage Temperature				-40	--	85	
Operating Humidity		Non-condensing		10	--	95	%RH
Storage Humidity				20	--	90	
Power Derating		Operating temperature derating	-40℃ to -30℃	5	--	--	%/℃
			+50℃ to +70℃	2	--	--	
		Input voltage derating	180VAC-200VAC	0.5	--	--	%/VAC
Safety Standards				IS13252 (Part1) safety approved & BS EN/EN62368-1(Report) ; Design refer to IEC62368-1, GB4943.1			

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Safety Class		CLASS I
MTBF	MIL-HDBK-217F@25℃	⩾354,000 h
Warranty	Ambient temperature: <50℃	3 years

Functional Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
DC_OK Signal	All input voltage range, all load range	Power on	80	90	95	%Vo
Remote Sense	S-(CON3) and S+(CON4) of the terminal (CON) 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-(CON5) and RC+(CON6) of the terminal (CON) are the pins of the remote control switch function, and external voltage is required when used (RC+ is connected to external voltage positive electrode, RC- is connected to external voltage negative electrode).					
	All input voltage range, all load range	Power on	0	--	0.8	V
		Power off	4	--	10	
Note: *Power is on when the remote switch pins are left open.						

General Specifications

Case Material	SUS 304	
Dimensions	250.00mm x 127.00mm x 40.50mm	
Weight	5V	1740g (Typ.)
	12V/15V	1550g (Typ.)
	24V/27V/36V/48V/54V	1450g (Typ.)
Cooling Method	Forced air cooling, 17.15CFM	

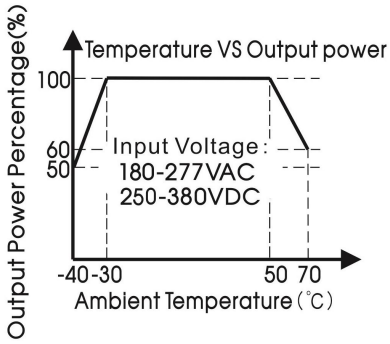
Electromagnetic Compatibility (EMC)

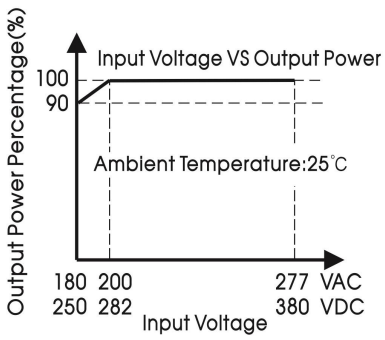
Emissions	CE (Input port)	CISPR32 EN55032 150k - 30MHz		CLASS A
	RE	CISPR32 EN55032 30MHz - 1GHz		CLASS A
Immunity	ESD	IEC/EN61000-4-2 Contact ±6kV/Air ±8kV		perf. Criteria A
	RS	IEC/EN61000-4-3 10V/m		
	EFT (Input port)	IEC/EN61000-4-4 ±4kV		
	Surge (Input port)	IEC/EN61000-4-5 line to line ±2kV/line to PE ±4kV		
	MS	IEC/EN61000-4-8 30A/m		
	CS	IEC/EN61000-4-6 0.15 - 80MHz 10Vr.m.s		
	Voltage dips	IEC/EN61000-4-11	0% of 200Vac, 0Vac, 1 cycle	perf. Criteria C
			40% of 100Vac, 80Vac, 10/12 cycle	perf. Criteria C
			70% of 100Vac, 140Vac, 25/30 cycle	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;
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.
2. *The power supply does not meet the requirements of harmonic current stipulated in EN61000-3-2; This power supply is not suitable for the following situations.
1) The terminal equipment is used in the European Union.
2) The terminal equipment is connected to public mains supply with 220VAC or greater rated nominal voltage that mandatory to meet 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.
In addition, the power supply can be used in the following terminals which do not need to meet EN61000-3-2;
(1) Professional equipment with total fixed input power greater than 1000W;
(2) symmetrical controlled heating element with 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.

