EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

be quiet! Pure Power 12 M 1000W

Lab ID#: BQ10002159
Receipt Date: Feb 17, 2023
Test Date: Mar 24, 2023

Report: 23PS2159A
Report Date: Mar 30, 2023

DUT INFORMATION

Brand	be quiet!
Manufacturer (OEM)	HEC
Series	Pure Power 12 M
Model Number	L12-M-1000W
Serial Number	345H2489000008
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	12-6
Rated Frequency (Hz)	50-60
Rated Power (W)	1000
Type	ATX12V
Cooling	120mm Rifle Bearing Fan (BQ QF2-12025-HS)
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 v3.0 PSU Power Excursion	✓

115V

Average Efficiency	89.674%
Efficiency With 10W (≤500W) or 2% (>500W)	78.400
Average Efficiency 5VSB	80.629%
Standby Power Consumption (W)	0.0552000
Average PF	0.983
Avg Noise Output	30.47 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

230V

Average Efficiency	91.506%
Average Efficiency 5VSB	80.284%
Standby Power Consumption (W)	0.0955000
Average PF	0.955
Avg Noise Output	30.91 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

POWER SPECIFICATIONS

Rail		3.3V	5V	12V(1)	12V(2)	5VSB	-12V
Max. Power	Amps	22	22	46	42	3	0.3
	Watts	120		1000		15	3.6
Total Max. Power (W)		1000					

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

Hold-Up Time (ms)	20.1
AC Loss to PWR_OK Hold Up Time (ms)	17.3
PWR_OK Inactive to DC Loss Delay (ms)	2.8

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (550mm)	1	1	16-20AWG	No
4+4 pin EPS12V (600mm)	1	1	18AWG	No
8 pin EPS12V (600mm)	1	1	18AWG	No
6+2 pin PCIe (500mm+150mm)	2	4	16-18AWG	No
12+4 pin PCIe (600mm) (600W)	1	1	16-28AWG	No
SATA (500mm+150mm+150mm+150mm)	1	4	18AWG	No
SATA (500mm+150mm) / 4-pin Molex (+150mm+150mm)	1	2 / 2	18AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

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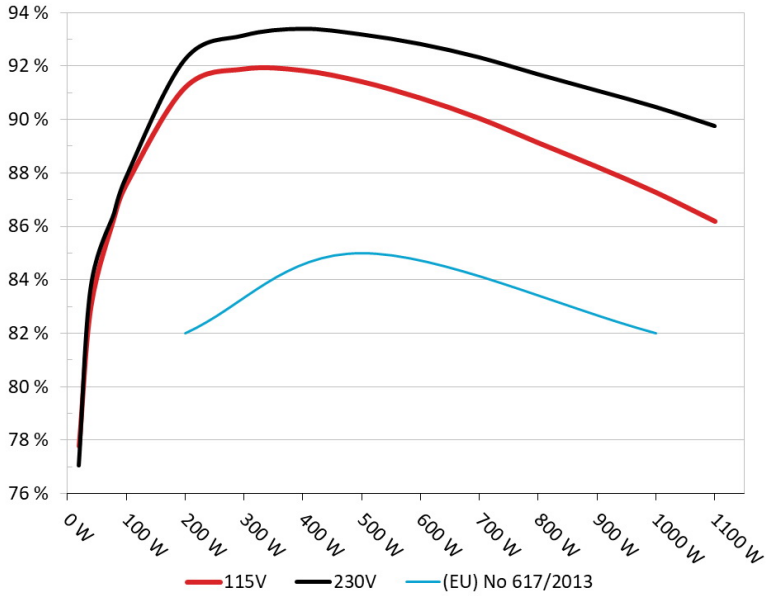
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: be quite! Pure Power 12 M 1000W
Ambient: 37°C - 47°C (98.6°F - 116.6°F)

