

Lab ID#: FS10002078  
Receipt Date: Sep 28, 2022  
Test Date: Oct 18, 2022

Report: 22PS2078A  
Report Date: Oct 18, 2022

### DUT INFORMATION

Brand	FSP Technology Inc.
Manufacturer (OEM)	FSP
Series	Hydro G Pro
Model Number	HG2-1000
Serial Number	S2271000388
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 Fluid Dynamic Bearing Fan (MGA12012XF-O25)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

### TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

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## RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6 (+-2°C / +- 3.6°F)
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	88.560%
Efficiency With 10W (≤500W) or 2% (>500W)	67.969
Average Efficiency 5VSB	79.337%
Standby Power Consumption (W)	0.0714000
Average PF	0.991
Avg Noise Output	27.04 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A-

### 230V

Average Efficiency	90.806%
Average Efficiency 5VSB	76.878%
Standby Power Consumption (W)	0.1615000
Average PF	0.966
Avg Noise Output	26.84 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A-

## POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	83.33	2.5	0.3
	Watts	120		1000	12.5	3.6
Total Max. Power (W)		1000				

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## CABLES AND CONNECTORS

### Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18-22AWG	No
4+4 pin EPS12V (700mm)	2	2	18AWG	No
6+2 pin PCIe (650mm+150mm)	2	4	18AWG	No
6+2 pin PCIe (500mm+150mm)	1	2	18AWG	No
12+4 pin PCIe (700mm)	1	1	16-24AWG	No
SATA (500mm+150mm+150mm+150mm)	2	8	18AWG	No
SATA (500mm+150mm) / 4-pin Molex (+150mm+100mm)	2	4 / 4	18AWG	No
SATA (500mm+150mm) / 4-pin Molex (+150mm) / FDD (+150mm)	1	2 / 1 / 1	18-22AWG	No
AC Power Cord (1350mm) - C13 coupler	1	1	18AWG	-

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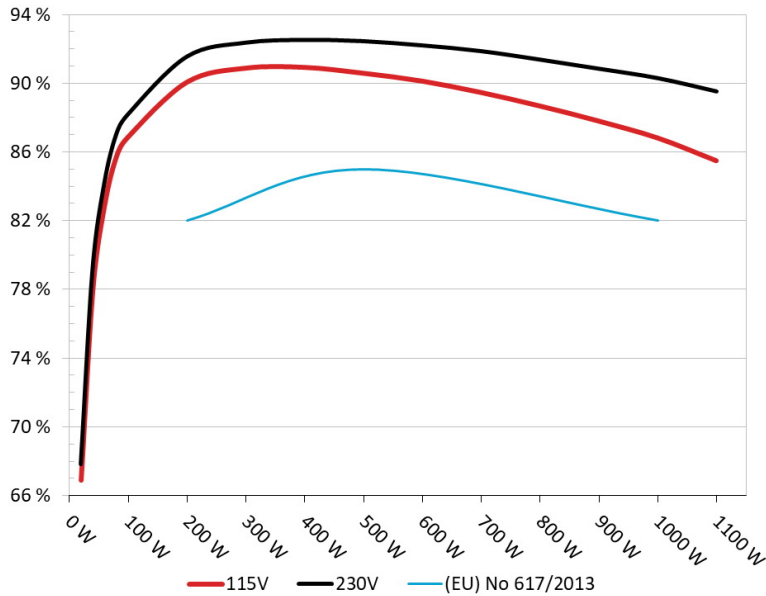
<b>General Data</b>	-
Manufacturer (OEM)	FSP
PCB Type	Double Sided
<b>Primary Side</b>	-
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor SCK-056 (5 Ohm) & Relay
Bridge Rectifier(s)	2x HY GBJ2506 (600V, 25A @ 100°C)
APFC MOSFETs	2x Infineon IPA60R120P7 (600V, 16A @ 100°C, Rds(on): 0.120hm)
APFC Boost Diode	1x CREE C3D08060A (600V, 8A @ 150°C)
Bulk Cap(s)	1x Nippon Chemi-Con (450V, 680uF, 3,000h @ 105°C, KHS)
Main Switchers	2x Magnachip MMFT60R115PC (600V, 20.9A @ 100°C, Rds(on): 0.1150hm)
APFC Controller	Infineon ICE2PCS02G
Resonant Controller	Champion CM6901T2X
Topology	Primary side: APFC, Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
<b>Secondary Side</b>	-
+12V MOSFETs	6x Infineon BSC014N04LSI (40V, 123A @ 100°C, Rds(on): 1.45mOhm)
5V & 3.3V	DC-DC Converters: 6x NEC 2SK3062-ZJ (60V, 70A, Rds(on): 8.5mOhm) PWM Controller(s): ANPEC APW7159C
Filtering Capacitors	Electrolytic: 4x Nippon Chemi-Con (2-5,000h @ 105°C, KZE), 2x Rubycon (3-6,000h @ 105°C, YXG), 2x Rubycon (2-10,000h @ 105°C, YXF), 1x Rubycon (6-10,000h @ 105°C, ZLH), 1x TK (105°C) Polymer: 29x Nippon Chemi-Con, 1x NIC
Supervisor IC	Weltrend WT7527RA (OCP, OVP, UVP, SCP,PG)
Fan Controller	APW9010
Fan Model	Protechnic Electric MGA12012XF-O25 (120mm, 12V, 0.52A, Fluid Dynamic Bearing)
<b>5VSB Circuit</b>	-
Rectifier	1x CET CEF04N7G (700V, 4A, Rds(on): 3.30hm) & 1x PFC P15L50SP SBR (50V, 15A)
Standby PWM Controller	97CL2N13