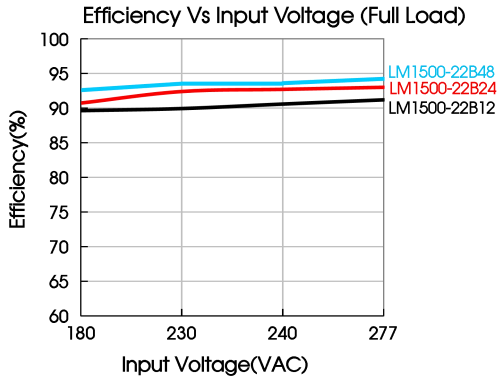
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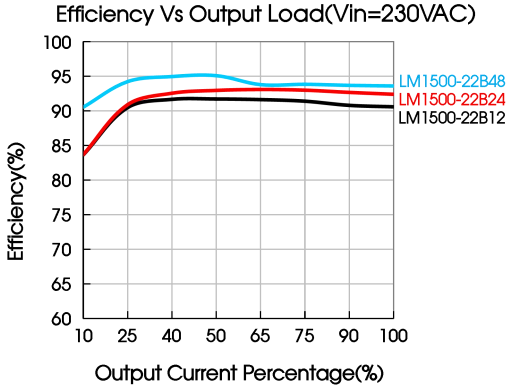
Product Characteristic Curve





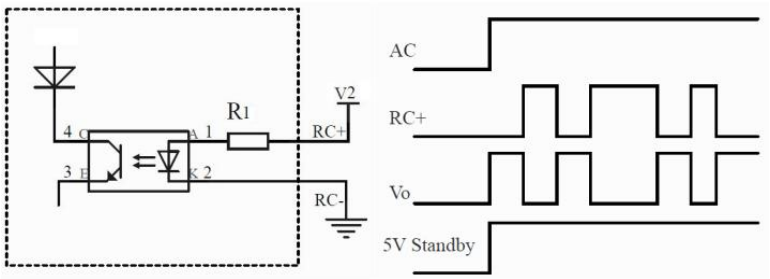
Note: 1. With an AC input voltage between 180-200VAC and a DC input between 254-282VDC the output power must be derated as per the temperature derating curves;
2. This product is suitable for applications using forced air cooling; for applications in closed environment please consult Mornsun FAE.





Typical Application

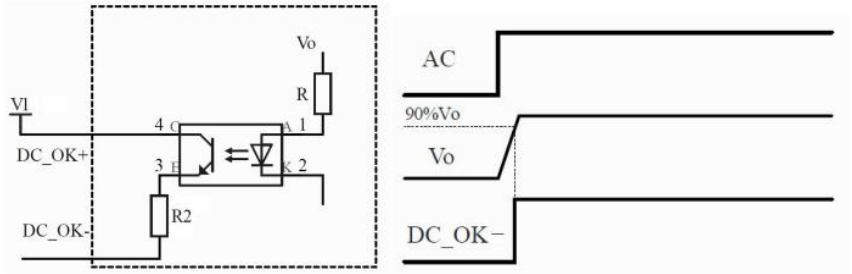
1. Remote ON/OFF



V2 (User side)	4V-10V

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

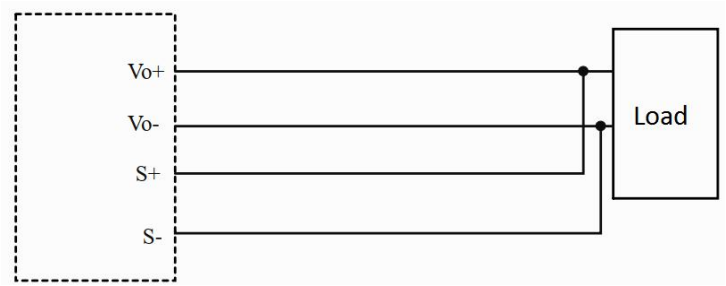


V1 (User side)	4V-10V

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.

