

## Basic Characteristics Data

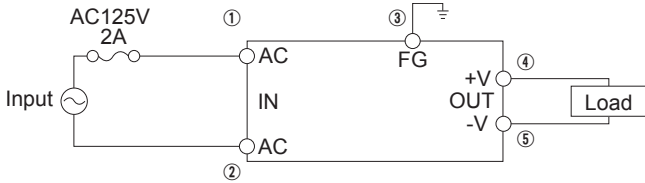
Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
VAA5	Flyback converter	100 - 500	0.13	-	Resistor	CEM-3	Yes		*1	*1
VAA10	Flyback converter	100 - 600	0.3	-	Resistor	CEM-3	Yes		*1	*1

\*1 Refer to Instruction Manual

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# 1 Pin Connection

No.	Pin connection	Function
①	AC	Input pin AC85 - 132V 1 φ
②	AC	
③	FG	Frame ground
④	OUT +V	+Output
⑤	OUT -V	-Output



# 2 Function

## 2.1 Input voltage range

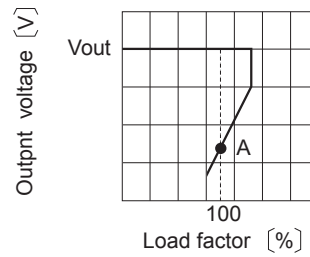
- Input voltage range of the power supplies is from AC85-AC132V or DC110-DC170V. In cases that conform with safety standard, input voltage range is AC100-AC120V(50/60Hz).
- AC input voltage must have a from AC85V to AC132V or DC110V to DC170V for normal operation. If the wrong input is applied, the unit will not operate properly and/or may be damage.

## 2.2 Inrush current limiting

- Inrush current limiting is built-in.
- If a switch on the input side is installed, it has to be the one handling the input inrush current.

## 2.3 Overcurrent protection

- Overcurrent protection circuit is built-in to be operated over 105% of the rated current. Overcurrent protection prevents the unit from short circuit and overcurrent condition of less than 20sec. The unit automatically recovers when the fault condition is cleared.
- When the overcurrent/short circuit condition continues more than 20 sec., it may damage devices inside the power supply.
- The power supply which has a current foldback characteristics may not start up when connected to non-linear load such as lamp, motor or constant current load. See the characteristics above.



—: Load characteristics of power supply.  
 .....: Characteristics of load (lamp, motor, constant current load, etc.).  
 Note: In case of non-linear load, the output is locked out at A point.

Fig.2.1 Current foldback characteristics

## 2.4 Overvoltage protection

- Overvoltage protection circuit, clamping the output voltage by zener diode, is built-in and comes into effect at over 115% of the rated voltage.
- The unit in an overvoltage protection mode cannot be recovered by a user, it must be repaired at the factory.
- Overvoltage protection (diode) also comes into effect if the voltage is externally applied to the output side. Avoid applying voltage to the output side.

## 2.5 Isolation

- For a receiving inspection, such as Hi-Pot test, gradually increase (decrease) the voltage for the start (shut-down).
- Avoid using Hi-Pot tester with the timer because it may generate voltage a few times higher than the applied voltage, at ON/OFF of a timer.

# 3 Wiring to Input/ Output Pin

- To decrease output ripple voltage more, install external capacitor Co at output terminal as below.

Table 3.1 Capacity of external capacitor at output terminal: Co[μF]

Model Output voltage(V)	VAA5	VAA10
5	220	220
12	100	100

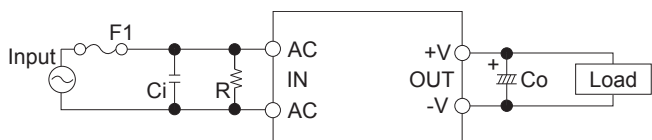


Fig.3.1 Connecting method of external capacitor at output terminal

## Conduction noise

This unit can comply with VCCI class B of conduction noise by attaching capacitor Ci at AC input terminal. To meet with agency approval, the Ci should be agency approved capacitor. Moreover, discharge resistor is required. Please refer Fig.3.1.

Ci : AC250V, 0.47 $\mu$ F (Agency approved unit)

R : 1/2W 220K $\Omega$

(Rated: Max. operative voltage: More than 200V)

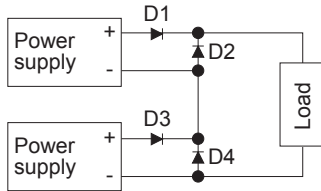
F1 : AC125V2A (Time-delay type)

## 4 Series Operation and Parallel Operation

### 4.1 Series operation

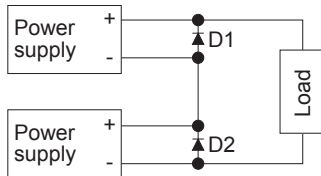
Series operation is available by connecting the outputs of two or more power supplies, as shown below. Output current in series connection should be lower than the lowest rated current in each unit.

(a) When the output voltage is less than 5V.



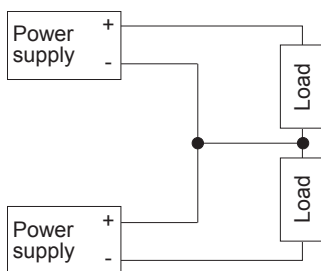
D1 - D4: Please use Schottky Barrier Diode which has lower forward voltage.

(b) When the output voltage is more than 12V.



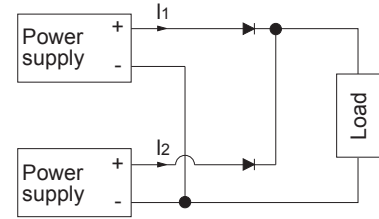
D1 - D2: Please use Schottky Barrier Diode which has lower forward voltage.

