

# Desktop PC Power Supply PCSA-250 Series

Recommended to Customers Who Have a Problem with Discontinued AT Power Supply and Its Troubles

BRAIN Power Supply

Desktop PC Power Supply

Non-backup Power Supply



PCSA-250-H101

| AT                             |                 |
|--------------------------------|-----------------|
| Continuous Max.<br><b>250W</b> | Peak Power<br>— |

| Model          | Description           | Stock          |
|----------------|-----------------------|----------------|
| PCSA-250P-H101 | No fan alarm signal   | Standard stock |
| PCSA-250P-H120 | With fan alarm signal | Standard stock |

|   |  |  |
|---|--|--|
| <b>Model Name Coding</b><br><b>PCSA - 250 - H***</b><br>①      ②      ③ |  | 1. Series name<br>2. Output power<br>3. H101: No fan alarm signal<br>H120: With fan alarm signal |
|---|--|--|

## Features

- With Harness equipped with ON/OFF switch, 'ACC5046', existing AT power supplies can be easily replaced. This model utilizes Remote ON/OFF function.
- PFC (Power Factor Correction) circuit brings high power factor (98% typ.), and worldwide range for input voltage is available.
- With fan alarm signal (PCSA-250-H120)
- Worldwide range
- With AC outlet

Refer to "Product Page Guideline" on p.13

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

## Function

|          |         |     |     |     |         |          |          |            |      |
|----------|---------|-----|-----|-----|---------|----------|----------|------------|------|
| DC start | RS 232C | USB | TTL | PFC | Silence | sVSB FAN | TSFC FAN | Connection | RoHS |
|----------|---------|-----|-----|-----|---------|----------|----------|------------|------|

## Input

Refer to [ ] only for PCSA-250P-H120

|          |                                  |
|----------|----------------------------------|
| AC input | 90 [85] - 264V (worldwide range) |
|----------|----------------------------------|

## Output

| Output voltage                         | +5V          | +12V | -5V  | -12V | +5VSB |
|--|--------------|------|------|------|-------|
| Max. current / max. power (continuous) | 25A          | 12A  | 0.5A | 0.5A | 0.05A |
|  | Total 245W   |      |      |      |       |
|  | Total 253.5W |      |      |      |       |
| Min. current                           | 2A           | 0.5A | 0A   | 0A   | 0A    |

## Dimensions

|            |                        |
|------------|------------------------|
| W×H×D (mm) | 150×86×140 (PS/2 size) |
|------------|------------------------|

