# Product Specification

14 Dec, 2011

## Scope

This specification shall be applied to Embedded type DC stabilized power supply ePCSA-500P-X2C.
All items in the specification shall be specified at normal temperature and humidity unless otherwise specified.

## General Specification

| | Items | Specification | Measurement conditions, etc. |
|---|---|---|---|
| AC Input | Rated Voltage | AC100 to 240V | Universal range<br>Load factor shall be 90 to 100% at AC85 to 90V (refer to output specification).<br>Startup voltage: AC80±10V |
| | Voltage Range | AC85 to 264V | |
| | Rated Frequency | 50 / 60 Hz | Tolerance: 47 to 63Hz |
| | Inrush Current | 31Apeak or less at AC100V, 75Apeak or less at AC240V | at Rated load and cold start (25℃) |
| | Input VA | 513VA max. at AC100V, 487VA max. at AC240V | at Rated Input with continuous max. output power |
| | | 754VA max. at AC100V, 714VA max, at AC240V | at Rated Input with Peak output power |
| | Efficiency | 73% typical at AC100V, 77% typical at AC240V | at Rated load |
| | Power Factor (PF) | 99% typical at AC100V, 97% typical at AC240V | |
| Environmental specification | Operating Temperature | 0～60℃ | Temperature gradient: 15℃/H<br>However, load factor shall be 70 to 100% at 45 to 60℃. |
| | Storage Temperature | -25 to 70℃ | Temperature gradient: 15℃/H |
| | Relative Humidity | 10 to 90% at operation, 10 to 95% at no operation | There shall be no condensation. |
| | Vibration | To endure for 45 minutes in each direction of X, Y, and Z under the condition of Displacement amplitude: 0.075mm、Frequency: 10-55Hz, and Sweep cycle: 10 | To follow JIS-C-60068-2-6 at no operation |
| | Mechanical Shock (Surface dropping) | Lifting one bottom edge of the unit up to 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3 times for each of four bottom edges, and no malfunction shall be observed. | To follow JIS-C-60068-2-31 at no operation |

Note:

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| Drawn by | Checked by | Approved by | Model | Drawing No. |
|---|---|---|---|---|
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| | Items | Specification | Measurement conditions, etc. |
|---|---|---|---|
| Insulation | Dielectric withstand voltage | AC 1500V for 1 minute between AC input and FG/DC output | |
| | Insulation Resistance | 50MΩmin. between AC input and FG/DC output | with DC500V Megger |
| | Leakage Current | 0.5mA max. at AC100V, and 1mA max. at AC200V | YEW. TYPE3226 or equivalent (1kΩ) |
| Others | Electrostatic Discharge | Contact Discharge: ±6kV、10 times | No malfunction shall be observed. To follow IEC61004-4-2 (Test level 3) |
| | Line Noise immunity | ± 2000V for 10 minutes with pulse width of 100/1000nS 、 cycle period of 30 to 100Hz, positive/negative polarity, normal/common mode pulse | Measured with INS-410 No fluctuation in DC factor and no malfunction shall be observed. |
| | Impulse voltage immunity | 5 times for each of Common mode ±2kV, Normal mode ±1kV, and Pulse width 1.2×50μS | No malfunction shall be observed to follow IEC-61000-4-5 Installation environment Class 3) |
| | Conducted emission | To meet VCCI Class B, FCC Class B, and EN55022 Class B | To be measured with single power supply body |
| | Harmonic Current Regulation | To comply with IEC61000-3-2 (Ver. 2.1) Class D and EN61000-3-2 (A14) Class D | at Rated input and Rated load |
| | Safety Standards | UL60950, CSA C22.2 No.60950 EN60950, CCC(S&E) | Acquired |
| | Cooling system | Forced air cooling with self-contained fan motor to control fan speed by detecting inside temperature | Fan speed varies due to operating temperature and load condition (Note 1). |
| | | Equipped with function to switch modes between low speed and high speed by the slide switch on upper side of front panel. | Low speed mode is factory setting. Speed at high-speed mode is fixed. |
| | Reliability Grade | FA | To follow internal grade |
| | Weight | 1.8kg typical | |
| | Warranty | Three years after delivery. If any fault belongs to us, we will repair or replace at our cost. | Provided that the unit shall be operated under normal temperature and humidity. |
| | Global Environment Conservation | RoHS compliance | |

Note:

Note 1: The fan operates with low fan speed only when the inside temperature goes high while the power supply stops operation due to PS_ON# signal.

