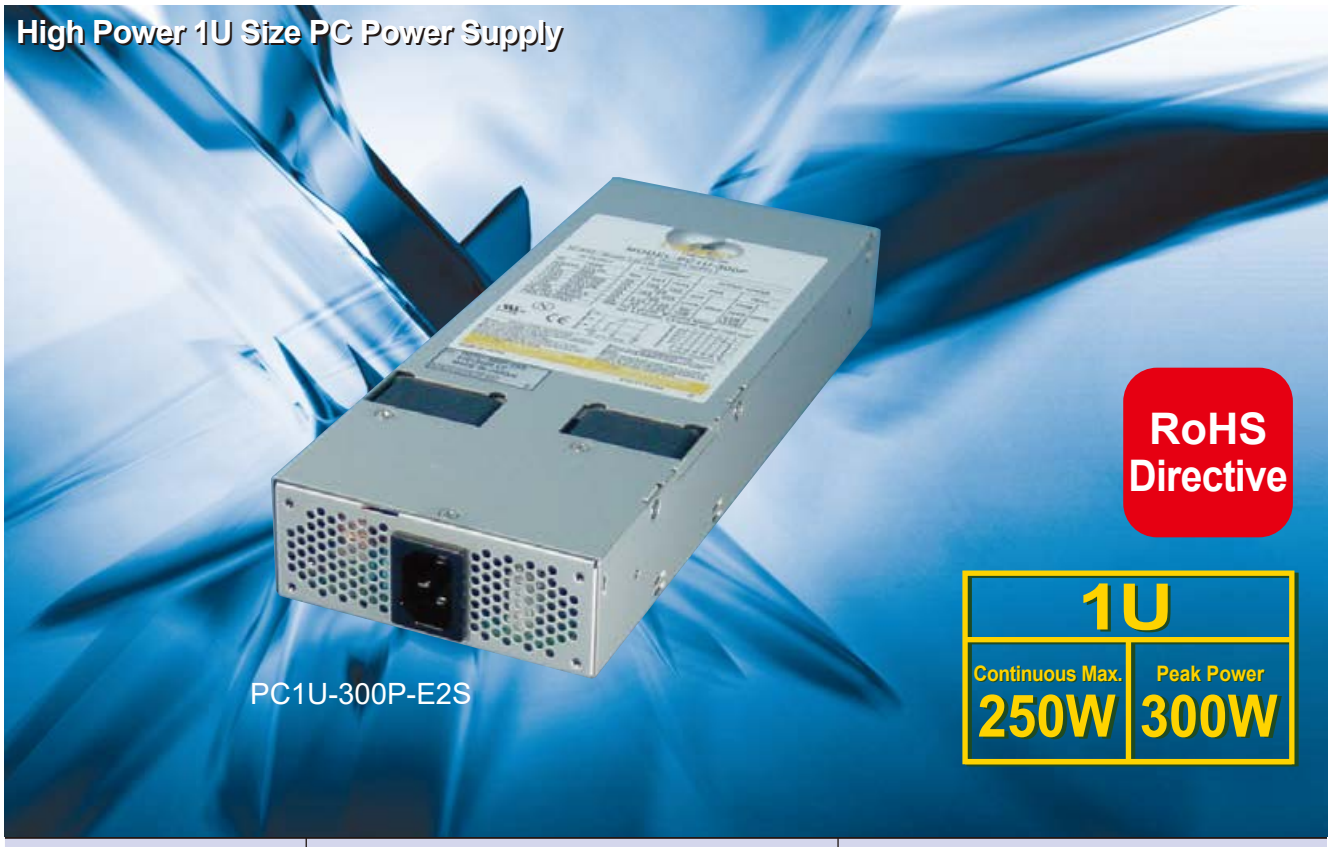
# Rack Mount Power Supply PC1U-300P-E2S




| Model | Description | Stock |
|---|---|---|
| PC1U-300P-E2S | —— | Standard stock |

■Model Name Coding

**PC1U - 300 P - E 2 S**
① ② ③ ④ ⑤ ⑥

1. Series name
2. Output power
3. Peak output compliant
4. EPS output
5. +3.3V output equipped
6. Standard

### Features

- High reliability is reserved due to 77% typ. of high efficiency even mounted in high density environment such as rack servers.
- +12V dual output allows stable CPU operation.
- All output in stable operation even with no load current
- Connector system for output harness enable flexible selection in specification.

**Mass production in motion !**
**Quantity discount is available.**

Refer to “Product Page Guideline” on p.11

| Safety standard / Approval | UL | CSA | EN | CE | CCC |
|---|---|---|---|---|---|
| Reliability Grade | HFA | FA | HOA | OA | |

### Function

DC start | RS 232C | USB | TTL | PFC | Silence | 5VSB FAN | TSFC FAN | Connection | RoHS

### Input

| | |
|---|---|
| *AC input* | 85 - 264V (worldwide range) |

### Output

| *Output voltage* | *+3.3V* | *+5V* | *+12V1* | *+12V2* | *-12V* | *+5VSB* |
|---|---|---|---|---|---|---|
| *Max. current / max. power (continuous)* | 16A | 14A | 16A | 10A | 0.5A | 2A |
| | Total 90W | | Total 216W | | | |
| | Total 250W | | | | | |
| *Peak current / peak power (+12V1: 0.5 sec, Others: 5 sec max.)* | 16A | 16A | 22A | 10A | 0.8A | 2.5A |
| | Total 100W | | Total 264W | | | |
| | Total 300W | | | | | |
| *Min. current* | 0A | 0A | 0A | 0A | 0A | 0A |