## Output connector

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

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

BRAIN  
Power  
Supply

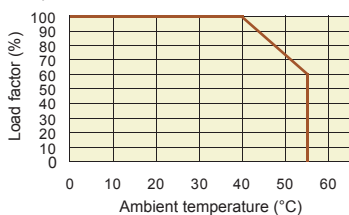
Desktop PC Power Supply

Non-backup Power Supply

| Items                       |  | Specification   |                                       |                    |                            |   | Measurement conditions, etc.   |
|-----------------------------|--|---|---------------------------------------|--------------------|----------------------------|---|--|
| AC Input                    | Rated Voltage  | 115 - 230 VAC [90 [85*] - 264 VAC]<br>*Apply to only PCSA-250-H120 when output power is 200W or less.   |                                       |                    |                            |   | Worldwide range<br>For 253 to 264 VAC range,<br>harmonic current regulation shall be omitted |
|                             | Input Frequency  | 50 / 60Hz   |                                       |                    |                            |   | 47 - 63Hz  |
|                             | Efficiency   | 70% typ. *Characteristic data: Fig.2  |                                       |                    |                            |   | At rated input/output  |
|                             | Power Factor   | *Characteristic data: Fig.3   |                                       |                    |                            |   |  |
|                             | Inrush Current   | 50A peak *Characteristic data: Fig.4  |                                       |                    |                            |   | At rated output (2 sec min. interval)  |
| Input VA                    | At Operation   | 380VA typ. *Characteristic data: Fig.3  |                                       |                    |                            |   | At rated input/output<br>(AC outlet output shall not be used)                                |
|                             | At Standby   | 20VA typ. (115 VAC) / 50VA typ. (230 VAC)   |                                       |                    |                            |   | At remote off (AC outlet output shall not be used)   |
| Output                      | Rated Voltage  | +5V   | +12V                                  | -5V                | -12V                       | +5VSB   |  |
|                             | Rated Current  | 25A   | 10A                                   | 0.5A               | 0.5A                       | 0.05A   |  |
|                             | Max. Current / Power   | 25A   | 12A                                   | 0.5A               | 0.5A                       | 0.05A   | Max. output power: 253.5W  |
|                             |  | 245W max.   |                                       |                    |                            |   |  |
|                             | 253.5W max.  |   |                                       |                    |                            |   |  |
|                             | Min. Current   | 2.0A  | 0.5A                                  | 0A                 | 0A                         | 0A  |  |
|                             | Total Voltage Accuracy (%)   | ±6 max.   | ±13 max.                              | ±6 max.            | ±6 max.                    | ±5 max.   | Total accuracy of temperature, input, and<br>load fluctuations                               |
| Max. Ripple Voltage (mVp-p) | 50 max.  | 120 max.  | 50 max.                               | 120 max.           | -                          | Measured on a test board connected with a 47µF<br>capacitor. The test board shall be away from load<br>wire and within 150mm from output terminals.<br>*Characteristic data: Fig.15     |  |
| Max. Spike Voltage (mVp-p)  | 100 max.   | 170 max.  | 100 max.                              | 170 max.           | -                          |   |  |
| Protection                  | Overcurrent Protection   | OCP Point (A)   | 105% or more of rated output current  |                    |                            | Short protection  |  |
|                             |  | Method  | All outputs except for +5VSB shutdown |                    | Fold back current limiting | Fold back current limiting  | At rated load, except measured output  |
|                             | Recovery   | Reclosing AC input (120 sec min. interval)<br>or switching PS_ON# signal from 'H' to 'L'  |                                       | Automatic recovery |                            | Automatic recovery  |  |
|                             | Overvoltage Protection   | OVP Point (V)   | 5.6 - 7.0                             | -                  | -                          | -   | -  |
| Method                      |  | All outputs shutdown<br>except for +5VSB  |                                       | -                  | -                          | -   |  |
| Recovery                    | Reclosing AC input (120 sec min. interval)<br>or switching PS_ON# signal from 'H' to 'L' |   |                                       |                    |                            |   |  |
| Overheating Protection      | +5V, +12V, -5V and -12V shutdown when heatsink temperature inside rises to 80 to 90°C    |   |                                       |                    |                            | Recovery is performed by AC input reclosing<br>after AC input is turned off while the temp. of<br>heatsink goes down<br>*Or, changing the status of PS_ON# signal<br>immediately resets |  |
| Environment                 | Operating Temp. / Humidity   | 0 to 55°C* / 20 to 90%  |                                       |                    |                            |   | *Refer to Fig.1<br>No condensation   |
|                             | Storage Temp. / Humidity   | -20 to 70°C / 10 to 95%   |                                       |                    |                            |   | No condensation  |
|                             | Vibration  | Displacement amplitude: 0.15mm (10-55Hz), Sweep cycles: 10, Test duration: 30 minutes each axis<br>Acceleration: 1G (55-250Hz), Sweep cycles: 10, Test duration: 30 minutes each axis |                                       |                    |                            |   | At no operation<br>At operation for PCSA-250-H101 only                                       |
|                             | Mechanical Shock   | Acceleration of 98m/s <sup>2</sup> for 20ms one time each in the X, Y and Z directions.<br>No malfunction, damage, loosening or coming-off  |                                       |                    |                            |   | At no operation  |
| Insulation                  | Dielectric Strength  | AC input - DC output/FG: 1500 VAC for 1 minute  |                                       |                    |                            |   | Cut-off current: 20mA max.   |
|                             | Insulation Resistance  | AC input - DC output/FG and DC output - FG: 50MΩ min.<br>DC output - FG: 50MΩ min.  |                                       |                    |                            |   | At 500 VDC   |
|                             | Leakage Current  | 0.25mA typ. (100 VAC) / 0.5mA typ. (200 VAC) *Characteristic data: Fig.5  |                                       |                    |                            |   | At no operation  |
| EMC                         | Line Noise Immunity  | 1200V min. (pulse width: 100/800ns, repetitive cycle: 30-100Hz)   |                                       |                    |                            |   | 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-A compliant *Characteristic data: Fig.6 and 7  |                                       |                    |                            |   | Measured by single unit at rated output  |
|                             | Harmonic Current Regulation  | IEC1000-3-2 compliant   |                                       |                    |                            |   | At rated input/output  |
| Others                      | Safety Standard  | UL1950  |                                       |                    |                            |   | Class I equipment embedded power supply  |
|                             | Cooling System   | Forced air cooling  |                                       |                    |                            |   |  |
|                             | Output Grounding   | Capacitor grounding   |                                       |                    |                            |   |  |
|                             | Output Hold-up Time  | PWR_OK holds up 10ms min. after AC failure *Characteristic data: Fig.12   |                                       |                    |                            |   | At rated output  |
|                             | Reliability Grade  | HOA   |                                       |                    |                            |   | Follow our standard  |
|                             | Weight   | 1.75 kg typ.  |                                       |                    |                            |   |  |
|                             | Warranty   | 1 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 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