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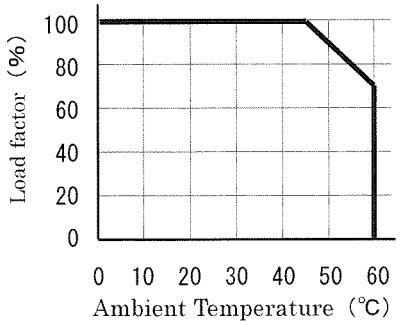
## Output Specification

| Items | | | CH1 | CH2 | CH3 | CH4 | CH5 (5VSB) | Measurement conditions, etc |
|---|---|---|---|---|---|---|---|---|
| DC Output | Rated Voltage | | 3.3V | 5V | 12V | -12V | 5V | |
| | Minimum Current | | 0A | 0A | 0A | 0A | 0A | To secure voltage accuracy |
| | Rating | Rated Current | 11.5A | 16A | 18A | 0.5A | 2A | Total rated output power: 350W |
| | | Rated Output Power | 38W | 80W | 216W | 6W | 10W | |
| | Continuous max. power | Max. Current | 20A | 22A | 22A | 0.5A | 2A | Total continuous max. output power: 350W |
| | | Continuous output power | 160W max. | | 264W max. | 6W | 10W | |
| | | | 334W max. | | | | | |
| | Peak Power | Max. Current | 30A | 33A | 30A | 0.5A | 2.5A | Total peak output power: 500.5W for the duration of 5 seconds max. and duty ratio shall be 10% max. when repeatedly operated (refer to the drawing below). |
| | | Peak output power | 200W max. | | 360W max. | 6W | 12.5W | |
| | | | 482W max. | | | | | |

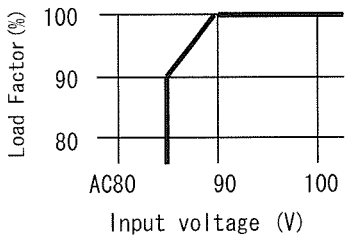
Output Derating against ambient temperature

When ambient temp. near air intake area exceeds 45℃ follow the drawing below to derate rated current/power, continuous max. current/power and peak max. current/power.



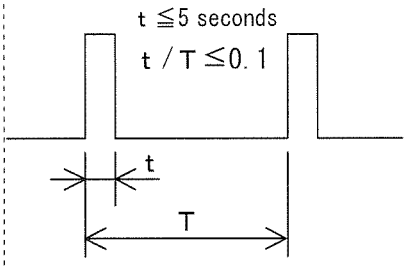

Output derating against Input voltage

When Input voltage is AC 90V or less, follow the drawing below to derate rated current/power, continuous max. current/power, and peak max. current/power.




Duty ratio at Peak max. current/power

Duration for continuous max. current/power shall be 5 seconds max., and duty cycle shall be 10% max. when repeatedly operated.




Note:

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| Drawn by | Checked by | Approved by | Model | Drawing No. |
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| Items | | | CH1 | CH2 | CH3 | CH4 | CH5 | Measurement conditions, etc. |
|---|---|---|---|---|---|---|---|---|
| Output characteristics | Total voltage accuracy (%) | | ±4 max. | ±4 max. | ±5 max. | ±5 max. | ±5 max. | Total fluctuation due to change of Temp., Input voltage and Load. |
| | Max. Ripple voltage ($mV_{p-p}$) | | 50 max. | 50 max. | 120 max. | 120 max. | 50 max. | Connect lead wires to output connector, and then connect a 10uF capacitor and a 0.1uF ceramic capacitor to the other ends to measure. |
| | Max. Spike voltage ($mV_{p-p}$) | | 100 max. | 100 max. | 170 max. | 170 max. | 100 max. | |
| | Rising time | | 0.1ms min. to 70ms max. | | | | | Time for output voltage rises from 10% to 95% of rated voltage |
| Protection Circuit | Over Current protection | OCP point (A) | 31 min. | 34 min. | 31 min. | 105% min. of Peak max. current | | Other outputs are to be rated load with rated input voltage. |
| | | Method | All outputs shutdown except CH5 | | | Foldback | Same as CH1, CH2 and CH3 | |
| | | Recovery | Reclosing of AC input, or make PS_ON# signal "H", then "L" | | | Automatic recovery | | |
| | Over voltage protection | OVP point (V) | 3.76 to 4.3 | 5.74 to 7.0 | 13.4 to 15.6 | — | — | |
| | | Method | All outputs shutdown except CH5 | | | — | — | |
| | | Recovery | Reclosing of AC input, or make PS_ON# signal "H", then "L" | | | — | — | |

