Fractal

# Fractal Design ION+ 760P

Serial Number 1918FD19340101113

Lab ID FD76001534

Certification ID 251534

Test Result Report ID:

Certificate Issue Date: May 21, 2020

Scheme: ETA-EMI PSU

115V




230V




115V




230V




Scheme: LAMBDA PSU



Aristeidis Bitziopoulos, Certification Body General Manager

# General Information

## Test Equipment

| | |
|---|---|
| Electronic Loads | Chroma 63601-5 x2<br>Chroma 63600-2<br>Chroma 63640-80-80 x10<br>Chroma 63610-80-20 |
| AC Sources | Chroma 6530, APM SP300VAC4000W-P, GW Instek ASR-3500 |
| Power Analyzers | Rohde & Schwarz HMC8015 & NPA701 |
| Oscilloscopes | Picoscope 4444, 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 |
| EMI Analyzer | TekBox TBMR-110M-EU |
| Isolation Transformer | 4kVA |
| UPS | FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA |
| Testing Methodology | Cybenetics PSU Test Protocol |

## DUT Information
## (Non-accredited measurements)

| | |
|---|---|
| Product Identification Details | |
| Brand | Fractal Design |
| Model | ION+ 760P |
| OEM/ODM | High Power |
| Serial Number | 1918FD19340101113 |
| Product Specifications | |
| Manufacturer-Provided Information | |
| Rated Voltage (Vrms) | 100-240 |
| Rated Current (Arms) | 10-5 |

| | |
|---|---|
| Rated Frequency (Hz) | 50-60 |
| Rated Power (W) | 760 |
| Operating Temperature (Continuous Full Load) (°C) | |
| Type | ATX12V |
| Cable Design | Fully Modular |
| Warranty | - |
| Cybenetics Measurements | |
| Dimensions (W x H x D) | |
| Weight | |
| Cooling | 140mm Fluid Dynamic Bearing Fan<br>(DYNAMIC X2 GP-14) |
| Semi-Passive Operation | ✓ (selectable) |
| Cybenetics Testing Information | |
| Lab ID | FD76001534 |
| Date of receipt | Jul 11, 2019 |
| Testing Date | May 20, 2020 |
| Report Issued Date | May 21, 2020 |
| Engineer Name | - |
| Authorized By the Laboratory Technical Manager | Aristeidis Bitziopoulos |
| Signature |  |

## Cables and Connectors
## (Non-accredited measurements)

| Modular Cables | | | | |
|---|---|---|---|---|
| Description | Cable Count | Connector Count (Total) | Gauge | In Cable Capacitors |
| ATX connector 20+4 pin (600mm) | 1 | 1 | 18AWG | No |
| 4+4 pin EPS12V (700mm) | 2 | 2 | 16AWG | No |
| 6+2 pin PCIe (550mm+120mm) | 3 | 6 | 16-18AWG | No |
| SATA (650mm+120mm) | 1 | 2 | 18AWG | No |
| SATA (400mm+120mm+120mm+120mm) | 2 | 8 | 18AWG | No |

| | | | | |
|---|---|---|---|---|
| 4 pin Molex (400mm+120mm+120mm+120mm) | 1 | 4 | 18AWG | No |
| AC Power Cord (1400mm) - C13 coupler | 1 | 1 | 16AWG | - |

## Power Specifications

| Rail | | 3.3V | 5V | 12V | 5VSB | -12V |
|---|---|---|---|---|---|---|
| Max. Power | Amps | 22 | 22 | 63.3 | 3 | 3.6 |
| | Watts | 120 | | 760 | 15 | 0.3 |
| Total Max. Power (W) | | 760 | | | | |

## Parts Description

| General Data | |
|---|---|
| Manufacturer (OEM) | High Power |
| PCB Type | Double Sided |
| Primary Side | |
| Transient Filter | 4x Y caps, 2x X caps, 3x CM chokes, 1x MOV,1x Discharge IC |
| Inrush Protection | NTC Thermistor & Relay |
| Bridge Rectifier(s) | 2x GBU1506 (600V, 15A @ 100°C) |
| APFC MOSFETS | 2x Infineon IPA60R120P7 (650V, 16A @ 100°C, 0.120Ohm) |
| APFC Boost Diode | 1x Infineon IDH08G65C5 (650V, 8A @ 145°C) |
| Hold-up Cap(s) | 2x Rubycon (400V, 470uF each or 940uF combined, 2,000h @ 105°C, MXH) |
| Main Switchers | 2x Infineon IPA60R120P7 (650V, 16A @ 100°C, 0.120Ohm) |
| APFC Controller | Infineon ICE3PCS01G |
| Resonant Controllers | Champion CM6901X |
| Topology | Primary side: Half-Bridge & LLC converter<br>Secondary side: Synchronous Rectification & DC-DC converters |
| Secondary Side | |
| +12V MOSFETS | 8x Infineon BSC027N04LS (40V, 88A @ 100°C, 2.7mOhm) |
| 5V & 3.3V | DC-DC Converters:8x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm)<br>PWM Controllers: ANPEC APW7159C |
| Filtering Capacitors | Electrolytics: 4x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 5x Rubycon (3-6,000h @ 105°C, YXG), 1x Rubycon (6-10,000h @ 105°C, ZLH)<br>Polymers: 31x FPCAP, 6x NIC |
| Supervisor IC | SITI PS224 (OCP, OVP, UVP, SCP, PG) |

| | |
|---|---|
| Micro Controller | STC 15W408AS |
| Fan Model | Fractal Design DYNAMIC X2 GP-14 (140mm, 3-12V, 0.35A, 1700 rpm, Fluid Dynamic Bearing Fan ) |
| Fan Power Transistor | STi 2SD882 (NPN) |
| 5VSB Circuit | |
| Rectifier | 1x PFC P10V45SP SBR (45V, 10A) & 2x Infineon BSC0906NS FET (30V, 40A @ 100°C, 4.5mΩ) |
| Standby PWM Controller | Excelliance MOS Corp EM8569 |
| -12V Circuit | |
| Rectifier | KEC KIA7912PI (-12V, 1A) |

# Test Results

## Temperature & Compliance Info

| | |
|---|---|
| Temperature Range (°C /°F) | 28-32 / 82.4-89.6 |
| ErP Lot 3/6 Ready | ✓ |
| (EU) No 617/2013 Compliance | ✓ |

