

# Rack Mount Power Supply PCFL-180P Series

Fanless ATX Power Supply Lined Up with ATX + Mechanism System (24V Output Equipped) too.



PCFL-180P-F2S

PCFL-180P-X2S2 can be backed up at blackout with battery package connected.



■ Battery package  
BS17A-H24/2.0L  
Refer to p.251 for details

**RoHS  
Directive**

**Other**  
Continuous Max. **90W**  
Peak Power **180W**

| Model          | Description  | Stock          |
|----------------|--|----------------|
| PCFL-180P-X2S2 | ATX output   | Standard stock |
| PCFL-180P-F1S  | +5V, +12V, -12V, +5VSB, and +24V output equipped (no +3.3V output) | Standard stock |
| PCFL-180P-F2S  | ATX and +24V output equipped                                       | Standard stock |

■ Model Name Coding

**PCFL - 180 P - \* \* S \***

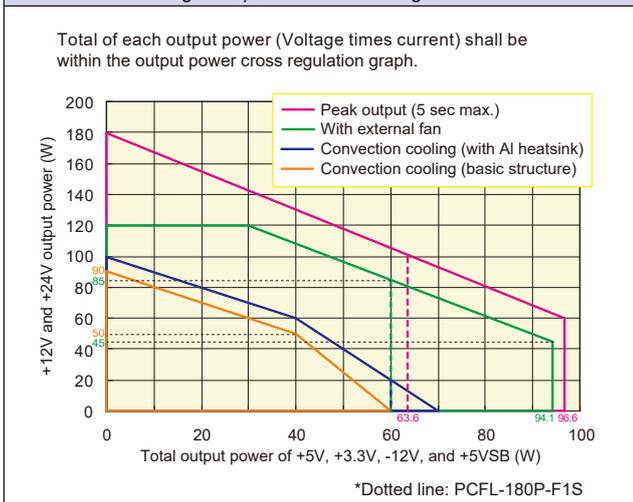
① ② ③ ④ ⑤ ⑥ ⑦

|                          |   |                      |
|--------------------------|---|----------------------|
| 1. Series name           | 4. X: ATX output equipped                         | 6. Standard          |
| 2. Output power          | F: +24V output equipped                           | 7. Modification code |
| 3. Peak output compliant | 5. 1: No +3.3V output<br>2: +3.3V output equipped |                      |

## Features

- Heavy duty compact fanless power supply !
- Operation with rated load for individual output is available. (Min. load current is 0A for all output.)
- Easy output customization as each output is chopper unit.
- Lower leakage current compared with combination of single output power supply.
- Compact with input electrolytic capacitor-less new circuit
- Overheat protection equipped.
- Lined up with ATX plus semi-regulated 24V for mechanism systems.

Fig.1 Output Power Cross Regulation



Refer to "Product Page Guideline" on p.11

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

## Function



## Input

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

## Output

| Output voltage   | +3.3V                                   | +5V  | +12V  | +24V | -12V  | +5VSB |      |      |
|--|---|--|---|------|-------|-------|------|------|
| PCFL-180P-X2S2   | ○                                       | ○  | ○   | —    | ○     | ○     |      |      |
| PCFL-180P-F1S  | —                                       | ○  | ○   | ○    | ○     | ○     |      |      |
| PCFL-180P-F2S  | ○                                       | ○  | ○   | ○    | ○     | ○     |      |      |
| Max. current / max. power (continuous)                         | At convection cooling (basic structure) |  | 10A   | 10A  | 7.5A  | 3.75A | 0.3A | 1.5A |
|  | Total 60W                               |  | Within output power cross regulation (Max. output power: 90W) |      |       |       |      |      |
| At convection cooling (Special AL heatsink is required)        |   | 10A  | 10A   | 8.5A | 4.25A | 0.3A  | 1.5A |      |
| Total 70W  |   | Within output power cross regulation (Max. output power: 102W) |   |      |       |       |      |      |
| Forced air cooling* (External FAN is required)                 |   | 10A  | 10A   | 10A  | 5A    | 0.3A  | 1.5A |      |
| Within output power cross regulation (Peak output power: 150W) |   |  |   |      |       |       |      |      |
| Peak current / peak power (5 sec max.)                         |   | 10A  | 10A   | 15A  | 7.5A  | 0.3A  | 2A   |      |
| Within output power cross regulation (Peak output power: 180W) |   |  |   |      |       |       |      |      |
| Min. current   |   | 0A   | 0A  | 0A   | 0A    | 0A    | 0A   |      |

\*In forced air cooling, air flow of 0.5m<sup>3</sup>/min. or more to parts surface is required.

## Dimensions

|            |           |
|------------|-----------|
| W×H×D (mm) | 93×55×160 |
|------------|-----------|