### Dimensions

| | |
|---|---|
| W×H×D (mm) | 106×41×260 |

### Output connector (optional component)

Main 20+4pin | Main 24pin | Main 20pin | AT | AUX | 12V 4pin | 12V 8pin | PCI-E 6pin | PCI-E 6+2pin | HDD | S-ATA | FDD

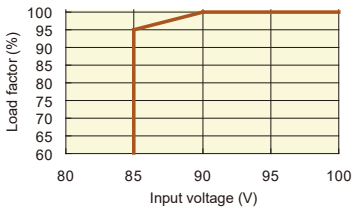
Refer to p.161 “Detachable Output Harness” for details

# General Specification Condition: at normal temperature and humidity unless otherwise specified

| | Items | | Specification | | | | | | Measurement conditions, etc. |
|---|---|---|---|---|---|---|---|---|---|
| AC Input | Rated Voltage | | 100 - 240 VAC (85* - 264 VAC) | | | | | | Worldwide range<br>*Refer to Fig.1 |
| | Input Frequency | | 50 / 60Hz | | | | | | 47 - 63Hz |
| | Efficiency | | 73% typ. (100 VAC), 77% typ. (240 VAC) *Characteristic data: Fig.4 | | | | | | At rated input/output |
| | Power Factor | | 96% typ. (100 VAC), 90% typ. (240 VAC) *Characteristic data: Fig.5 | | | | | | |
| | Inrush Current | | 31A peak (100 VAC), 75A peak (240 VAC) *Characteristic data: Fig.6 | | | | | | At rated output, at cold start (25°C) |
| | Input VA | | 3.4A typ. (100 VAC), 1.4A typ. (240 VAC) *Characteristic data: Fig.5 | | | | | | |
| Output | Rated Voltage | | +3.3V | +5V | +12V1 | +12V2 | -12V | +5VSB | |
| | Rated Current | | 8A | 8A | 8A | 6A | 0.5A | 2A | |
| | Max. Current / Power | | 16A | 14A | 16A | 10A | 0.5A | 2A | Max. output power: 250W |
| | | | 90W max. | | 216W max. | | | | |
| | | | 250W max. | | | | | | |
| | Peak Current / Power | | 16A | 16A | 22A | 10A | 0.8A | 2.5A | Peak output power: 300W<br>Time: 5 sec or less (only +12V1 is 0.5 sec)<br>Duty ratio of repetitive load: 10% or less<br>*Refer to Fig.2 |
| | | | 100W max. | | 264W max. | | | | |
| | | | 300W max. | | | | | | |
| | Min. Current | | 0A | 0A | 0A | 0A | 0A | 0A | |
| | Total Voltage Accuracy (%) | | ±5 max. | ±5 max. | ±5 max. | ±5 max. | ±5 max. | ±5 max. | Total accuracy of temperature, input, and load fluctuations |
| | Max. Ripple Voltage (mVp-p) | | 50 max. | 50 max. | 80 max. | 80 max. | 80 max. | 50 max. | Measured on a test board connected with a 10μF electrolytic capacitor and 0.1μF ceramic capacitor by 100MHz oscilloscope. The test board shall be away from load wire and within 150mm from output terminals. *Characteristic data: Fig.17 |
| | Max. Spike Voltage (mVp-p) | | 100 max. | 100 max. | 200 max. | 200 max. | 200 max. | 100 max. | |
| Protection | Overcurrent Protection | OCP Point (A) | 17 min. | 17 min. | 17 min. | 12 min. | Short protection | | When measuring +12V1 and +12V2, no load on other outputs. Each other outputs are having rated current at the time for measuring other output |
| | | Method | Hold down current limiting → All outputs shutdown except for +5VSB | | | | Hold down current limiting/ All outputs shutdown | | All other output shutdown when +5VSB is shorted. (Automatic recovery) |
| | | Recovery | Reclosing AC input (10 sec min. interval) | | | | Automatic recovery* | | * +5VSB: Or AC input reclosing |
| | Overvoltage Protection | OVP Point (V) | 3.76 - 4.3 | 5.74 - 7.0 | 13.4 - 15.6 | - | - | - | |
| | | Method | All outputs shutdown except for +5VSB | | | - | - | Zener clamp | |
| | | Recovery | Reclosing AC input (10 sec min. interval) | | | | - | | |
| Environment | Operating Temp. / Humidity | | 0 to 60°C* / 10 to 90% | | | | | | *Refer to Fig.3<br>No condensation |
| | Storage Temp. / Humidity | | -20 to 70°C / 10 to 95% | | | | | | No condensation |
| | Vibration | | Acceleration amplitude: 2G (10-55Hz), Sweep cycles: 10, Test duration: 45 minutes each axis | | | | | | JIS-C-60068-2-6, at no operation |
| | Mechanical Shock | | Lift one bottom edge up to 50mm and let it fall. Number of bumps: 3 each of 4 edges | | | | | | JIS-C-60068-2-31, at no operation |
| Insulation | Dielectric Strength | | AC input - DC output/FG: 1500 VAC for 1 minute | | | | | | Cut-off current: 20mA |
| | Insulation Resistance | | AC input - DC output/FG: 50MΩ min. | | | | | | At 500 VDC |
| | Leakage Current | | 0.5mA max. (100 VAC) / 1mA max. (200 VAC) / 1.2mA max. (240 VAC) *Characteristic data: Fig. 7 | | | | | | YEW. TYPE3226 (1kΩ) or equivalent |
| EMC | Line Noise Immunity | | ±2000V (pulse width: 100/1000ns, repetitive cycle: 30-100Hz, normal/common mode with pos./neg. polarity for 10 minutes) | | | | | | Measured by INS-410<br>No fluctuation of DC output or malfunction |
| | Electrostatic Discharge | | EN61000-4-2 compliant | | | | | | |
| | Radiated, Radio-Frequency EM Field | | EN61000-4-3 compliant | | | | | | |
| | Fast Transient Burst | | EN61000-4-4 compliant | | | | | | |
| | Lightning Surge | | EN61000-4-5 compliant | | | | | | |
| | RF Conducted Immunity | | EN61000-4-6 compliant | | | | | | |
| | Magnetic Field Immunity | | EN61000-4-8 compliant | | | | | | |
| | Voltage Dip / Regulation | | EN61000-4-11 compliant | | | | | | |
| | Conducted Emission | | VCCI-B, FCC-B, EN55022-B, CISPR22-B compliant *Characteristic data: Fig.8 and 9 | | | | | | |
| | Harmonic Current Regulation | | IEC61000-3-2 Class D compliant | | | | | | At rated input/output |
| Others | Safety Standards | | UL60950, CSA60950(c-UL), EN60950, EN62368(NEMKO) certified, CE Marking, PSE compliant | | | | | | |
| | Cooling System | | Forced air cooling | | | | | | Fan rotates at low speed depending on the internal temperature of power supply even PS_ON# signal 'H'. |
| | Output Grounding | | Connected chassis (FG)* | | | | | | *It can be customized to connect to capacitor |
| | Output Hold-up Time | | PWR_OK holds up 16ms min. after AC failure. *Characteristic data: Fig.14 | | | | | | At rated output |
| | Reliability Grade | | FA (industrial equipment grade, double-sided PCB with plated through hole) | | | | | | Follow our standard |
| | MTBF | | 70,000H min. | | | | | | Based on EIAJ RCR-9102 |
| | Weight | | 1.25kg typ. | | | | | | |
| | Warranty | | 3 years after delivery. If any faults belong to us, the defective unit shall be repaired or replaced at our cost. | | | | | | Except for errors caused by operation not listed |

