200W Fanless Industrial Power Supply Series

TGRF200-XX

Report EN62368-1 GB4943.1 BS EN 62368-1

FEATURES

- Universal 85 - 305VAC or 120 - 430VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Semi-potted process, fanless design
- Operating ambient temperature range: -40℃ to +70℃
- High efficiency, active PFC
- 150% peak load output for 1 second
- High I/O isolation test voltage up to 4000VAC
- Output short circuit, over-current, over-voltage, over-temperature protection
- Operating altitude up to 5000m
- Safety according to UL62368, EN60335, EN61558

TGRF200-XX series is one of Tiger Power'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 305VAC operating conditions, universal AC input and at the same time accepts DC input voltage, cost-effective, high PF value, high efficiency, high reliability, 150% peak load output and operating altitude up to 5000m. These converters offer excellent EMC performance and meet EN/UL/BS EN 62368, EN60335, EN61558, GB4943 standards and they are widely used in areas of industrial, lighting, 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)
EN,CE, UKCA	TGRF200-5	200	5V/40A	4.5-5.5	91	10000
	TGRF200-12	200.4	12V/16.7A	11.4-12.6	93	8000
	TGRF200-24	201.6	24V/8.4A	22.8-25.2	94	5000
	TGRF200-36	201.6	36V/5.6A	34.2-37.8	94	3000
	TGRF200-48	201.6	48V/4.2A	45.6-50.4	94	2000

Note: *12V, 24V output product with optional salt-spray proof at terminal

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		--	2.1	2.5	A
	230VAC		--	1.0	1.2	
Inrush Current	115VAC	Cold start	--	40	--	
	230VAC		--	80	--	
Power Factor	115VAC	Full load	--	0.98	--	--
	230VAC		--	0.95	--	
Leakage Current	240VAC		＜0.5mA			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	5V	--	±2.0	--	%
		12V/24V/36V/48V	--	±1.0	--	
Line Regulation	Rated load	5V	--	±0.5	--	
		12V/24V/36V/48V	--	±0.3	--	
Load Regulation	0% - 100% load	5V	--	±1.0	--	
		12V/24V/36V/48V	--	±0.5	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value), 25℃	5V	--	--	200	mV
		12V/24V/36V	--	--	240	
		48V	--	--	300	
Temperature Coefficient			--	±0.03	--	%/℃
Minimum Load			0	--	--	%
Hold-up Time	115VAC/230VAC		10	--	--	ms
Short Circuit Protection	Recovery time <10s after the short circuit disappear.	5V	Hiccup mode, constant current (200%Io-300%Io) works 200ms, turn off 10s, continuous, self-recover			
		12V/24V/36V/48V	Hiccup mode, constant current (200%Io-300%Io) works 1s, turn off 10s, continuous, self-recover			
Over-current Protection	230VAC, rated load	Normal temperature, high temperature	105% - 200% Io, delay protection, delay time 1s, self-recovery after the abnormality is removed			
		Low temperature	≥105%Io, delay protection, delay time 1s, self-recovery after the abnormality is removed			
Over-voltage Protection	5V		＜6.3V (Hiccup, self-recover)			
	12V		＜16V (Hiccup, self-recover)			
	24V		＜35V (Hiccup, self-recover)			
	36V		＜47V (Hiccup, self-recover)			
	48V		＜60V (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	2000	--	--	VAC
	Input - output		4000	--	--	
	Output - ⏚		1250	--	--	
Insulation Resistance	Input - ⏚	At 500VDC	100	--	--	MΩ
	Input - output		100	--	--	
	Output - ⏚		100	--	--	
Operating Temperature			-40	--	+70	℃
Storage Temperature			-40	--	+85	
Storage Humidity		Non-condensing	10	--	95	%RH
Operating Humidity			20	--	90	

Power Derating	Operating temperature derating							
		With aluminum plate*		-40℃ to -30℃	4.0	--	--	%/℃
				+50℃ to +70℃	2.0	--	--	
		Without aluminum plate	230VAC, others	-40℃ to -30℃	4.0	--	--	
				+50℃ to +70℃	3.0	--	--	
			230VAC, 5V & 100VAC, others; 80%Io	-40℃ to -30℃	2.0	--	--	
				+50℃ to +70℃	2.0	--	--	
			100VAC, 5V, 60%Io	+50℃ to +70℃	1.0	--	--	

	Input voltage derating	85VAC -100VAC	2.0	--	--	%/VAC
Safety Standard			GB4943.1 safety approved & EN62368-1, BS EN62368-1 (Report) Design refer to UL62368-1, EN60335-1, EN61558-1			
Safety Class			CLASS I			
MTBF	MIL-HDBK-217F@25℃		≥300,000 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 must be coated with thermal grease; 3. The product must be tightly attached to the aluminum plate.