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### EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

**Efficiency: FSP Hydro G Pro 1000W**  
Ambient: 37°C - 47°C (98.6°F - 116.6°F)

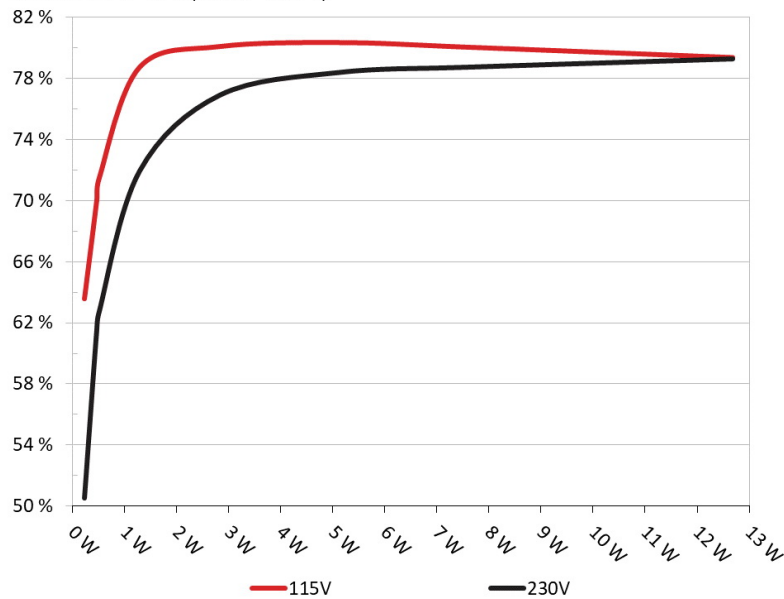


#### INFO

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: FSP Hydro G Pro 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	0.232W	63.597%	0.035
	5.166V	0.365W		115.17V
2	0.09A	0.465W	69.948%	0.064
	5.163V	0.665W		115.17V
3	0.55A	2.829W	80.065%	0.263
	5.145V	3.533W		115.16V
4	1A	5.128W	80.323%	0.352
	5.128V	6.384W		115.17V
5	1.5A	7.666W	80.013%	0.408
	5.111V	9.58W		115.16V
6	2.499A	12.681W	79.346%	0.462
	5.074V	15.982W		115.16V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.232W	50.516%	0.013
	5.165V	0.459W		230.33V
2	0.09A	0.464W	61.366%	0.022
	5.162V	0.757W		230.33V
3	0.55A	2.829W	76.875%	0.102
	5.145V	3.679W		230.33V
4	1A	5.128W	78.365%	0.168
	5.128V	6.543W		230.33V
5	1.5A	7.665W	78.714%	0.224
	5.11V	9.738W		230.33V
6	2.499A	12.68W	79.248%	0.301
	5.074V	16.001W		230.33V

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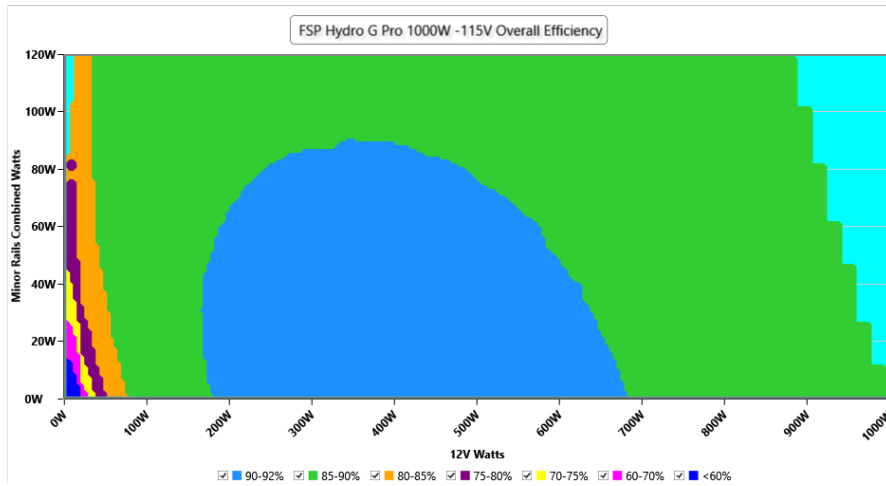
# 115V

