Anex

Deepcool PN1000M

Lab ID#: DC10002419
Receipt Date: Mar 29, 2024
Test Date: Apr 17, 2024

Report: 24PS2419A
Report Date: Apr 18, 2024

DUT INFORMATION

Brand	Deepcool
Manufacturer (OEM)	CWT
Series	PN-M
Model Number	PNA00M-FC
Serial Number	2024000024
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	13-6.5
Rated Frequency (Hz)	50-60
Rated Power (W)	1000
Type	ATX12V
Cooling	135mm Fluid Dynamic Bearing (HA13525H12SF-Z)
Semi-Passive Operation	✗
Cable Design	Fully Modular

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, APM SP300VAC4000W-P
Power Analyzers	RS HMC8015, N4L PPA1530, N4L PPA5530
Oscilloscopes	Picoscope 4444, Rigol DS7014, Siglent SDS2104X PLUS
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Temperature Logger	Picoscope TC-08
Tachometer	UNI-T UT372
Multimeters	Keysight 34465A, Keithley 2015 - THD
UPS	FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA
Isolation Transformer	4kVA

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.1 PSU Power Excursion	✓

115V

Average Efficiency	88.339%
Efficiency With 10W (≤500W) or 2% (>500W)	74.575
Average Efficiency 5VSB	77.441%
Standby Power Consumption (W)	0.0157000
Average PF	0.984
Avg Noise Output	24.12 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A

230V

Average Efficiency	90.551%
Average Efficiency 5VSB	77.421%
Standby Power Consumption (W)	0.0827000
Average PF	0.957
Avg Noise Output	24.00 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	83.3	3	0.3
	Watts	120		999.6	15	3.6
Total Max. Power (W)		1000				

HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	18.7
AC Loss to PWR_OK Hold Up Time (ms)	16.5
PWR_OK Inactive to DC Loss Delay (ms)	2.2

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (540mm)	1	1	18AWG	No
4+4 pin EPS12V (700mm)	2	2	16AWG	No
6+2 pin PCIe (550mm)	3	3	16AWG	No
12+4 pin PCIe (600mm) (600W)	1	1	16-24AWG	No
SATA (450mm+120mm+120mm+120mm) / 4-pin Molex (+120mm)	2	8 / 2	18AWG	No

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General Data	
Manufacturer (OEM)	CWT
Platform	CSZ
PCB Type	Double-Sided
Primary Side	
Transient Filter	4x Y caps, 1x X caps, 2x CM chokes, 1x MOV
Inrush Protection	1x NTC Thermistor SCK-207R0 (7 Ohm @25°C) & Relay
Bridge Rectifier(s)	2x GBJ2510 (1000V , 25A @ 100°C)
APFC MOSFETs	2x Infineon IPW60R099P6 (650V, 24A @ 100°C, Rds(on): 0.099Ohm)
APFC Boost Diode	1x OnSemi FFSP1065(650V, 10A @ 152°C)
Bulk Cap(s)	1x Rubycon (420V, 820uF , 2000h @ 105°C, MXE)
Main Switchers	2x Infineon IPA60R125P6 (600V, 19A @ 100°C, Rds(on): 0.125Ohm)
APFC Controller	Champion 6500UNX & 1x Sync Power SPN5003 (No load consumption FET)
Resonant Controller	Champion CM6901X
Topology	Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETs	8x On Semiconductor NTMFS5C430N (40V, 131A @ 100°C, Rds(on): 1.7mOhm)
5V & 3.3V	DC-DC Converters: 2x UBIQ QM3054M6 (30V, 61A @ 100°C, Rds(on): 4.8mOhm) & 2x UBIQ QN3107M6N (30V, 70A @ 100°C, Rds(on): 2.6mOhm) PWM Controller(s): uPI-Semi uP3861P
Filtering Capacitors	Electrolytic: 8x Chengx (6-10000 @ 105°C, GR), 1x Elite (2,000 @ 105°C, PF) Polymer: 15x Apaq , 9x Elite ,2x
Supervisor IC	Weltrend WT7502 (OVD ,PGO, UVD,)
Fan Model	Hong Hua HA13525H12SF-Z (135mm, 12V, 0.5A, Fluid Dynamic Bearing Fan)
5VSB Circuit	
High Side Rectifier	Chongqing-Pingwei-Tech R1MF (700V, 1A @ 90°C)
Standby PWM Controller	On-Bright OB2365T

