500W Fanless Industrial Enclosed Power Supply Series

TGRF500-XX

CE Report EN62368-1 | CCC GB4943.1 | UKCA BS EN 62368-1

FEATURES

- Universal 85 - 305VAC or 120 - 430VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +85℃
- Output short circuit, over-current, over-voltage, over temperature protection
- Low ripple & noise
- High efficiency
- Active PFC
- 150% peak load output for 1 second
- Ultra narrow shape, semi-potted process, fanless design
- High I/O isolation test voltage up to 4000VAC
- Operating up to 5000m altitude
- Safety according to IEC/UL62368, IEC60335, EN61558,

TGRF500-XX series is one of Tiger Power's enclosed AC-DC switching power supply. 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/UL/EN/BS EN62368, IEC60335, EN61558, 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.	Rated Output Power (W)*	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.	Room Temperature Max. Capacitive Load (μF)	Low Temperature Max. Capacitive Load (μF)
(EN/CCC/BS)	TGRF500-5	400.0	5V/80.0A	4.5-5.5	90.0	12000	6000
EN/CCC/BS	TGRF500-12	500.4	12V/41.7A	11.4-12.6	94.0	10000	4000
	TGRF500-24	501.6	24V/20.9A	22.8-25.2	94.5	8000	3000
(EN/CCC/BS)	TGRF500-36	500.4	36V/13.9A	34.2-37.8	95.0	6000	2000
	TGRF500-48	501.6	48V/10.45A	45.6-50.4	95.0	4000	1000
	TGRF500-55	489.5	55V/8.9A	45.0-58.0	95.0	2000	600

Note: *Under any conditions, the total power of the product should not exceed the rated output power, and the output current should not exceed the rated output current.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		85	--	305	VAC
	DC input		120	--	430	VDC
Input Voltage Frequency			47	--	63	Hz
Input Current	115VAC		--	--	5.0	A
	230VAC		--	--	3.0	
Inrush Current	115VAC	Cold start	--	30	--	
	230VAC		--	60	--	
Leakage Current	277VAC		<0.75mA			
Hot Plug			Unavailable			
Power Factor	115VAC	Normal temperature, full load	PF ≥ 0.98			
	230VAC		PF ≥ 0.95			

Output Specifications*

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy*	Full load range	5V	--	±2.0	--	%
		12V/24V/36V/48V/55V	--	±1.0	--	
Line Regulation	Rated load	5V	--	±0.5	--	
		12V/24V/36V/48V/55V	--	±0.3	--	
Load Regulation	0% - 100% load	5V	--	±1.0	--	
		12V/24V/36V/48V/55V	--	±0.5	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	--	200	mV
Hold-up Time	115VAC		--	12	--	mS
	230VAC		--	12	--	
Short Circuit Protection	Recover time <5s after the short circuit disappear.		Hiccup, continuous, self-recover			
Over-current Protection			>110% Io, hiccup, self-recover			
Over-temperature Protection			Output voltage turn off, self-recover after the temperature drops			
Over-voltage Protection	5V		5.75VDC≤ Vo ≤6.75VDC	Output voltage turn off, re-power on for recover		
	12V		13.2VDC≤ Vo ≤15.6VDC			
	24V		26.4VDC≤ Vo ≤31.2VDC			
	36V		39.6VDC≤ Vo ≤46.8VDC			
	48V		52.8VDC≤ Vo ≤60.0VDC			
	55V		60.0VDC≤ Vo ≤69.0VDC			

Note:1.*Output Voltage Accuracy: including setting error, line regulation, load regulation;
2.*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;
3.*For all the above test items, please refer to our company standard "AC-DC Black Box Test Specification" for specific test specifications and methods.