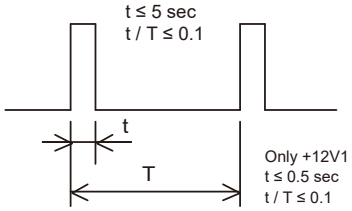
### Fig.1 Derating for Low Input Voltage

When the input voltage is 90 VAC or less, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.



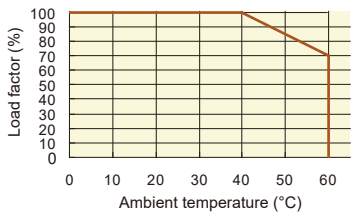

### Fig.2 Duty Ratio

Peak current/power shall be 5* sec or less continuously.
For repetitive loads, duty ratio shall be 10% or less.
*Only +12V1: 0.5 sec or less

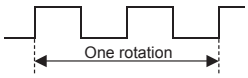



### Fig.3 Temperature Derating

When the ambient temperature (near the airflow inlet) exceeds 40°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.

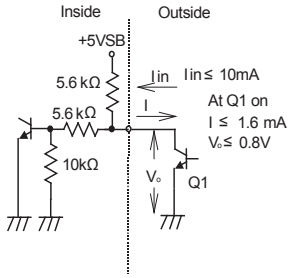


## Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

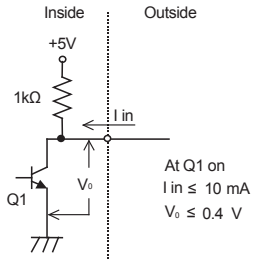
| | Items | Specification | Note |
|---|---|---|---|
| Input Signal | Output ON / OFF Control Signal (PS_ON#) | +3.3V, +5V +12V1, +12V2, and -12V outputs shutdown with 'H' or 'OPEN' input. | Signal input between the pin 2 of MAIN2 connector and COM pin |
| Input Signal | +3.3V SENSE | The input terminal to detect the voltage of +3.3V output; by connecting to the load terminal, only the line drop of the + side of the output cable is compensated. | The pin 4 of MAIN2 connector |
| Output Signal | Normal Output Signal (PWR_OK) | 'H'signal is delivered at normal output (detection delay time: 100 - 500ms). | The pin 3 of MAIN2 connector |
| Output Signal | FAN_M1<br>FAN_M2 | Two cycle pulses per one rotation of the fan motor are delivered (open collector output).<br>Duty ratio of the pulse shall be 0.5 typ.<br>(Interval between the signals becomes longer at low speed and shorter at high speed.)<br>The signal remains 'L' or 'OPEN' when the fan stops caused by any failure or malfunction. | FAN_M1 : The pin 1 of SIG connector<br>FAN_M2 : The pin 2 of SIG connector<br>  |