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3. Remote Sense Compensation

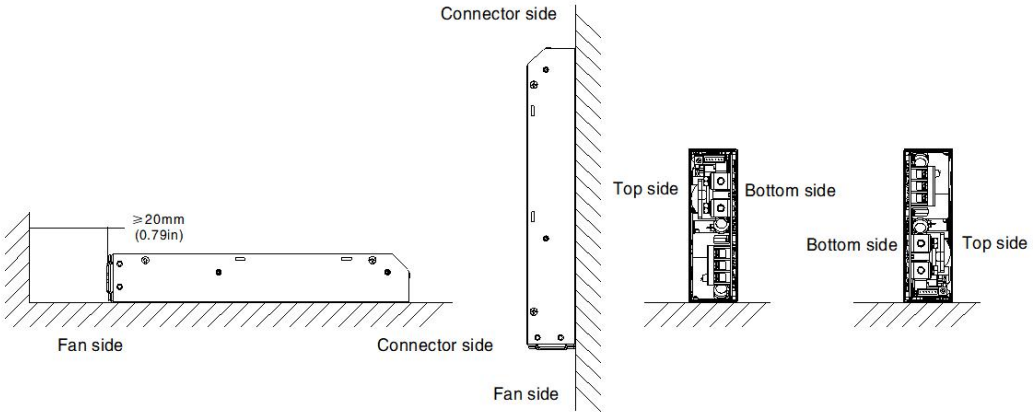


Note:
1. The left side represents the internal schematic diagram of the product, the right side represents the customer system;
2. Twisted pair wires are needed for S+/S-;
3. If the Pin14 terminal function is used for long-term matching, please glue to secure it.

Note:
The product is equipped with a built-in cooling fan. Keep the air intake clear of debris. If the environment cannot meet this requirement, a fanless model is recommended.

Installation Diagram

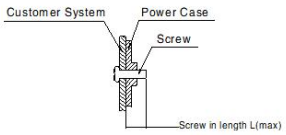
Standard mounting orientation:

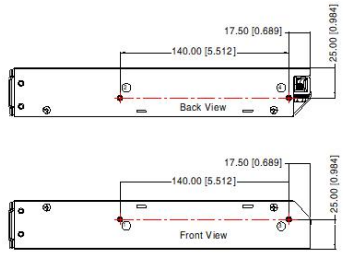


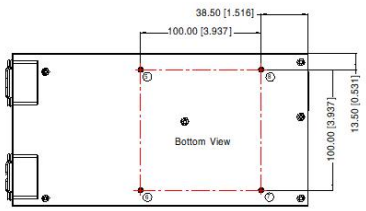
Note: The fan panel cannot be blocked by other objects, and a distance of at least 20mm must be maintained, otherwise it will affect the heat dissipation and performance of the power module.

Position of mounting holes:

Position	Screw Spec.	Screw in length L(max)	Recommended torque
①–⑧	M3	3mm	0.4 N · m ±10%