(c)



### 4.2 Redundancy operation

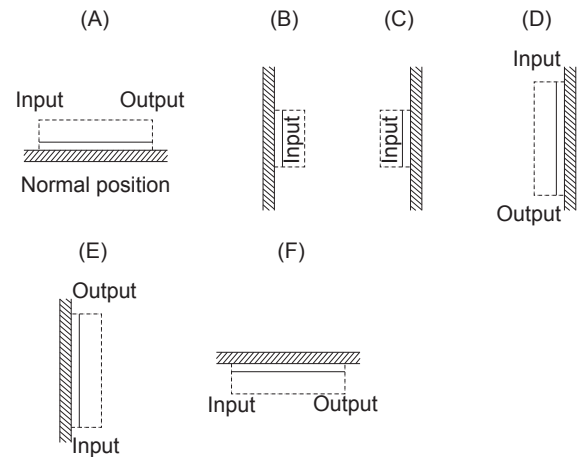
Redundancy operation is available by connecting the unit as shown below.



## 5 Assembling and Installation Method

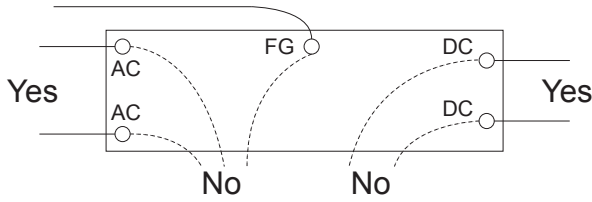
### 5.1 Installation method

When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Ambient temperature around each power supply should not exceed the temperature range shown in derating curve.



When installing the components (inclusive chassis) or pattern which is a foreign potentials around the unit, keep the distance for more than 5mm. If this distance can not be kept, insert the insulation sheet between them.

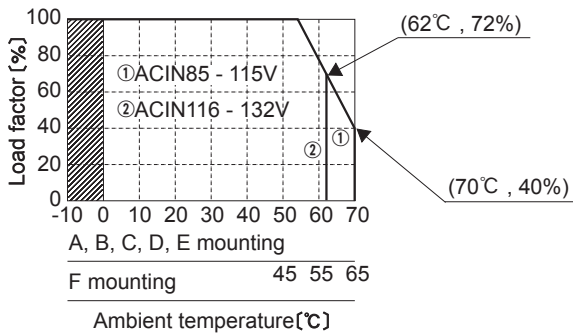
Avoid placing the AC input line pattern lay out underneath the unit as it will increase the line conducted noise. Make sure to leave an ample distance between the line pattern lay out and the unit. Also, avoid placing the DC output line pattern underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.



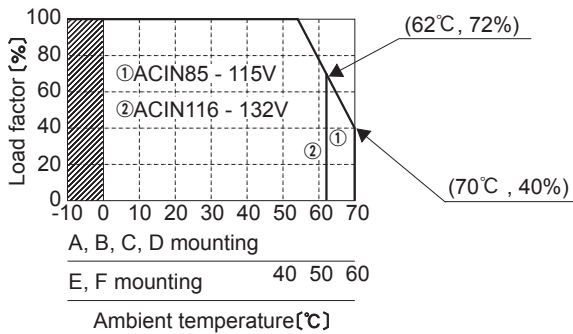
### 5.2 Derating

When unit mounted except below drawings, it is required to consider ventilated environment by forced air cooling for temperature/load derating. For details, please consult our sales or engineering departments.

#### VAA5



#### VAA10



Note:

In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

## 6 Cleaning

- Cleaning agents : IPA (Solvent type)
- Cleaning period : When cleaning the unit, the unit must be washed with a brush, and IPA must be kept out of the unit.
- After cleaning, dry them enough.

## 7 Soldering

- Dip soldering : 260°C less than 10 seconds.
- Soldering iron : 350°C less than 3 seconds.

## 8 Input/Output Pin

- When too much stress is applied on the input/output pins of the unit, the internal connection may be weakened. As below Fig.8.1, avoid applying stress of more than 9.8N (1kgf) on the pins horizontally and more than 19.6N (2kgf) vertically.
- The input/output pins are soldered on PCB internally, therefore, do not pull or bend them with abnormal forces.
- When additional stress is expected to be put on the input/output pins because of vibration or impacts, fix the unit on PCB (using silicone rubber or fixing fittings) to reduce the stress onto the input/output pins.

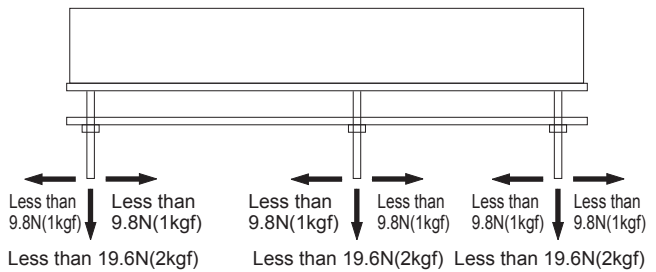


Fig.8.1 Stress on to the pins

## 9 External Fuse

- Fuse is not built-in on the input side. In order to secure the safety of the unit, install a slow-blow type fuse on the input side.

Model	VAA5	VAA10
Rated current	125V 2A	125V 2A

## 10 Ground

- When installing the power supply with your unit, ensure that the input FG terminal is connected to safety ground of the unit. However, when applying the safety agency, connect the input FG terminal to safety ground of the unit.

## 11 Others

- This power supply is rugged PCB. Do not drop conductive objects in the power supply.
- At light load, there remains high voltage inside the power supply for a few minutes after power OFF. So at maintenance, take care about electric shock.
- This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.