## Typical Features

◆ Wide input voltage range 3:1

◆ High efficiency up to 91%

◆ Low no-load power consumption

◆ Operating Temperature: -40℃ to +105℃

◆ High isolation voltage, input-output 2500VAC, input-case 2100VAC

◆ Protection: Input under/over voltage, output over voltage, over current, over temp, short circuit

◆ Standard brick size

Conform to CE standard

**ZAA700-220S24** high efficiency brick ac-dc converter, rated input voltage 220VAC, output 24V/700W, no minimum load, wide input 90-286VAC,regulated single output, high isolation insulation voltage, allowing operating temperature up to 105 ℃, with input under/over voltage protection, output over-current, over-voltage, over-temperature, short-circuit protection and remote compensation, output voltage regulation and other functions.

## Typical Product List

| Part no | Input voltage range (VAC) | Output power (W) | Output voltage (VDC) | Output current (A) | Ripple & Noise (mV) | Full load efficiency(%) Min/Typ. | Note |
|---|---|---|---|---|---|---|---|
| ZAA700-220S24 | 90-286 | 700 | 24 | 29 | 240 | 88/90 | Standard |
| ZAA700-220S24-H | | | | | | | With heat-sink |

Note: When the input is 154VAC and below 200VDC, the output load capacity is linearly derated. When input is 90VAC/140VDC, the stable output power is 500W.

## Input Specification

| Item | Operating conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| AC input starting working voltage | | -- | -- | 90 | VAC |
| Ac input under voltage protection | | -- | -- | 80 | |
| Ac input over voltage protection | | 290 | -- | 310 | |
| Input impulse voltage (1sec.max.) | Input beyond this range may cause permanent damage | -0.7 | -- | 315 | |
| Dc input starting working voltage | | -- | -- | 145 | VDC |
| Dc input under voltage protection | | -- | -- | 135 | |
| Dc input over voltage protection | | 425 | -- | 435 | |
| Input maximum impulse current | Input line in series 5.6R, 20mm diameter thermal sensitive, 220Vac input | -- | -- | 40 | A |
| Input voltage frequency | | 47 | -- | 63 | Hz |
| Start-up time | | -- | -- | 5 | S |
| Standby power consumption | 220Vac input | -- | 10 | 20 | W |
| PF value | 220Vac input, full load output | 95 | -- | -- | % |

## Output Specification

| Item | Operating conditions | Min. | Typ. | Max. | Unit |
|------|---------------------|------|------|------|------|
| Output voltage accuracy | Nominal input voltage, 0%-100% load | -- | ±0.2 | ±1.0 | % |
| Linear regulation rate | Full load, input voltage from low to high | -- | ±0.1 | ±0.2 | |
| Load regulation rate | Nominal input voltage, 10%-100% load | -- | ±0.1 | ±0.2 | |
| Transient recovery time | 25% load step change (step rate 1A/50uS) | -- | 200 | 250 | uS |
| Transient response deviation | | -5 | -- | 5 | % |
| Temperature drift coefficient | Full load | -0.02 | -- | +0.02 | %/℃ |
| Ripple & Noise | 20M bandwidth, external capacitance test above 1000uF | -- | 150 | 240 | mVp-p |
| Output voltage adjustment（TRIM） | | 21.6 | -- | 26.4 | VDC |
| Output voltage remote compensation（Sense） | | -- | -- | 105 | % |
| Over temp protection | Maximum temperature of product metal substrate surface | 105 | 115 | 125 | ℃ |
| Output over voltage protection | | 125 | -- | 150 | % |
| Output over current protection | | 30.5 | -- | 37.7 | A |
| Output short circuit protection | | Hiccup, continuous, self-recovery | | | |