## Performance Summary

### 115V

| | |
|---|---|
| Accredited | |
| Average Efficiency (>1450 load combinations) | 90.211% |
| Average Noise Output (>1450 Load Combinations) | 15.87dBA |
| Average PF (>1450 Load Combinations) | 0.992 |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | 44.135% |
| Standby Power Consumption | 0.1021W |
| Non-Accredited | |
| 12V Ripple (Full Load) | 26.48mV |
| 5V Ripple (Full Load) | 13.84mV |
| 3.3V Ripple (Full Load) | 17.12mV |
| 5VSB Ripple (Full Load) | 23.29mV |
| 12V Load Regulation | 0.73% |

| | |
|---|---|
| 5V Load Regulation | 0.64% |
| 3.3V Load Regulation | 0.91% |
| 5VSB Load Regulation | 2.50% |
| Inrush Current | 30.774A |

**230V**

| | | |
|---|---|---|
| Accredited | | |
| Average Efficiency (>1450 load combinations) | 91.896% | |
| Average Noise Output (>1450 Load Combinations) | 15.90dBA | |
| Average PF (>1450 Load Combinations) | 0.955 | |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | - | |
| Standby Power Consumption | 0.1394W | |
| Non-Accredited | | |
| 12V Ripple (Full Load) | 23.32mV | |
| 5V Ripple (Full Load) | 14.27mV | |
| 3.3V Ripple (Full Load) | 16.43mV | |
| 5VSB Ripple (Full Load) | 18.34mV | |
| 12V Load Regulation | 0.69% | |
| 5V Load Regulation | 0.52% | |
| 3.3V Load Regulation | 0.88% | |
| 5VSB Load Regulation | 2.27% | |
| Inrush Current | 81.766A | |
| Hold-Up Time & PWR_OK Signal | 21.40ms | |
| AC Loss to PWR_OK Hold Up Time | 17.40ms | |
| PWR_OK Inactive to DC Loss Delay | 4.00ms | |
| OPP (0.00°C / 0.00°C) | 134.78% | - |

## Hold-Up Time & PWR_OK Signal

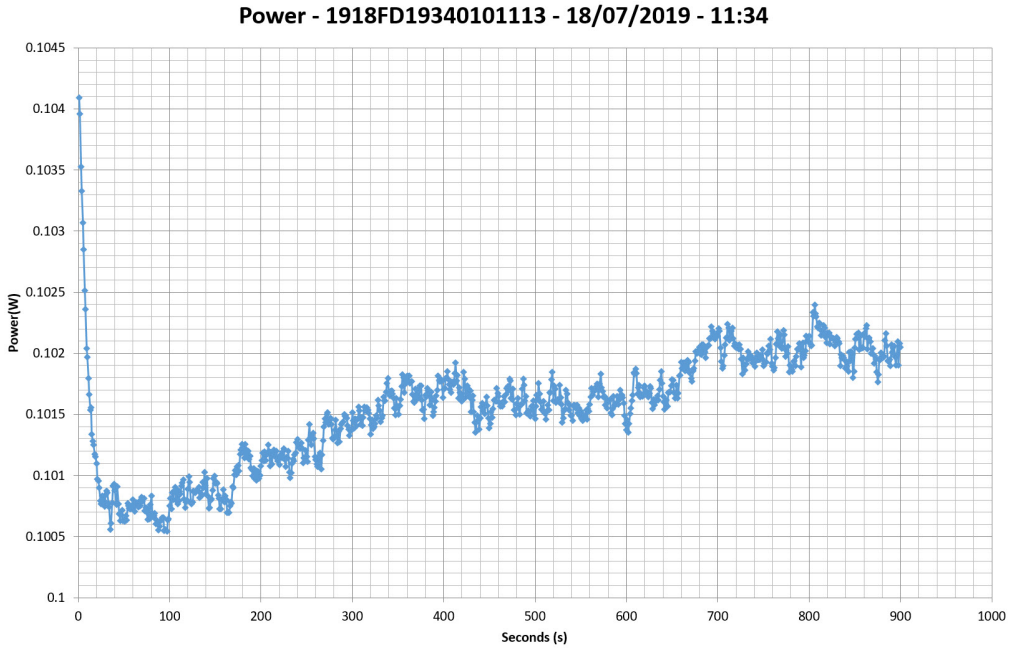
| | |
|---|---|
| Hold-Up Time (ms) | 21.4 |
| AC Loss to PWR_OK Hold Up Time (ms) | 17.4 |