## Output connector (optional component)



\*Refer to p.203 "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.2  |   |
|                             | Input Frequency  | 50 / 60Hz   |   |           |              |          |   | 47 - 63Hz   |   |
|                             | Efficiency   | 75% min. (77% typ.) *Characteristic data: Fig.5   |   |           |              |          |   | At rated input/output   |   |
|                             | Power Factor   | 90% min. *Characteristic data: Fig.6  |   |           |              |          |   |   |   |
|                             | Inrush Current   | N/A *1  |   |           |              |          |   |   |   |
| Input VA at standby mode    | 30VA typ. (100 VAC) / 60VA typ. (240 VAC) *Characteristic data: Fig.6<br>10VA typ. (100 VAC) / 40VA typ. (240 VAC) *Characteristic data: Fig.6 |   |   |           |              |          | PS_ON signal 'H' or 'OPEN' at rated load of 5VSB<br>PS_ON signal 'H' or 'OPEN' at no load of 5VSB   |   |   |
| Output                      | Rated Voltage  | +3.3V   | +5V   | +12V      | +24V *2      | -12V     | +5VSB   |   |   |
|                             | Output by Model  | PCFL-180P-X2S2  | ○   | ○         | ○            | —        | ○   | ○   | ○ : Available<br>— : N/A  |
|                             |  | PCFL-180P-F1S   | —   | ○         | ○            | ○        | ○   | ○   |   |
|                             |  | PCFL-180P-F2S   | ○   | ○         | ○            | ○        | ○   | ○   |   |
|                             | Rated Current  | PCFL-180P-X2S2  | 4A  | 4A        | 4A           | —        | 0.3A  | 1A  |   |
|                             |  | PCFL-180P-F1S   | —   | 4A        | 3A           | 1A       | 0.3A  | 1A  |   |
|                             |  | PCFL-180P-F2S   | 4A  | 4A        | 2A           | 1A       | 0.3A  | 1A  |   |
|                             | Max. Current / Power   | At Natural Air Cooling (Basic Structure)  | 10A   | 10A       | 7.5A         | 3.75A    | 0.3A  | 1.5A  | Max. output power: 90W  |
|                             |  |   | 60W max.  |           |              |          |   |   |   |
|                             |  | At Natural Air Cooling (Special AL Heatsink is Required*)   | 10A   | 10A       | 8.5A         | 4.25A    | 0.3A  | 1.5A  | Max. output power: 102W<br>*Refer to p.364 'Optional Components'  |
|                             |  |   | 70W max.  |           |              |          |   |   |   |
|                             | Forced Air Cooling* (External FAN is Required)   | 10A   | 10A   | 10A       | 5A           | 0.3A     | 1.5A  | Max. output power: 150W<br>*Refer to p.364 'Installation'   |   |
|                             |  | Within output power cross regulation *Refer to Fig.1  |   |           |              |          |   |   |   |
|                             | Peak Current / Power   | 10A   | 10A   | 15A       | 7.5A         | 0.3A     | 2A  | Peak output power: 180W<br>Time: 5 sec or less<br>*Refer to Fig.3   |   |
|                             |  | Within output power cross regulation *Refer to Fig.1  |   |           |              |          |   |   |   |
| Min. Current                | 0A   | 0A  | 0A  | 0A        | 0A           | 0A       |   |   |   |
| Total Voltage Accuracy (%)  | At Max. Power  | ±5 max.   | ±5 max.   | ±5 max.   | ±5 max.      | ±10 max. | ±5 max.   | Voltage accuracy of each rated output when input voltage changes from min. to max. while loads are changed statically within output power cross regulation chart. |   |
|                             | At Peak Power  | ±5 max.   | ±5 max.   | ±5 max.   | ±5 / -8 max. | ±10 max. | ±5 max.   |   |   |
| Max. Ripple Voltage (mVp-p) | 50 max.  | 50 max.   | 120 max.  |           | 120 max.     | 50 max.  | Measured on a test board connected with a 47µF capacitor. The test board shall be away from load wire and within 150mm from output terminals.<br>*Characteristic data: Fig.17 |   |   |
| Max. Spike Voltage (mVp-p)  | 100 max.   | 100 max.  | 170 max.  | *3        | 170 max.     | 100 max. |   |   |   |
| Protection                  | Overcurrent Protection   | OCP Point (A)   | 10.5 min.   | 10.5 min. | -            | -        | 0.32 min.   | 2.1 min.  | At rated output current, except measured output   |
|                             |  | Method  | Hold down current limiting → +3.3V, +5V, +12V, +24V and -12V output latch stop        |           |              |          | Fold back current limiting  | Hold down current limiting  | At min. output current, except measured output  |
|                             |  | Recovery  | Reclosing AC input (10 sec min. interval), or switching PS_ON# signal from 'H' to 'L' |           |              |          | Automatic recovery  |   | All outputs shutdown when +5VSB is shorted. *5  |
|                             | Overvoltage Protection   | OVP Point (V)   | 3.7 - 4.3   | 5.7 - 7.0 | 13.8 - 15.6  | -        | -   | 5.7 - 7.0   | Excessive voltage applied to +3.3V, +5V and +12V output is unacceptable due to circuit characteristics. (No overvoltage protection for 24V and -12V output) |
| Method                      |  | All outputs latch stop  |   |           |              |          |   |   |   |
| Recovery                    |  | Reclosing AC input (10 sec min. interval)   |   |           |              |          |   |   |   |
| Environment                 | Operating Temp. / Humidity   | 0 to 60°C / 10 to 90%   |   |           |              |          |   | *Refer to Fig.4<br>No condensation  |   |
|                             | Storage Temp. / Humidity   | -20 to 70°C / 10 to 95%   |   |           |              |          |   | No condensation   |   |
|                             | Vibration  | Acceleration amplitude: 2gn (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.<br>DC output - FG: 50MΩ min.   |   |           |              |          |   | At 500 VDC  |   |
|                             | Leakage Current  | 0.5mA max. (100 VAC) / 1mA max. (200 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 1 minute) |   |           |              |          |   | 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-A, FCC-A, EN55022-A, CISPR22-A compliant *Characteristic data: Fig.8 and 9                                       |   |           |              |          |   | Measured by single unit at rated output   |   |
|                             | Harmonic Current Regulation  | IEC61000-3-2 (ver.2.1) Class D, compliant   |   |           |              |          |   | At rated input/output   |   |
| Others                      | Safety Standards   | UL60950-1, CSA60950-1(c-UL), CE Marking (IEC62368-1)  |   |           |              |          |   |   |   |
|                             | Cooling System   | Convection cooling or forced air cooling by external fan  |   |           |              |          |   |   |   |
|                             | Output Grounding   | Capacitor grounding   |   |           |              |          |   |   |   |
|                             | 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   | 100,000H min.   |   |           |              |          |   | Based on EIAJ RCR-9102  |   |
|                             | Weight   | 0.85kg 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  |   |   |

\*1 Inrush current, in general, is specified as peak charging current into electrolytic capacitors used for smoothing in primary circuit shortly after input voltage is turned on. This power supply adopts capacitor-less circuit, there does not exist inrush current under the definition like this.