## General Specification

| Item | Operating conditions | | Min. | Typ. | Max. | Unit |
|------|---------------------|---|------|------|------|------|
| Isolation Voltage | I/P-O/P | Test 1min, leakage current < 3mA | -- | -- | 2500 | VAC |
| | I/P-Case | Test 1min, leakage current < 3mA | -- | -- | 2100 | VAC |
| | O/P-Case | Test 1min, leakage current < 3mA | -- | -- | 500 | VAC |
| Insulation resistance | I/P-O/P | Insulation voltage 500VDC | 100 | -- | -- | MΩ |
| MTBF | | | 150 | -- | -- | K hours |

## Environmental characteristics

| Item | Operating conditions | Min. | Typ. | Max. | Unit |
|------|---------------------|------|------|------|------|
| Operating Temperature | See temperature derating curve | -40 | -- | +105 | ℃ |
| Storage Humidity | No condensing | 5 | -- | 95 | %RH |
| Storage Temperature | | -40 | -- | +125 | ℃ |
| Soldering resistance of pins | The solder joint is 1.5mm away from the shell, and the soldering time< 1.5S | -- | -- | +350 | |
| Cooling requirements | | EN60068-2-1 | | | |
| Dry heat requirement | | EN60068-2-2 | | | |
| Damp heat requirement | | EN60068-2-30 | | | |
| Shock and vibration | | IEC/EN 61373 Body 1 Class B | | | |

## EMC Characteristics(EN55032)

| | | | | |
|------|------|------|------|------|
| EMI | CE | EN55032-3-2 | 150kHz-500kHz 66dBuV | |
| | | EN55032-2-1 | 500kHz-30MHz 60dBuV | |
| | RE | EN55032-3-2 | 30MHz-230MHz 50dBuV/m at 3m | |
| | | EN55032-2-1 | 230MHz-1GHz 57dBuV/m at 3m | |
| EMS | ESD | EN55032-3-2 | Contact ±6KV/Air ±8KV | perf. Criteria A |
| | RS | EN55032-3-2 | 10V/m | perf. Criteria A |

| EFT | EN55032-3-2 | ±2kV 5/50ns 5kHz | perf. Criteria A |
|---|---|---|---|
| Surge | EN55032-3-2 | line to line ± 1KV （42Ω, 0.5μF） | perf. Criteria A |
| CE | EN55032-3-2 | 0.15MHz-80MHz 10 Vr.m.s | perf. Criteria A |

## Physical Characteristics

| Case Materials | Metal bottom shell + black flame retardant material shell （UL94 V-0） |
|---|---|
| Heat sink | Dimension 116.8*61*20mm, weight 150g,  aluminum alloy, anodized black |
| Cooling method H | Conduction cooling or forced air cooling |
| Product Weight | Standard 250g, with heat sink 402g |