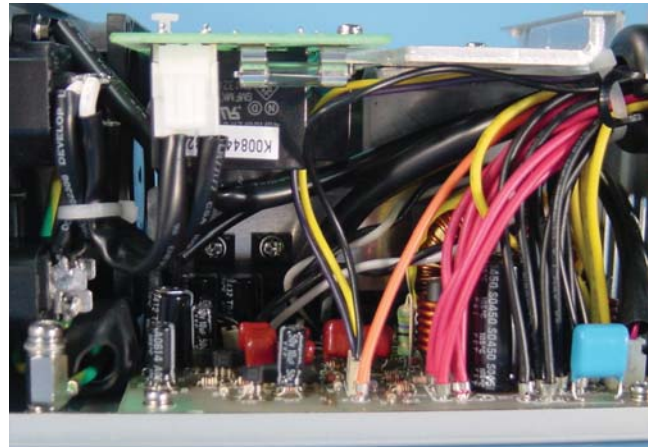
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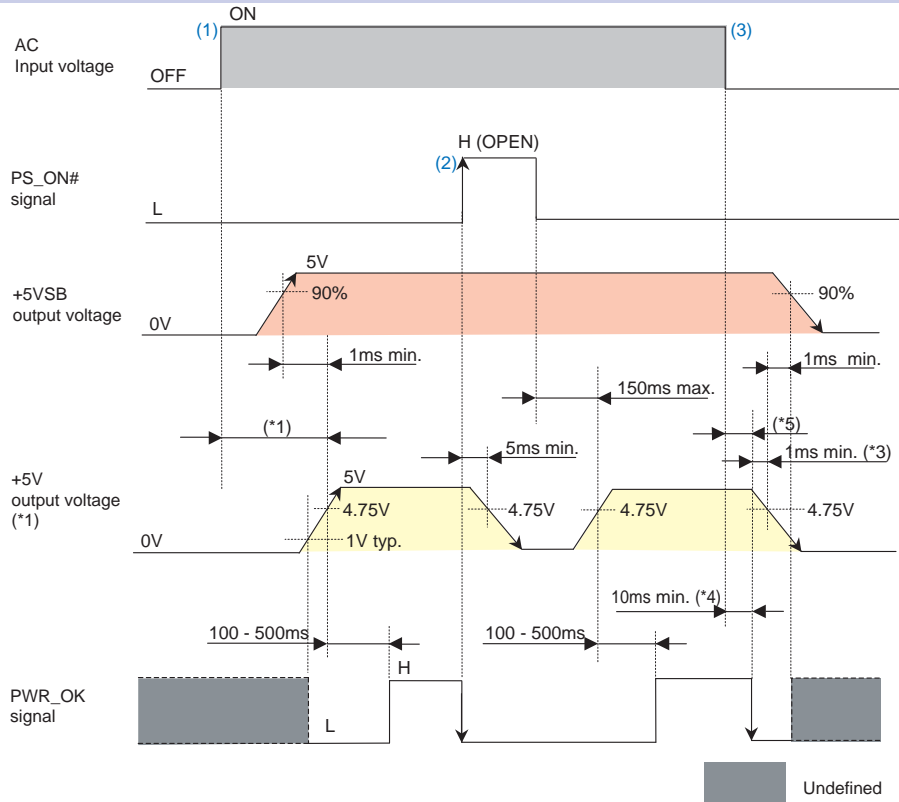
| Items   | Specification   | Note   |
|---|---|--|
| Input Signal<br>Output ON / OFF Control Signal (PS_ON#) | +5V, +12V, -5V, and -12V outputs are delivered with 'L' input.<br>+5V, +12V, -5V, and -12V outputs shutdown with 'H' or 'OPEN' input and, protection circuit is activated to reset locked latch circuit at output shutdown status.  | Signal input between the pin 2 of P9 connector and COM pin |
| Output Signal<br>Normal Output Signal (PWR_OK)          | 'H' signal is delivered when the +5V output is normal (detection delay time: 100 - 500ms).<br>'L' is delivered at normal status. At abnormal mode, pulse signal between 'OPEN' and 'L' is delivered.<br>Open Collector output (pull-up resistor is not required.)<br>Output current: 2mA max. Output voltage: 20V max.<br>When the fan lock status continues, square waves, as shown below, are delivered constantly. | The pin 1 of P1 connector<br>Only PCSA-250-H120            |
|   |   |  |
| Signal Circuit  |   |  |
| Input Signal Circuit<br>(PS_ON#)                        |   | Output Signal Circuit<br>(PWR_OK)                          |
|   |   |  |

## Internal Structure



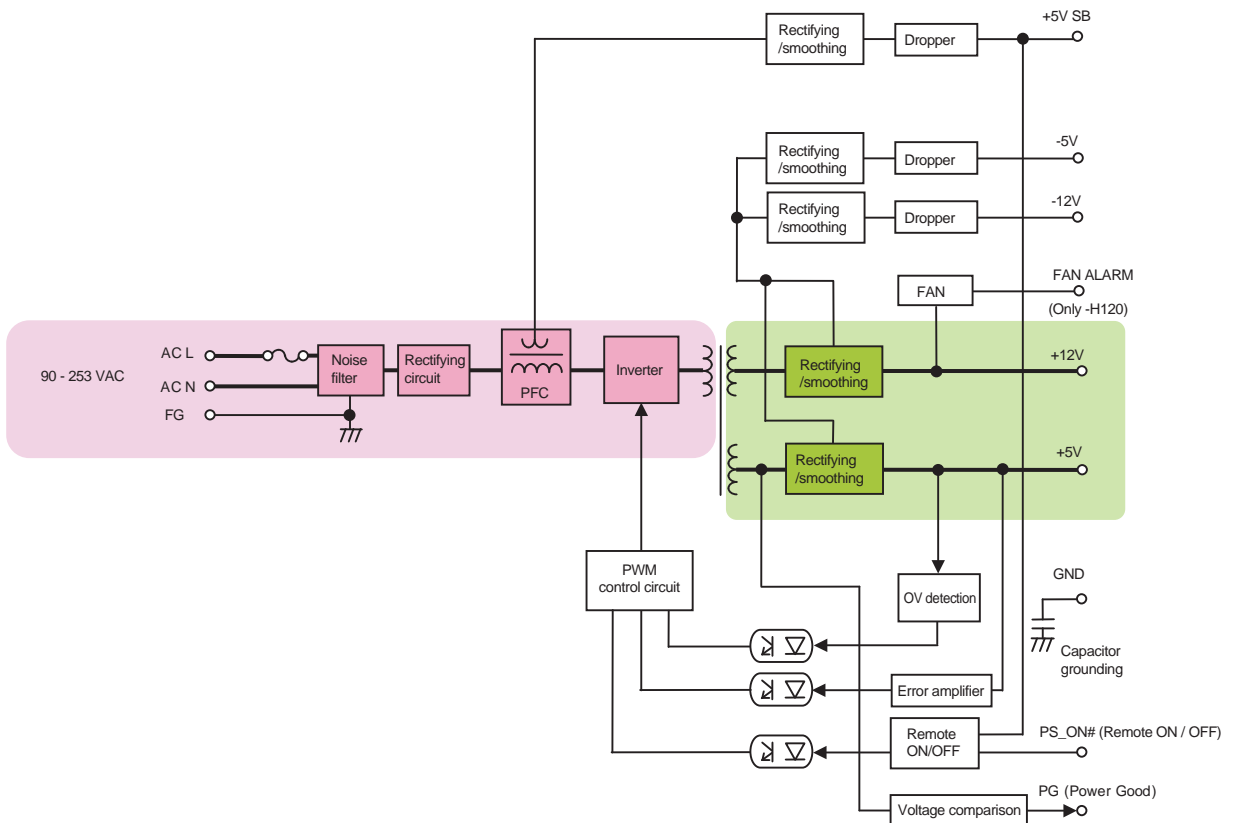
Note: Single-sided PCB with through-holes is adopted to avoid solder cracks.