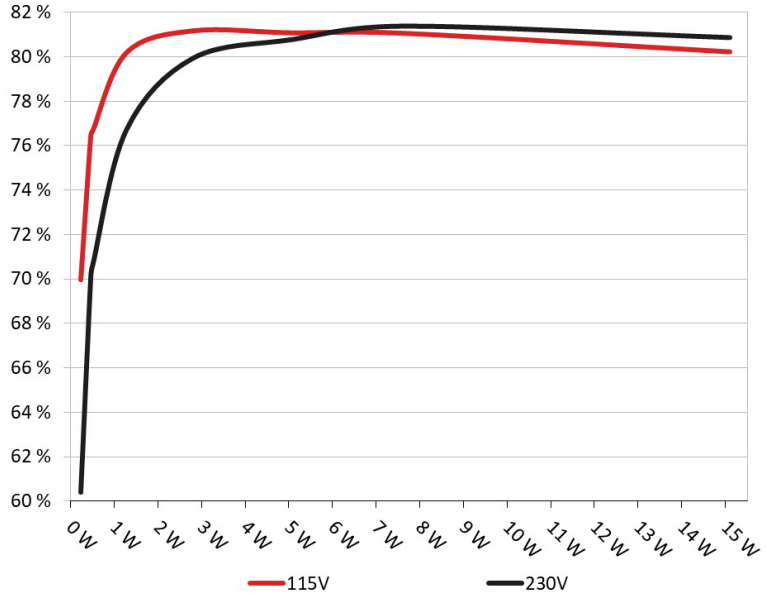


INFO

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

5VSB Efficiency: be quite! Pure Power 12 M 1000W
Ambient: 34°C - 36°C (93.2°F - 96.8°F)



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	0.23W	69.975%	0.03
	5.103V	0.329W		114.87V
2	0.09A	0.459W	76.457%	0.054
	5.102V	0.601W		114.87V
3	0.55A	2.8W	81.171%	0.25
	5.092V	3.449W		114.87V
4	1A	5.081W	81.077%	0.352
	5.081V	6.267W		114.86V
5	1.5A	7.605W	81.062%	0.405
	5.07V	9.381W		114.87V
6	3A	15.108W	80.224%	0.477
	5.036V	18.832W		114.86V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.23W	60.403%	0.01
	5.103V	0.382W		229.88V
2	0.09A	0.459W	70.127%	0.018
	5.102V	0.656W		229.88V
3	0.55A	2.8W	79.944%	0.091
	5.092V	3.503W		229.88V
4	1A	5.081W	80.788%	0.154
	5.081V	6.29W		229.88V
5	1.5A	7.605W	81.39%	0.209
	5.07V	9.345W		229.88V
6	3A	15.108W	80.874%	0.32
	5.036V	18.68W		229.88V

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115V

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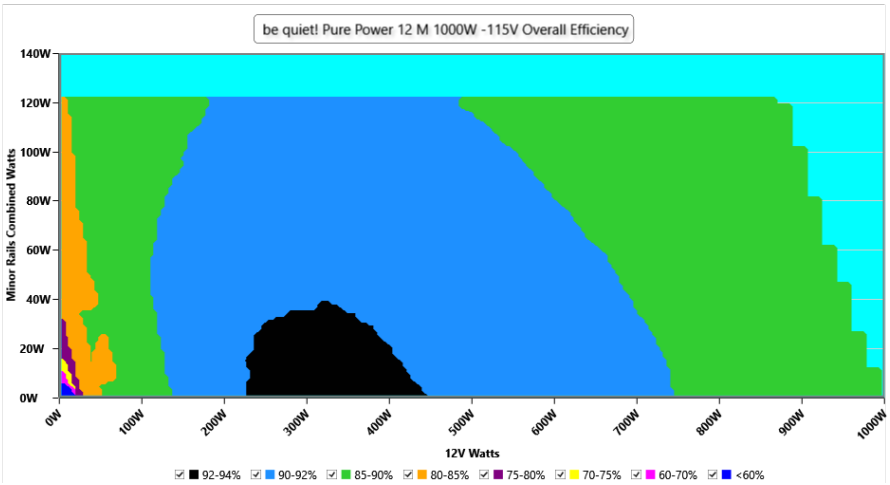
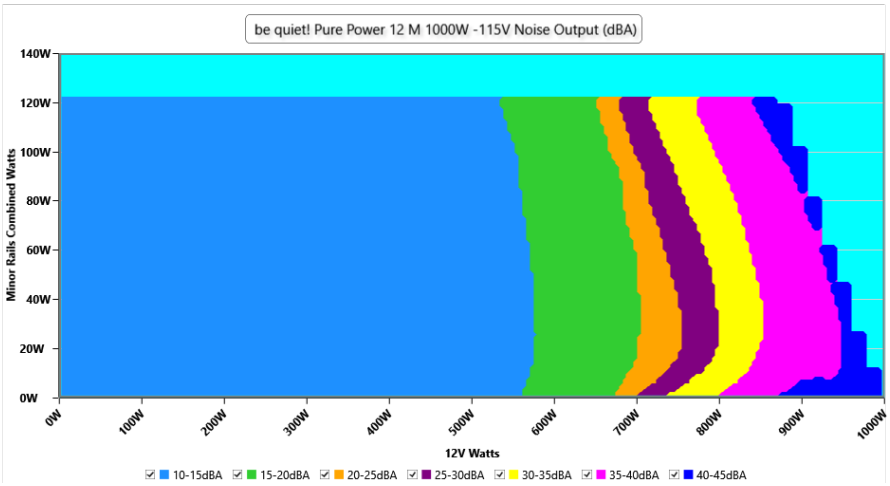
EFFICIENCY GRAPH 115V