Note:

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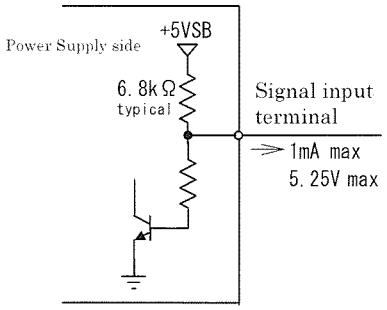
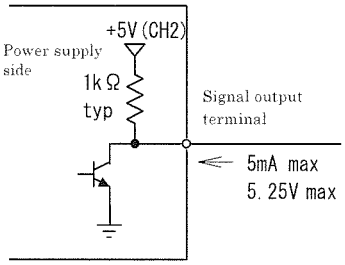
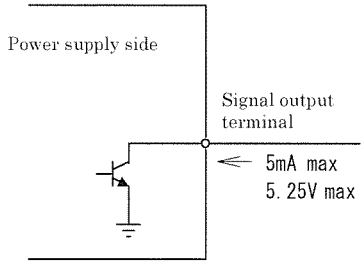
Signal Input/Output Specification

| | Items | Specification | Circuit diagram |
|---|---|---|---|
| Input Signal | Output ON/OFF control signal (PS_ON#) | When 'H' or 'OPEN' signal is received, CH1 to CH4 come to shutdown. |  ('L'≦0.8V,2.0V≦'H') |
| | +3.3V SENSE | Signal terminal for CH1(+3.3V) output voltage detection<br>Connecting to the load end compensates the line drop of the positive side of output wires. | |
| Output Signal | Normal Output signal (PWR_OK) | 'H' signal is delivered when output is normal.<br>(Detection delay time: 100 to 500ms) |  ('L'<0.4V) |
| | Fan Monitoring signal (FAN M) | Two-cycle pulse waveform per one rotation of fan motor is delivered. |  ('L'<0.4V) |