**Signal Circuit**

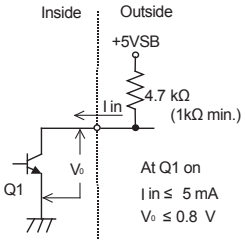
Input Signal Circuit — *(PS_ON#)*



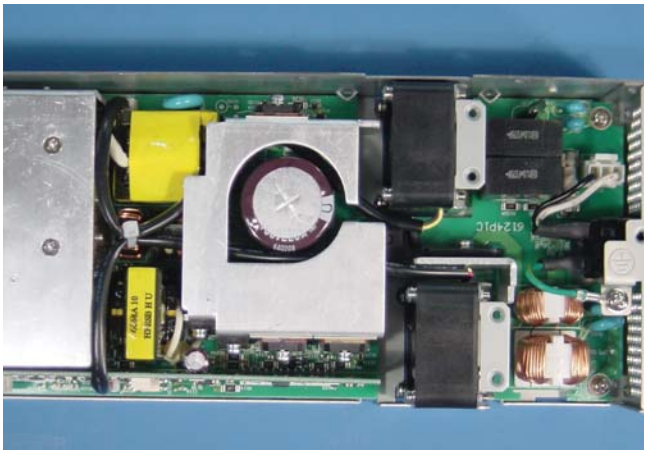

Output Signal Circuit — *(PWR_OK)*



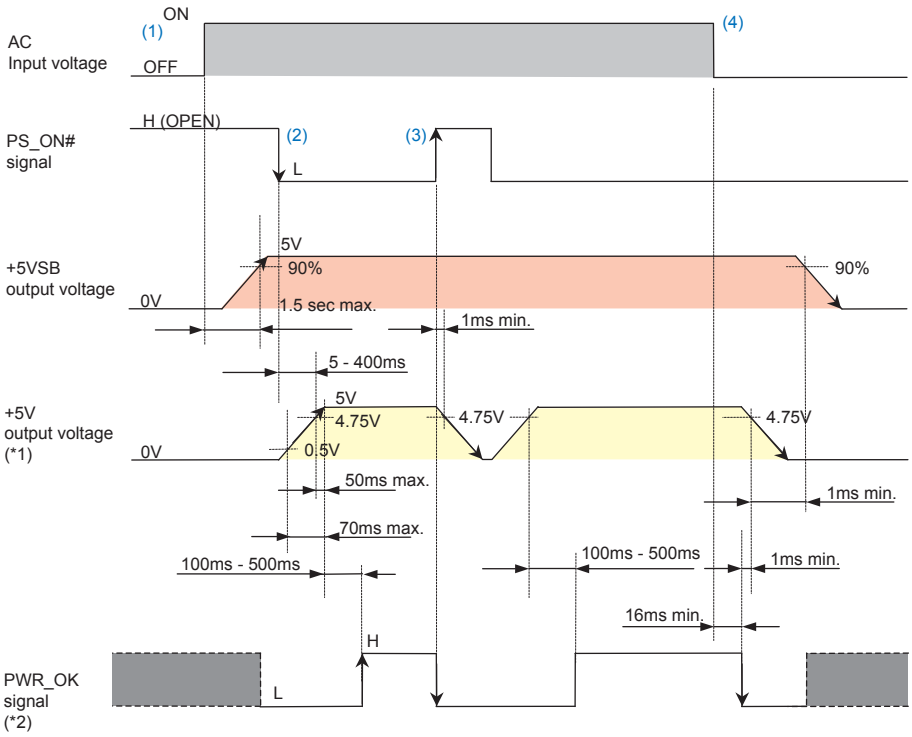

*(FAN M1) (FAN M2)*




## Internal Structure



# Sequence Diagram

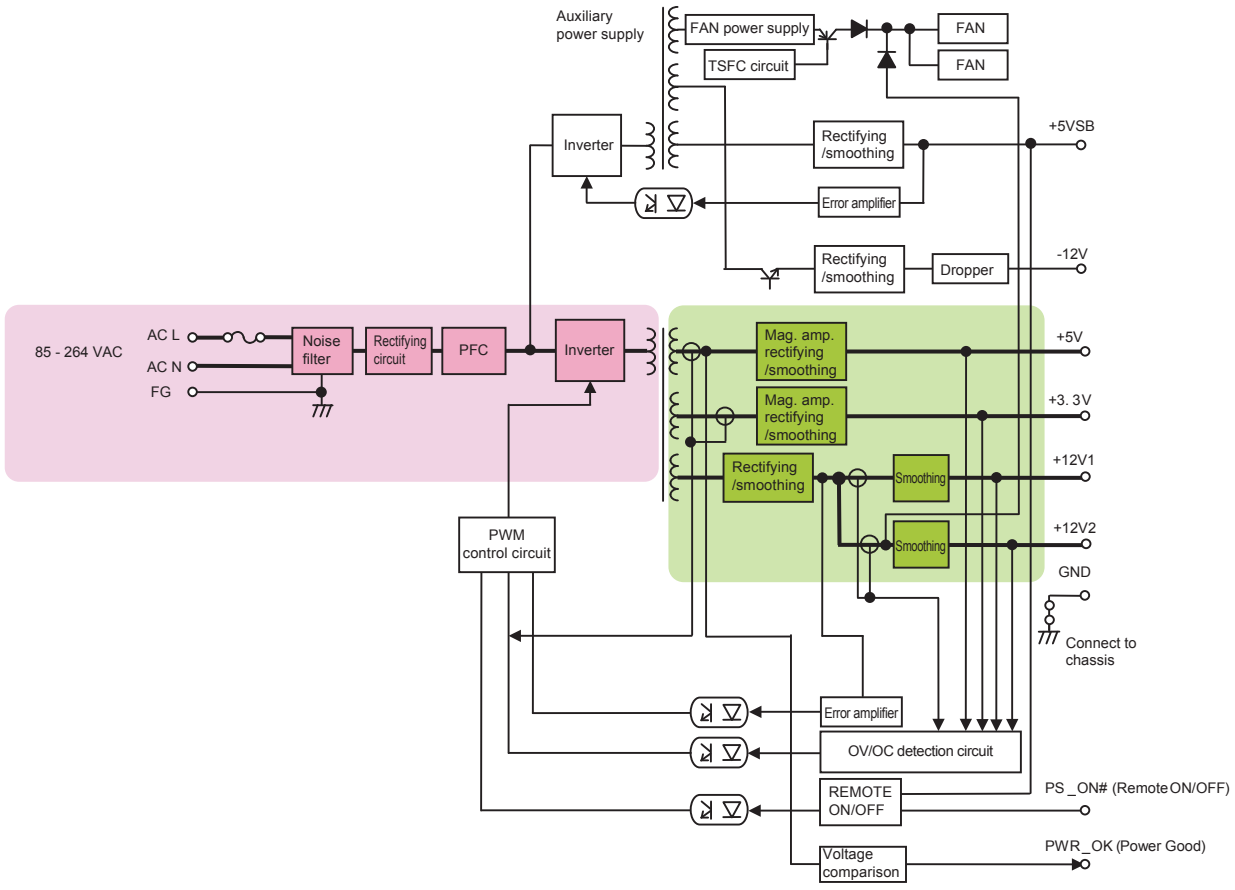



Note 1: All other outputs except for +5V shall follow this timing and the rising time difference from +5V shall be 50ms or less.
In addition, output voltage level of +5V and +12V at rising shall be more than the voltage level of +3.3V.
The difference of output voltage level of +5V and +3.3V should be less than 2.25V .
Each output voltage at the time of trailing rank or level differences are unregulated.
Note2: A rise and a fall time of PWR_OK signal shall be less than 100μs at the time of the capacitive load is not connected to signal output.

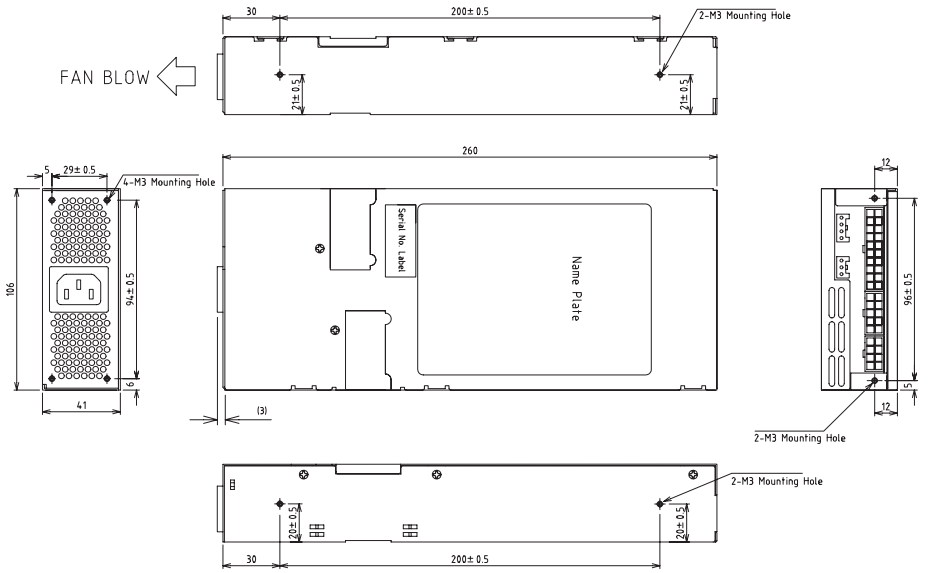
Undefined

(1) With PS_ON# 'H (OPEN)', only +5VSB output starts up at AC input.
(2) All outputs start up at PS_ON# 'L' status. Also, PWR_OK 'H' is delivered 100 - 500ms after +5V has started up.
(3) Upon receipt of PS_ON# 'H' (OPEN), all outputs shutdown except +5VSB.
(4) PWR_OK 'L' is delivered 16ms or later after blackout. +5V and +5VSB outputs shut down 1ms or later than that.