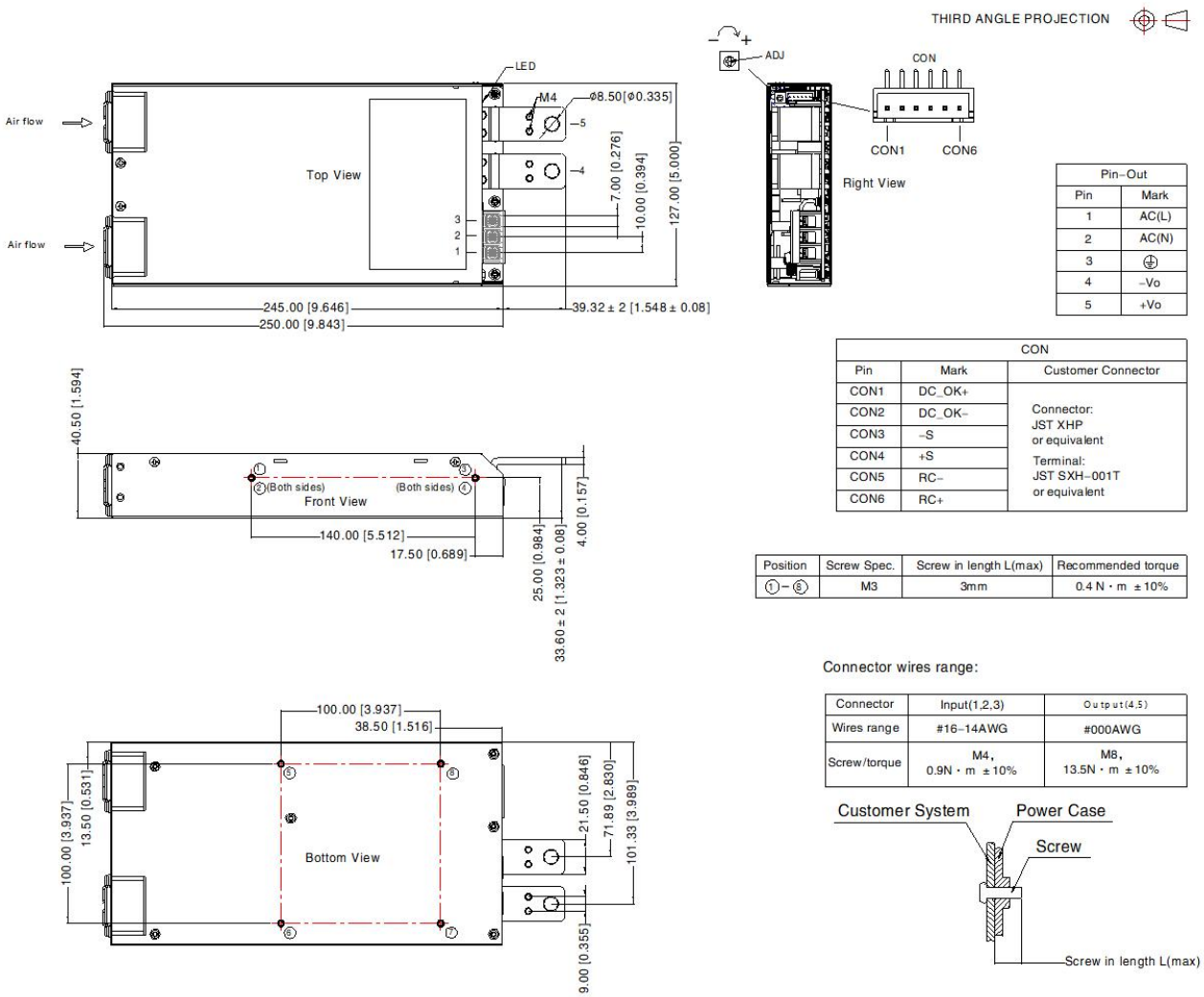




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Dimensions and Recommended Layout

LM1500-22B05



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

CON		
Pin	Mark	Customer Connector
CON1	DC_OK+	Connector: JST XHP or equivalent Terminal: JST SXH-001T or equivalent
CON2	DC_OK-	
CON3	-S	
CON4	+S	
CON5	RC-	
CON6	RC+	

Position	Screw Spec.	Screw in length L(max)	Recommended torque
①-⑧	M3	3mm	0.4 N · m ±10%