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| Drawn by | Checked by | Approved by | Model | Drawing No. |
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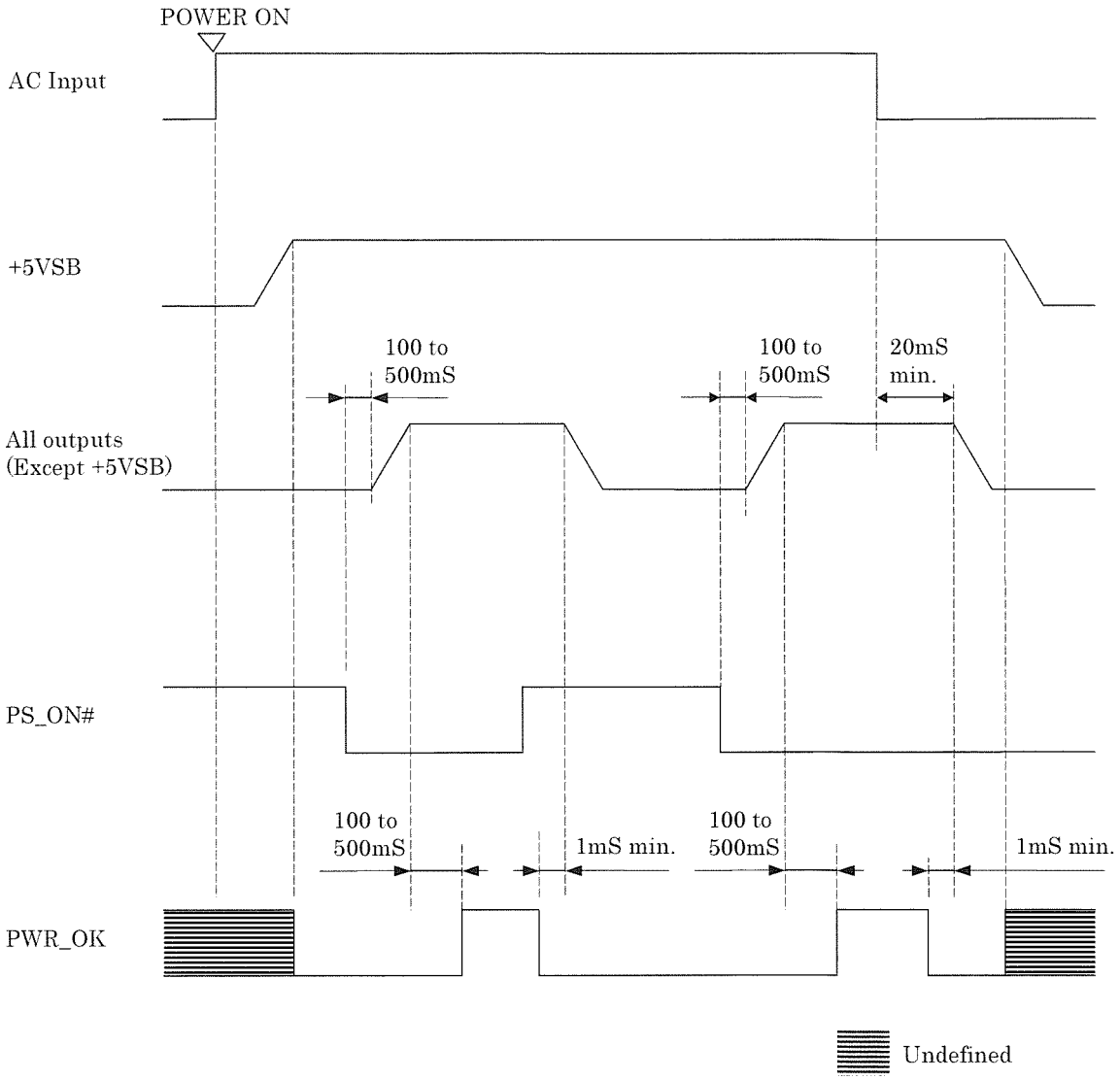
## Signal Input/Output Specification

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| Drawn by | Checked by | Approved by | Model | Drawing No. |
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| Yodo | Yamada | Yamamoto | ePCSA-500P-X2C | ３０８７－０１－４－５２０ 6／8 |

Current ratings of output connector pins

The maximum allowable continuous current for each of output connector pins is shown in the following table. The sum of the shared currents for the same output must be less than the maximum current specified for eacth output.

| Connector | Pin | Output | Max. current |
|---|---|---|---|
| MAIN | 1 | +3.3V SENSE | 10mA |
| | 2 | +3.3V | 6.0A |
| | 3 | GND | 6.0A |
| | 4 | +5V | 6.0A |
| | 5 | GND | 6.0A |
| | 6 | +5V | 6.0A |
| | 7 | GND | 6.0A |
| | 8 | PWR_OK | 5mA |
| | 9 | +5VSB | 2.5A |
| | 10 | +12V | 6.0A |
| | 11 | +12V | 6.0A |
| | 12 | +3.3V | 6.0A |
| | 13 | +3.3V | 6.0A |
| | 14 | -12V | 0.5A |
| | 15 | GND | 6.0A |
| | 16 | PS_ON# | 1mA |
| | 17 | GND | 6.0A |
| | 18 | GND | 6.0A |
| | 19 | GND | 6.0A |
| | 20 | NC | — |
| | 21 | +5V | 6.0A |
| | 22 | +5V | 6.0A |
| | 23 | +5V | 6.0A |
| | 24 | GND | 6.0A |

| Connector | Pin | Output | Max. Current |
|---|---|---|---|
| 12V | 1 | GND | 7.0A |
| | 2 | GND | 7.0A |
| | 3 | GND | 7.0A |
| | 4 | GND | 7.0A |
| | 5 | +12V | 7.0A |
| | 6 | +12V | 7.0A |
| | 7 | +12V | 7.0A |
| | 8 | +12V | 7.0A |
| HD | 1 | +3.3V | 7.0A |
| | 2 | +5V | 7.0A |
| | 3 | GND | 7.0A |
| | 4 | GND | 7.0A |
| | 5 | +12V | 7.0A |
| | 6 | +3.3V | 7.0A |
| | 7 | +5V | 7.0A |
| | 8 | GND | 7.0A |
| | 9 | GND | 7.0A |
| | 10 | +12V | 7.0A |
| SIG | 1 | NC | — |
| | 2 | NC | — |
| | 3 | NC | — |
| | 4 | NC | — |
| | 5 | FAN M | 5mA |
| | 6 | PS_ON# | 1mA |
| | 7 | GND | 2.0A |
| | 8 | +3.3V SENSE | 10mA |
| | 9 | NC | — |
| | 10 | +5VSB | 2.0A |