## Dimension and Pin-Out

First Angle Projection

Bottom View

2-∅2.00

9-∅1.00

Bottom View

9-∅1.50

2-∅2.50

4-∅3.50

Recommend PCB slot size

4-M3

Front View

Front View

TOP View

TOP View

4-M3

**With Heat Sink**

116.8*61.0*32.7mm

**Standard**

116.8*61.0*12.7mm
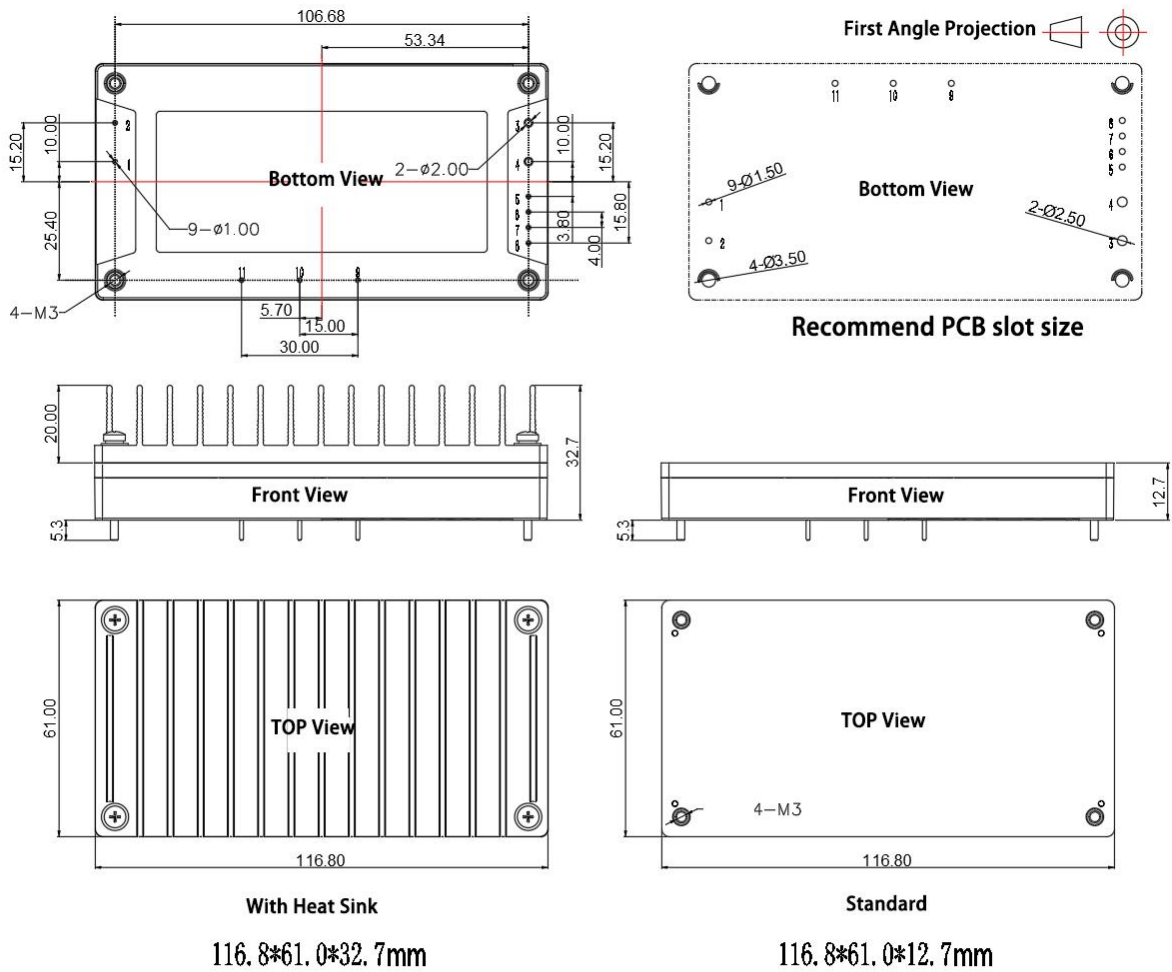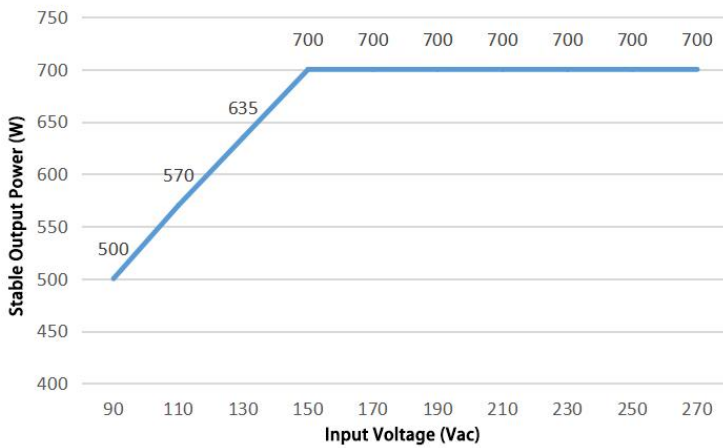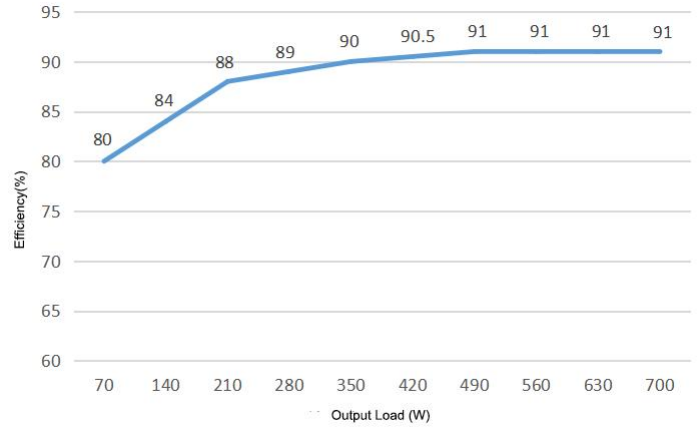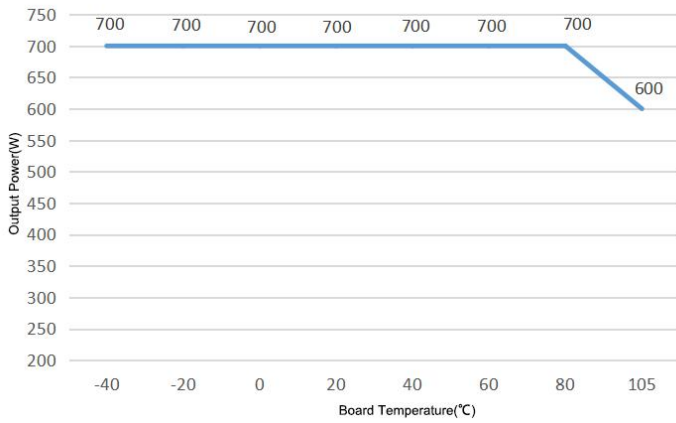
Note:
Unit:mm
Pin 1, 2, 5, 6, 7, 8, 9, 10, 11 dia:1.00
Pin 3, 4 dia:2.00
General tolerance: ±0.10
Mounting hole tightening torque: Max 0.4N*m