Mechanical Specifications

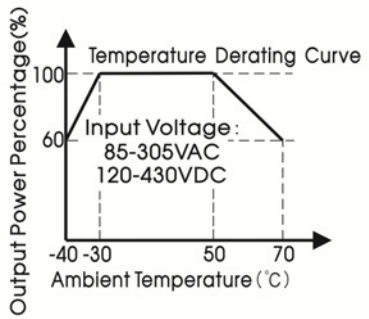
Case Material	Metal (AL6063, SGCC)
Dimensions	194.00mm x 55.00mm x 26.00mm
Weight	430g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

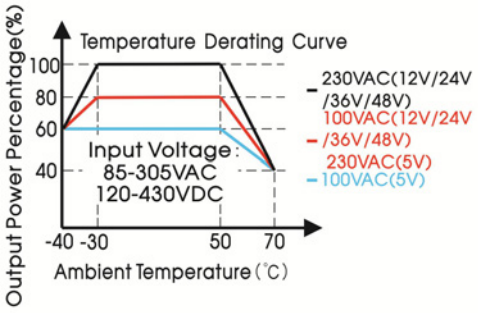
Emissions	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 CLASS B	
	Harmonic current	IEC/EN61000-3-2 CLASS A, CLASS C and CLASS D	
Immunity	ESD	IEC/EN 61000-4-2 Contact ±6KV/Air ±8KV	perf. Criteria A
	RS	IEC/EN 61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4 ±4KV	perf. Criteria A
	Surge	IEC/EN 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
	Intercom interference test	MS-SOP-DQC-007	perf. Criteria B

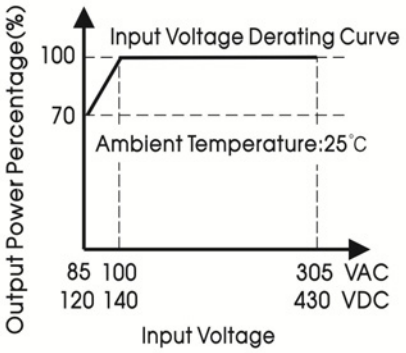
Product Characteristic Curve

With aluminum plate



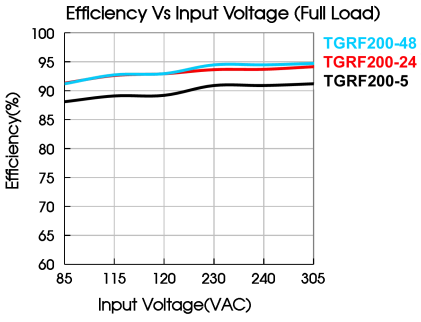
Without aluminum plate

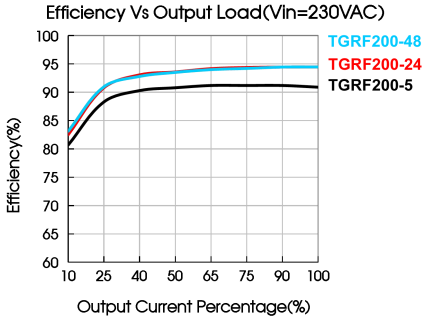




Note: 1. With an AC input voltage between 85 -100VAC and a DC input between 120-140VDC the output power must be derated as per the temperature derating curves;

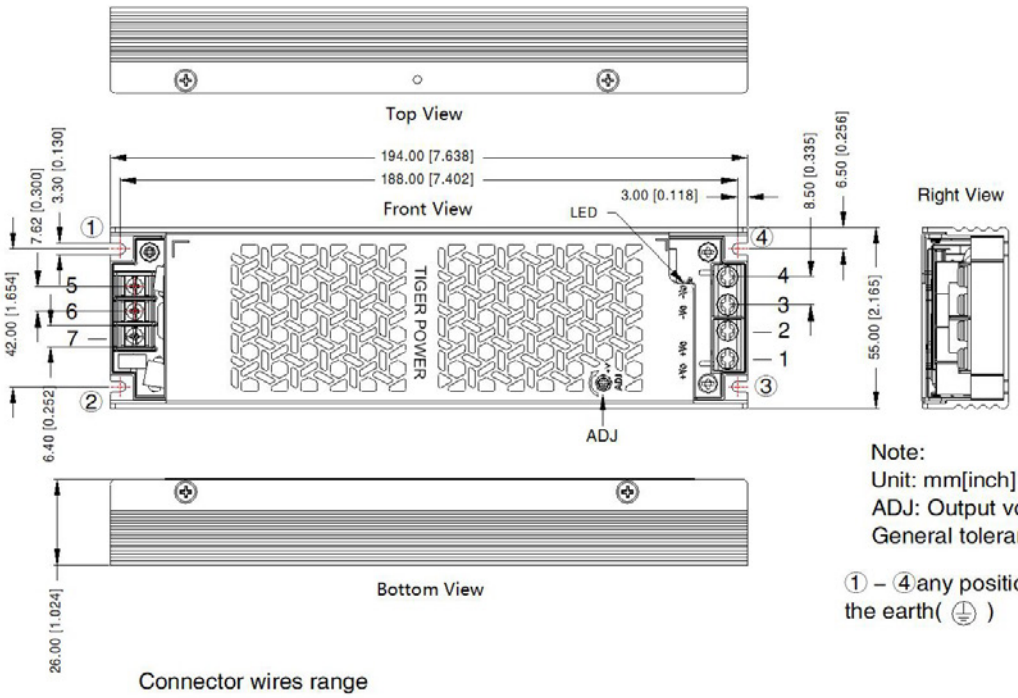
2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.





Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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

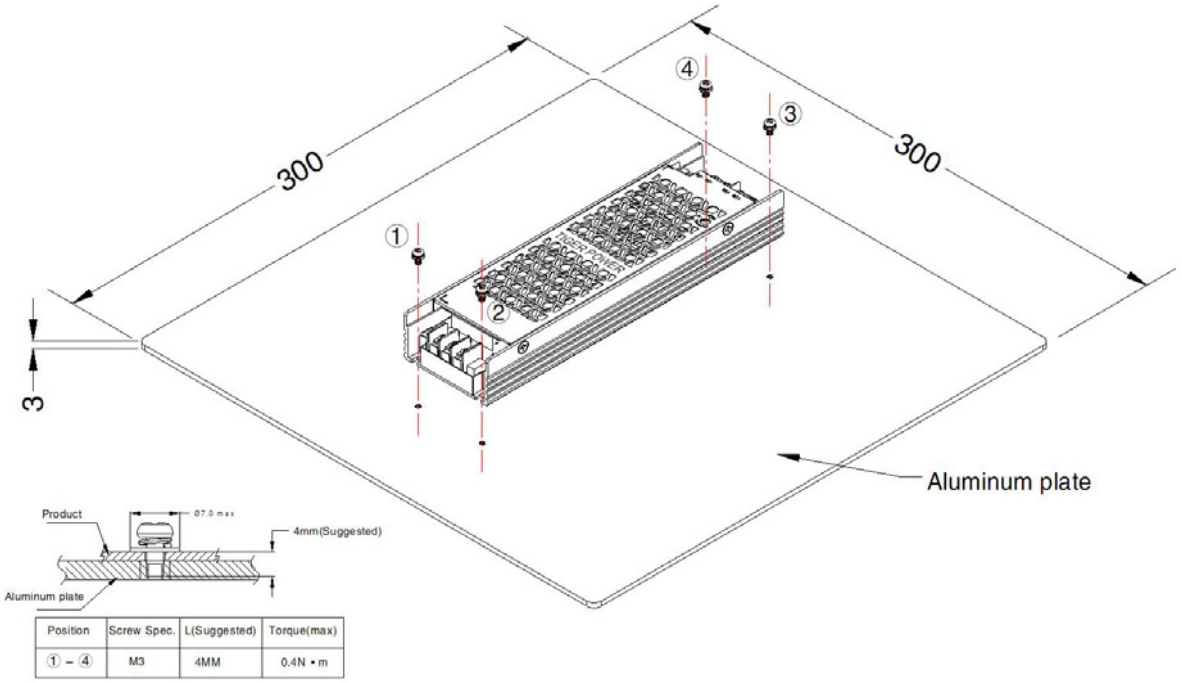
Note:
Unit: mm[inch]
ADJ: Output voltage adjustable resistor
General tolerances: ± 1.00[± 0.039]

① – ④any position must be connected to the earth(⏚)

Connector wires range

Pro. No	Input connector	Output connector (single wire)	Output connector (double wires)	Output connector (double wires) Pic.
5V	22–14AWG	No suggested	14–12AWG	–Vo double wires +Vo double wires
12V		14–12AWG	18–12AWG	
24/36/48V		18–12AWG	20–12AWG	
Screw/torque	M3.0, Max 0.5N・m	M3.5, Max 0.8N・m		

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 x 5 combination screws, and the product must be firmly installed at the center of the aluminum plate.

Note:

1. **For additional information on Product Packaging please refer to Tiger Power Supplies**
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 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.**