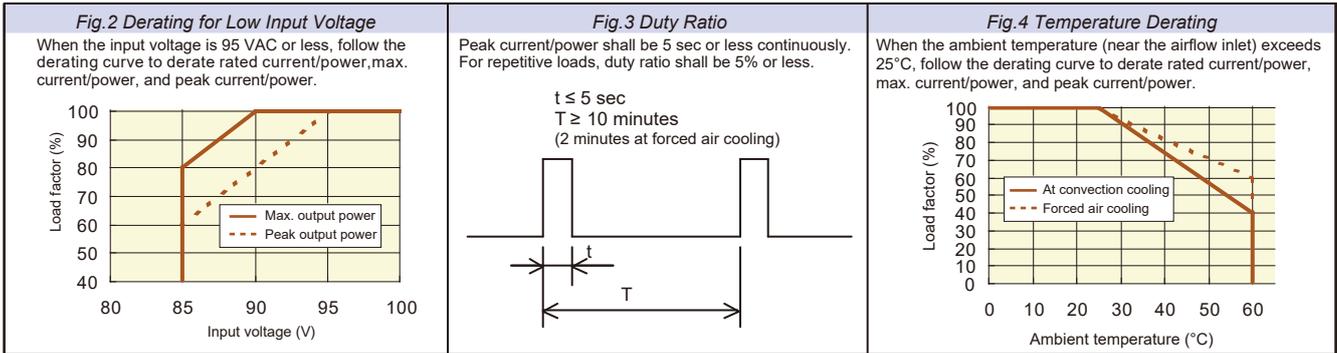
\*2 +24V output is semi-regulated. Therefore, output voltage at rising includes +10%/-20% at max. of overshoot or undershoot.

\*3 For +24V output, Ripple/Spike voltage is 120mVp-p or less at max. load (90W), and 2400mVp-p or less at peak output (180W).

\*4 Overcurrent protection point of +24V output shall be defined at the temperature of AL chassis under normal temperature. (Overcurrent detection level of +24V decreases as the ambient and component temperature rise due to overcurrent - temperature protection circuit equipped in +24V output.)

\*5 All other outputs shut down when +5VSB output is dead short providing its output voltage is 1V or less. All outputs are automatically recovered when the shorting of +5VSB is removed. However, the protection method moves to hold-down current limiting so that the output voltage at short is 1 to 3 volts left. All other outputs go to latch stop. All outputs except +5VSB remains in shutdown even after the partial shorting of +5VSB has been removed. In this case, conduct reclosing of PS\_ON# signal or input voltage after 10 sec or longer for recovery.

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



# 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#)<br>+3.3V, +5V, +12V, +24V, and -12V outputs are delivered with 'L' input. +3.3V, +5V, +12V, +24V, and -12V outputs shutdown with 'H' or 'OPEN' input and, protection circuit is activated to reset locked latch circuit at output shutdown status. Reclosing interval from PS_ON# 'H' or 'OPEN' input (output OFF) to 'L' input (output ON) shall be 5 sec min. | Signal input between the pin 22 of CN10 connector and COM pin  |
|               | +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. |
| Output Signal | Normal Output Signal (PWR_OK)   | 'H'signal is delivered when the +5V output is normal.  |