# Sequence Diagram



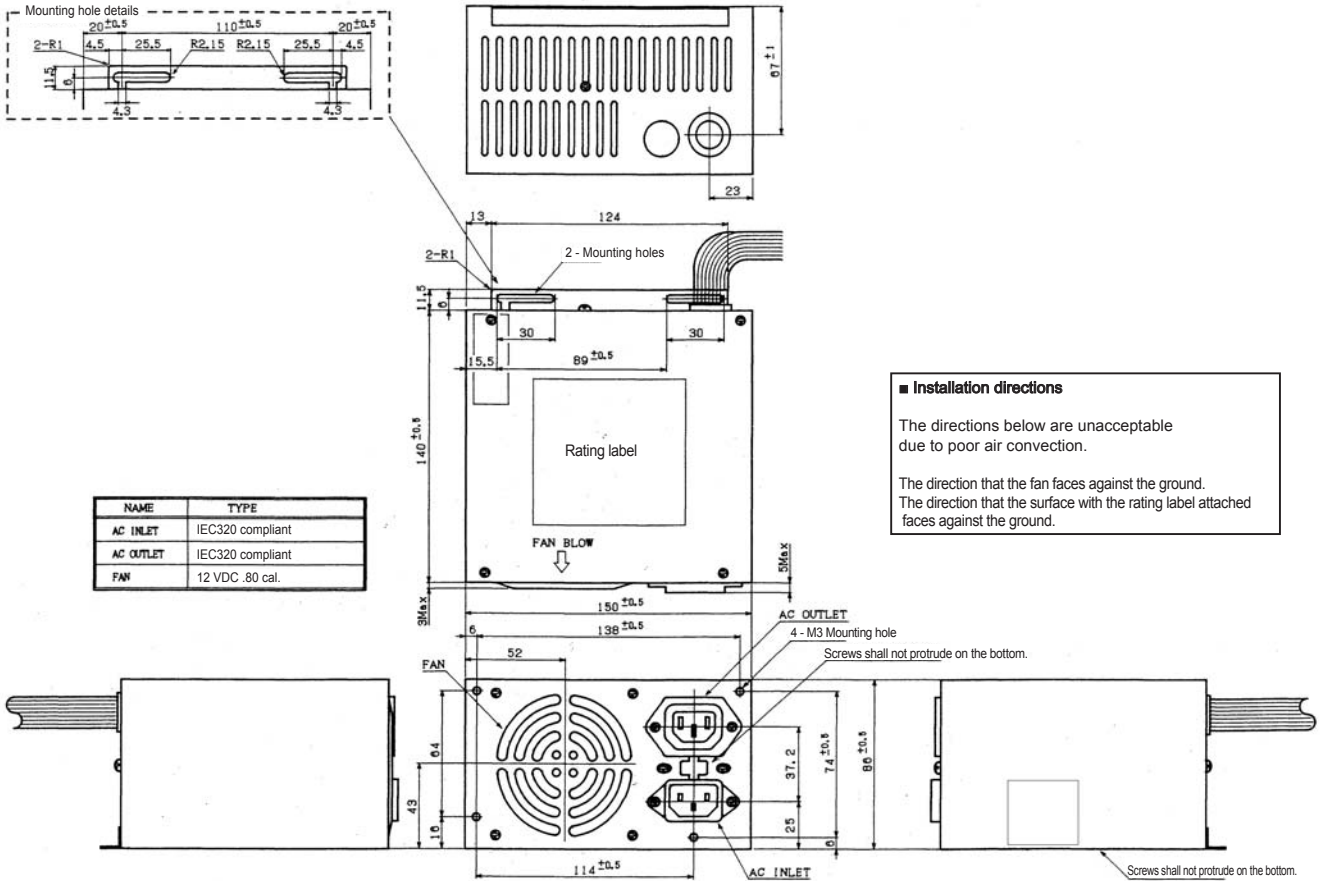
- (\*1) Startup time at 115 VAC input shall be 1800ms typ. and 800ms typ. at 230 VAC input.
- (\*2) All other outputs shall follow this timing except voltage values.
- (\*3) This period shall be 5ms min. at 150W output.
- (\*4) At 150W output, this period shall be 32ms min. for PCSA-250-H101, and 20ms min. for PCSA-250-H120.
- (\*5) For PCSA-250-H101, this period shall be 11ms min. at 253.5W output, and 32ms min. at 125W output.
- (1) All outputs start up by being supplied AC input under the condition of PS\_ON# 'L'. PWR\_OK goes to 'H' at 100 - 500ms after +5V output has risen.
- (2) At PS\_ON# 'H (OPEN)' input, outputs except for +5VSB shut down.
- (3) PWR\_OK turns to 'L' after (\*4) or longer from blackout. 1ms later than this event, the +5V and +5VSB outputs shut down.