PCB
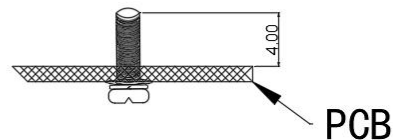
| No | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Pin-out | AC(L) | AC(N) | -Vo | +Vo | -S | +S |
| No | 7 | 8 | 9 | 10 | 11 | |
| Pin-out | TRIM | ENA | -BC | +BC | R | |

Note: 1. ENA is the output status signal, and when the power supply is working normally, ENA shows low impedance; When the power supply operates abnormally, ENA exhibits high impedance and the maximum pulling current is 10mA;

**AIPULNION**®  CE RoHS

## Product characteristic curve



Output Power(W) vs Board Temperature(℃): 700, 700, 700, 700, 700, 700, 700, 600



Efficiency(%) vs Output Load (W): 80, 84, 88, 89, 90, 90.5, 91, 91, 91, 91



Stable Output Power (W) vs Input Voltage (Vac): 500, 570, 635, 700, 700, 700, 700, 700, 700, 700

Notes

1. The temperature derating curve and efficiency curve are both typical values tested;

2. The temperature derating curve is tested according to our laboratory testing conditions. If the actual environmental conditions used by the customer are inconsisten necessary to ensure that the temperature of the aluminum shell of the product does not exceed 105 ℃ and can be used within any rated load range.