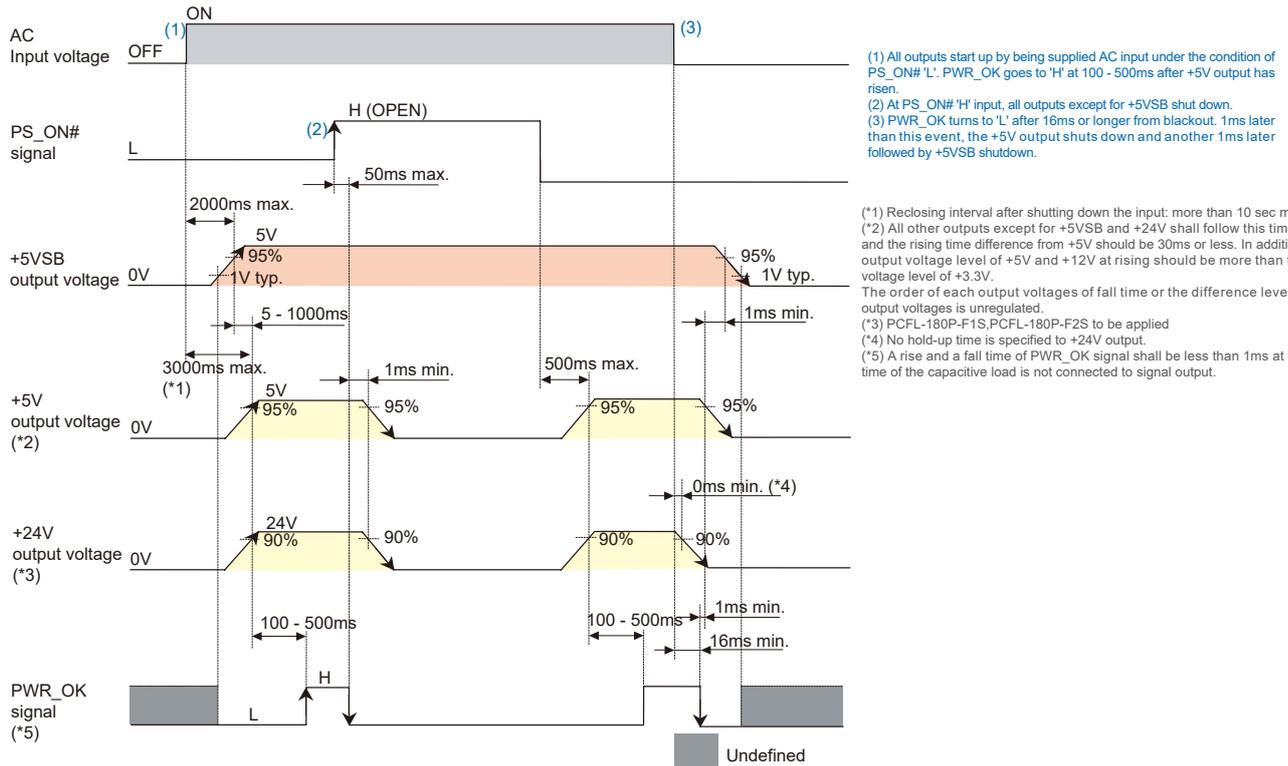
  

| Signal Circuit        |   |
|-----------------------|---|
| Input Signal Circuit  | <p>(PS_ON#)</p> <p>(+3.3V SENSING)</p> <p>+3.3V SENSE is to be connected to + side of the load. Potential difference between power supply connector and + side of the load shall be 0.1V or less. In case of excessive potential difference, it may damage the resistor (100Ω) inside the power supply.</p> |
| Output Signal Circuit | <p>(PWR_OK)</p>   |