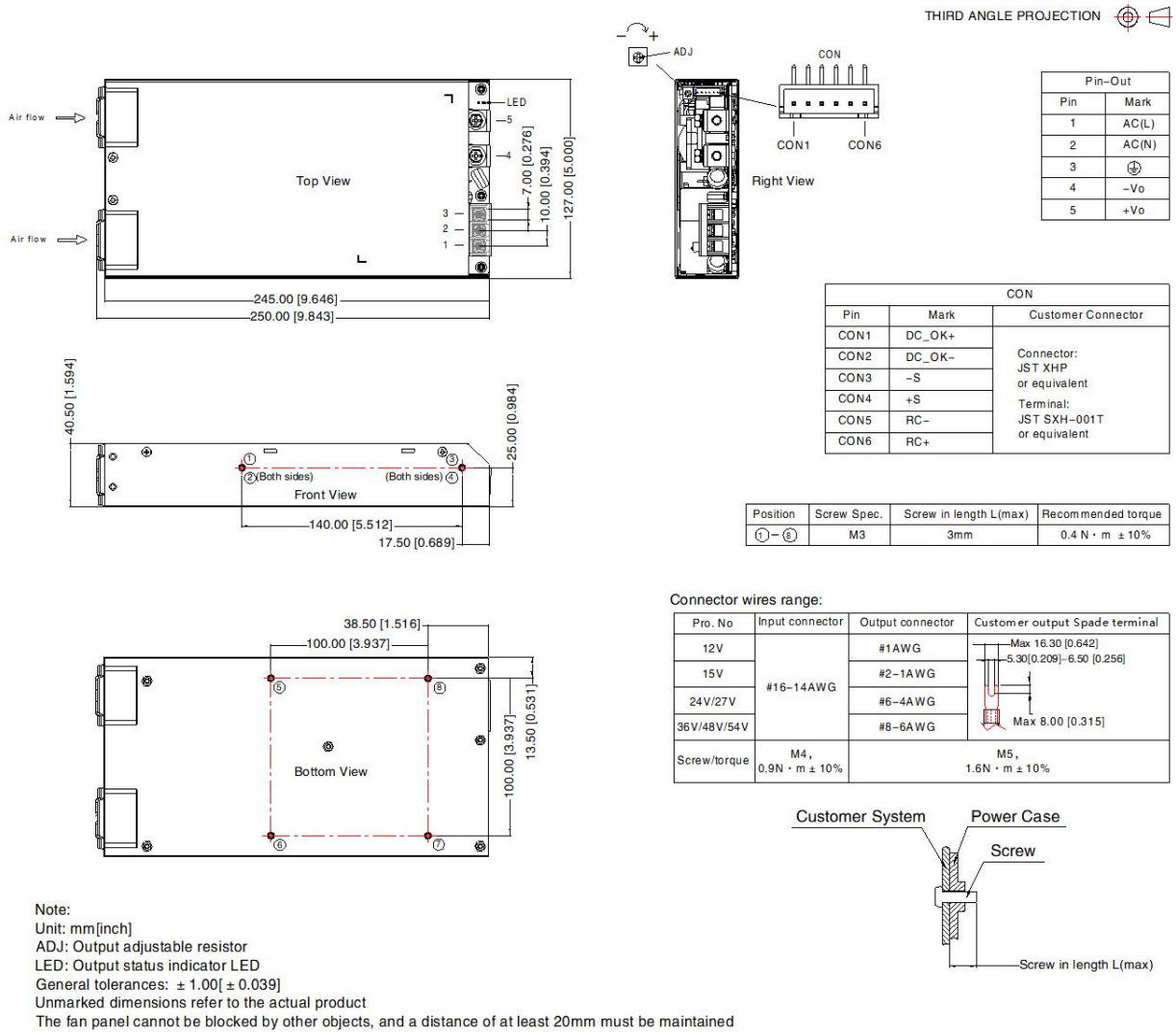
Connector wires range:

Connector	Input(1,2,3)	Output(4,5)
Wires range	#16-14AWG	#000AWG
Screw/torque	M4, 0.9N · m ±10%	M8, 13.5N · m ±10%

Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
LED: Output status indicator LED
General tolerances: ± 1.00[± 0.039]
Unmarked dimensions refer to the actual product
The fan panel cannot be blocked by other objects, and a distance of at least 20mm must be maintained

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LM1500-22B12/15/24/27/36/48/54



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

CON		
Pin	Mark	Customer Connector
CON1	DC_OK+	Connector: JST XHP or equivalent Terminal: JST SXH-001T or equivalent
CON2	DC_OK-	
CON3	-S	
CON4	+S	
CON5	RC-	
CON6	RC+	

Position	Screw Spec.	Screw in length L(max)	Recommended torque
①-⑧	M3	3mm	0.4 N·m ±10%

Pro. No	Input connector	Output connector	Customer output Spade terminal
12V	#16-14AWG	#1AWG	
15V		#2-1AWG	
24V/27V		#6-4AWG	
36V/48V/54V		#8-6AWG	
Screw/torque	M4, 0.9N·m ±10%	M5, 1.6N·m ±10%	

Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
LED: Output status indicator LED
General tolerances: ±1.00[±0.039]
Unmarked dimensions refer to the actual product
The fan panel cannot be blocked by other objects, and a distance of at least 20mm must be maintained

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220772(5V), 58220735 (12/15/24/27/36/48/54V);
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 decrease;
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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