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**PAGE 7/14**

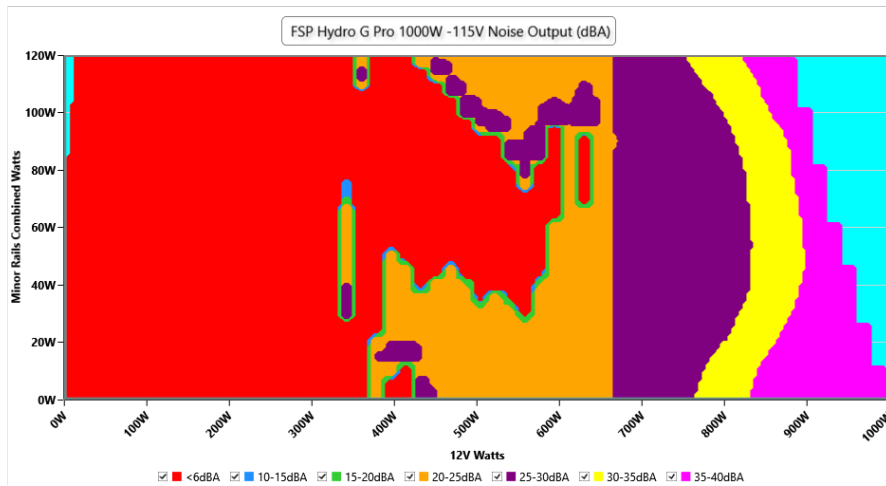
### EFFICIENCY GRAPH 115V



#### 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 (+2 °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:	115.15 V	115.11 V	113.85 V	115.19 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 %	0.10 %	N/A	0.16 %	2.00 %	PASS
Real Power:	0.071 W	0.065 W	N/A	0.080 W	N/A	N/A
Apparent Power:	10.254 W	10.085 W	N/A	10.432 W	N/A	N/A
Power Factor:	0.007	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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**COMMISSION REGULATION (EU) NO 617/2013 TESTING 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%	6.387A	1.977A	1.967A	0.974A	99.985	86.87%	0	<6.0	45.28°C	0.981
	12.273V	5.058V	3.355V	5.133V	115.1				40.96°C	115.16V
20%	13.786A	2.968A	2.954A	1.172A	199.927	90.053%	0	<6.0	46.2°C	0.996
	12.262V	5.054V	3.351V	5.119V	222.007				41.46°C	115.12V
50%	36.677A	4.957A	4.938A	1.772A	499.168	90.573%	1033	24.6	43.18°C	0.995
	12.233V	5.043V	3.341V	5.079V	551.124				49.19°C	115.04V
100%	74.977A	8.965A	8.94A	2.492A	999.906	86.809%	2276	47.5	45.83°C	0.991
	12.174V	5.018V	3.321V	5.016V	1151.846				55.85°C	114.85V

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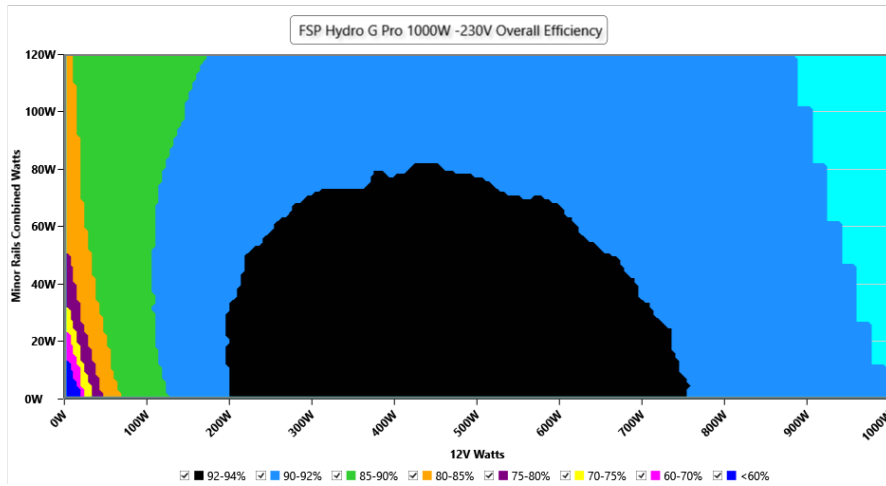
# 230V

