250W AC/DC Switching Power Supply
Model: TN19-0250-XX-1 Series



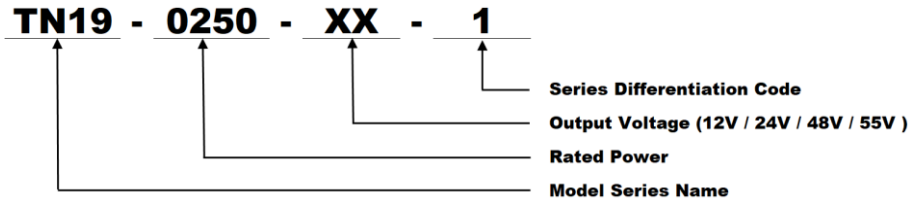
FEATURES

- Universal 90 - 264VAC.
- Operating ambient temperature range: -40°C to +70°C.
- Built-in active PFC function.
- Output short circuit, over-current, over-voltage protection, over-temperature protection.
- 140W with conduction cooling, 250W with forced air cooling.
- High efficiency up to 94.5%.
- Supports 375W peak load for 0.2 seconds
- High power density, compact size: 2"x4"x1.063" (above PCB).
- Safety according to IEC 62368-1.

Models & Ratings

Model No.	Cooling Method	Output Power (W)	Output Voltage (V)	Output Current (A)	Efficiency (%) Typ.
TN19-0250-12-1	Convention Cooling	140	12	11.67	92.5
	Forced Air Cooling	250	12	20.84	
TN19-0250-24-1	Convention Cooling	140	24	5.83	93.5
	Forced Air Cooling	250	24	10.42	
TN19-0250-48-1	Convention Cooling	140	48	2.92	94.5
	Forced Air Cooling	250	48	5.21	
TN19-0250-55-1	Convention Cooling	140	55	2.55	94.5
	Forced Air Cooling	250	55	4.55	

Model No.



Efficiency

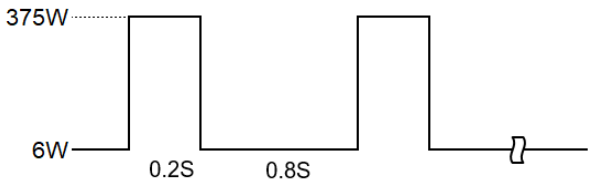
Efficiency is measured at 50% load, 230VAC input, 25°C ambient temperature, after a 20-minute warm-up.

Forced Air Cooling

Additional fan cooling is required, with an airflow rate of 13 CFM min.

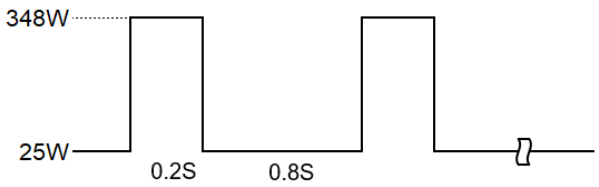
Peak Power 1

During peak-load testing, the transient deviation of the output voltage shall not exceed +5% / −20%.
The peak current test duration cannot be continuous; each test can only last for 3 cycles.
Under the conditions of an input voltage of 115Vac – 264 Vac and an ambient temperature of 25 °C.



Peak Power 2

During peak-load testing, the transient deviation of the output voltage shall not exceed +5% / −10%.
The peak current test duration cannot be continuous; each test can only last for 3 cycles.
Under the conditions of an input voltage of 115Vac – 264 Vac at an ambient temperature of 25 °C, with a 10,000 μF capacitive load.



Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		90	100 - 240	264	VAC
Input Frequency	-		47	50 - 60	63	Hz
Input Current	115VAC & Maximum load		-	-	3.5	Arms
Inrush Current	115VAC	At 25°C, Cold start	-	-	45	A peak
	230VAC		-	-	90	
Power Factor	115VAC & Maximum load		0.98	-	-	-
Leakage Current	264VAC		-	-	300	uA

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage	See Models and Ratings table		12	-	55	VDC
Output Accuracy	Not adjustable		-	±5	-	%
Minimum Load	-		0	-	-	A
Line Regulation	100% load		-	±1	-	%
Load Regulation	Output from 0 - 100% load (12V)		-	±2	-	%
	Output from 0 - 100% load (24V,48V,55V)			±1		%
Ripple & Noise	20MHz bandwidth	0°C < Ta < 70°C	-	-	1	%
Turn On Time	115VAC/60Hz Maximum load from input AC turn on		-	-	2	S
Rise Time	10% to 90% of output voltage		-	-	50	mS
Hold Up Time	75% Maximum load		10	-	-	mS
Short Circuit Protection	Output shut down and auto recovery		-	-	-	-
Over Temperature Protection	Output shut down and auto recovery		-	-	-	-
Over Current Protection	Output shut down and auto recovery (12V)		32	-	40	A
	Output shut down and auto recovery (24V)		16	-	20	A
	Output shut down and auto recovery (48V)		8	-	10	A
	Output shut down and auto recovery (55V)		7	-	9	A
Over Voltage Protection	Output shut down and auto recovery (12V, 24V)		-	-	130	%
	Output shut down and auto recovery (48V)				60	V
	Output shut down and auto recovery (55V)		-	-	65	V