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:	114.88 V	114.82 V	113.85 V	114.93 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.98 Hz	59.40 Hz	60.01 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.418	1.417	1.340	1.421	1.490	PASS
Mains Voltage THD:	0.15 %	0.09 %	N/A	0.27 %	2.00 %	PASS
Real Power:	0.055 W	0.033 W	N/A	0.080 W	N/A	N/A
Apparent Power:	11.136 W	11.104 W	N/A	11.170 W	N/A	N/A
Power Factor:	0.006	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%	6.470A	2.008A	2.008A	0.984A	99.963	87.549%	734	12.4	40.22°C	0.958
	12.113V	4.978V	3.285V	5.081V	114.181				44.45°C	114.84V
20%	13.989A	3.014A	3.016A	1.184A	199.899	91.181%	734	12.4	40.81°C	0.975
	12.081V	4.975V	3.282V	5.067V	219.231				45.51°C	114.8V
30%	21.874A	3.518A	3.521A	1.384A	299.934	91.875%	736	12.4	41.36°C	0.978
	12.064V	4.974V	3.28V	5.056V	326.462				46.39°C	114.77V
40%	29.726A	4.022A	4.027A	1.586A	399.385	91.818%	737	12.4	41.72°C	0.982
	12.049V	4.972V	3.278V	5.045V	434.974				47.21°C	114.74V
50%	37.278A	5.031A	5.038A	1.788A	499.129	91.404%	753	13.3	42.39°C	0.986
	12.035V	4.969V	3.275V	5.033V	546.074				48.41°C	114.7V
60%	44.916A	6.04A	6.052A	1.992A	599.681	90.785%	870	17.7	42.52°C	0.99
	12.020V	4.967V	3.272V	5.021V	660.551				49.18°C	114.67V
70%	52.511A	7.05A	7.067A	2.196A	699.435	90.031%	1216	28.4	43.18°C	0.992
	12.004V	4.964V	3.269V	5.009V	776.875				50.24°C	114.63V
80%	60.199A	8.001A	8.083A	2.3A	799.191	89.119%	1791	39.5	43.92°C	0.994
	11.986V	4.962V	3.266V	4.999V	896.772				52.05°C	114.6V
90%	68.242A	8.569A	8.58A	2.405A	899.291	88.219%	1886	41.3	44.5°C	0.995
	11.970V	4.96V	3.263V	4.99V	1019.396				53.58°C	114.55V
100%	76.105A	9.077A	9.109A	3.02A	999.339	87.261%	1883	41.2	45.66°C	0.996
	11.953V	4.958V	3.26V	4.968V	1145.231				55.69°C	115.04V
110%	83.924A	10.09A	10.223A	3.025A	1099.964	86.174%	1882	41.2	46.65°C	0.997
	11.935V	4.955V	3.257V	4.959V	1276.451				57.59°C	115.06V
CL1	0.114A	14.564A	14.572A	0A	121.301	84.078%	797	15.1	41.02°C	0.96
	12.119V	4.958V	3.273V	5.088V	144.272				46.56°C	115.93V
CL2	0.114A	22.205A	0A	0A	111.304	82.549%	766	14.0	41.34°C	0.964
	12.125V	4.95V	3.286V	5.096V	134.837				48.42°C	115.95V
CL3	0.114A	0A	22.189A	0A	73.982	76.456%	747	13.0	41.19°C	0.953
	12.124V	4.981V	3.272V	5.09V	96.766				50.27°C	115.97V
CL4	83.601A	0A	0A	0A	999.875	87.95%	1892	41.6	45.79°C	0.996
	11.960V	4.977V	3.273V	5.049V	1136.882				56.74°C	115.21V