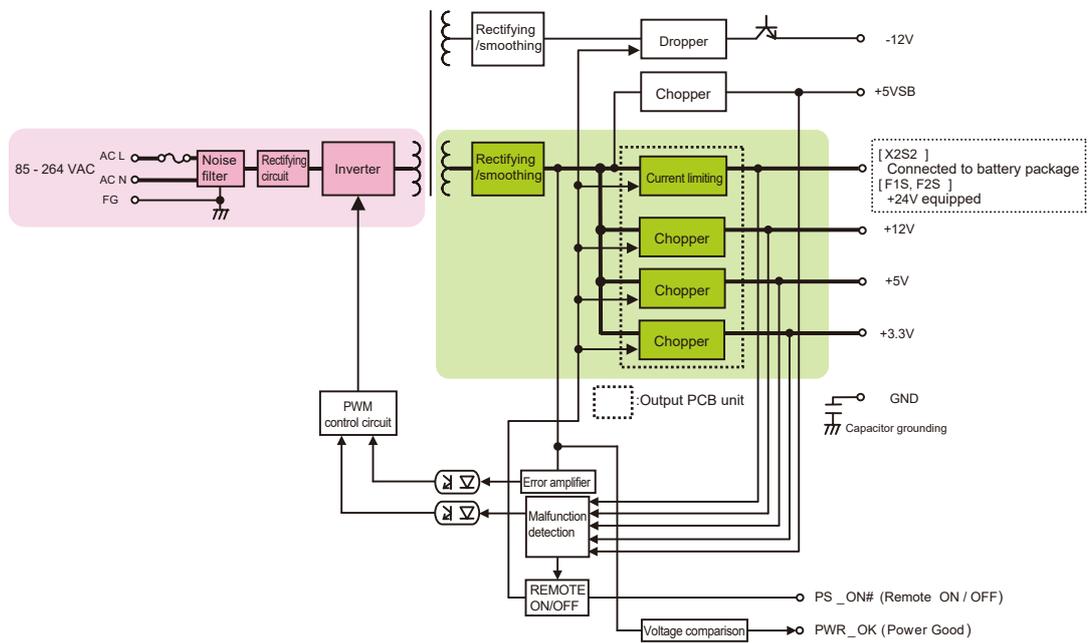
# Internal Structure



# Sequence Diagram



# Block Diagram



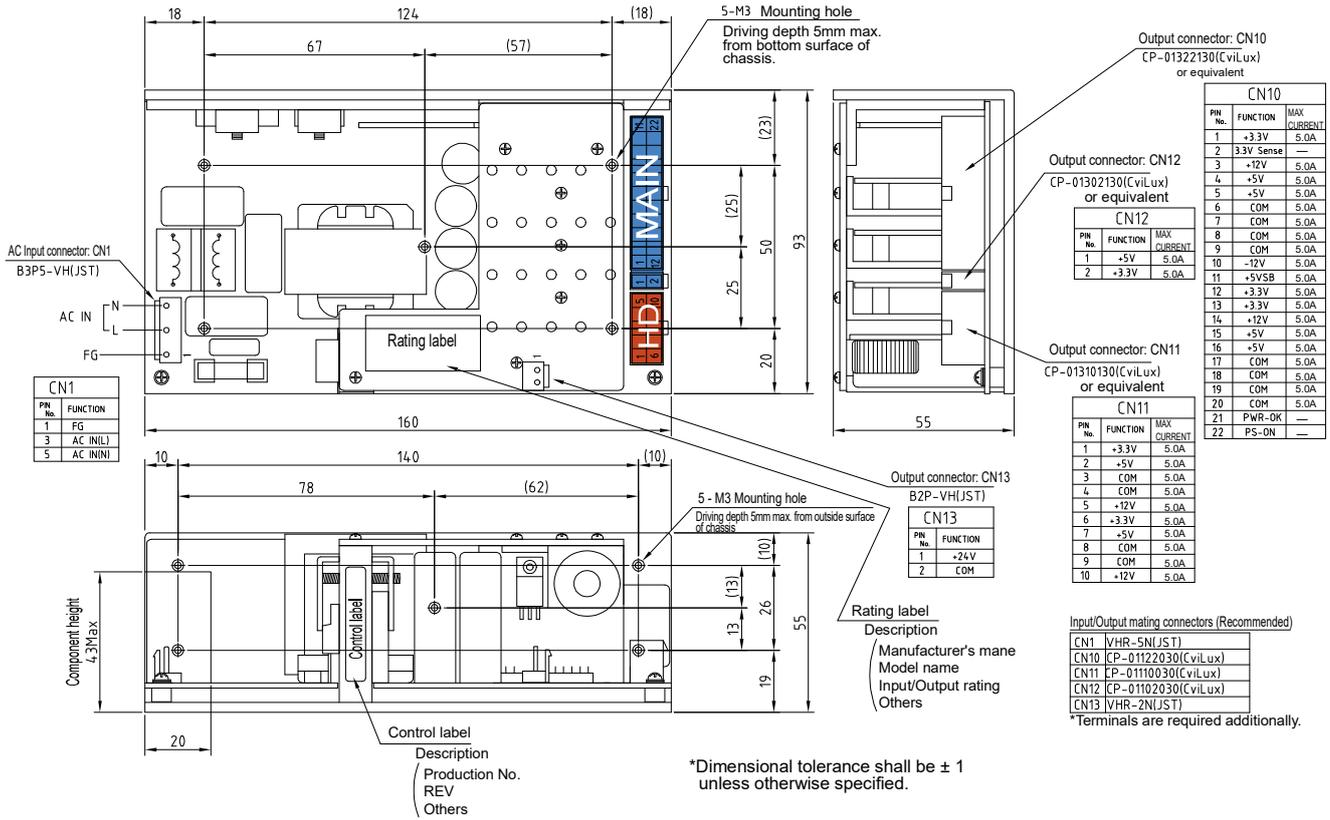
# SFX mounting surface applicable case

Case design to mount PCFL-180P corresponding to SFX12V APPENDIX D size is ongoing.



# Outline Drawing

## PCFL-180P-F2S



## Optional Components Sold Separately

| Detachable Output Harness           |                | Length and Type of Connector |                 | Output Port Allocation |
|-------------------------------------|----------------|------------------------------|-----------------|------------------------|
| <b>Main power cable</b> <b>MAIN</b> |                |                              |                 |                        |
| WH-M2022-500                        | 500±15         | 20-pin                       | MAIN            |                        |
| WH-M2022-300                        | 300±15         | 20-pin                       | MAIN            |                        |
| WH-M2022-500-01*                    | 500±15         | 20-pin                       | MAIN            |                        |
| WH-M2422-500                        | 500±15         | 24-pin                       | MAIN            |                        |
| <b>HD power cable</b> <b>HD</b>     |                |                              |                 |                        |
| WH-PP610-850                        | 550±15         | 150±15, 150±15               | peripheral (HD) |                        |
| WH-PS610-850                        | 550±15         | 150±15, 150±15               | FD              |                        |
| WH-PS710-850                        | 550±15, 850±15 | 150±15, 150±15               | S-ATA           |                        |

Acceptable cable(s)  
**MAIN** 1 model    **HD** 1 model

\*For battery package connection, select "WH-M2022-500-01" as main power cable.

| Picture | Model           | Type   | Description  |
|---------|-----------------|--|--|
|         | WH-02VH02VH-250 | Battery package connection harness (Power harness) | Power harness to connect power supply with battery package "BS17A-H24/2.0L"* |

\*Required for backup operation at blackout in case of connection with battery package "BS17A-H24/2.0L"

| Cables (Signal Harness to Connect Battery Package) |                      |              |                          |
|--|----------------------|--------------|--------------------------|
| Model  | Description          | Model        | Description              |
| WH-S0604-500                                       | 6-pin connector type | WH-C04PH-500 | Cut-off type at wire end |

BRAIN Power Supply Rack Mount Power Supply

Non-backup Power Supply

## Optional Components Sold Separately

| Cables (Signal Harness to Connect Battery Package) |              |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
|--|--------------|--|--|---------|-------|----------------------------|---|---|---|---|---|---|--|--|-----------------|--------------------------------------|--|---|---|---|---|---|---|---|---|---|--|
| Picture  | Model        | Compatible Pin Assignments                 |  | Picture | Model | Compatible Pin Assignments |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
|  | WH-S1004-500 | DCD<br>RXD(SIN)<br>TXD(SOUT)<br>DTR<br>GND | <table border="1"> <tr><td>1</td><td>2</td></tr> <tr><td>3</td><td>4</td></tr> <tr><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td></tr> <tr><td>9</td><td></td></tr> </table> DSR<br>RTS<br>CTS<br>RI | 1       | 2     | 3                          | 4 | 5 | 6 | 7 | 8 | 9 |  |  | WH-S1004-500-01 | DCD<br>TXD(SOUT)<br>GND<br>RTS<br>RI | <table border="1"> <tr><td>1</td><td>2</td></tr> <tr><td>3</td><td>4</td></tr> <tr><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td></tr> <tr><td>9</td><td></td></tr> </table> RXD(SIN)<br>DTR<br>DSR<br>CTS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  |
| 1  | 2            |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 3  | 4            |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 5  | 6            |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 7  | 8            |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 9  |              |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 1  | 2            |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 3  | 4            |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 5  | 6            |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 7  | 8            |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |
| 9  |              |  |  |         |       |                            |   |   |   |   |   |   |  |  |                 |                                      |  |   |   |   |   |   |   |   |   |   |  |