General Specifications

Item		Operating Conditions			Min.	Typ.	Max.	Unit
Isolation Test	Input - ⏚	Electric test for 1min, leakage current <10mA			2000	--	--	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	--	--	
Operating Temperature					-40	--	+85	℃
Storage Temperature					-40	--	+85	
Operating Humidity		Non-condensing			20	--	90	%RH
Storage Humidity					10	--	95	
Power Derating		Operating temperature derating (with heat-sink plate*)	5V	+40℃ to +85℃	1.667	--	--	%/℃
			12V	+45℃ to +85℃	2	--	--	
			24V/36V/48V/55V	+50℃ to +85℃	2.5	--	--	
		Operating temperature derating (110VAC input, without heat-sink plate)	5V (derating from 70% load)	+40℃ to +85℃	1.0	--	--	
			12V/24V/36V/48V/55V (derating from 70% load)	+50℃ to +85℃	1.5	--	--	
		Operating temperature derating (230VAC input, without heat-sink plate)	5V (derating from 80% load)	+40℃ to +50℃	1.0	--	--	
				+50℃ to +85℃	1.5	--	--	
			12V (derating from 90% load)	+40℃ to +85℃	1.33	--	--	
			24V/36V/48V/55V (derating from 90% load)	+45℃ to +85℃	1.6	--	--	
		Input voltage derating	85VAC - 110VAC		1.0	--	--	%/VAC

Safety Standard		GB4943.1 safety approved & EN62368-1, BS EN62368-1 (Report) Design refer to IEC/UL62368-1, IEC60335-1, EN61558-1
Safety Class		CLASS I
MTBF	MIL-HDBK-217F@25℃	≥200,000 h

Note: *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 × 450mm × 3mm; 2. The surface of the aluminum plate mast be coated with thermal grease; 3. The product must be tightly attached to the aluminum plate.

Mechanical Specifications

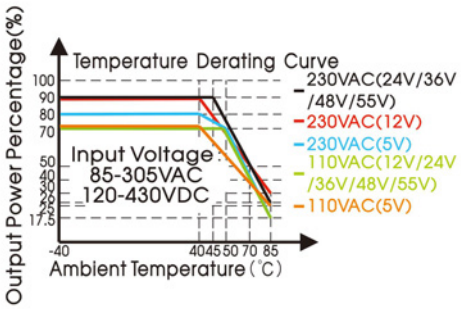
Product Appearance	Enclosed
Case Material	Metal (AL6063, SGCC)
Dimensions	232.00mm × 81.00mm × 31.00mm
Weight	985g (Typ.)
Cooling Method*	Free air convection

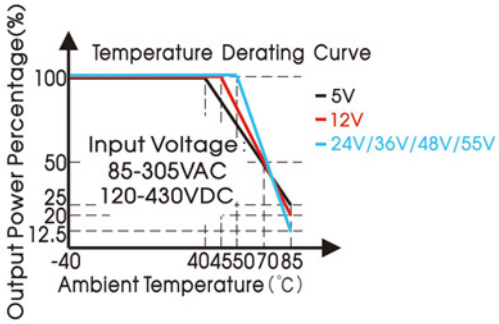
Note: *Cooling method and output power derating refer to the Product Characteristic Curve.

Electromagnetic Compatibility (EMC)

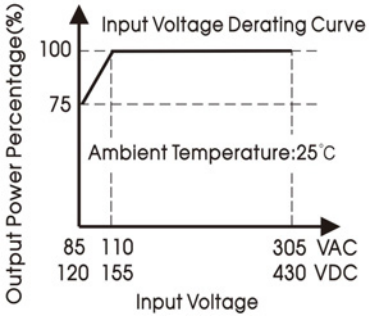
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
	Harmonic current	IEC/EN61000-3-2	CLASS A/D	
	Voltage flicker	IEC/EN6100-3-3		
Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV /Air ±15KV	perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2KV/line to ground ±4KV	perf. Criteria A
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	Power frequency magnetic field	IEC/EN61000-4-8	30A/m	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%, 70%	perf. Criteria B
	Intercom interference test	MS-SOP-DQC-007		perf. Criteria B
Immunity (for output port)	EFT	EN61000-6-2	±2KV	perf. Criteria A
	Surge	EN61000-6-2	line to line ±0.5KV/line to ground ±1KV	perf. Criteria A
	RS	EN61000-6-2	10Vr.m.s	perf. Criteria A