# Block Diagram



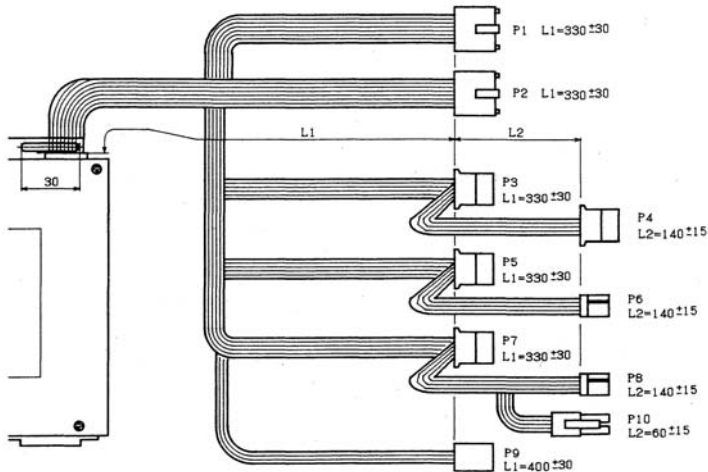
# Outline Drawing

## PCSA-250-H101 / PCSA-250-H120



# Output Harness

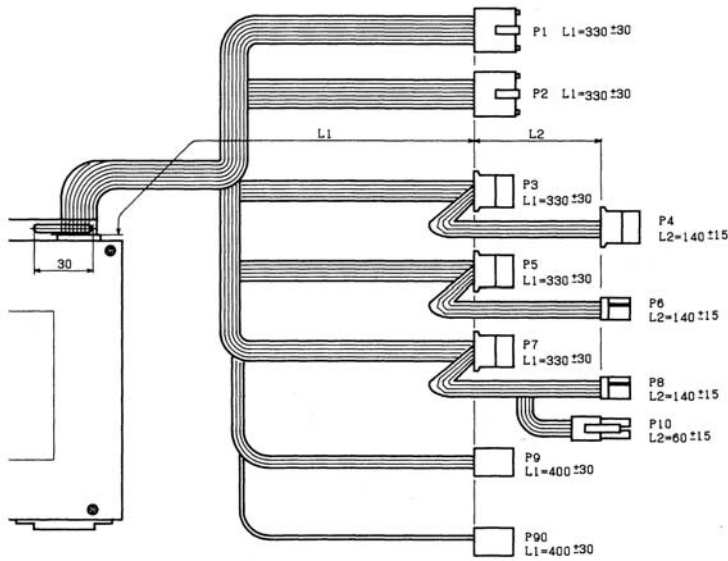
## PCSA-250-H101



| CN NAME        | PIN No. | FUNCTION | WIRE COLOR | WIRE TYPE        | CONNECTOR TYPE  |
|----------------|---------|----------|------------|------------------|---|
| P1             | 1       | PWR_OK   | ORANGE     | UL1007<br>AWG#18 | Housing : C15306S0004(CvILux) or equivalent<br>Terminal : C151T031BE0(CvILux) or equivalent |
|                | 2       | +5V      | RED        |                  |   |
|                | 3       | +12V     | YELLOW     |                  |   |
|                | 4       | -12V     | BLUE       |                  |   |
|                | 5       | COM      | BLACK      |                  |   |
|                | 6       | COM      | BLACK      |                  |   |
| P2             | 1       | COM      | BLACK      | UL1007<br>AWG#18 | Housing : C15306S0001(CvILux) or equivalent<br>Terminal : C151T031BE0(CvILux) or equivalent |
|                | 2       | COM      | BLACK      |                  |   |
|                | 3       | -5V      | WHITE      |                  |   |
|                | 4       | +5V      | RED        |                  |   |
|                | 5       | +5V      | RED        |                  |   |
|                | 6       | +5V      | RED        |                  |   |
| P3,P4<br>P5,P7 | 1       | +12V     | YELLOW     | UL1007<br>AWG#18 | Housing : LCP-04(JST) or equivalent<br>Terminal : SLC22T-2.0(JST) or equivalent             |
|                | 2       | COM      | BLACK      |                  |   |
|                | 3       | COM      | BLACK      |                  |   |
| P6<br>P8       | 4       | +5V      | RED        | UL1007<br>AWG#22 | Housing : 171822-4(AMP) or equivalent<br>Terminal : 170204-1(AMP) or equivalent             |
|                | 1       | +5V      | RED        |                  |   |
|                | 2       | COM      | BLACK      |                  |   |
|                | 3       | COM      | BLACK      |                  |   |
| P10            | 4       | +12V     | YELLOW     | UL1007<br>AWG#22 | Housing : ELP-02V(JST) or equivalent<br>Terminal : SLF-42T-1.3E(JST) or equivalent          |
|                | 1       | COM      | BLACK      |                  |   |
|                | 2       | +12V     | YELLOW     |                  |   |
| P9             | 1       | +5VSB    | YELLOW     | UL1007<br>AWG#22 | Housing : 51030-0330(Molex) or equivalent<br>Terminal : 50084-8029(Molex) or equivalent     |
|                | 2       | PS_ON#   | VIOLET     |                  |   |
|                | 3       | COM      | BLACK      |                  |   |