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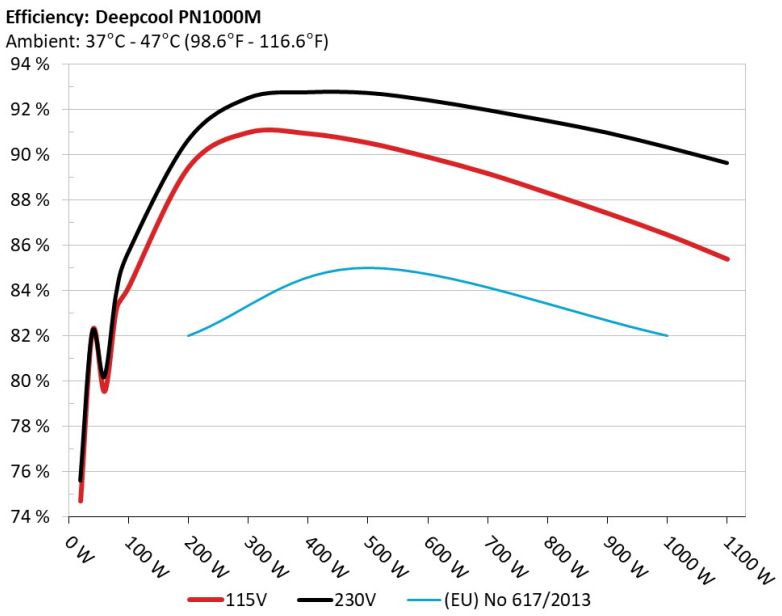
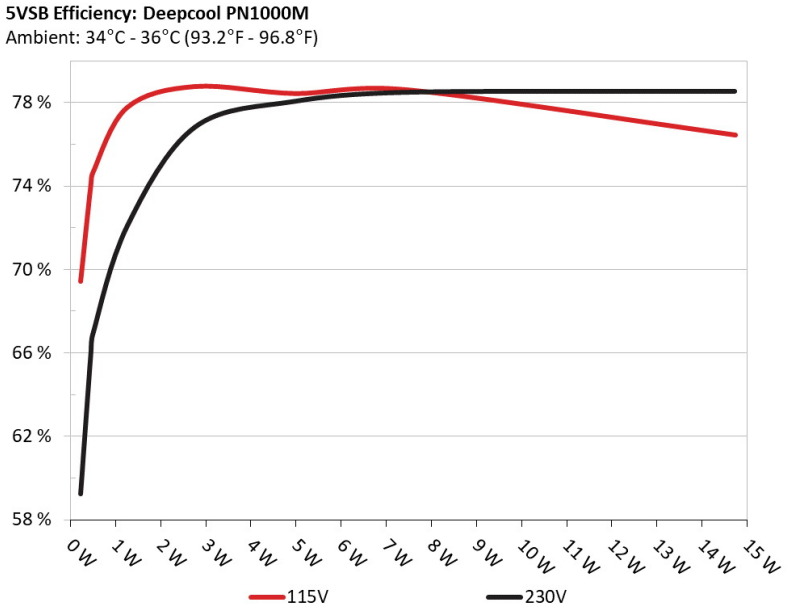
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



INFO

The PSU`s efficiency under high ambient temperatures with 115V and 230V input. For this graph the results of the 10-110% load regulation table are used

5VSB EFFICIENCY



INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

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5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.227W	69.432%	0.032
	5.036V	0.327W		114.87V
2	0.09A	0.453W	74.073%	0.06
	5.037V	0.612W		114.87V
3	0.55A	2.76W	78.788%	0.272
	5.017V	3.503W		114.87V
4	1A	4.998W	78.449%	0.378
	4.998V	6.371W		114.87V
5	1.5A	7.465W	78.628%	0.426
	4.976V	9.494W		114.87V
6	3A	14.733W	76.459%	0.505
	4.911V	19.268W		114.86V

5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.227W	59.232%	0.011
	5.036V	0.384W		229.94V
2	0.09A	0.453W	65.948%	0.02
	5.036V	0.687W		229.94V
3	0.55A	2.759W	76.822%	0.102
	5.017V	3.591W		229.94V
4	1A	4.997W	78.069%	0.17
	4.997V	6.401W		229.93V
5	1.5A	7.463W	78.495%	0.231
	4.975V	9.508W		229.94V
6	3A	14.729W	78.544%	0.328
	4.909V	18.754W		229.94V