Note: +3.3 V SENSE input signal at pin 8 of SIG connector is detected prior to the same signal at pin 1 of Main connector when both inputs are used. When the pin 8 of SIG connector is not used, the signal status at pin 1 of MAIN connector is detected.

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|---|---|---|---|---|
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Warnings and Cautions on operation

1. WARNING: Grounding
   This power supply is designed safety class I apparatus. For operator safety, be sure to ground the power supply by connecting the Earth terminal to earth ground.
2. WARNING: Electrical shock hazards
   This power supply is designed as embedded products for system. High potentials exist inside the power supply. When integrating the power supply into an instrument or system, use appropriate safe procedure to avoid electrical shock hazards.
3. CAUTION: Do not short the DC outputs of the power supply. Shorting the outputs makes internal Capacitors quickly discharge and cause dangerous spark and heat generation that may result in Serious accident such as fire. Furthermore, it will shorten the operating life of power supply.

4. CAUTION: Power on procedure to prevent harmful inrush current.
   To restrict the surge current into smoothing capacitor, a power thermistor is used inside the Unit. If AC input is re-entered soon without allowing the power thermistor to cool down after The AC input was disconnected before, and excessive surge current may flow into the power supply. Be sure to allow at least 60 seconds before the re-entry of AC input.

5. Note: Audible power-on noise
   There is possibility that, when the power supply starts up by remote ON/OFF signal, it generates Audible noise for a moment. This noise is caused by a low frequency transient vibration of choking inductor (used for harmonic current suppression) or of another component. The noise does not affect the operating characteristics and operating life of the power supply.

6. Note: Hold the main unit for carrying the power supply.
   Do not grasp the output cables to hand the unit when carrying the power supply. Doing so will Damage the output cables and connectors. Hold the main unit when carrying the power supply.

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|---|---|---|---|---|
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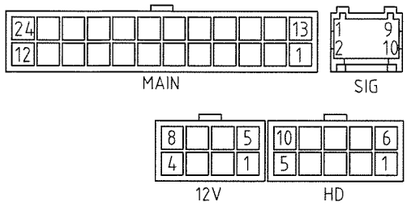
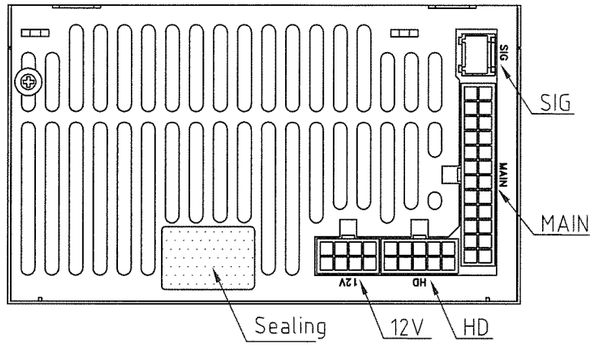