| | |
|---|---|
| PWR_OK Inactive to DC Loss Delay (ms) | 4 |

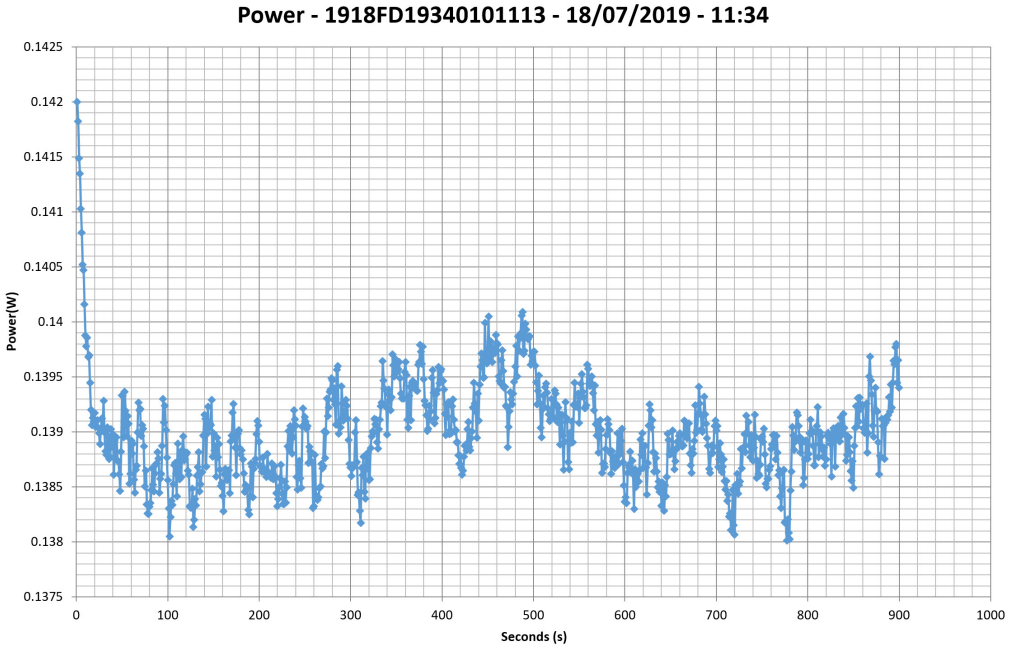
## Stromverbrauch im Ruhezustand

### Graphs

**115V**

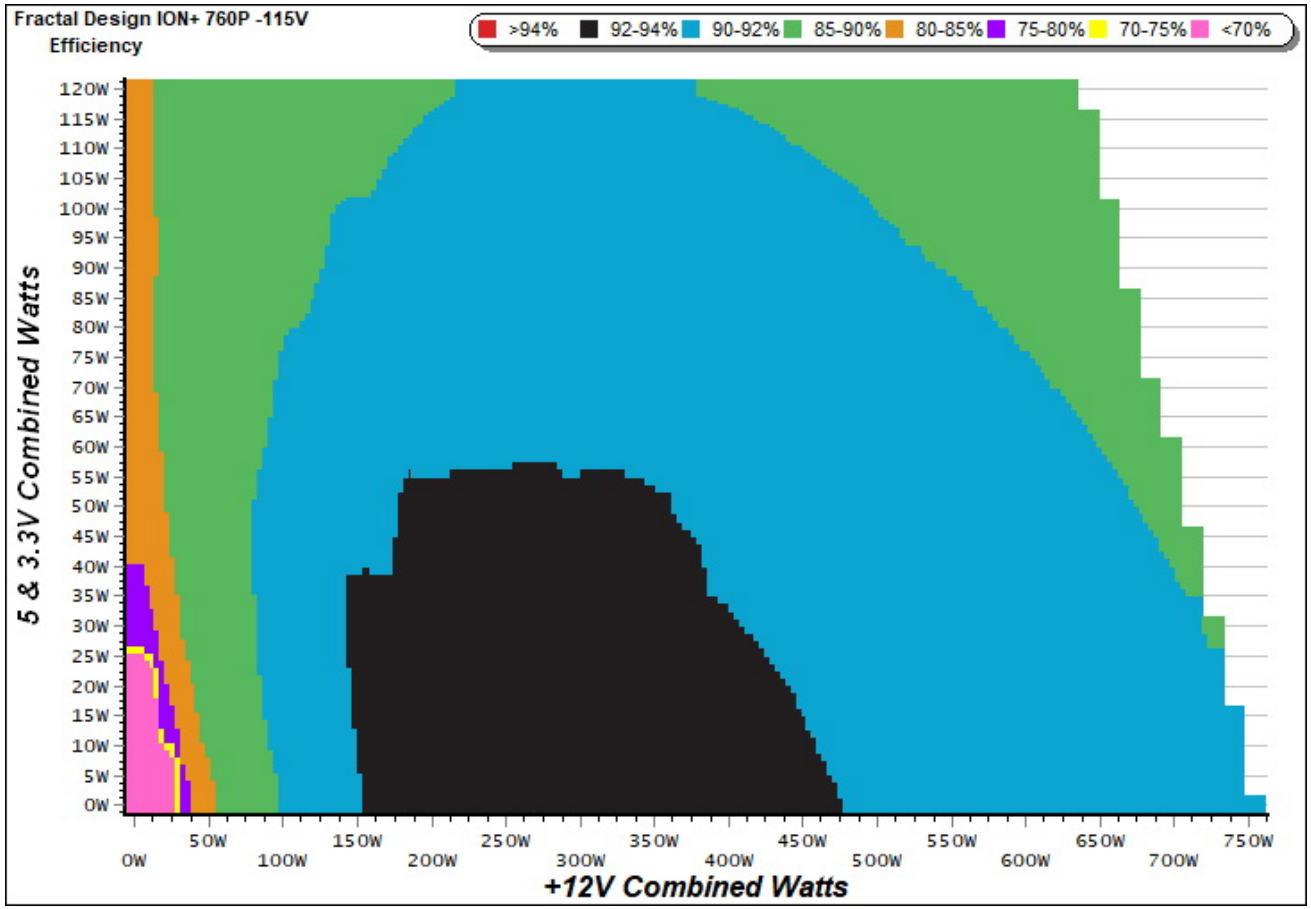



**230V**



## Efficiency Graph

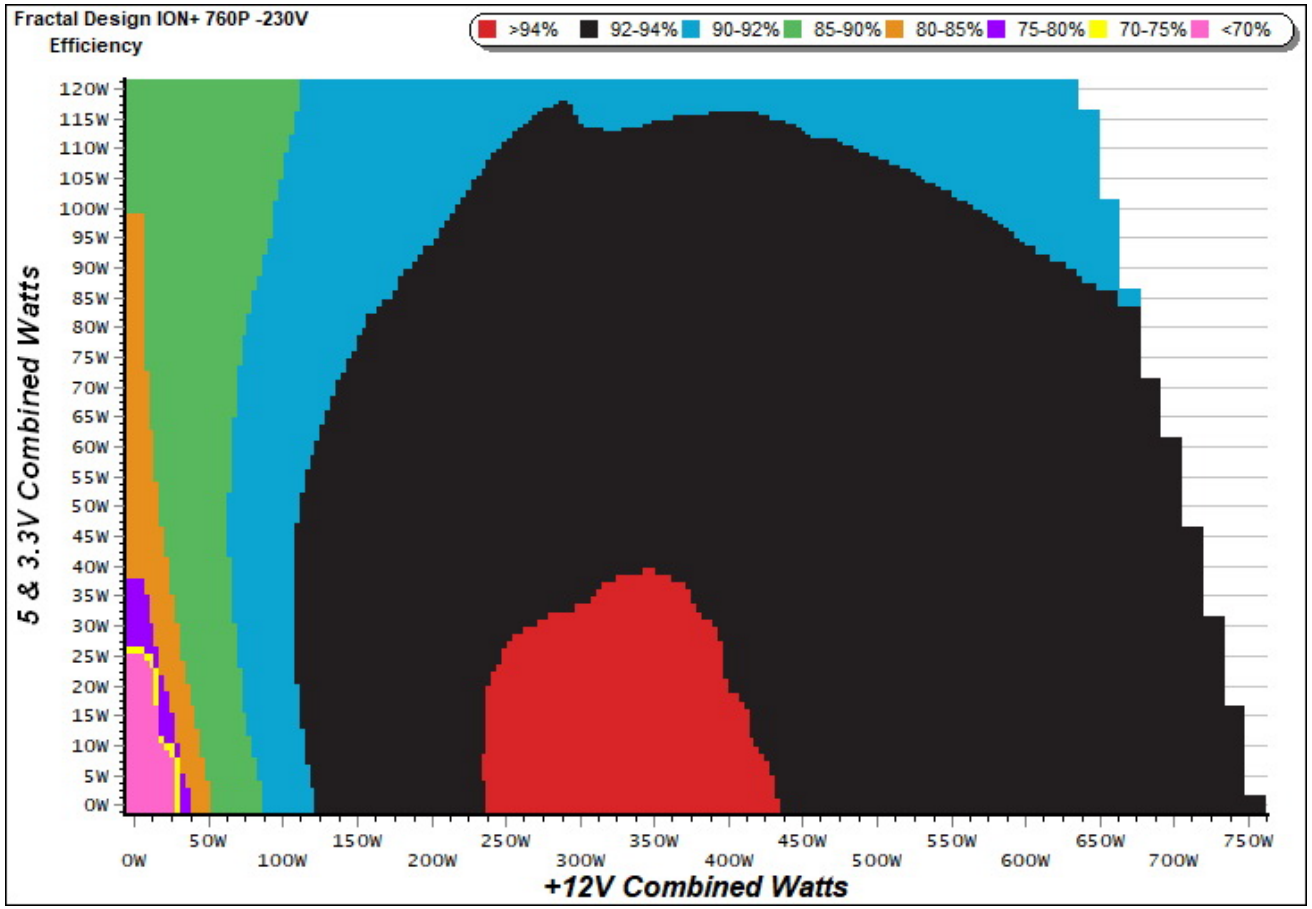
### 115V




### 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

## 230V

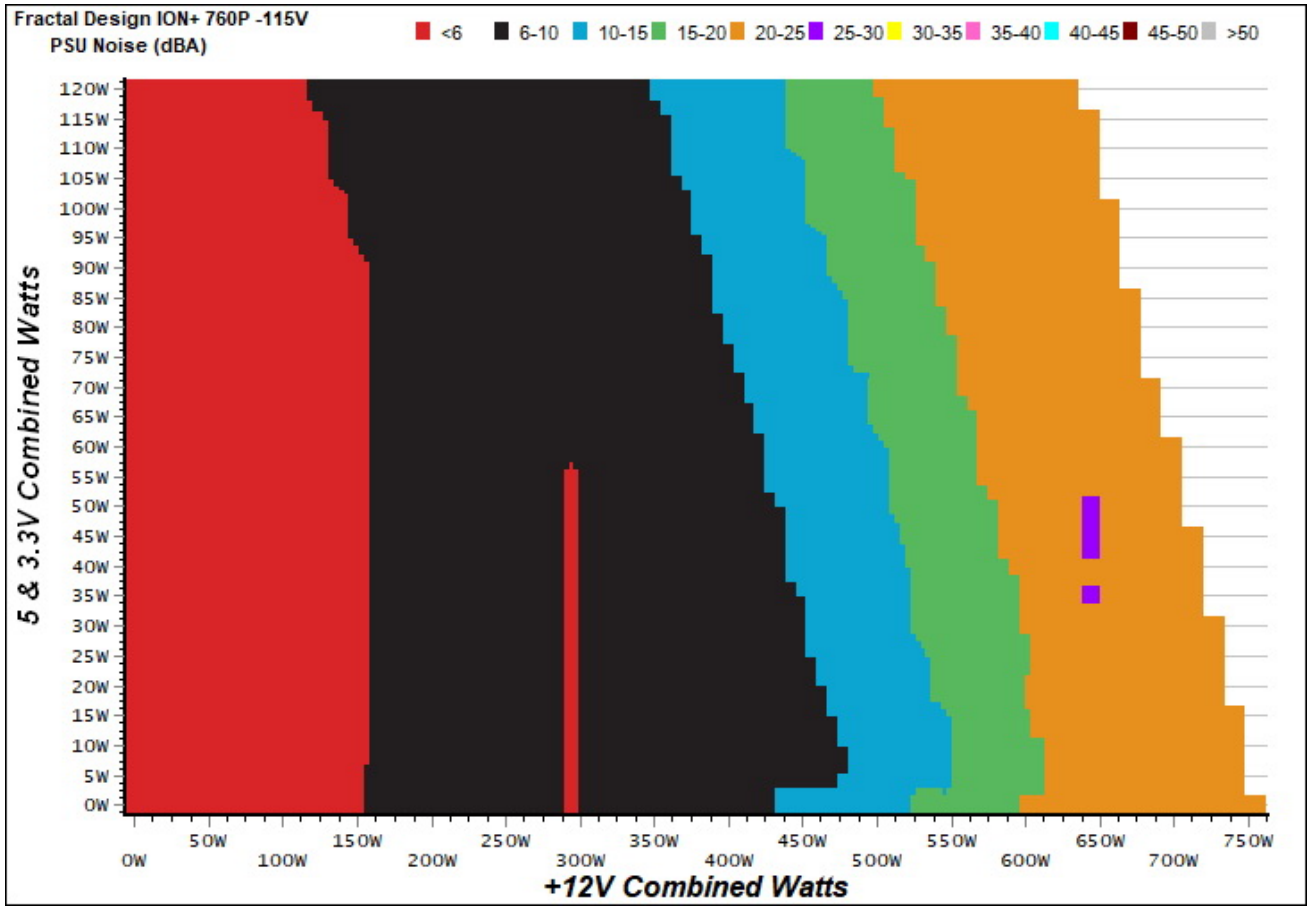



### INFO

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

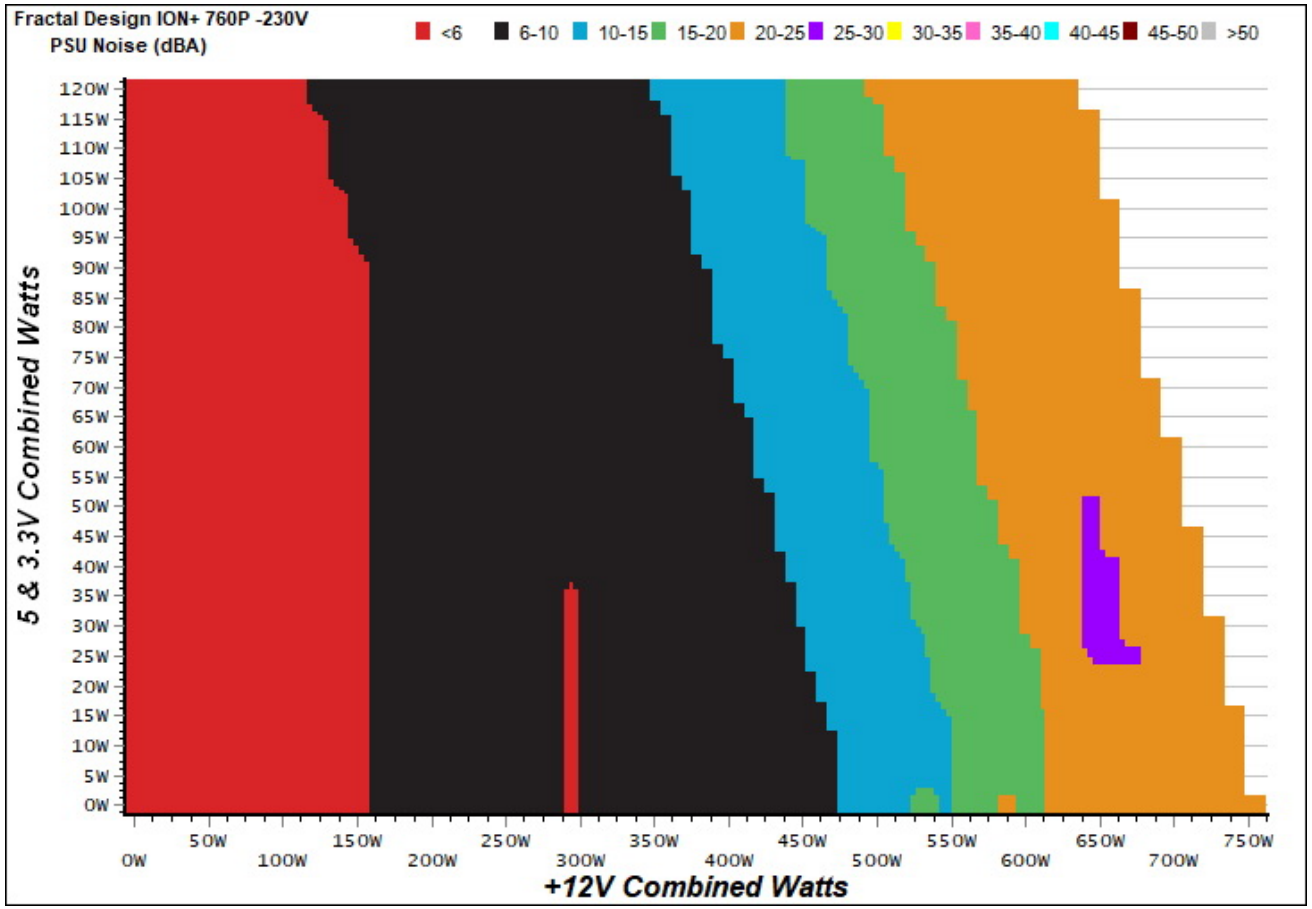