# Output Harness

PCSA-250-H120



| CN NAME        | PIN No. | FUNCTION  | WIRE COLOR | WIRE TYPE        | CONNECTOR TYPE  |
|----------------|---------|-----------|------------|------------------|---|
| P1             | 1       | PWR_OK    | ORANGE     | UL1007<br>AWG#18 | Housing : C15306S0004(CviLux) or equivalent<br>Terminal : C151T031BE0(CviLux) or equivalent |
|                | 2       | +5V       | RED        |                  |   |
|                | 3       | +12V      | YELLOW     |                  |   |
|                | 4       | -12V      | BLUE       |                  |   |
|                | 5       | COM       | BLACK      |                  |   |
|                | 6       | COM       | BLACK      |                  |   |
| P2             | 1       | COM       | BLACK      | UL1007<br>AWG#18 | Housing : C15306S0001(CviLux) or equivalent<br>Terminal : C151T031BE0(CviLux) or equivalent |
|                | 2       | COM       | BLACK      |                  |   |
|                | 3       | -5V       | WHITE      |                  |   |
|                | 4       | +5V       | RED        |                  |   |
|                | 5       | +5V       | RED        |                  |   |
|                | 6       | +5V       | RED        |                  |   |
| P3,P4<br>P5,P7 | 1       | +12V      | YELLOW     | UL1007<br>AWG#18 | Housing : LCP-04(JST) or equivalent<br>Terminal : SLC22T-2.0(JST) or equivalent             |
|                | 2       | COM       | BLACK      |                  |   |
|                | 3       | COM       | BLACK      |                  |   |
|                | 4       | +5V       | RED        |                  |   |
| P6<br>P8       | 1       | +5V       | RED        | UL1007<br>AWG#22 | Housing : 171822-4(AMP) or equivalent<br>Terminal : 170204-1(AMP) or equivalent             |
|                | 2       | COM       | BLACK      |                  |   |
|                | 3       | COM       | BLACK      |                  |   |
|                | 4       | +12V      | YELLOW     |                  |   |
| P10            | 1       | COM       | BLACK      | UL1007<br>AWG#22 | Housing : ELP-02V(JST) or equivalent<br>Terminal : SLF-42T-1.3E(JST) or equivalent          |
|                | 2       | +12V      | YELLOW     |                  |   |
| P9             | 1       | FAN_ALARM | YELLOW     | UL1007<br>AWG#22 | Housing : 51030-0330(Molex) or equivalent<br>Terminal : 50084-8029(Molex) or equivalent     |
|                | 2       | PS_ON#    | VIOLET     |                  |   |
|                | 3       | COM       | BLACK      |                  |   |
| P90            | 1       | +5VSB     | YELLOW     | UL1007<br>AWG#22 | Housing : 51030-0330(Molex) or equivalent<br>Terminal : 50084-8114(Molex) or equivalent     |
|                | 2       | -         | -          |                  |   |
|                | 3       | -         | -          |                  |   |

## Optional Components sold Separately

| Cable   |           |               |   |
|---------|-----------|---------------|---|
| Picture | Model     | Type          | Description                                     |
|         | WH2753    | AC power cord | 125 VAC 12A [PSE]                               |
|         | WH2753-02 | AC power cord | 125 VAC 12A (tracking resistance version) [PSE] |

| Other Optional Components |  |         |                                |
|---------------------------|--|---------|--------------------------------|
| Model                     | Description                                    | Model   | Description                    |
| WH2812                    | PCI-E 6-pin connector conversion harness       | ACC5046 | Harness with PS_ON switch      |
| WH5105                    | 12V 4-pin connector conversion harness (80mm)  | ACC5077 | PS_ON terminal short connector |
| WH5105-02                 | 12V 4-pin connector conversion harness (320mm) |         |                                |

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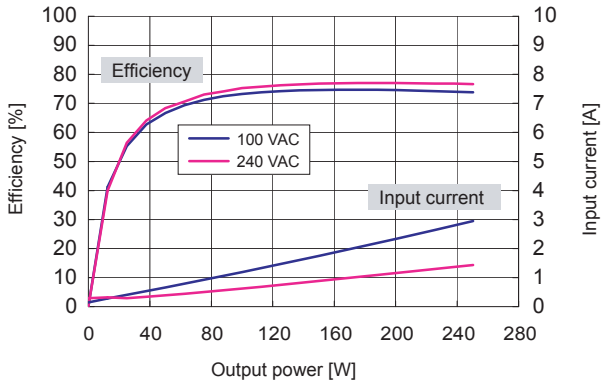
# Characteristics Data PCSA-250-H101 (Examples of actual measurement)

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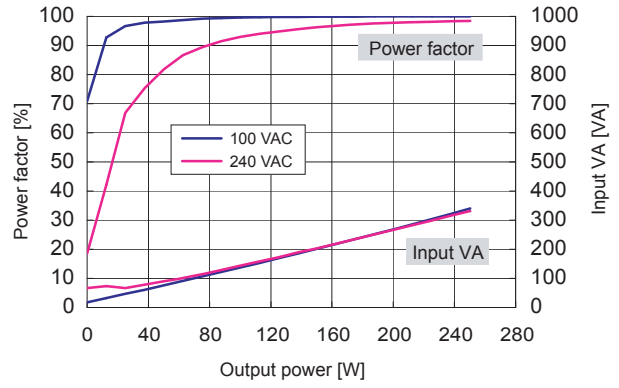
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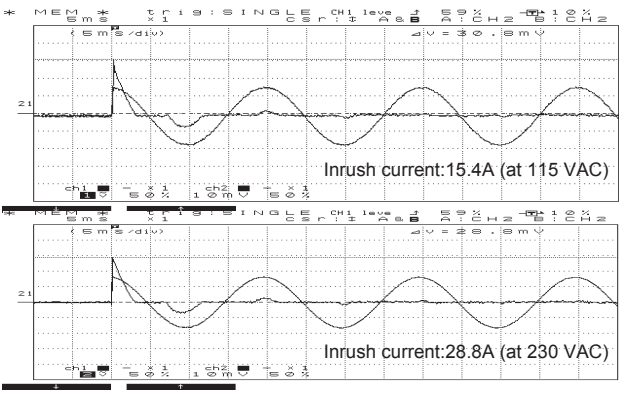
• Fig.2 Efficiency / Input Current vs. Output Power