\*Harnesses for automatic shutdown at blackout.  
Please select the compatible conversion signal harness to the pin assignments of serial port connector for your motherboard.

| Battery Package |         |                |       |  |             |
|-----------------|---------|----------------|-------|--|-------------|
| Page            | Picture | Model          | Type  | Shape (size)                                       | Backup Time |
| P.251           |         | BS17A-H24/2.0L | Ni-MH | 3.5 inch bay fixed type<br>(W×D×H=101.5×180×25 mm) |             |

\*The backup time is a reference value at initial use; it is not a guaranteed value.

| Parts / Unit |             |   |   |
|--------------|-------------|---|---|
| Picture      | Model       | Type  | Description   |
|              | AF5113-1605 | Heatsink for Fanless power supply (side mounting)   | Higher power can be gained with connection to Fanless power supply (90W → 102W) |
|              | AF5113-1609 | Heatsink for Fanless power supply (bottom mounting) | Higher power can be gained with connection to Fanless power supply (90W → 102W) |

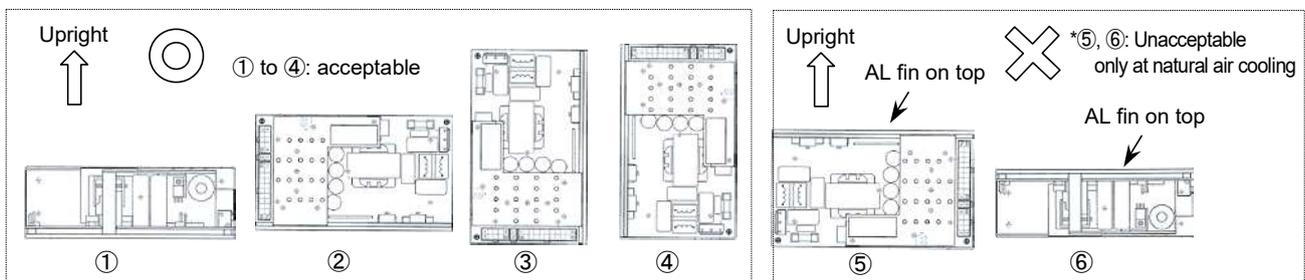
| Software |           |                             |  |
|----------|-----------|-----------------------------|--|
| Picture  | Model     | Type                        | Description                                |
|          | NSP Pro 2 | Automatic shutdown software | Dedicated to Windows 2000 / XP / Vista / 7 |

\*Free software "NSP Pro 2" available at our web-site  
\*The UPS service of Windows 2000 and XP available

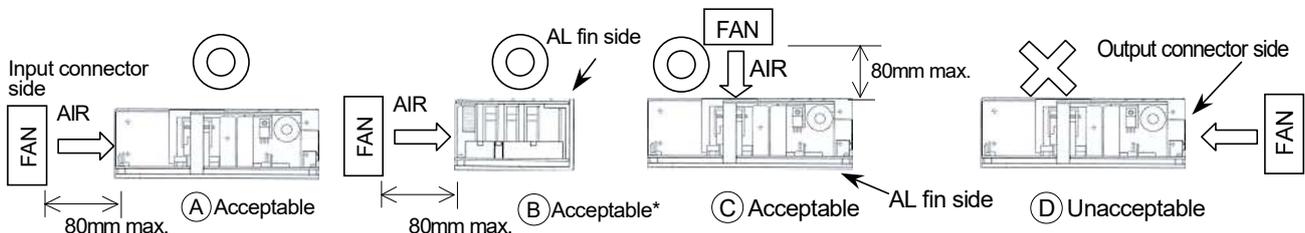
| Other Optional Components |  |           |  |
|---------------------------|--|-----------|--|
| Model                     | Description                              | Model     | Description                                    |
| ACC2637                   | Automatic startup unit                   | 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            |

## Installation

- In installation, keep 5mm or more clearance both from the edge of PCB and the height dimension of power supply to meet insulation and dielectric strength.
- At natural air cooling, keep enough clearance on top to avoid poor convection. Never install in the directions marked "X" shown below.



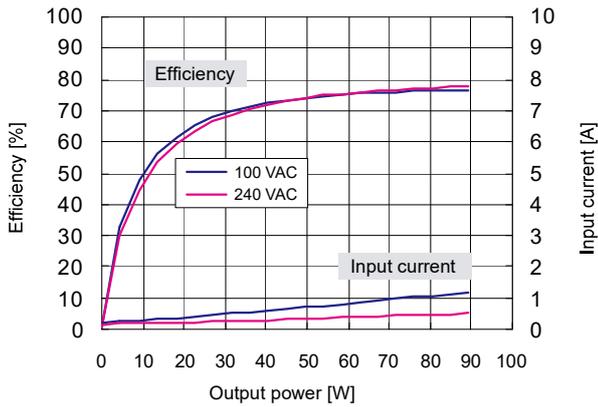
- All directions from ① to ⑥ above are acceptable. However, in case of external fan installed, follow the direction of ① to ③ below, ④ is not acceptable. Also, air flow of Fan shall be 0.5m<sup>3</sup>/min. or more and its air direction shall be the arrow direction below.