Product Characteristic Curve

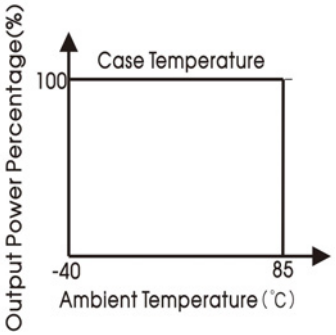




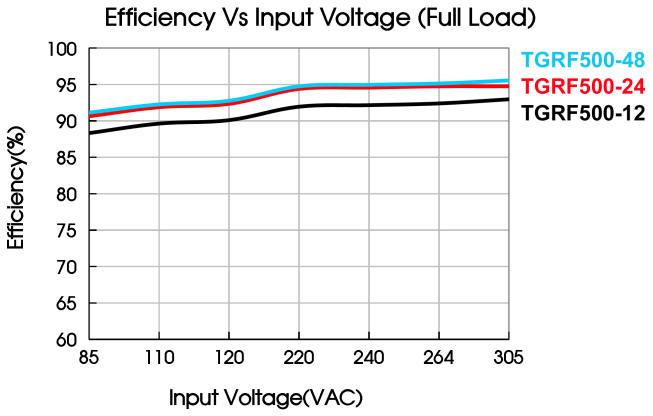
No aluminum plate for heat dissipation

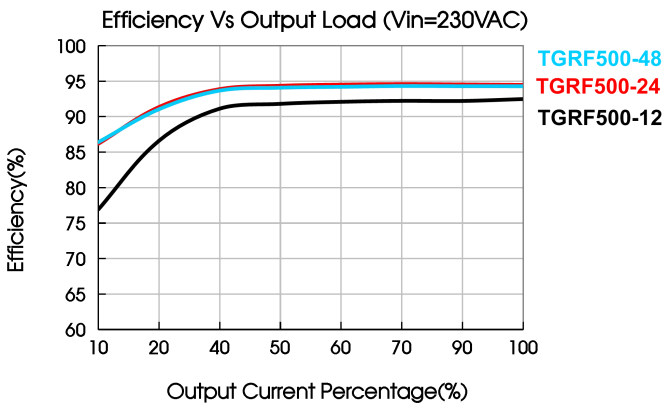


With aluminum plate for heat dissipation

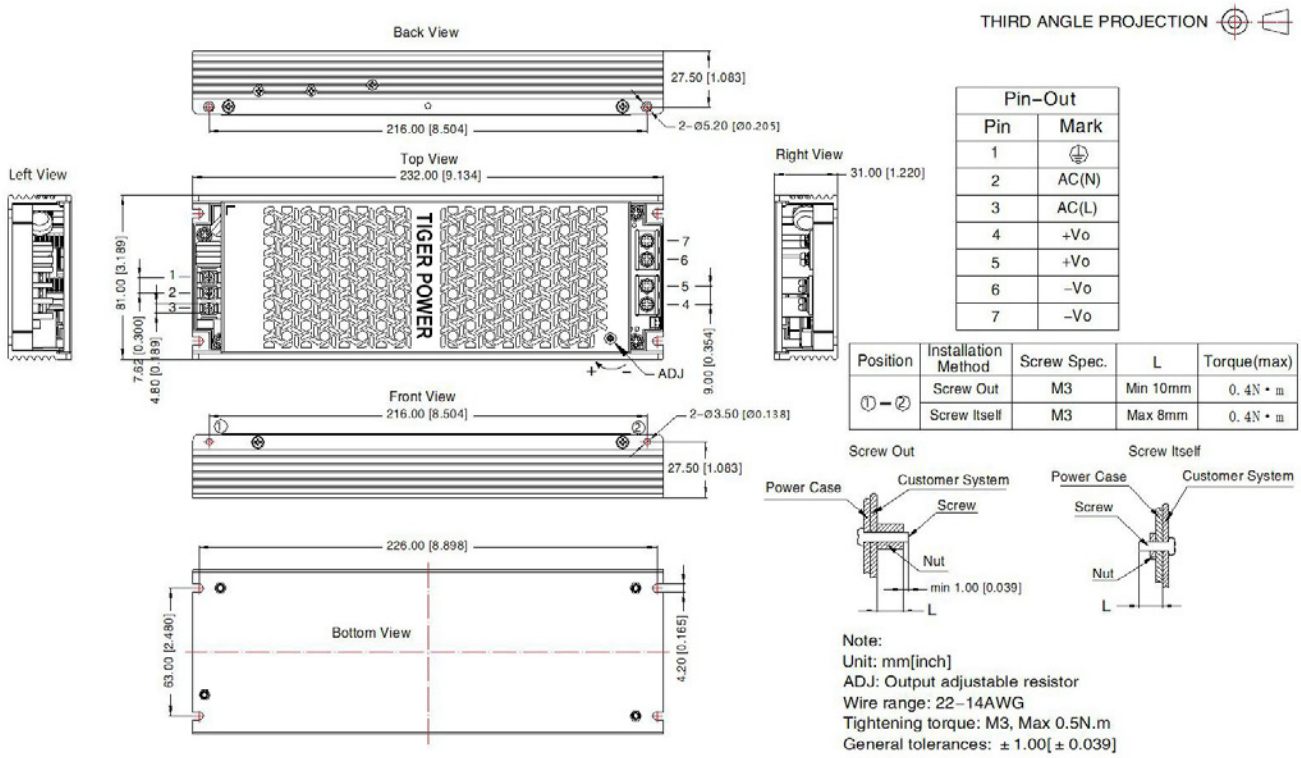


Note: This product is suitable for applications using natural air cooling, for applications in closed environment please consult Mornsun FAE.





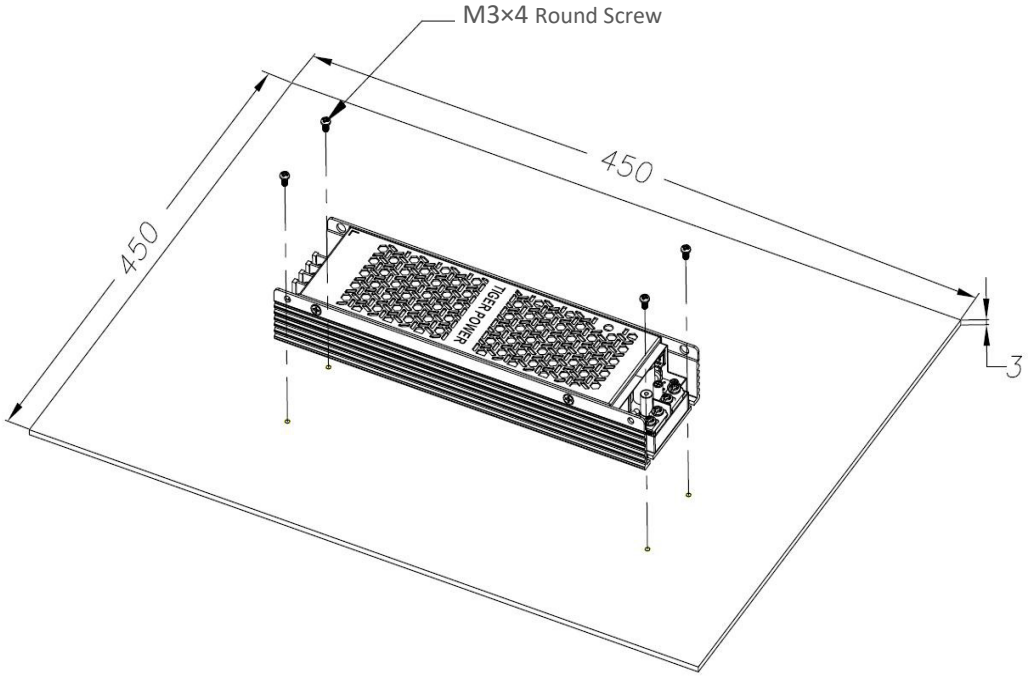
Dimensions and Recommended Layout



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

Position	Installation Method	Screw Spec.	L	Torque(max)
①-②	Screw Out	M3	Min 10mm	0.4N·m
	Screw Itself	M3	Max 8mm	0.4N·m

Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
Wire range: 22-14AWG
Tightening torque: M3, Max 0.5N.m
General tolerances: ±1.00[±0.039]



Note:

1. **For additional information on Product Packaging please refer to Tiger Power**
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. **In order to improve the efficiency, there will be audible noise generated when work at light load, but it does not affect product performance and reliability;**
5. **We can provide product customization service, please contact our technicians directly for specific information;**
6. **Products are related to laws and regulations: see "Features" and "EMC";**
7. **The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;**
8. **Our products shall be classified according to related environmental laws and regulations, and shall be handled by qualified units;**
9. **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.**