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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	1.225A	0.501A	0.501A	0.196A	19.985	77.771%	729	12	36.53°C	0.827
	12.109V	4.984V	3.29V	5.099V	25.696				39.58°C	114.86V
40W	2.700A	0.702A	0.702A	0.294A	39.987	82.999%	728	12.1	37.35°C	0.912
	12.105V	4.982V	3.288V	5.097V	48.178				40.68°C	114.86V
60W	4.174A	0.903A	0.903A	0.392A	59.986	86.362%	728	12.1	38.02°C	0.941
	12.102V	4.981V	3.288V	5.094V	69.459				41.79°C	114.85V
80W	5.638A	1.104A	1.104A	0.491A	79.914	85.293%	733	12.2	39.07°C	0.952
	12.112V	4.98V	3.287V	5.094V	93.695				43.05°C	114.84V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.46mV	10.93mV	9.08mV	11.13mV	Pass
20% Load	18.67mV	11.50mV	9.13mV	11.44mV	Pass
30% Load	14.07mV	10.62mV	9.85mV	11.08mV	Pass
40% Load	13.81mV	11.39mV	9.75mV	11.29mV	Pass
50% Load	14.27mV	11.96mV	11.19mV	11.60mV	Pass
60% Load	14.32mV	11.91mV	11.24mV	12.73mV	Pass
70% Load	14.73mV	12.52mV	11.70mV	12.26mV	Pass
80% Load	15.39mV	11.80mV	12.82mV	12.47mV	Pass
90% Load	15.19mV	13.29mV	12.47mV	12.42mV	Pass
100% Load	22.03mV	14.76mV	14.59mV	16.09mV	Pass
110% Load	23.58mV	14.91mV	15.69mV	17.43mV	Pass
Crossload1	15.23mV	19.20mV	19.66mV	13.14mV	Pass
Crossload2	16.01mV	21.09mV	17.14mV	11.19mV	Pass
Crossload3	17.69mV	15.81mV	16.78mV	10.16mV	Pass
Crossload4	22.41mV	11.49mV	10.12mV	13.04mV	Pass