• Fig.3 Power Factor / Input VA vs. Output Power



• Fig.4 Inrush Current

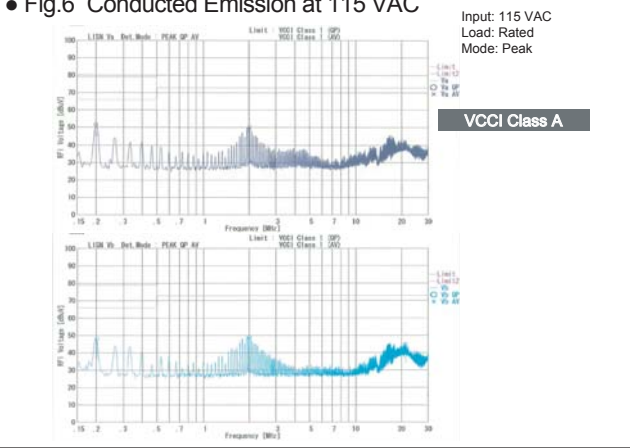


• Fig.5 Leakage Current

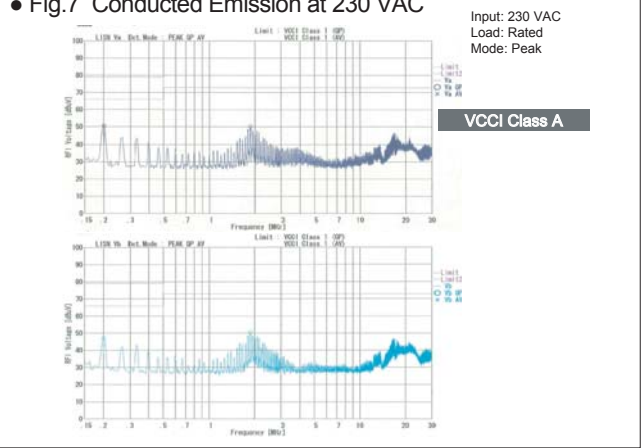
Input: 115 / 230 VAC  
Load: Rated and min. load

|         | Rated load | Min. load |
|---------|------------|-----------|
| 100 VAC | 0.25mA     | 0.24mA    |
| 230 VAC | 0.49mA     | 0.48mA    |

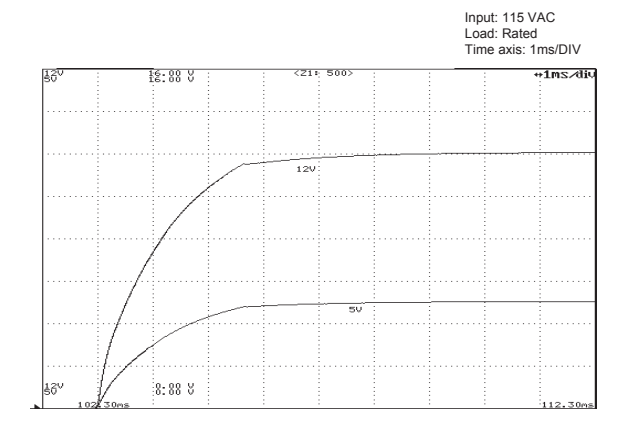
• Fig.6 Conducted Emission at 115 VAC



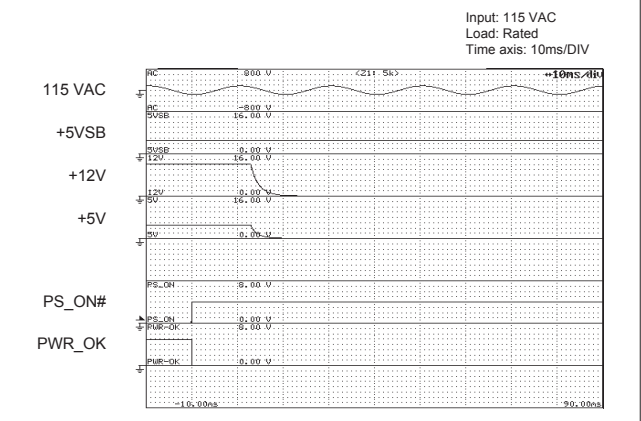
• Fig.7 Conducted Emission at 230 VAC



• Fig.8 Rising Characteristics at 115 VAC

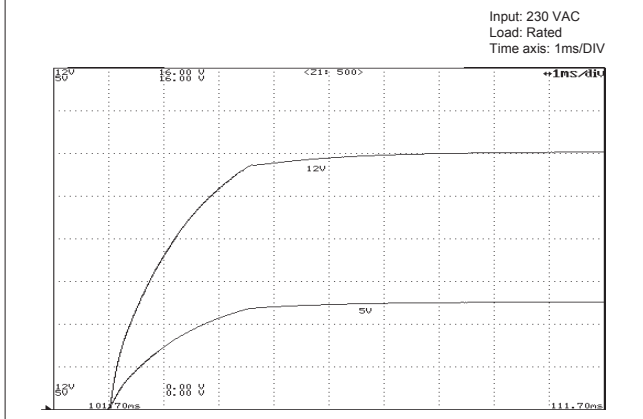


• Fig.9 Falling Characteristics at 115 VAC when REMOTE goes Off

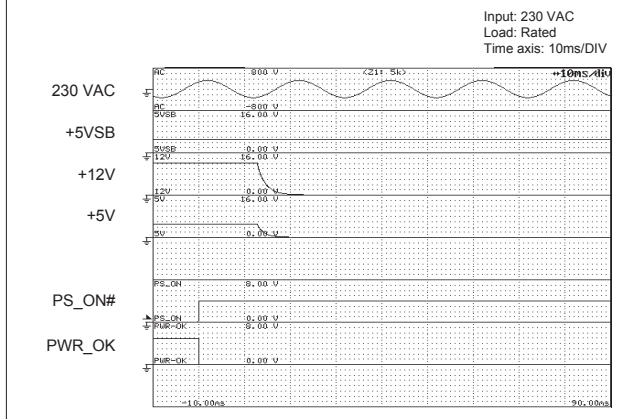


# Characteristics Data PCSA-250-H101 (Examples of actual measurement)

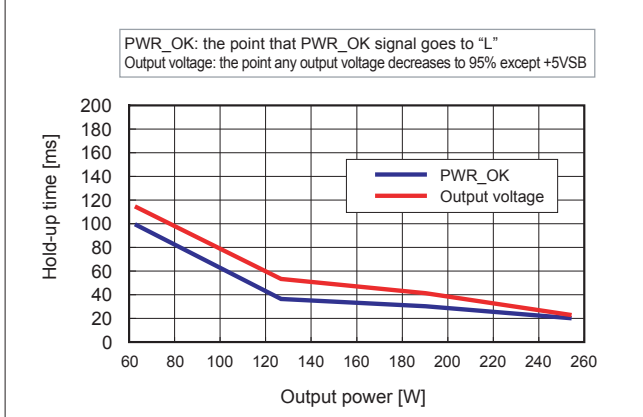
• Fig.10 Rising Characteristics at 230 VAC