Ripple & Noise :

Please refer to Fig. A for measurement of Vo, line & load regulation and ripple voltage, ripple and noise is the maximum peak-to-peak voltage value measured at the output with 20MHz bandwidth, at rated line voltage and output load, and with a 47µF electrolytic capacitor in parallel with a 0.1µF ceramic capacitor.

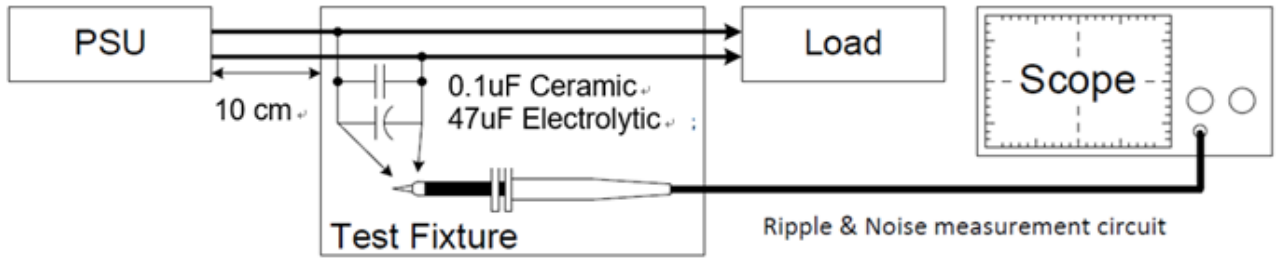


Fig. A

Hold-up Time

Hold-up time is measured until the output voltage drops to 90%, under the following conditions:
10ms (minimum) at 75% Maximum load and ambient temperature 25°C.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Operating Temperature	Refer to power de-rating curve		-40	-	+70	°C
Storage Temperature	Non-operation		-40	-	+85	
Operating Humidity	Non-condensing		20	-	90	%
Storage Humidity			5	-	95	
Power De-rating	Conduction cooling 140W	+40°C to +50°C	0.892	-	-	%/°C
		+50°C to +70°C	2.35	-	-	
	Forced Air Cooling 250W	+50°C to +70°C	2.5	-	-	
	90VAC ~ 115VAC		0.8	-	-	%/VAC
Altitude	Operating altitude		-	-	5000	meter
Dielectric Strength Test	Input – Output		3,000	-	-	VDC
	Input – FG		1,800	-	-	VDC
	Output – FG		500	-	-	VDC
Insulation Resistance	Input – Output	25±5°C, 70% RH, non-condensing testing voltage 500VDC.	20			MΩ
	Input – FG		20			
	Output – FG		20			
Mean Time Between Failure	At 230VAC/50Hz, 100% load, 25°C, Telcordia SR332, issue 4.		300,000	-	-	Hrs.
Vibration	Operating：0.5G, 5 - 500Hz, 10 min/cycle, 30 min each axis (X, Y, Z)					
Shock	Non-operating (package)：20G, 11 ms, 1 shock per direction per axis (X, Y, Z)					

Operating Temperature

Starts at 100Vac or above with a 50% load within the temperature range of -40°C to 0°C. Continuous operation under these conditions is subject to the limitations defined in the "temperature de-rating curve".
Some specifications may not be met below 0°C.

Temperature de-rating curve

Forced-cooled ≧ 13 CFM: de-rate linearly from 250W at +50°C to 125W at +70°C.

Conduction -cooled: de-rate linearly from 140W at +40 °C, to 127.5W at +50 °C, and to 75W at +70 °C.

Power De-rating

Input voltage de-rating curve, refer to Fig. C
Input voltage de-rate from 100% load at 115Vac to 80% load at 90Vac .