### 115V




### 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

## 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

## Noise under high ambient temperature (indicative)

### 115V

| Load | Normal ambient<br>fan · noise · intake | High ambient<br>fan · noise · intake | Noise change |
|---|---|---|---|
| 10% | 0 RPM · <6.0 dB(A) · 45.8 °C | 0 RPM · <6.0 dB(A) · 45.8 °C | fan off in both |
| 20% | 0 RPM · <6.0 dB(A) · 46.8 °C | 0 RPM · <6.0 dB(A) · 46.8 °C | fan off in both |
| 50% | 489 RPM · 8.1 dB(A) · 42.3 °C | 489 RPM · 8.1 dB(A) · 42.3 °C | **+0.0 dB(A)** |
| 100% | 1046 RPM · 29.0 dB(A) · 45.1 °C | 1046 RPM · 29.0 dB(A) · 45.1 °C | **+0.0 dB(A)** |

### 230V

| Load | Normal ambient<br>fan · noise · intake | High ambient<br>fan · noise · intake | Noise change |
|---|---|---|---|
| 10% | 0 RPM · <6.0 dB(A) · 45.3 °C | 0 RPM · <6.0 dB(A) · 45.3 °C | fan off in both |
| 20% | 0 RPM · <6.0 dB(A) · 45.8 °C | 0 RPM · <6.0 dB(A) · 45.8 °C | fan off in both |
| 50% | 487 RPM · 8.1 dB(A) · 42.3 °C | 487 RPM · 8.1 dB(A) · 42.3 °C | **+0.0 dB(A)** |
| 100% | 1198 RPM · 33.1 dB(A) · 45.1 °C | 1198 RPM · 33.1 dB(A) · 45.1 °C | **+0.0 dB(A)** |