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230V

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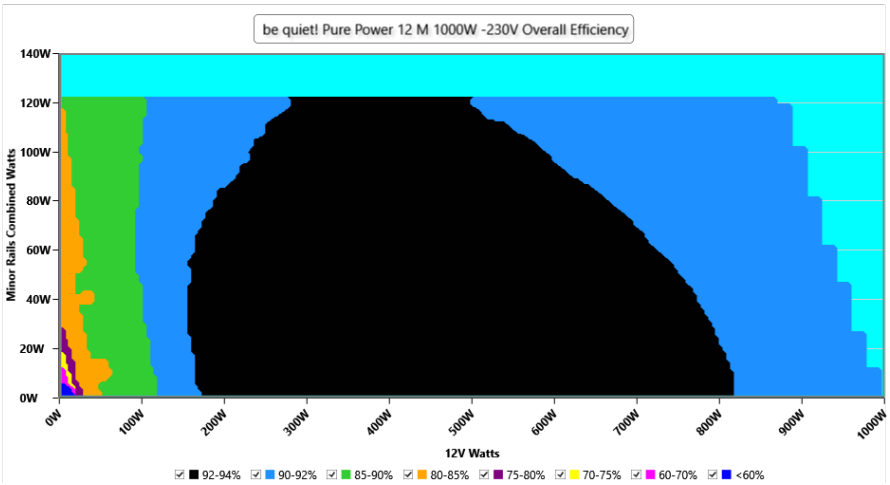
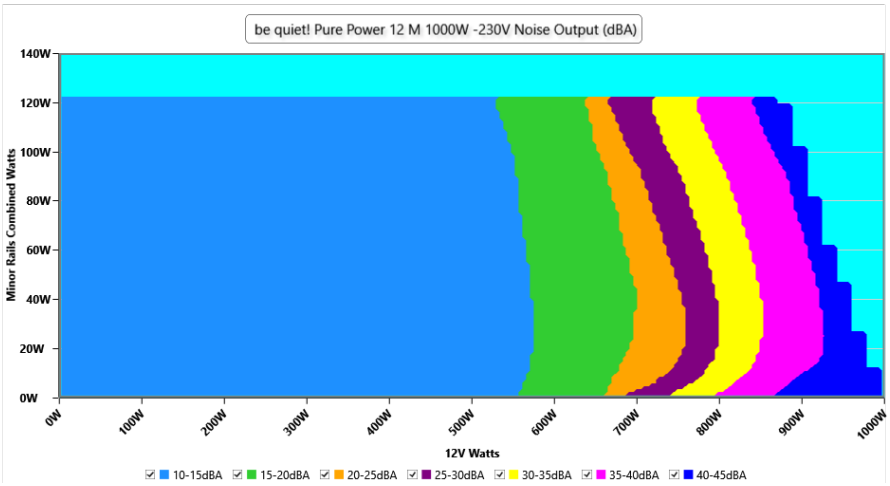
EFFICIENCY GRAPH 230V



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 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:	229.88 V	229.82 V	227.70 V	229.95 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:	1.416	1.415	1.340	1.417	1.490	PASS
Mains Voltage THD:	0.13 %	0.09 %	N/A	0.20 %	2.00 %	PASS
Real Power:	0.095 W	0.049 W	N/A	0.150 W	N/A	N/A
Apparent Power:	37.542 W	37.496 W	N/A	37.588 W	N/A	N/A
Power Factor:	0.002	N/A	N/A	N/A	N/A	N/A