# Block Diagram

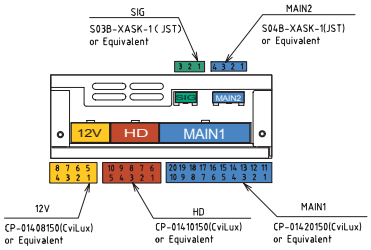


# Outline Drawing




* Dimensional tolerance shall be ± 1mm.
Convex parts such as inlet and connectors are not included.
Driving depth of screws inside power supply shall be 6mm max.

Pin Assignments




MAIN1

| Pin | Signal | MAX CURRENT |
|---|---|---|
| 1 | +3.3 V DC | 6.0A |
| 2 | +3.3 V DC | 6.0A |
| 3 | +5 V DC | 6.0A |
| 4 | +5 V DC | 6.0A |
| 5 | +5 VSB | 2.5A |
| 6 | +12 V2 DC | 6.0A |
| 7 | COM | 6.0A |
| 8 | COM | 6.0A |
| 9 | COM | 6.0A |
| 10 | COM | 6.0A |
| 11 | +3.3 V DC | 6.0A |
| 12 | +3.3 V DC | 6.0A |
| 13 | +5 V DC | 6.0A |
| 14 | +5 V DC | 6.0A |
| 15 | +5 V DC | 6.0A |
| 16 | +12 V2 DC | 6.0A |
| 17 | COM | 6.0A |
| 18 | COM | 6.0A |
| 19 | COM | 6.0A |
| 20 | COM | 6.0A |

12V

| Pin | Signal | MAX CURRENT |
|---|---|---|
| 1 | COM | 6.0A |
| 2 | COM | 6.0A |
| 3 | COM | 6.0A |
| 4 | COM | 6.0A |
| 5 | +12 V1 DC | 6.0A |
| 6 | +12 V1 DC | 6.0A |
| 7 | +12 V1 DC | 6.0A |
| 8 | +12 V1 DC | 6.0A |

HD

| Pin | Signal | MAX CURRENT |
|---|---|---|
| 1 | +3.3 V DC | 6.0A |
| 2 | +5 V DC | 6.0A |
| 3 | COM | 6.0A |
| 4 | COM | 6.0A |
| 5 | +12 V2 DC | 6.0A |
| 6 | +3.3 V DC | 6.0A |
| 7 | +5 V DC | 6.0A |
| 8 | COM | 6.0A |
| 9 | COM | 6.0A |
| 10 | +12 V2 DC | 6.0A |