※Pin assignment



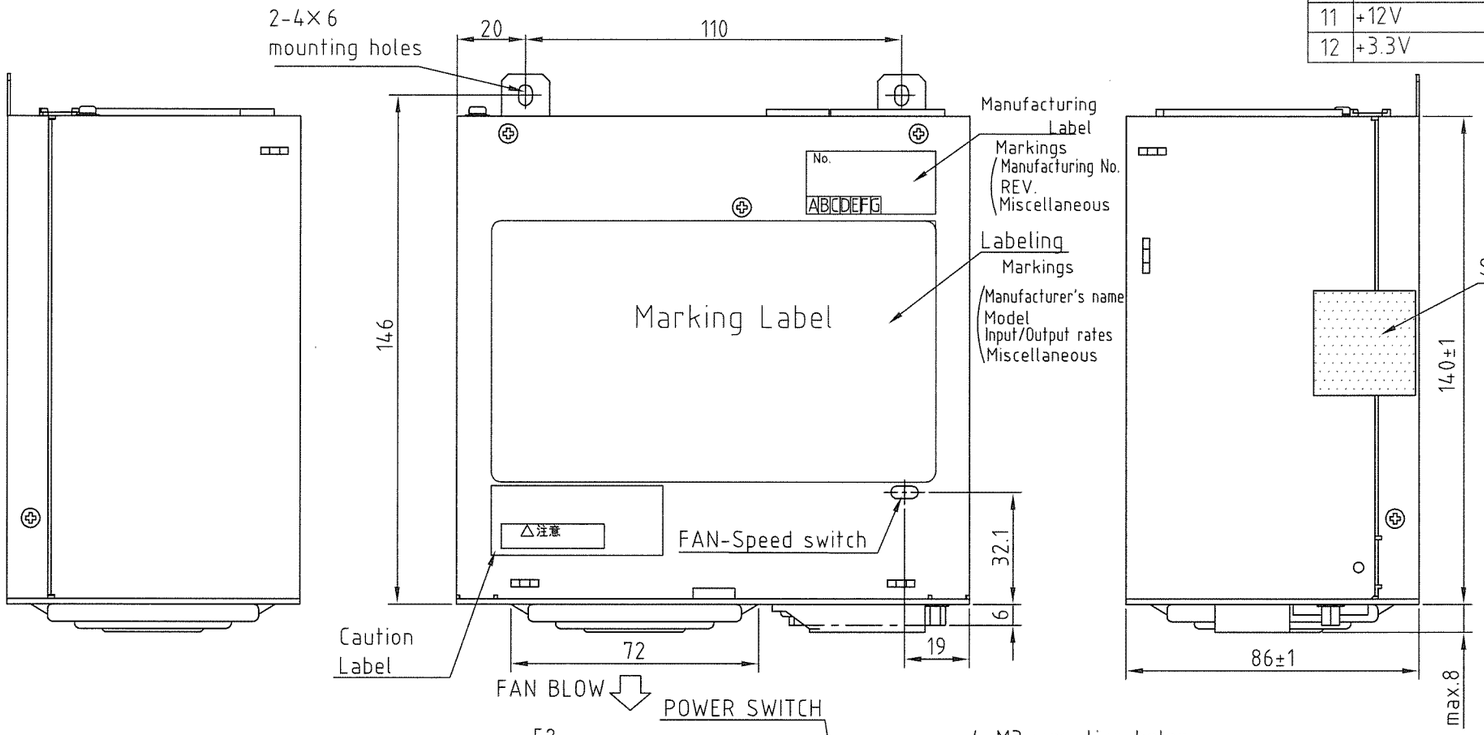

| MAIN | | | |
|---|---|---|---|
| PIN No. | FUNCTION | PIN No. | FUNCTION |
| 1 | +3.3V SENSE | 13 | +3.3V |
| 2 | +3.3V | 14 | -12V |
| 3 | COM | 15 | COM |
| 4 | +5V | 16 | PS_ON# |
| 5 | COM | 17 | COM |
| 6 | +5V | 18 | COM |
| 7 | COM | 19 | COM |
| 8 | PWR_OK | 20 | N.C. |
| 9 | +5VSB | 21 | +5V |
| 10 | +12V | 22 | +5V |
| 11 | +12V | 23 | +5V |
| 12 | +3.3V | 24 | COM |

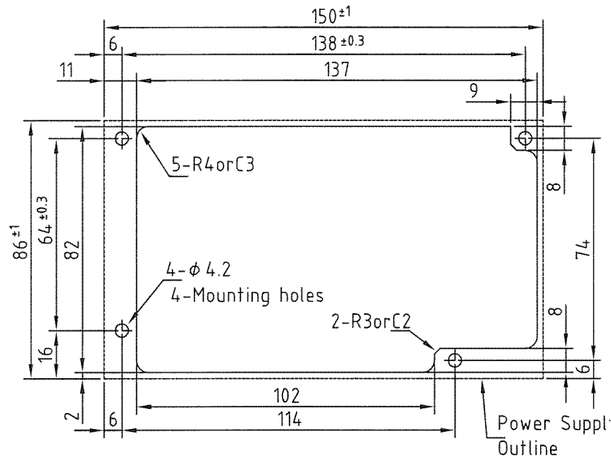
| 12V | |
|---|---|
| PIN No. | FUNCTION |
| 1 | COM |
| 2 | COM |
| 3 | COM |
| 4 | COM |
| 5 | +12V |
| 6 | +12V |
| 7 | +12V |
| 8 | +12V |