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**PAGE 11/14**

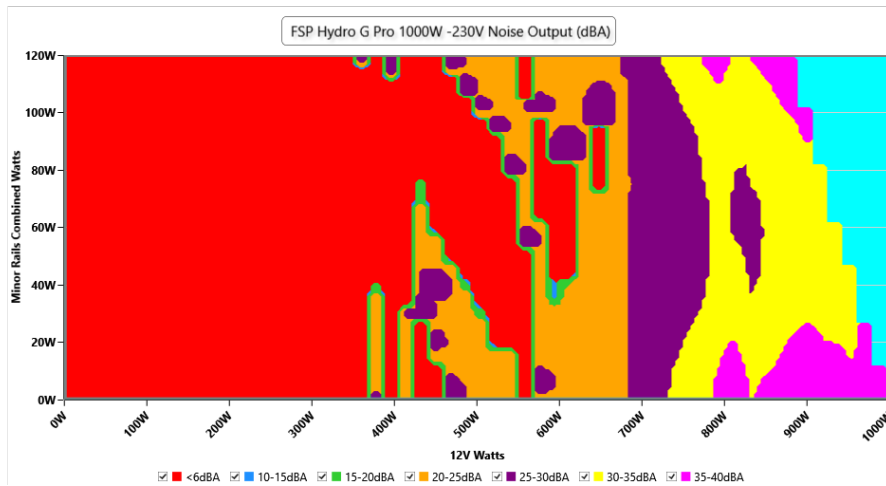
### EFFICIENCY GRAPH 230V



#### INFO

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### NOISE GRAPH 230V



#### INFO

The PSU's noise in its entire operational range and under 30-32 °C (+2 °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:	230.29 V	230.18 V	227.70 V	230.35 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:	0.12 %	0.10 %	N/A	0.22 %	2.00 %	PASS
Real Power:	0.162 W	0.146 W	N/A	0.194 W	N/A	N/A
Apparent Power:	34.265 W	33.950 W	N/A	34.612 W	N/A	N/A
Power Factor:	0.005	N/A	N/A	N/A	N/A	N/A

**INFO**

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**COMMISSION REGULATION (EU) NO 617/2013 TESTING 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%	6.386A	1.977A	1.967A	0.974A	99.967	88.208%	0	<6.0	44.35°C	0.892
	12.272V	5.058V	3.355V	5.134V	113.33				40.11°C	230.36V
20%	13.784A	2.968A	2.954A	1.172A	199.898	91.573%	0	<6.0	45.29°C	0.951
	12.261V	5.054V	3.351V	5.12V	218.295				40.62°C	230.35V
50%	36.690A	4.961A	4.941A	1.774A	499.265	92.478%	0	<6.0	48.82°C	0.983
	12.231V	5.041V	3.339V	5.074V	539.872				42.88°C	230.3V
100%	74.971A	8.963A	8.939A	2.491A	999.857	90.323%	2366	48.1	45.12°C	0.977
	12.174V	5.019V	3.321V	5.016V	1106.97				55.2°C	230.24V

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EFFICIENCY AND NOISE REPORT IN ACCORDANCE WITH  
CYBENETICS ETA AND CYBENETICS LAMBDA PROCEDURE

FSP Technology Inc. Hydro G Pro 1000W

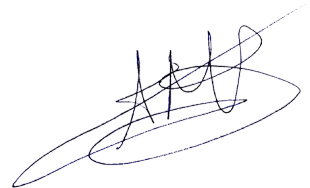


Top side

FSP Hydro G Pro					
Model No. ( 型号 / 型号 / 모델명 )					
AC Input 交流輸入 / 交流輸入 / 정격입력	100-240V~ 12-6A 50-60Hz				
	200-240V~ 6A 50-60Hz				
DC Output 直流輸出 / 直流輸出	+3.3V	+5V	+12V	-12V	+5Vsb
Max Output Current 最大電流 / 最大電流 / 정격출력	20A	20A	83.33A	0.3A	2.5A
Max Combined Power 最大功率 / 最大功率	120W		1000W	3.6W	12.5W
	Total Power 額定功率 / 額定功率				
1000W					
					

Power specifications label

### CERTIFICATIONS 115V

**Aristeidis Bitziopoulos**  
Lab Director

### CERTIFICATIONS 230V



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