INFO

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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%	6.470A	2.008A	2.008A	0.984A	99.967	87.814%	740	13.1	40.36°C	0.857
	12.112V	4.979V	3.286V	5.08V	113.838				44.57°C	229.86V
20%	13.993A	3.014A	3.015A	1.184A	199.904	92.23%	737	12.4	40.73°C	0.933
	12.079V	4.976V	3.283V	5.067V	216.747				45.48°C	229.85V
30%	21.878A	3.517A	3.52A	1.385A	299.938	93.135%	737	12.4	41.36°C	0.954
	12.062V	4.974V	3.281V	5.055V	322.042				46.46°C	229.83V
40%	29.734A	4.022A	4.026A	1.586A	399.392	93.386%	738	12.7	41.81°C	0.963
	12.046V	4.973V	3.278V	5.044V	427.676				47.37°C	229.82V
50%	37.286A	5.03A	5.037A	1.788A	499.124	93.177%	750	13.0	42.34°C	0.97
	12.032V	4.97V	3.275V	5.033V	535.669				48.35°C	229.8V
60%	44.924A	6.039A	6.05A	1.992A	599.66	92.818%	864	17.5	42.56°C	0.976
	12.017V	4.968V	3.273V	5.021V	646.059				49.17°C	229.78V
70%	52.518A	7.049A	7.065A	2.196A	699.399	92.322%	1205	28.1	43.33°C	0.979
	12.002V	4.966V	3.27V	5.009V	757.57				50.39°C	229.77V
80%	60.207A	8A	8.08A	2.3A	799.151	91.689%	1776	39.1	43.84°C	0.98
	11.984V	4.963V	3.267V	5V	871.595				51.89°C	229.75V
90%	68.247A	8.566A	8.577A	2.404A	899.219	91.081%	1885	41.2	44.17°C	0.982
	11.968V	4.961V	3.264V	4.99V	987.281				53.18°C	229.73V
100%	76.108A	9.073A	9.105A	3.019A	999.263	90.465%	1883	41.2	45.05°C	0.985
	11.952V	4.959V	3.261V	4.969V	1104.584				55.06°C	229.72V
110%	83.919A	10.087A	10.219A	3.024A	1099.893	89.748%	1877	41.1	46.59°C	0.986
	11.935V	4.957V	3.258V	4.961V	1225.537				57.51°C	229.7V
CL1	0.114A	14.559A	14.567A	0A	121.29	84.879%	755	13.4	40.81°C	0.89
	12.116V	4.96V	3.275V	5.088V	142.898				46.27°C	229.86V
CL2	0.114A	22.197A	0A	0A	111.298	83.17%	763	13.8	40.36°C	0.88
	12.122V	4.952V	3.287V	5.096V	133.825				47.38°C	229.86V
CL3	0.113A	0A	22.186A	0A	73.98	77.294%	745	12.8	41.38°C	0.832
	12.122V	4.981V	3.272V	5.091V	95.707				50.41°C	229.86V
CL4	83.603A	0A	0A	0A	999.834	91.071%	1891	41.5	45.04°C	0.984
	11.959V	4.978V	3.273V	5.05V	1097.864				55.99°C	229.72V

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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	1.226A	0.501A	0.501A	0.196A	19.985	77.048%	725	11.9	36.52°C	0.468
	12.102V	4.984V	3.291V	5.099V	25.941				39.57°C	229.88V
40W	2.700A	0.702A	0.702A	0.294A	39.987	83.676%	726	12	37.2°C	0.659
	12.099V	4.982V	3.289V	5.097V	47.79				40.56°C	229.89V
60W	4.176A	0.903A	0.903A	0.393A	59.987	86.484%	728	12.1	38.01°C	0.761
	12.098V	4.981V	3.288V	5.094V	69.368				41.54°C	229.88V
80W	5.638A	1.104A	1.104A	0.491A	79.917	86.067%	735	12.4	39.12°C	0.827
	12.110V	4.981V	3.288V	5.094V	92.852				42.96°C	229.87V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	12.58mV	11.44mV	9.23mV	10.72mV	Pass
20% Load	19.64mV	10.98mV	9.44mV	11.14mV	Pass
30% Load	15.75mV	10.83mV	9.54mV	10.62mV	Pass
40% Load	15.09mV	11.96mV	9.90mV	11.60mV	Pass
50% Load	15.04mV	11.29mV	10.52mV	11.24mV	Pass
60% Load	15.09mV	12.37mV	10.88mV	11.55mV	Pass
70% Load	15.34mV	12.32mV	11.34mV	12.31mV	Pass
80% Load	15.04mV	13.60mV	12.83mV	12.78mV	Pass
90% Load	16.32mV	12.99mV	12.98mV	12.37mV	Pass
100% Load	22.76mV	14.91mV	15.00mV	15.82mV	Pass
110% Load	23.78mV	15.72mV	16.08mV	16.74mV	Pass
Crossload1	15.76mV	18.65mV	19.08mV	12.59mV	Pass
Crossload2	18.05mV	22.53mV	17.91mV	10.72mV	Pass
Crossload3	16.27mV	16.12mV	16.78mV	10.21mV	Pass
Crossload4	23.58mV	12.89mV	10.22mV	11.74mV	Pass

Anex

be quiet! Pure Power 12 M 1000W

Top side

Power specifications label

CERTIFICATIONS 115V

CYBENETICS PLATINUM

CYBENETICS STANDARD++

CERTIFICATIONS 230V

CYBENETICS PLATINUM 230v

CYBENETICS STANDARD++ 230v

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