## Reference

1. Recommended application circuit.
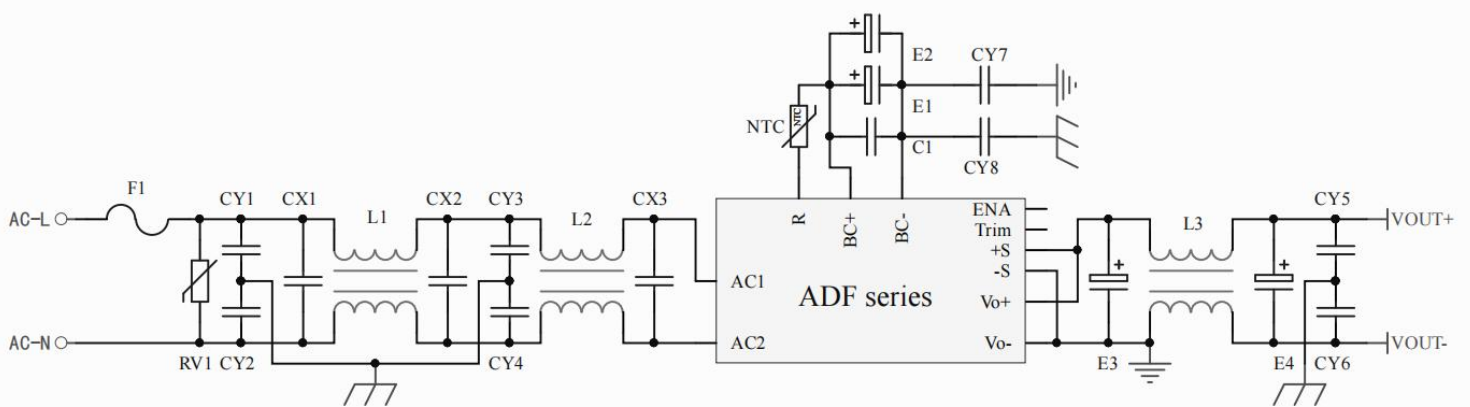


| F1 | AC250V 10A fuse |
|---|---|
| RV1 | 14D 620V varistor |
| CX1,CX2,CX3 | 250Vac 1uF X2 capacitor |
| CY1,CY2,CY3,CY4,CY8 | 1000pF 250VAC Y2 capacitor |

| CY7 | 470pF 250VAC Y1 capacitor |
|---|---|
| L1,L2 | 6.0mH common mode inductor, rated current not less than 7.5A |
| E1,E2 | 450V 330uF electrolytic capacitor |
| C1 | 1 uF 630V polypropylene capacitor |
| NTC | 5.6 Ω 20mm thermistor |
| E3, E4 | 1000uF 35V electrolytic capacitor |
| CY5,CY6 | 10nF 2KV ceramic chip capacitor |
| L3 | 5.0uH common mode inductor, rated current not less than 29A |

Note: There are limited requirements for the selection of capacitors CX3, C1, E1, and E2 in the recommended circuits above; CX3 and C1 must ≥ 1 uF capacitance; The capacity after E1 and E2 are connected in parallel must ≥ 440 uF; the NTC resistor must be installed; if this restriction is not followed, the power supply may be damaged.

## 2. Sense usage and precautions
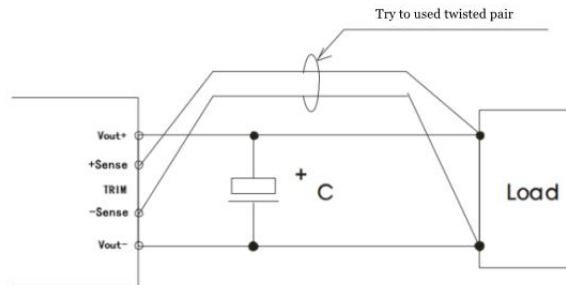
（1）Without far-end compensation:
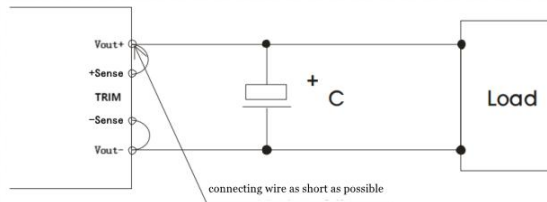


Precautions:
1. Do not use remote compensation, make sure Vout+ and Sense+, Vout- and Sense- are short-circuited;
2. The connection between Vout+ and Sense+, Vout- and Sense- should be as short as possible and close to the pins, otherwise the module may become unstable.