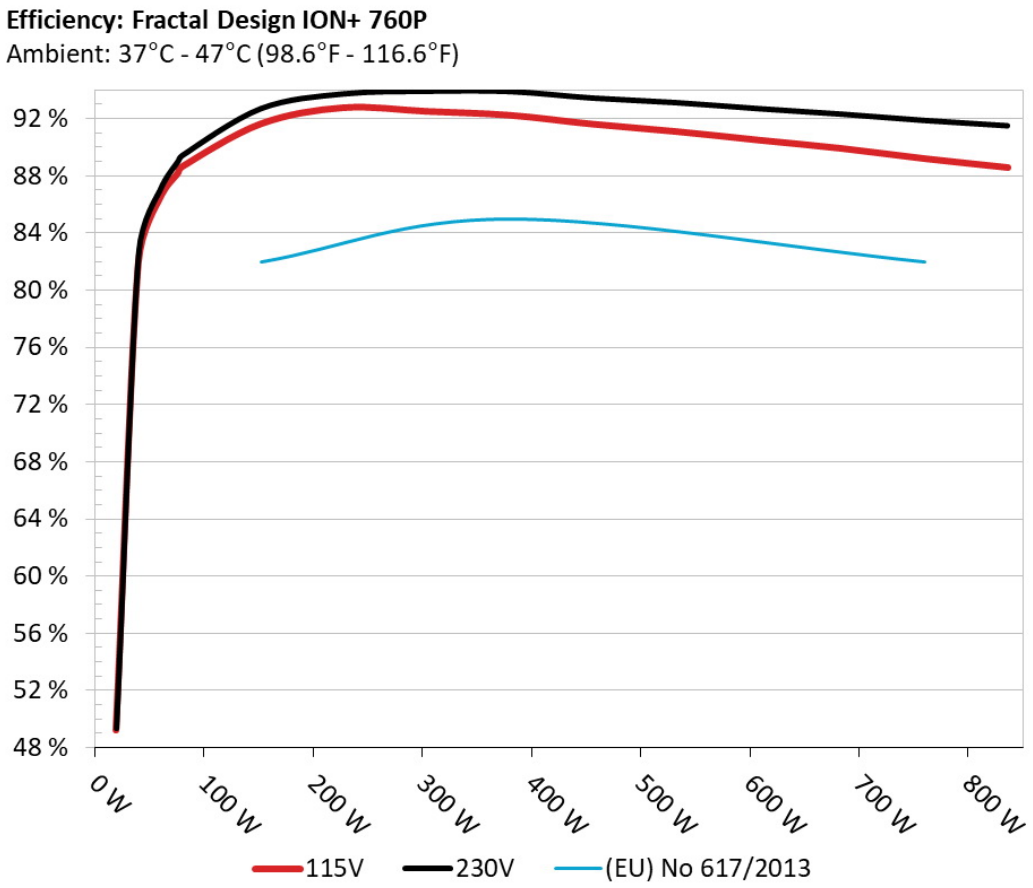
### INFO

Fan speed, noise and the measured intake temperature at 10, 20, 50 and 100 % load, from the two load regulation tests: at normal ambient (about 30-32 °C) and at high ambient (about 40-47 °C). These are stabilized readings at fixed loads, not averages over the certification sweep, so they are indicative of how the fan behaves when it is hot. "<6.0" is the floor of our sound meter: the fan is stopped or too quiet to measure (the fan speed column says which); with the fan stopped, the intake sensor can read higher than the chamber air.

*Informational. Not part of the ETA or LAMBDA rating.*

## Indicative Performance

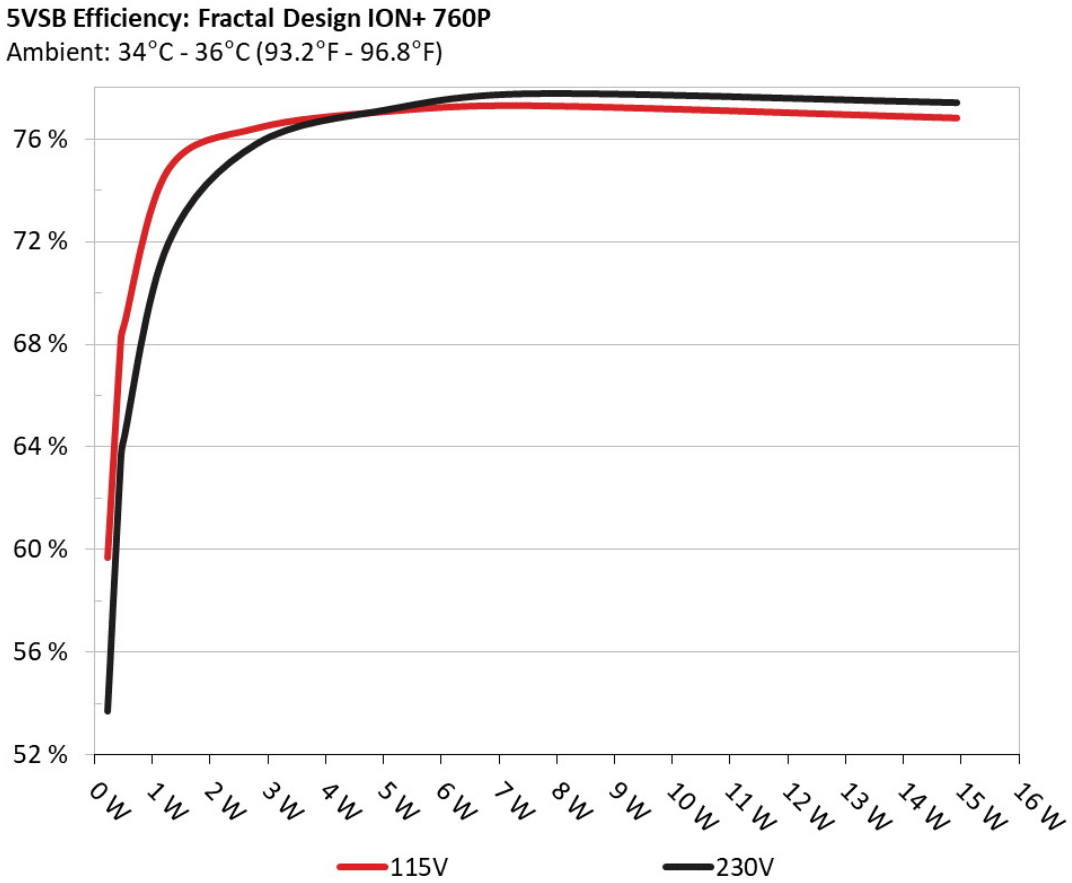
### Efficiency under high ambient temperature




**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

## 5VSB Efficiency (ERP LOT 3/6 & CEC)

### 115V

| Test # | 5VSB | DC/AC (Watts) | Efficiency | PF/AC Volts |
|---|---|---|---|---|
| 1 | 0.045A | 0.231 | 59.690% | 0.054 |
| | 5.114V | 0.387 | | 115.10V |
| 2 | 0.090A | 0.461 | 68.195% | 0.091 |
| | 5.112V | 0.676 | | 115.10V |
| 3 | 0.550A | 2.801 | 76.426% | 0.316 |
| | 5.091V | 3.665 | | 115.10V |
| 4 | 1.000A | 5.072 | 77.082% | 0.392 |
| | 5.071V | 6.580 | | 115.10V |
| 5 | 1.500A | 7.573 | 77.307% | 0.432 |
| | 5.048V | 9.796 | | 115.10V |
| 6 | 3.000A | 14.927 | 76.828% | 0.481 |
| | 4.975V | 19.429 | | 115.10V |

### 230V

| Test # | 5VSB | DC/AC (Watts) | Efficiency | PF/AC Volts |
|---|---|---|---|---|
| 1 | 0.046A | 0.231 | 53.721% | 0.115 |
| | 5.046V | 0.430 | | 230.24V |
| 2 | 0.090A | 0.461 | 63.586% | 0.031 |
| | 5.112V | 0.725 | | 230.24V |
| 3 | 0.550A | 2.801 | 75.785% | 0.143 |
| | 5.091V | 3.696 | | 230.24V |
| 4 | 1.000A | 5.072 | 77.129% | 0.220 |
| | 5.071V | 6.576 | | 230.24V |
| 5 | 1.500A | 7.573 | 77.752% | 0.277 |
| | 5.048V | 9.740 | | 230.25V |
| 6 | 3.001A | 14.934 | 77.402% | 0.365 |
| | 4.976V | 19.294 | | 230.25V |