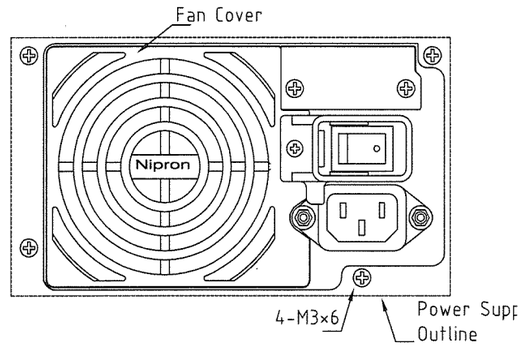
| HD | |
|---|---|
| PIN No. | FUNCTION |
| 1 | +3.3V |
| 2 | +5V |
| 3 | COM |
| 4 | COM |
| 5 | +12V |
| 6 | +3.3V |
| 7 | +5V |
| 8 | COM |
| 9 | COM |
| 10 | +12V |

| SIG | |
|---|---|
| PIN No. | FUNCTION |
| 1 | N.C. |
| 2 | N.C. |
| 3 | N.C. |
| 4 | N.C. |
| 5 | FAN M |
| 6 | PS_ON# |
| 7 | COM |
| 8 | +3.3V SENSE |
| 9 | N.C. |
| 10 | +5VSB |

Recommended a installation hol
and 4mounting hole




Installation hole and mounting screw holes(4pcs) are required, if replacement of a fan and to add or replace interface unit are necessary under the installed power supply on the personal computer case.

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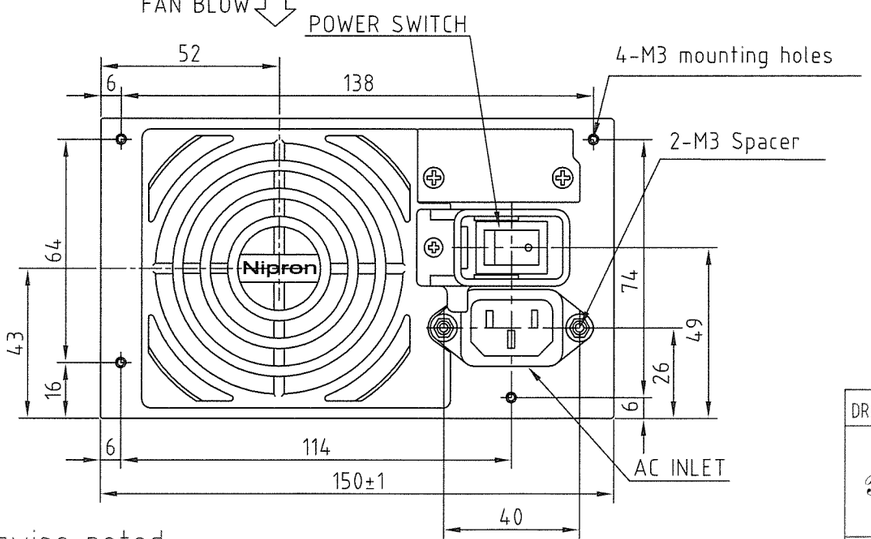


| NAME | TYPE |
|---|---|
| AC INLET | IEC320_Standard type |
| POWER SWITCH | A8L-21-12N2(OMRON) or equivalent |
| FAN | DC12V 80□ |

※Tolerance ±0.5 unless otherwise noted.

| DRAWN BY | CHECKED BY | CHECKED BY | APPROVED BY | SCALE | | MATERIALS | | |
|---|---|---|---|---|---|---|---|---|
| Yodo | Yamada | — | Yamamoto | UNITS | m/m | FINISH | TITLE | ePCSA-500P-X2C |
| ISSUED | 2011. 12. 14 | | | 3RD ANGLE PROJECTION | | — | | Mechanical Outline |
| | | | | | | | DRAWING NO. | 3087-01-3-550 |

Due to the technical improvement, the specifications and functions are subject to change without notice.

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西野 雅隆2015/05/27 16:30:27 JST