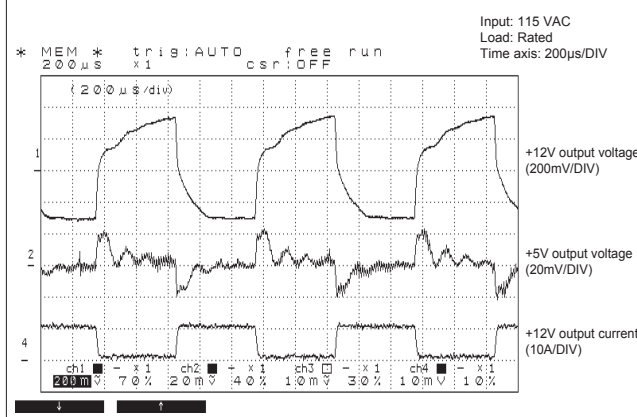
• Fig.11 Falling Characteristics at 230 VAC when REMOTE goes Off



• Fig.12 Output Hold-up Time vs. Output Power



• Fig.13 Dynamic Load Fluctuation Characteristics at 1kHz



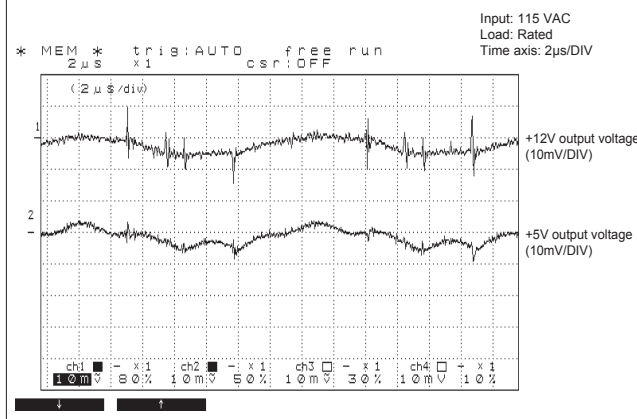
• Fig.14 Output Voltage Regulation

|             | Output    |            |           |  |  |  |
|-------------|-----------|------------|-----------|--|--|--|
|             | Min. load | Rated load | Max. load |  |  |  |
| +12V output | 0.5A      | 10A        | 12A       |  |  |  |
| +5V output  | 2A        | 25A        | 20.2A     |  |  |  |

| AC input voltage         | 85 VAC   | 100 VAC  | 132 VAC  | 176 VAC  | 240 VAC  | 264 VAC  |
|--------------------------|----------|----------|----------|----------|----------|----------|
| +12V output (min. load)  | 11.865 V | 11.865 V | 11.863 V | 11.860 V | 11.860 V | 11.861 V |
| +12V output (rated load) | 12.105 V | 12.103 V | 12.103 V | 12.103 V | 12.104 V | 12.103 V |
| +12V output (max. load)  | 11.866 V | 11.866 V | 11.867 V | 11.867 V | 11.867 V | 11.866 V |
| +5V output (min. load)   | 5.153 V  | 5.153 V  | 5.152 V  | 5.153 V  | 5.153 V  | 5.153 V  |
| +5V output (rated load)  | 5.042 V  | 5.042 V  | 5.042 V  | 5.042 V  | 5.042 V  | 5.042 V  |
| +5V output (max. load)   | 5.042 V  | 5.042 V  | 5.042 V  | 5.042 V  | 5.042 V  | 5.042 V  |

• Fig.15 Ripple and Spike Voltage



• Fig.16 Ambient Temperature vs. Expected Service Life

■ Electrolytic capacitors

Input: 115 VAC  
Load: Rated  
Operating time: 24 consecutive hours

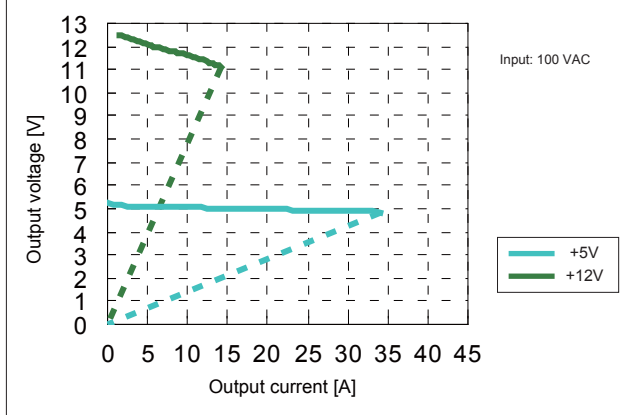
| Intake air temp.           | 20°C       | 30°C       | 40°C       |
|----------------------------|------------|------------|------------|
| Expected service life (yr) | approx. 47 | approx. 23 | approx. 12 |

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

■ Fan

| Ambient temp.              | 20°C        | 30°C        | 40°C        | 50°C        |
|----------------------------|-------------|-------------|-------------|-------------|
| Expected service life (yr) | approx. 8.1 | approx. 8.1 | approx. 8.1 | approx. 8.1 |

• Fig.17 Over Current Protection (V-I Characteristic)



BRAIN Power Supply  
Desktop PC Power Supply  
Non-backup Power Supply