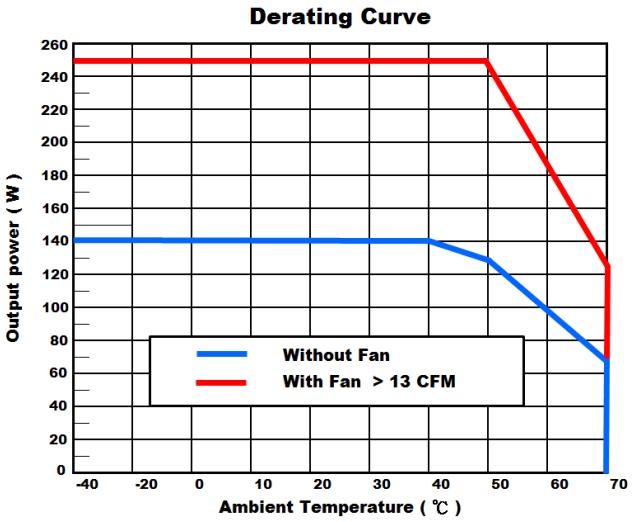


Fig. B

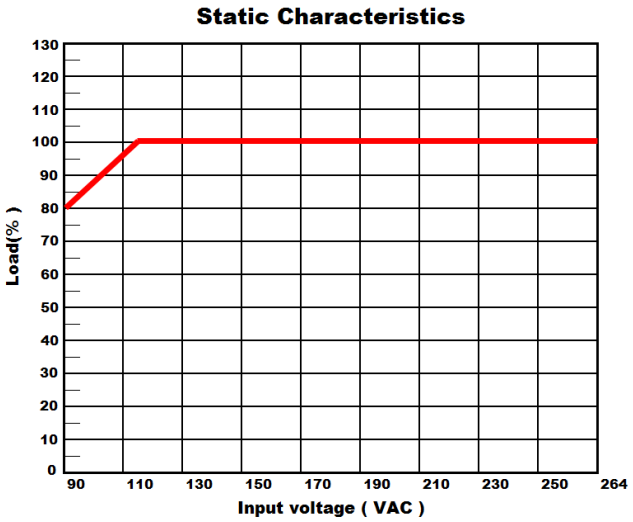


Fig. C

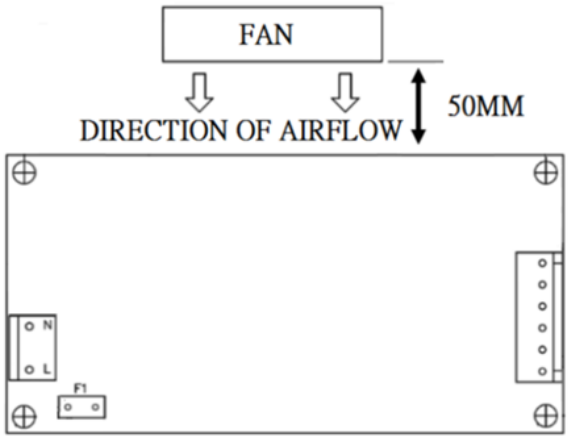
Altitude

For every 305 meters of altitude increase, the operating ambient temperature needs to be decreased by 1°C.

Notes

All specifications typical at 230Vac, 100% load 25 °C, unless otherwise noted.

Cooling Requirements – Forced Air Setup



Safety Approvals

Safety Standard	All models	UL/cUL UL 62368-1, 3rd Edition CB IEC 62368-1, 3rd Edition
Safety Class	-	Class II

Electromagnetic Compatibility (EMC)

Emissions	CE	EN55032 (CISPR32) Class B	
	RE	EN55032 (CISPR32) Class B	
	Harmonic Current	IEC/EN61000-3-2 Class D	
	Flicker	IEC/EN61000-3-3	
Immunity	ESD	IEC61000-4-2, level 4, Contact +/- 8KV; Air discharge +/- 15KV	Criteria A
	RS	IEC61000-4-3, level 3, 10V/m	Criteria A
	EFT	IEC61000-4-4, level 3, +/- 2KV	Criteria A
	Surge	IEC61000-4-5, level 3, Line to Line +/-1KV; Line to Earth +/- 2KV	Criteria A
	CS	IEC61000-4-6, level 2	Criteria A
	PFMF	IEC61000-4-8, level 1	Criteria A
	DIP	IEC61000-4-11	Criteria B

EMI

With an external ferrite core (T20.5×10×10.2, material K5B) applied to the AC input L & N cable with 5 turns, the product complies with EN55032 Class B limits; without the external core, it complies with Class A.

The power supply should be considered a part of the system component. All EMC tests conducted with the unit installed in a metal enclosure dummy system. The power supply needs to be confirmed for electromagnetic compatibility in conjunction with the terminal equipment.

Dimensions and Recommended Layout

Item	Value	Unit
Weight (Typ.)	192	g
Size (L x W x H)	101.6 x 50.8 x 27 (above PCB)	mm

Outline Drawing: (Unit: mm, Tolerance: ±1.0 mm)