## Supplementary Tests (For Reference)

### Typical 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.490A | 1.991A | 1.993A | 1.002A | 76.156 | 88.142% | 0 | <6.0 | 45.81°C | 0.959 |
| | 12.148V | 5.026V | 3.312V | 4.993V | 86.401 | | | | 40.24°C | 115.12V |
| 2 | 9.964A | 2.985A | 2.993A | 1.204A | 151.854 | 91.588% | 0 | <6.0 | 46.82°C | 0.984 |
| | 12.139V | 5.024V | 3.308V | 4.986V | 165.802 | | | | 40.62°C | 115.12V |
| 3 | 15.807A | 3.486A | 3.479A | 1.406A | 227.752 | 92.725% | 0 | <6.0 | 47.74°C | 0.994 |
| | 12.130V | 5.023V | 3.306V | 4.979V | 245.621 | | | | 41.35°C | 115.11V |
| 4 | 21.663A | 3.985A | 3.993A | 1.610A | 303.762 | 92.467% | 478 | 7.8 | 41.65°C | 0.996 |
| | 12.120V | 5.022V | 3.304V | 4.970V | 328.507 | | | | 48.52°C | 115.11V |
| 5 | 27.230A | 4.907A | 5.001A | 1.815A | 379.887 | 92.200% | 489 | 8.1 | 42.30°C | 0.997 |
| | 12.110V | 5.018V | 3.300V | 4.961V | 412.027 | | | | 49.45°C | 115.11V |
| 6 | 32.741A | 5.984A | 6.006A | 2.020A | 456.015 | 91.574% | 555 | 9.9 | 42.54°C | 0.998 |
| | 12.101V | 5.016V | 3.296V | 4.953V | 497.976 | | | | 50.27°C | 115.11V |
| 7 | 38.255A | 6.985A | 7.018A | 2.226A | 531.742 | 91.064% | 600 | 11.9 | 43.36°C | 0.998 |
| | 12.093V | 5.013V | 3.292V | 4.944V | 583.922 | | | | 51.40°C | 115.11V |
| 8 | 43.849A | 7.990A | 8.032A | 2.433A | 608.258 | 90.457% | 756 | 18.5 | 43.92°C | 0.998 |
| | 12.083V | 5.009V | 3.287V | 4.935V | 672.427 | | | | 52.90°C | 115.10V |
| 9 | 49.777A | 8.491A | 8.523A | 2.433A | 683.585 | 89.878% | 933 | 25.3 | 44.15°C | 0.999 |
| | 12.075V | 5.008V | 3.285V | 4.935V | 760.574 | | | | 53.51°C | 115.10V |
| 10 | 55.551A | 8.999A | 9.051A | 3.058A | 760.010 | 89.165% | 1046 | 29.0 | 45.08°C | 0.999 |
| | 12.066V | 5.003V | 3.282V | 4.907V | 852.363 | | | | 54.81°C | 115.10V |
| 11 | 61.897A | 9.003A | 9.064A | 3.061A | 836.037 | 88.541% | 1336 | 36.2 | 46.52°C | 0.999 |
| | 12.057V | 5.001V | 3.278V | 4.903V | 944.232 | | | | 57.01°C | 115.10V |
| CL1 | 0.154A | 14.003A | 14.000A | 0.000A | 118.180 | 84.237% | 0 | <6.0 | 49.53°C | 0.981 |
| | 12.125V | 5.018V | 3.289V | 5.064V | 140.295 | | | | 42.56°C | 115.12V |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CL2 | 63.354A | 1.004A | 1.001A | 1.000A | 778.434 | 89.727% | 1321 | 35.8 | 45.35°C | 0.999 |
| | 12.077V | 5.014V | 3.296V | 4.974V | 867.558 | | | | 54.46°C | 115.10V |

The results above are not used in the certification process

**230V**

| Test # | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.491A | 1.990A | 1.991A | 1.001A | 76.148 | 89.054% | 0 | <6.0 | 45.25°C | 0.801 |
| | 12.146V | 5.028V | 3.312V | 4.995V | 85.508 | | | | 40.39°C | 230.22V |
| 2 | 9.964A | 2.982A | 2.994A | 1.201A | 151.850 | 92.731% | 0 | <6.0 | 45.84°C | 0.909 |
| | 12.137V | 5.035V | 3.307V | 4.997V | 163.753 | | | | 40.64°C | 230.23V |
| 3 | 15.808A | 3.484A | 3.476A | 1.406A | 227.740 | 93.761% | 0 | <6.0 | 46.61°C | 0.947 |
| | 12.129V | 5.025V | 3.307V | 4.980V | 242.893 | | | | 41.03°C | 230.21V |
| 4 | 21.663A | 3.983A | 3.992A | 1.609A | 303.738 | 93.947% | 485 | 8.0 | 41.51°C | 0.963 |
| | 12.119V | 5.023V | 3.306V | 4.972V | 323.308 | | | | 47.75°C | 230.22V |
| 5 | 27.195A | 4.984A | 4.998A | 1.814A | 379.857 | 93.931% | 487 | 8.1 | 42.26°C | 0.976 |
| | 12.110V | 5.020V | 3.302V | 4.963V | 404.402 | | | | 48.86°C | 230.23V |
| 6 | 32.738A | 5.980A | 6.005A | 2.019A | 455.979 | 93.469% | 553 | 9.8 | 42.67°C | 0.979 |
| | 12.101V | 5.018V | 3.298V | 4.955V | 487.839 | | | | 49.82°C | 230.23V |
| 7 | 38.256A | 6.981A | 7.013A | 2.224A | 531.705 | 93.152% | 597 | 11.9 | 43.01°C | 0.984 |
| | 12.092V | 5.016V | 3.293V | 4.947V | 570.795 | | | | 50.74°C | 230.23V |
| 8 | 43.847A | 7.982A | 8.030A | 2.431A | 608.218 | 92.727% | 754 | 18.4 | 43.38°C | 0.988 |
| | 12.083V | 5.012V | 3.288V | 4.939V | 655.925 | | | | 51.75°C | 230.23V |
| 9 | 49.780A | 8.484A | 8.519A | 2.431A | 683.574 | 92.349% | 1014 | 27.9 | 44.02°C | 0.991 |
| | 12.074V | 5.012V | 3.287V | 4.939V | 740.209 | | | | 52.68°C | 230.23V |
| 10 | 55.554A | 8.987A | 9.046A | 3.055A | 759.979 | 91.907% | 1198 | 33.1 | 45.07°C | 0.994 |
| | 12.065V | 5.009V | 3.283V | 4.912V | 826.901 | | | | 54.60°C | 230.23V |
| 11 | 61.895A | 9.005A | 9.073A | 3.061A | 836.003 | 91.534% | 1334 | 36.2 | 46.99°C | 0.995 |
| | 12.057V | 5.000V | 3.274V | 4.902V | 913.327 | | | | 56.86°C | 230.23V |
| CL1 | 0.147A | 14.004A | 13.999A | 0.000A | 118.168 | 84.908% | 0 | <6.0 | 48.82°C | 0.889 |
| | 12.124V | 5.022V | 3.290V | 5.068V | 139.171 | | | | 42.46°C | 230.24V |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CL2 | 63.354A | 1.004A | 1.000A | 1.000A | 778.436 | 92.540% | 1257 | 34.4 | 45.11°C | 0.994 |
| | 12.077V | 5.016V | 3.297V | 4.976V | 841.193 | | | | 54.10°C | 230.23V |