MAIN2

| Pin | Signal | MAX CURRENT |
|---|---|---|
| 1 | -12 V DC | 0.8A |
| 2 | PS_ON# | 10mA |
| 3 | PWR_OK | 10mA |
| 4 | +3.3 V Sense | 10mA |

SIG

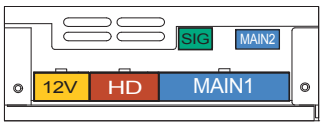
| Pin | Signal | MAX CURRENT |
|---|---|---|
| 1 | FAN-M1 | 5mA |
| 2 | FAN-M2 | 5mA |
| 3 | COM | 10mA |

■Installation direction
The unit can be installed in any directions.

# Optional Components Sold Separately

## Detachable Output Harness

| Model | Length and Type of Connector | |
|---|---|---|
| *Main power cable* MAIN 1 , 2 | | |
| WH6113-13 | MAIN 1 , 2 — 500±15 — 20-pin | |
| WH6113-12 | MAIN 1 , 2 — 500±15 — 24-pin | |
| *12V power cable* 12V | | |
| WH-V0808-500 | 12V — 500±15 — 12V 8-pin | |
| WH-V0408-500 | 12V — 500±15 — 12V 4-pin | |
| WH-VG208-500 | 12V — 500±15 — 12V 4-pin, PCI-E 6-pin | |
| WH-VV208-500-02 | 12V — 500±10 — 12V 8-pin, 12V 8-pin | |
| WH-VG208-500-02 | 12V — 500±10 — 12V 8-pin, PCI-E 6-pin | |
| *HD power cable* HD | | |
| WH-PP610-850 | HD — 550±15, 150±15, 150±15 | peripheral (HD) |
| WH-PS610-850 | HD — 550±15, 150±15, 150±15 | FD |
| WH-PS710-850 | HD — 550±15, 150±15, 150±15, 850±15 | S-ATA |
| *SIG cable* SIG | | |
| WH-S0603-500 | SIG — 500±15 | |
| WH-S0303-500 | SIG — 500±15 | |




Acceptable cable (s)

| MAIN 1 , 2 | 12V | HD | SIG |
|---|---|---|---|
| 1 model | 1 model | 1 model | 1 model |

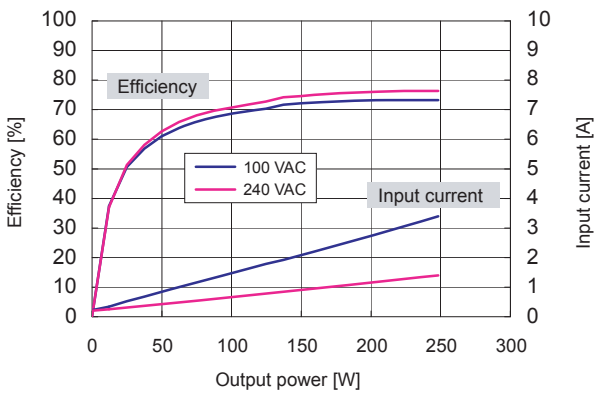
## Optional Components Sold Separately

| Cable | | | |
|---|---|---|---|
| *Picture* | *Model* | *Type* | *Description* |
|  | WH2753 | AC power cord | 125 VAC 12A<br>[PSE] |
|  | WH2753-02 | AC power cord | 125 VAC 12A (tracking resistance type)<br>[PSE] |

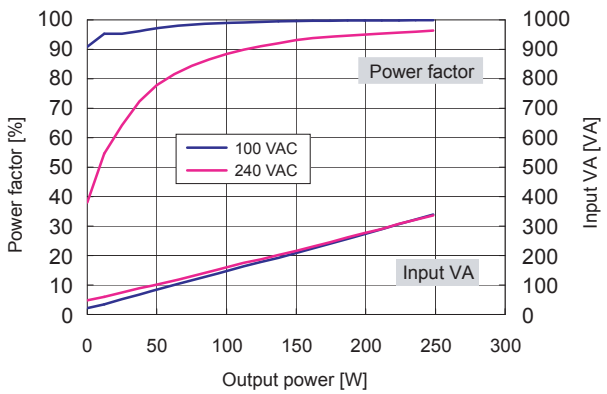
| Other Optional Components | | | |
|---|---|---|---|
| *Model* | *Description* | *Model* | *Description* |
| ACC2637 | Automatic startup unit | WH5105 | 12V 4-pin connector conversion harness (80mm) |
| WH2820 | 20-pin extension harness (600mm) | WH5105-02 | 12V 4-pin connector conversion harness (320mm) |
| WH2747 | 20-pin extension harness (450mm) | WH5055 | AT connector conversion harness |
| WH2892-02 | 20-pin extension harness (200mm) | ACC5046 | Harness with PS_ON switch |
| WH2812 | PCI-E 6-pin connector conversion harness | ACC5077 | PS_ON terminal short connector |
| | | WH5073 | PS_ON terminal short 20-pin harness |

# Characteristics Data (Examples of actual measurement)

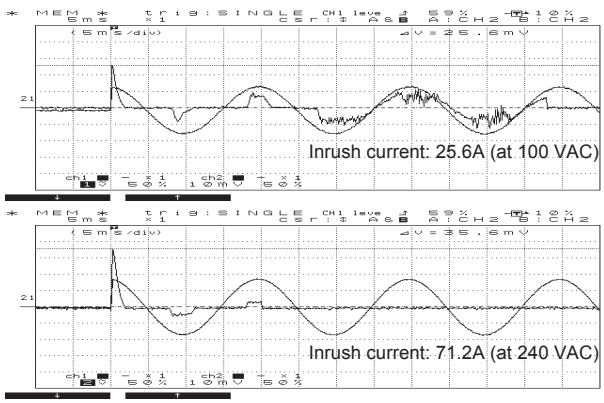
## ● Fig.4 Efficiency / Input Current vs. Output Power