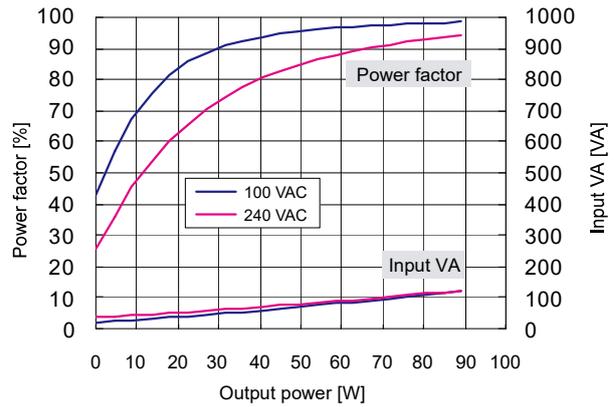
\*In case of ②, the fan motor shall be installed in the middle of longitudinal direction of power supply.

# Characteristics Data PCFL-180P-X2S2 (Examples of actual measurement)

• Fig.5 Efficiency / Input Current vs. Output Power



• Fig.6 Power Factor / Input VA vs. Output Power



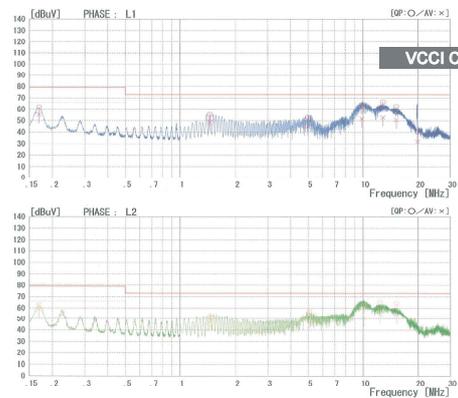
• Fig.7 Leakage Current

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

|         | Rated load | Min. load |
|---------|------------|-----------|
| 100 VAC | 0.22mA     | 0.21mA    |
| 240 VAC | 0.47mA     | 0.44mA    |

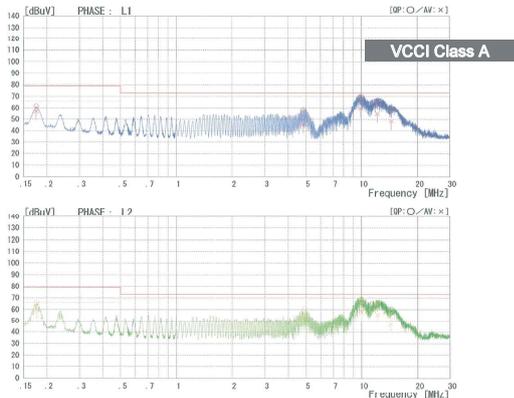
• Fig.8 Conducted Emission at 100 VAC

Input: 100 VAC  
Load: Rated  
Mode: Peak



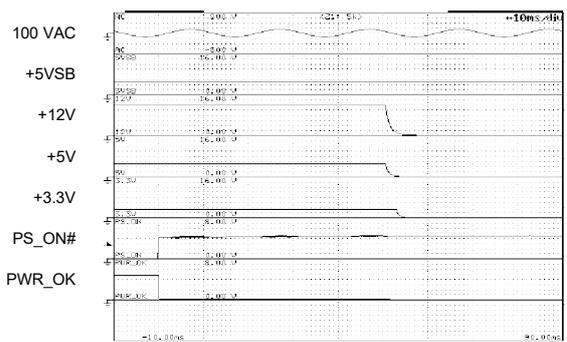
• Fig.9 Conducted Emission at 240 VAC

Input: 240 VAC  
Load: Rated  
Mode: Peak



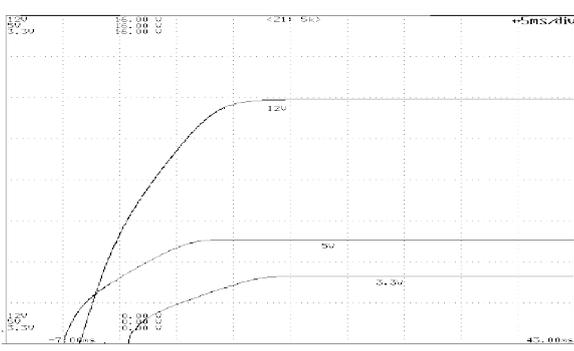
• Fig.10 Falling Characteristics at 100 VAC when REMOTE goes Off

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



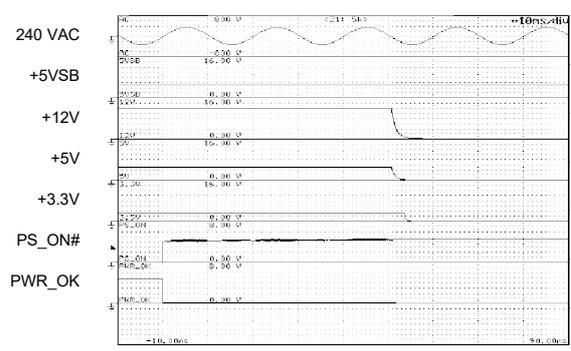
• Fig.11 Rising Characteristics at 100 VAC

Input: 100 VAC  
Load: Rated  
Time axis: 5ms/DIV



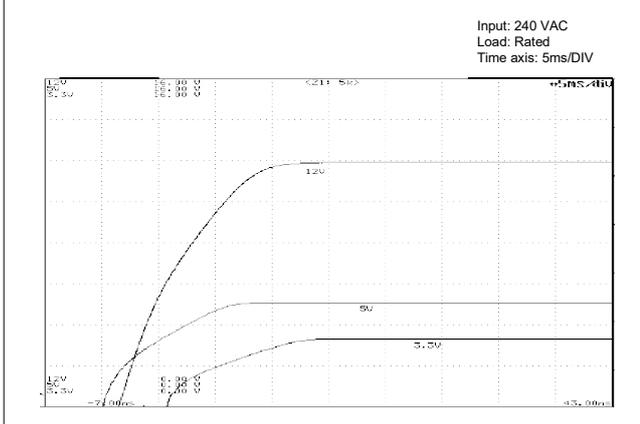
• Fig.12 Falling Characteristics at 240 VAC when REMOTE goes Off