The results above are not used in the certification process

## Light Load Tests

### 115V

| Test # | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.191A | 0.496A | 0.481A | 0.199A | 19.618 | 49.207% | 0 | <6.0 | 0.894 |
| | 12.194V | 5.039V | 3.315V | 5.033V | 39.868 | | | | 115.11V |
| 2 | 2.448A | 0.993A | 0.997A | 0.399A | 40.060 | 81.875% | 0 | <6.0 | 0.916 |
| | 12.155V | 5.035V | 3.311V | 5.022V | 48.928 | | | | 115.12V |
| 3 | 3.632A | 1.491A | 1.480A | 0.599A | 59.527 | 86.356% | 0 | <6.0 | 0.940 |
| | 12.151V | 5.030V | 3.306V | 5.011V | 68.932 | | | | 115.12V |
| 4 | 4.886A | 1.991A | 1.992A | 0.800A | 79.954 | 88.592% | 0 | <6.0 | 0.962 |
| | 12.147V | 5.026V | 3.312V | 5.000V | 90.250 | | | | 115.12V |

The results above are not used in the certification process

### 230V

| Test # | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.194A | 0.497A | 0.481A | 0.199A | 19.650 | 49.381% | 0 | <6.0 | 0.602 |
| | 12.190V | 5.030V | 3.317V | 5.024V | 39.793 | | | | 230.23V |
| 2 | 2.450A | 0.996A | 0.996A | 0.399A | 40.079 | 82.700% | 0 | <6.0 | 0.664 |
| | 12.152V | 5.026V | 3.313V | 5.014V | 48.463 | | | | 230.23V |
| 3 | 3.633A | 1.494A | 1.479A | 0.600A | 59.535 | 87.024% | 0 | <6.0 | 0.737 |
| | 12.149V | 5.022V | 3.308V | 5.003V | 68.412 | | | | 230.23V |
| 4 | 4.887A | 1.989A | 1.992A | 0.800A | 79.960 | 89.457% | 0 | <6.0 | 0.808 |
| | 12.146V | 5.028V | 3.313V | 5.003V | 89.384 | | | | 230.23V |

The results above are not used in the certification process

## Ripple Measurements

### 115V

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 12.80mV | 9.30mV | 11.50mV | 11.90mV | Pass |
| 20% Load | 13.50mV | 10.30mV | 13.20mV | 14.70mV | Pass |
| 30% Load | 15.20mV | 11.40mV | 13.20mV | 14.70mV | Pass |
| 40% Load | 16.20mV | 11.80mV | 14.10mV | 16.50mV | Pass |
| 50% Load | 16.30mV | 12.50mV | 15.00mV | 17.80mV | Pass |
| 60% Load | 18.40mV | 12.80mV | 14.30mV | 17.50mV | Pass |
| 70% Load | 18.20mV | 12.80mV | 15.10mV | 19.20mV | Pass |
| 80% Load | 19.40mV | 12.50mV | 15.30mV | 20.40mV | Pass |
| 90% Load | 20.80mV | 13.40mV | 14.90mV | 20.80mV | Pass |
| 100% Load | 26.50mV | 13.80mV | 17.10mV | 23.30mV | Pass |
| 110% Load | 27.70mV | 15.20mV | 17.80mV | 24.00mV | Pass |
| Crossload1 | 16.00mV | 11.20mV | 14.30mV | 14.40mV | Pass |
| Crossload2 | 25.60mV | 13.80mV | 17.00mV | 22.10mV | Pass |

The results above are not used in the certification process

### 230V

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 11.20mV | 8.70mV | 11.30mV | 11.90mV | Pass |
| 20% Load | 11.20mV | 10.20mV | 12.00mV | 13.20mV | Pass |
| 30% Load | 11.90mV | 10.80mV | 12.40mV | 13.20mV | Pass |
| 40% Load | 13.40mV | 11.10mV | 13.10mV | 14.20mV | Pass |
| 50% Load | 13.60mV | 11.60mV | 13.70mV | 15.70mV | Pass |
| 60% Load | 15.30mV | 12.50mV | 14.30mV | 15.50mV | Pass |
| 70% Load | 15.10mV | 12.60mV | 14.60mV | 17.00mV | Pass |
| 80% Load | 16.90mV | 14.00mV | 15.60mV | 17.70mV | Pass |

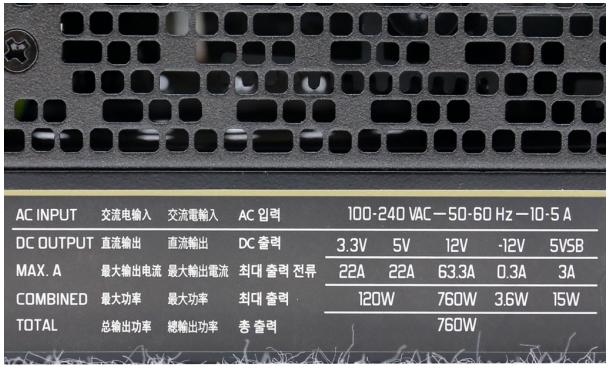
| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 90% Load | 16.90mV | 13.90mV | 15.10mV | 18.10mV | Pass |
| 100% Load | 23.30mV | 14.30mV | 16.40mV | 18.30mV | Pass |
| 110% Load | 23.50mV | 14.50mV | 16.40mV | 19.30mV | Pass |
| Crossload1 | 15.40mV | 11.00mV | 13.50mV | 13.10mV | Pass |
| Crossload2 | 22.20mV | 14.50mV | 15.70mV | 18.50mV | Pass |

The results above are not used in the certification process

## Fractal Design ION+ 760P



Top side




Power specifications label

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CYBENETICS LTD Syrou 6, Latsia, 2231, Nicosia Cyprus

www.cybenetics.com - info@cybenetics.com