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115V

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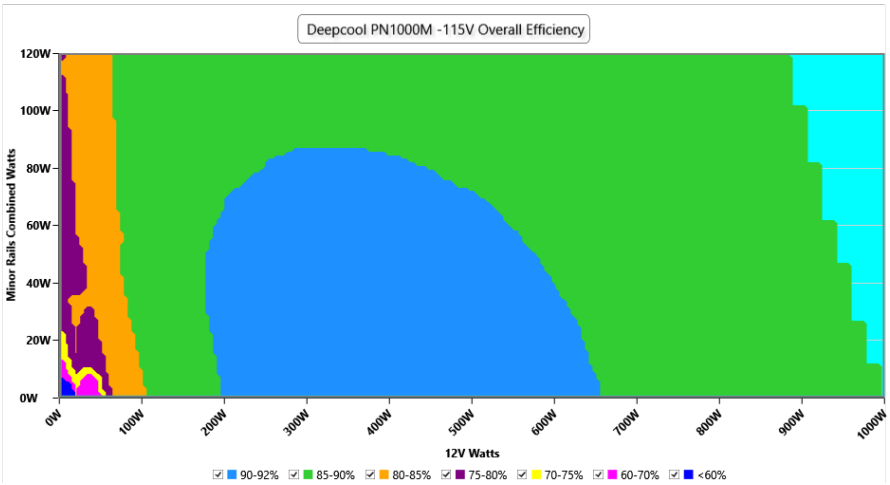
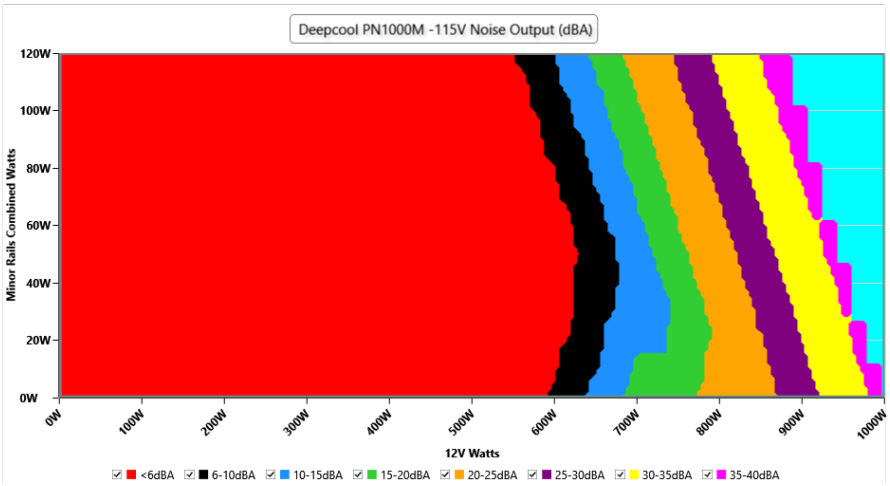
EFFICIENCY GRAPH 115V



INFO

This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations

NOISE GRAPH 115V



INFO

The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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VAMPIRE POWER -115V

Detailed Results

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	115.06 V	115.02 V	113.85 V	115.09 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.01 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.416	1.415	1.340	1.418	1.490	PASS
Mains Voltage THD:	0.13 %	0.09 %	N/A	0.19 %	2.00 %	PASS
Real Power:	0.016 W	0.011 W	N/A	0.020 W	N/A	N/A
Apparent Power:	9.934 W	9.894 W	N/A	9.988 W	N/A	N/A
Power Factor:	0.001	N/A	N/A	N/A	N/A	N/A

INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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10-110% LOAD TESTS 115V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
10%	6.447A	1.98A	1.971A	1.004A	99.983	84.135%	404	<6.0	40.47°C	0.971
	12.159V	5.05V	3.348V	4.979V	118.835				44.67°C	114.83V
20%	13.908A	2.973A	2.96A	1.209A	199.925	89.429%	405	<6.0	40.67°C	0.982
	12.153V	5.045V	3.344V	4.962V	223.556				45.17°C	114.81V
30%	21.753A	3.471A	3.457A	1.41A	299.97	90.98%	407	<6.0	41.63°C	0.982
	12.133V	5.042V	3.341V	4.964V	329.706				46.63°C	114.77V
40%	29.573A	3.97A	3.954A	1.614A	399.456	90.934%	407	<6.0	41.85°C	0.982
	12.114V	5.038V	3.338V	4.957V	439.281				47.42°C	114.74V
50%	37.097A	4.967A	4.949A	1.821A	499.193	90.527%	407	<6.0	42.36°C	0.984
	12.095V	5.033V	3.334V	4.941V	551.427				48.45°C	114.7V
60%	44.709A	5.967A	5.946A	2A	599.571	89.898%	449	<6.0	42.8°C	0.987
	12.076V	5.028V	3.33V	4.926V	666.951				49.31°C	114.67V
70%	52.284A	6.969A	6.946A	2.241A	699.464	89.173%	717	14.7	43.32°C	0.989
	12.056V	5.023V	3.326V	4.908V	784.385				50.35°C	114.63V
80%	59.956A	7.97A	7.948A	2.349A	799.471	88.315%	933	23.5	43.9°C	0.99
	12.035V	5.018V	3.321V	4.896V	905.246				52.02°C	114.59V
90%	67.968A	8.474A	8.439A	2.457A	899.267	87.419%	1267	34.8	44.67°C	0.991
	12.018V	5.015V	3.317V	4.884V	1028.674				53.82°C	114.56V
100%	75.736A	8.979A	8.963A	3.094A	999.277	86.468%	1665	41.1	45.85°C	0.992
	12.010V	5.011V	3.313V	4.848V	1155.663				56.04°C	114.51V
110%	83.447A	9.987A	10.063A	3.099A	1099.891	85.387%	2076	47.8	46.78°C	0.993
	12.003V	5.007V	3.309V	4.84V	1288.124				57.68°C	114.47V
CL1	0.114A	14.402A	14.312A	0A	121.29	80.372%	409	<6.0	40.83°C	0.982
	12.159V	5.013V	3.333V	5.009V	150.911				53.13°C	114.82V
CL2	0.114A	22.009A	0A	0A	111.314	77.84%	408	<6.0	40.81°C	0.982
	12.167V	4.995V	3.35V	5.016V	143.005				50.37°C	114.83V
CL3	0.114A	0A	21.823A	0A	73.98	72.534%	407	<6.0	40.27°C	0.972
	12.164V	5.031V	3.327V	5.013V	101.993				47.29°C	114.84V
CL4	83.227A	0A	0A	0A	999.861	87.326%	1582	40.7	45.52°C	0.992
	12.014V	5.03V	3.327V	4.997V	1144.987				54.71°C	114.52V

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20-80W LOAD TESTS 115V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
20W	1.222A	0.494A	0.493A	0.199A	19.996	74.704%	399	<6.0	36.75°C	0.883
	12.150V	5.056V	3.35V	5.024V	26.768				39.82°C	114.87V
40W	2.688A	0.692A	0.69A	0.299A	39.999	82.229%	401	<6.0	37.5°C	0.947
	12.158V	5.055V	3.35V	5.017V	48.644				40.85°C	114.86V
60W	4.155A	0.89A	0.886A	0.399A	59.997	79.544%	402	<6.0	38.32°C	0.958
	12.160V	5.054V	3.35V	5.011V	75.429				42.04°C	114.85V
80W	5.617A	1.089A	1.084A	0.5A	79.934	83.208%	403	<6.0	39.85°C	0.97
	12.160V	5.053V	3.35V	5.005V	96.068				43.84°C	114.84V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	14.08mV	13.14mV	12.10mV	8.00mV	Pass
20% Load	13.04mV	12.83mV	13.29mV	8.78mV	Pass
30% Load	16.62mV	13.14mV	12.52mV	9.91mV	Pass
40% Load	16.35mV	14.22mV	13.86mV	11.51mV	Pass
50% Load	16.50mV	20.55mV	14.84mV	10.89mV	Pass
60% Load	16.81mV	22.41mV	15.15mV	12.59mV	Pass
70% Load	18.30mV	17.11mV	14.69mV	12.65mV	Pass
80% Load	20.42mV	17.52mV	15.41mV	14.30mV	Pass
90% Load	21.09mV	19.11mV	15.98mV	16.88mV	Pass
100% Load	30.62mV	21.14mV	16.95mV	19.66mV	Pass
110% Load	31.33mV	22.84mV	18.25mV	20.57mV	Pass
Crossload1	14.76mV	15.44mV	15.48mV	10.10mV	Pass
Crossload2	16.24mV	22.25mV	12.05mV	9.55mV	Pass
Crossload3	16.14mV	13.24mV	18.56mV	9.96mV	Pass
Crossload4	28.76mV	19.31mV	16.64mV	12.41mV	Pass