## ● Fig.5 Power Factor / Input VA vs. Output Power




## ● Fig.6 Inrush Current



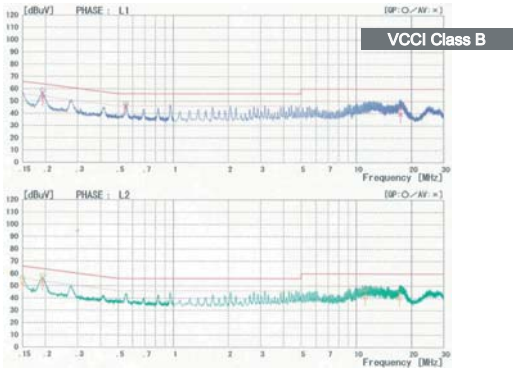

## ● Fig.7 Leakage Current

Input: 100 / 240 VAC
Load: Rated and min. load

| | Rated load | Min. load |
|---|---|---|
| 100 VAC | 0.30mA | 0.32mA |
| 240 VAC | 0.73mA | 0.83mA |

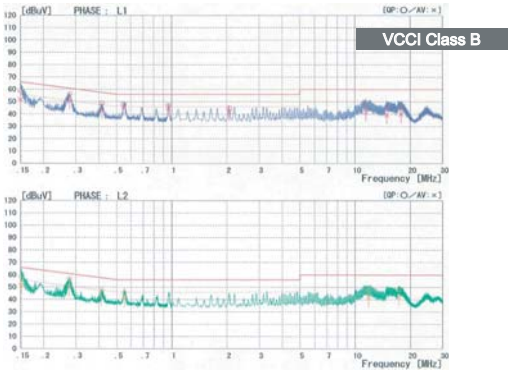
## ● Fig.8 Conducted Emission at 100 VAC

Input: 100 VAC
Load: Rated
Mode: Peak



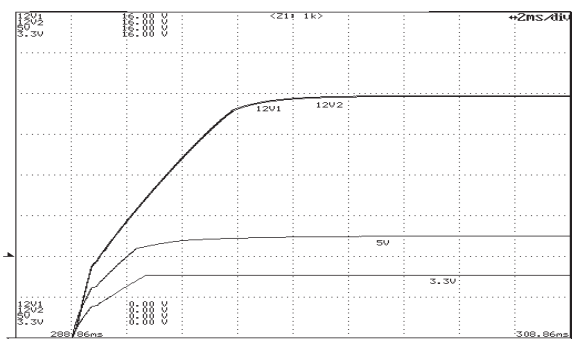

## ● Fig.9 Conducted Emission at 240 VAC

Input: 240 VAC
Load: Rated
Mode: Peak



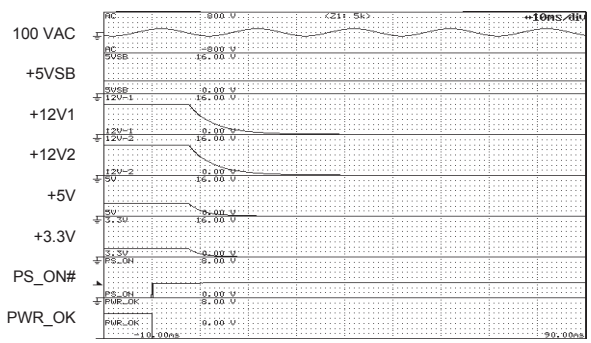

## ● Fig.10 Rising Characteristics at 100 VAC

Input: 100 VAC
Load: Rated
Time axis: 2ms/DIV




## ● Fig.11 Falling Characteristics at 100 VAC when REMOTE goes Off

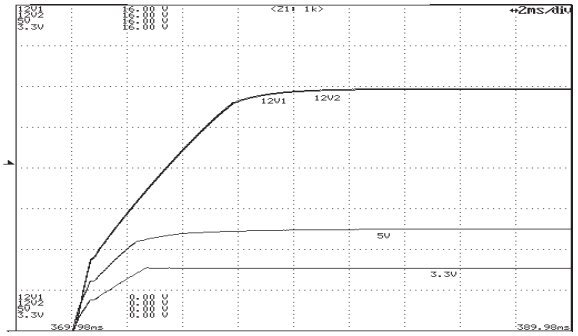
Input: 100 VAC
Load: Rated
Time axis:10ms/DIV



# Characteristics Data (Examples of actual measurement)

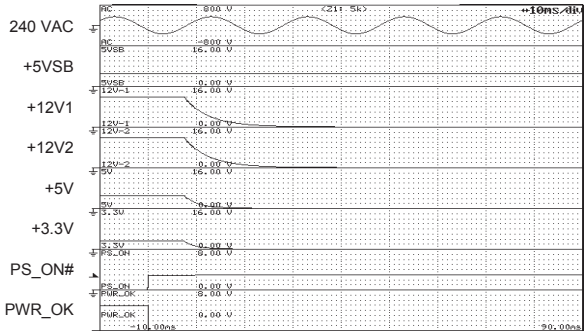
## ● Fig.12 Rising Characteristics at 240 VAC