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

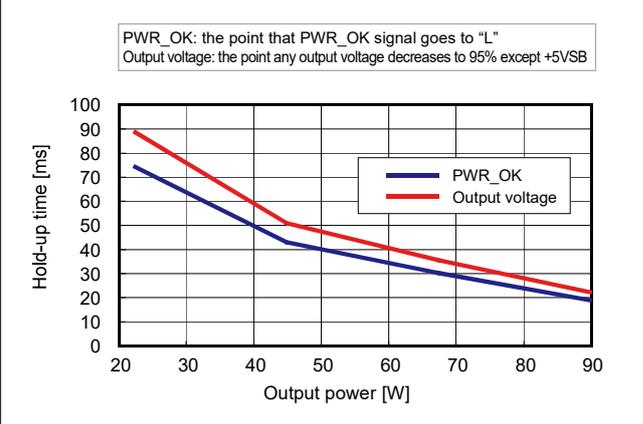


# Characteristics Data PCFL-180P-X2S2 (Examples of actual measurement)

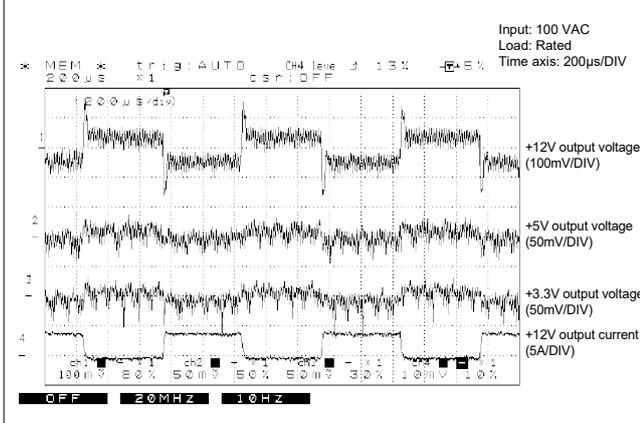
● Fig.13 Rising Characteristics at 240 VAC



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



● Fig.15 Dynamic Load Fluctuation Characteristics at 1kHz



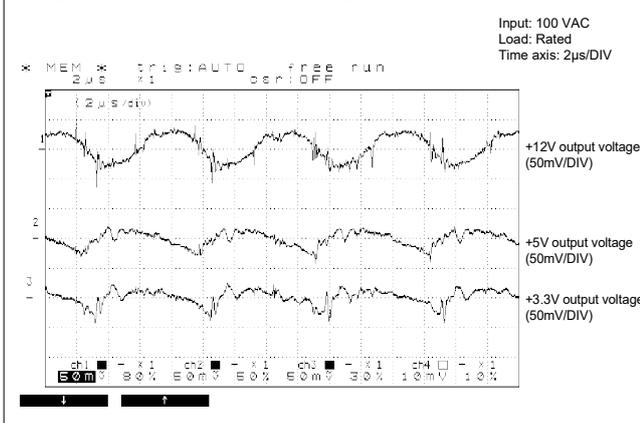
● Fig.16 Output Voltage Regulation

| Output       | Min. load | Rated load | Peak load |
|--------------|-----------|------------|-----------|
| +12V output  | 0A        | 4A         | 15A       |
| +5V output   | 0A        | 4A         | 10A       |
| +3.3V output | 0A        | 4A         | 10A       |

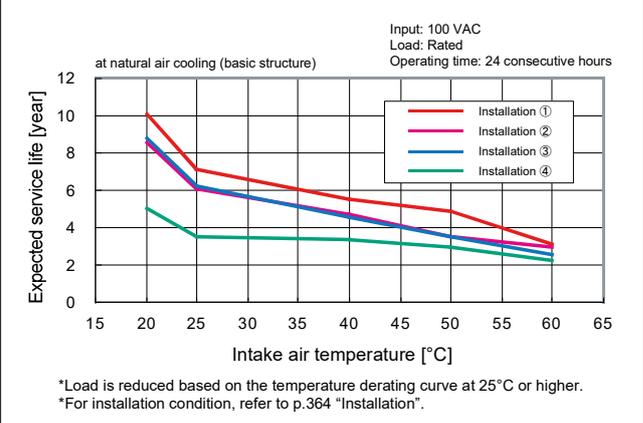
  

| AC input voltage          | 85 VAC   | 100 VAC  | 132 VAC  | 176 VAC  | 240 VAC  | 264 VAC  |
|---------------------------|----------|----------|----------|----------|----------|----------|
| +12V output (min. load)   | 11.974 V |
| +12V output (rated load)  | 11.830 V | 11.881 V | 11.881 V | 11.881 V | 11.881 V | 11.879 V |
| +12V output (peak load)   | 11.659 V | 11.663 V | 11.664 V | 11.661 V | 11.664 V | 11.666 V |
| +5V output (min. load)    | 5.113 V  |
| +5V output (rated load)   | 5.061 V  |
| +5V output (peak load)    | 5.007 V  | 5.006 V  |
| +3.3V output (min. load)  | 3.354 V  | 3.355 V  | 3.355 V  | 3.355 V  | 3.354 V  | 3.354 V  |
| +3.3V output (rated load) | 3.313 V  | 3.312 V  |
| +3.3V output (peak load)  | 3.271 V  | 3.271 V  | 3.270 V  | 3.270 V  | 3.270 V  | 3.269 V  |

● Fig.17 Ripple and Spike Voltage



● Fig.18 Ambient Temperature vs. Expected Service Life



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