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230V

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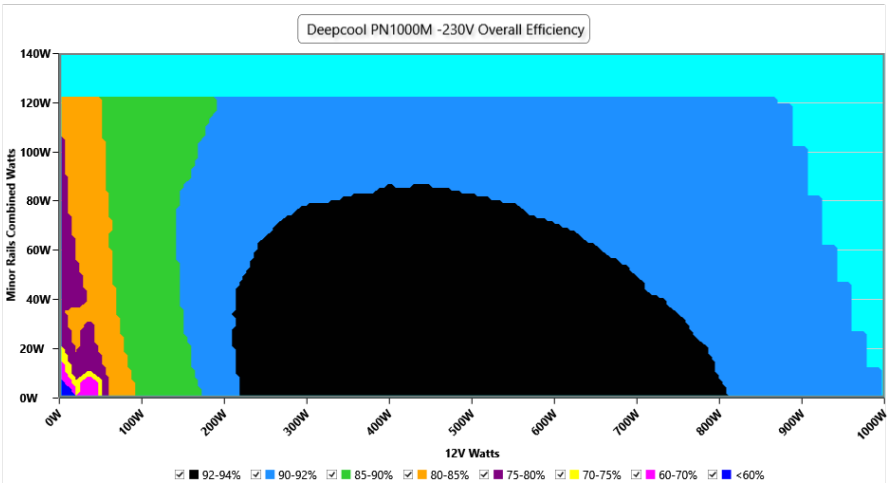
EFFICIENCY GRAPH 230V



INFO

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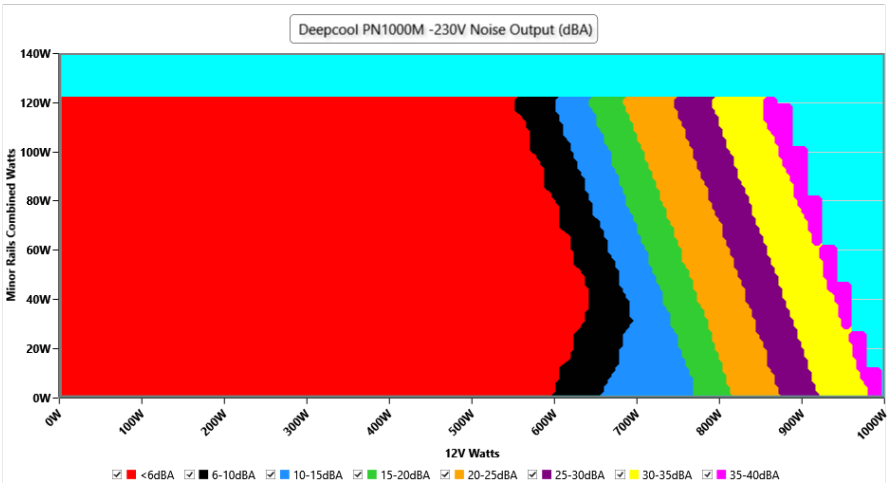
NOISE GRAPH 230V



INFO

The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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VAMPIRE POWER -230V

Detailed Results

	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	231.00 V	230.88 V	227.70 V	231.05 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	49.99 Hz	49.50 Hz	50.01 Hz	50.50 Hz	PASS
Mains Voltage CF:	1.417	1.416	1.340	1.419	1.490	PASS
Mains Voltage THD:	0.17 %	0.14 %	N/A	0.26 %	2.00 %	PASS
Real Power:	0.083 W	0.071 W	N/A	0.117 W	N/A	N/A
Apparent Power:	33.814 W	33.586 W	N/A	34.000 W	N/A	N/A
Power Factor:	0.002	N/A	N/A	N/A	N/A	N/A

INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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10-110% LOAD TESTS 230V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
10%	6.447A	1.981A	1.971A	1.004A	99.992	85.295%	406	<6.0	40.13°C	0.881
	12.159V	5.048V	3.348V	4.979V	117.229				44.39°C	229.93V
20%	13.910A	2.974A	2.961A	1.209A	199.946	90.647%	406	<6.0	40.59°C	0.938
	12.153V	5.044V	3.343V	4.962V	220.573				45.13°C	229.91V
30%	21.759A	3.472A	3.458A	1.411A	299.994	92.512%	406	<6.0	41.34°C	0.957
	12.131V	5.041V	3.34V	4.961V	324.277				46.4°C	229.9V
40%	29.586A	3.971A	3.956A	1.614A	399.549	92.767%	407	<6.0	41.74°C	0.965
	12.112V	5.037V	3.337V	4.957V	430.703				47.27°C	229.88V
50%	37.112A	4.969A	4.951A	1.822A	499.282	92.738%	407	<6.0	42.08°C	0.971
	12.092V	5.032V	3.333V	4.942V	538.376				48.16°C	229.86V
60%	44.726A	5.969A	5.948A	2A	599.664	92.421%	409	<6.0	42.64°C	0.974
	12.073V	5.027V	3.329V	4.926V	648.837				49.22°C	229.84V
70%	52.301A	6.972A	6.948A	2.242A	699.552	91.984%	676	12.7	43.23°C	0.977
	12.054V	5.022V	3.325V	4.908V	760.512				50.29°C	229.83V
80%	59.972A	7.973A	7.95A	2.349A	799.557	91.505%	921	23.1	43.95°C	0.978
	12.033V	5.017V	3.32V	4.896V	873.783				52.04°C	229.81V
90%	67.984A	8.478A	8.443A	2.458A	899.349	90.982%	1228	32.9	44.7°C	0.979
	12.016V	5.013V	3.316V	4.884V	988.488				53.76°C	229.8V
100%	75.759A	8.983A	8.967A	3.095A	999.364	90.34%	1645	40.5	45.96°C	0.98
	12.008V	5.01V	3.312V	4.847V	1106.227				56.04°C	229.78V
110%	83.471A	9.991A	10.068A	3.101A	1099.964	89.637%	2041	48.4	46.67°C	0.982
	12.000V	5.005V	3.307V	4.839V	1227.13				57.58°C	229.76V
CL1	0.116A	14.408A	14.317A	0A	121.305	81.049%	413	<6.0	40.67°C	0.912
	12.158V	5.011V	3.331V	5.009V	149.67				50.6°C	229.93V
CL2	0.115A	22.019A	0A	0A	111.335	78.355%	412	<6.0	41.44°C	0.907
	12.167V	4.993V	3.349V	5.015V	142.095				51.44°C	229.92V
CL3	0.114A	0A	21.831A	0A	73.985	73.373%	411	<6.0	40.47°C	0.861
	12.163V	5.03V	3.325V	5.013V	100.837				50.35°C	229.93V
CL4	83.243A	0A	0A	0A	999.937	91.106%	1566	40.4	45.77°C	0.98
	12.012V	5.029V	3.326V	4.996V	1097.556				55.19°C	229.77V

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Deepcool PN1000M

20-80W LOAD TESTS 230V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
20W	1.222A	0.494A	0.493A	0.199A	19.994	75.584%	397	<6.0	36.72°C	0.506
	12.146V	5.056V	3.348V	5.025V	26.45				39.82°C	229.96V
40W	2.690A	0.692A	0.69A	0.299A	39.995	82.151%	399	<6.0	37.28°C	0.703
	12.154V	5.055V	3.348V	5.018V	48.688				40.57°C	229.95V
60W	4.156A	0.89A	0.887A	0.399A	59.996	80.166%	402	<6.0	38.35°C	0.808
	12.158V	5.053V	3.349V	5.011V	74.843				41.8°C	229.94V
80W	5.618A	1.089A	1.084A	0.5A	79.938	83.856%	404	<6.0	39.2°C	0.848
	12.159V	5.052V	3.349V	5.005V	95.328				42.88°C	229.93V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	14.18mV	12.98mV	13.24mV	8.47mV	Pass
20% Load	13.04mV	11.23mV	11.90mV	8.15mV	Pass
30% Load	17.18mV	14.01mV	13.08mV	9.70mV	Pass
40% Load	16.86mV	16.49mV	12.88mV	9.91mV	Pass
50% Load	17.12mV	21.33mV	14.01mV	9.96mV	Pass
60% Load	17.53mV	23.85mV	14.74mV	10.63mV	Pass
70% Load	18.61mV	16.28mV	14.74mV	11.20mV	Pass
80% Load	19.08mV	17.93mV	16.08mV	12.18mV	Pass
90% Load	20.67mV	19.53mV	17.12mV	12.75mV	Pass
100% Load	31.57mV	21.22mV	17.77mV	16.37mV	Pass
110% Load	32.40mV	23.23mV	20.02mV	18.18mV	Pass
Crossload1	15.27mV	16.26mV	15.68mV	10.03mV	Pass
Crossload2	16.39mV	23.18mV	11.94mV	9.70mV	Pass
Crossload3	15.88mV	13.75mV	19.29mV	9.39mV	Pass
Crossload4	31.11mV	19.12mV	15.85mV	11.92mV	Pass

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Deepcool PN1000M

Top side

Power specifications label

CERTIFICATIONS 115V

CERTIFICATIONS 230V

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