Input: 240 VAC
Load: Rated
Time axis: 2ms/DIV



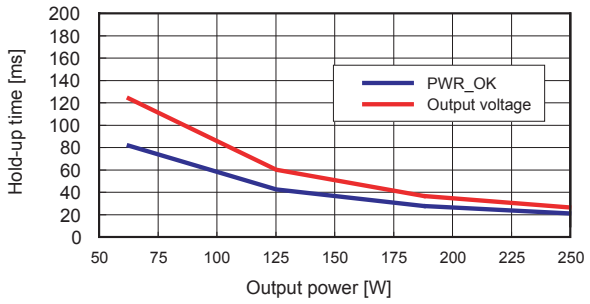

## ● Fig.13 Falling Characteristics at 240 VAC when REMOTE goes Off

Input: 240 VAC
Load: Rated
Time axis: 10ms/DIV



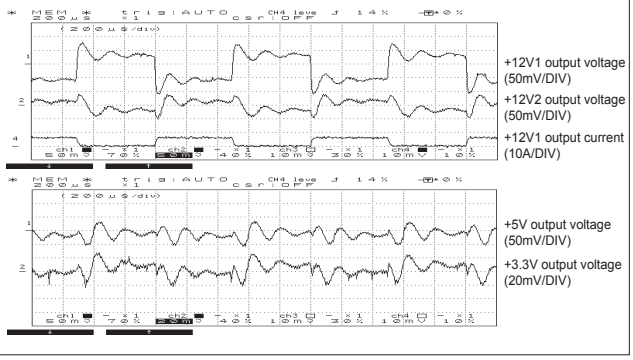

## ● Fig.14 Output Hold-up Time vs. Output Power

PWR_OK: the point that PWR_OK signal goes to "L".
Output voltage: the point any output voltage decreases to 95% except 5VSB.




## ● Fig.15 Dynamic Load Fluctuation Characteristics at 1kHz

Input: 100 VAC
Load: Rated
Time axis: 200μs/DIV



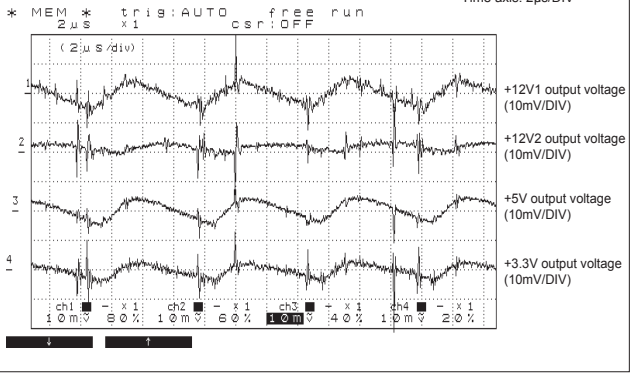

## ● Fig.16 Output Voltage Regulation

| Output | Min. load | Rated load | Peak load |
|---|---|---|---|
| +12V1 output | 0A | 8A | 16A |
| +12V2 output | 0A | 6A | 10A |
| +5V output | 0A | 8A | 14A |
| +3.3V output | 0A | 8A | 16A |

| AC input voltage | 85 VAC | 100 VAC | 132 VAC | 176 VAC | 240 VAC | 264 VAC |
|---|---|---|---|---|---|---|
| +12V1 output (min. load) | 12.009 V | 12.008 V | 12.007 V | 12.007 V | 12.006 V | 12.006 V |
| +12V1 output (rated load) | 11.820 V | 11.818 V | 11.818 V | 11.819 V | 11.818 V | 11.820 V |
| +12V1 output (peak load) | 11.553 V | 11.552 V | 11.553 V | 11.555 V | 11.553 V | 11.554 V |
| +12V2 output (min. load) | 11.998 V | 11.997 V | 11.996 V | 11.995 V | 11.994 V | 11.994 V |
| +12V2 output (rated load) | 11.902 V | 11.900 V | 11.900 V | 11.899 V | 11.900 V | 11.899 V |
| +12V2 output (peak load) | 11.870 V | 11.870 V | 11.869 V | 11.869 V | 11.868 V | 11.869 V |
| +5V output (min. load) | 5.130 V | 5.130 V | 5.130 V | 5.130 V | 5.130 V | 5.130 V |
| +5V output (rated load) | 5.059 V | 5.060 V | 5.060 V | 5.060 V | 5.060 V | 5.060 V |
| +5V output (peak load) | 5.026 V | 5.027 V | 5.026 V | 5.026 V | 5.026 V | 5.026 V |
| +3.3V output (min. load) | 3.326 V | 3.326 V | 3.326 V | 3.326 V | 3.326 V | 3.326 V |
| +3.3V output (rated load) | 3.264 V | 3.264 V | 3.264 V | 3.264 V | 3.264 V | 3.264 V |
| +3.3V output (peak load) | 3.228 V | 3.229 V | 3.229 V | 3.229 V | 3.229 V | 3.229 V |

## ● Fig.17 Ripple and Spike Voltage

Input: 100 VAC
Load: Rated
Time axis: 2μs/DIV




## ● Fig.18 Ambient Temperature vs. Expected Service Life

### ■ Electrolytic capacitors

Input: 85 VAC
Load: Rated
Operating time: 24 consecutive hours

| Intake air temp. | 20°C | 30°C | 40°C |
|---|---|---|---|
| Expected service life (yr) | approx. 20 | approx. 9.9 | approx. 5.0 |

※ Lifetime shall be 15 years at longest due to deterioration of sealing plates.

### ■ Fan

| Ambient temp. | 30°C | 40°C | 50°C | 60°C |
|---|---|---|---|---|
| Expected service life (yr) | approx. 13 | approx. 13 | approx. 8.7 | approx. 5.8 |

## ● Fig.19 Over Current Protection (V-I Characteristic)

Input: 100 VAC