(2) Using remote compensation



Precautions:
1. When the long-end compensation lead is used, the output voltage may be unstable;
2. If remote compensation is used, please use twisted pair or shielded wire, and keep the lead wire as short as possible;
3. Please use wide PCB leads or thick wires between the power module and the load, and keep the line voltage drop below 0.3V to ensure that the power output voltage remains within the specified range;
4. The impedance of the leads may cause the output voltage to oscillate or have larger ripples. Please verify it before use.

## 3. Use of TRIM and calculation of TRIM resistance
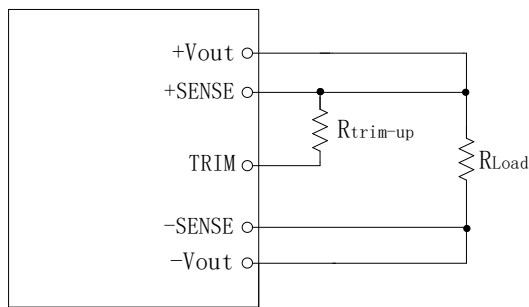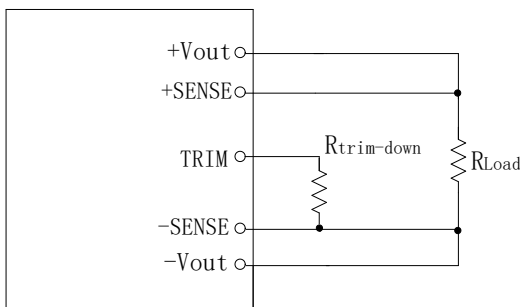


The external resistance is applied between the TRIM terminal and the ± SENSE terminal, which can increase or decrease the output voltage within the range of 66.6% -107% Vout. When a resistor is applied between the TRIM terminal and the+SENSE terminal, the output voltage increases; The resistor

**Guangzhou Aipu Electron Technology Co., Ltd** Add: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, CN.
Email: market@aipu-elec.com     Tel: 86-20-84206763     Fax: 86-20-84206762     Hotline:400-889-8821     Website: http://www.aipulnion-power.com/
Guangzhou Aipu Electron Technology Co., Ltd reserves the copyright and right of final interpretation.     Version: A/0     Date: 2023-12-26     Page 5 of 6

is applied between the TRIM and - SENSE terminals, resulting in a decrease in output voltage. During adjustment, adjust the resistance as close as possible to the lead of the module power supply. When this function is not needed, the TRIM end is suspended.

$$Rtrim\text{-}up = (5.1*\Delta*Vo-12.75)/(2.5*\Delta-2.5)-10.2 \text{ (K}\Omega\text{)}$$
$$Rtrim\text{-}down = (10.2*\Delta-5.1)/(1-\Delta) \text{ (K}\Omega\text{)}$$

For example, it is necessary to increase the output voltage to 26.4V, Vo=24V; Δ= 26.4/26=1.1. Bring in formula
Rtrim up=(5.1 * 1.1 * 24-12.75)/(2.5 * 1.1-2.5) -10.2=477.36
It is necessary to lower the output voltage to 21.6V, Δ= 21.6/24=0.9. Bring in formula
Rtrim down=(10.2 * 0.9-5.1)/(1-0.9)=40.8

## Others

1 The warranty period of this product is two years. During the normal damage, it will be repaired free of charge. Damages caused by errors in

the use method or manufacturing technology, a paid service is provided.

2. Our company can provide product customization and matching filter modules. For details, please contact our technical staff directly.