



Typical Features

- ◆ Wide input voltage range 85-265VAC/120-380VDC
- ◆ No load power consumption ≤ 0.3W
- ◆ Transfer efficiency 86%(typical)
- ◆ Switching frequency 65KHz
- ◆ Protections: short circuit, over current
- ◆ Isolation Voltage 4000Vac
- ◆ With CE, RoHS certificate
- ◆ PCB Mounting



Application Field

FA40-220SXXW2D4 Series-----a compact size, high efficient, conform to CE standard power converter offered by Aipu. It features universal input voltage range, taking both DC and AC input, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, safer isolation, with good EMC performance. EMC and Safety specification meet international EN55032、IEC/EN61000 standard. It is widely used in power, industrial, instrument, smart home applications. Please refer to this datasheet when module being used in a bad EMC environment.

Typical Product List

| Certificate | Part No. | Output Specification | | | Max. Capacitive Load | Ripple & Noise 20MHz (Max) | Efficiency @full load 220Vac (TYP) |
|-------------|-----------------|----------------------|---------|-----------|----------------------|----------------------------|------------------------------------|
| | | Power | Voltage | Current | | | |
| | | (W) | Vo1(V) | Io1 (m A) | u F | mVp-p | % |
| CE RoHS | FA40-220S05W2D4 | 40 | 5 | 8000 | 5000 | 100 | 79 |
| | FA40-220S12W2D4 | 40 | 12 | 3333 | 1000 | 120 | 84 |
| | FA40-220S24W2D4 | 40 | 24 | 1667 | 1000 | 150 | 86 |

Note 1: Due to space limitations, above is only a part of our product list, please contact our sales team for more items.

Note 2: "*" are models under developing.

Note 3: The typical value of output efficiency is based on product is full loaded and burned-in after half an hour.

Note 4: Fluctuation range of full load efficiency (% ,TYP) is ±2%. Full load efficiency=Total output power / module's Input power.

Note 5: Ripple& Noise is tested by Twisted Pair Method, details please see Ripple& Noise Test at back.

Input Specifications

| Items | Operating Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|----------------------|-----------------------|------|------|------|
| Input Voltage Range | AC input | 85 | 220 | 265 | VAC |
| | DC input | 120 | 310 | 380 | VDC |
| Input Frequency Range | - | 47 | 50 | 63 | Hz |
| Input Current | 115VAC | / | / | 0.8 | A |
| | 220VAC | / | / | 0.5 | |
| Surge Current | 115VAC | / | / | 10 | |
| | 220VAC | / | / | 20 | |
| Leakage Current | - | 0.5mA TYP/230VAC/50Hz | | | |



| | | |
|---------------------------------|---|---------------------------|
| Recommended External Input Fuse | - | 3.15A/250VAC, slow-fusing |
| Hot Plug | - | Unavailable |
| Remote Control Terminal | - | Unavailable |

Output Specifications

| Items | Operating Conditions | Min. | Typ. | Max. | Unit |
|---------------------------|--------------------------------------|---------------------------|--------|------|--------|
| Voltage Accuracy | Full input voltage range, any load | - | ±2.0 | ±4.0 | % |
| Line Regulation | Nominal load | - | - | ±0.5 | % |
| Load Regulation | Nominal input voltage, 20%~100% load | - | - | ±3.0 | % |
| No Load Power Consumption | Input 115VAC | - | - | 0.3 | W |
| | Input 220VAC | - | - | | |
| Minimum Load | Single Output | 0 | - | - | % |
| Start-up Delay Time | Nominal input voltage (full load) | - | 1000 | - | mS |
| Power-off Holding Time | Input 115VAC(full load) | - | 200 | - | mS |
| | Input 220VAC(full load) | -- | 100 | - | |
| Dynamic Response | 25%~50%~25% | -5.0 | - | +5.0 | % |
| | 50%~75%~50% | - | - | 5.0 | mS |
| Output Overshoot | Full input voltage range | ≤10%Vo | | | % |
| Short-Circuit Protection | | Continuous, Self-recovery | | | Hiccup |
| Drift Coefficient | - | - | ±0.03% | - | %/°C |
| Over-current Protection | Full input voltage range | ≥130% Io self-recovery | | | Hiccup |

General Specifications

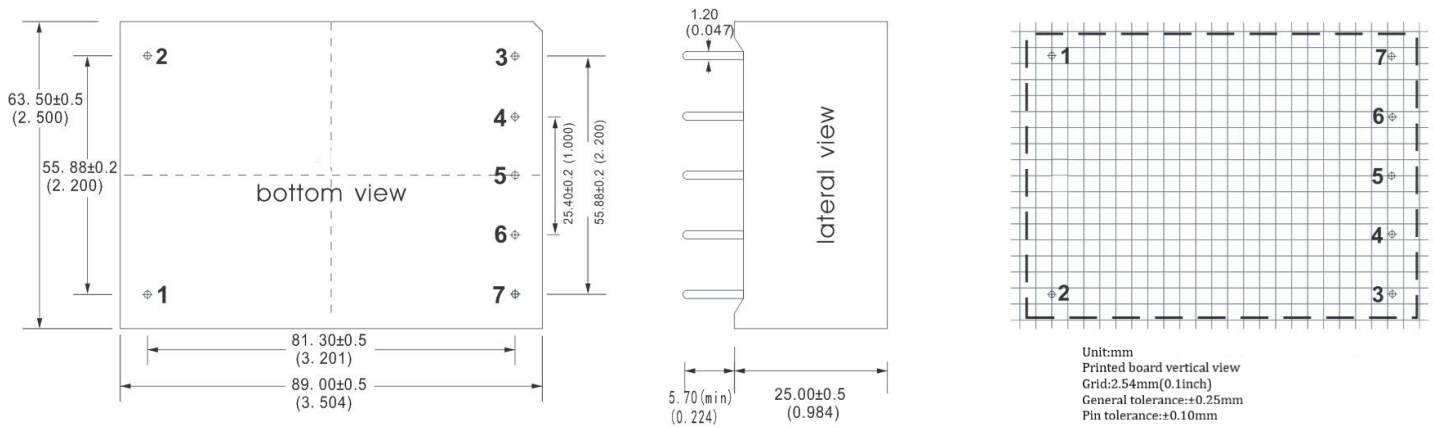
| Items | Operating Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|--|-----------------------|------|------|------|
| Switching Frequency | - | - | 65 | - | KHz |
| Operating Temperature | - | -40 | - | +75 | °C |
| Storage Temperature | - | -40 | - | +85 | |
| Soldering Temperature | Wave soldering | 260±4°C, timing 5-10S | | | |
| | Manual soldering | 360±8°C, timing 4-7S | | | |
| Relative Humidity | - | 10 | - | 90 | %RH |
| Isolation Voltage | Input-Output, test 1min, leakage current≤5mA | 4000 | - | - | VAC |
| Insulation Resistance | Input-Output@DC500V | 100 | - | - | MΩ |
| Safety Standard | - | EN62368, IEC62368 | | | |

| | | |
|----------------|---|-------------------------------|
| Vibration | - | 10-55Hz,10G,30Min, alongX,Y,Z |
| Safety Class | - | CLASS II |
| MTBF | - | MIL-HDBK-217F@25℃>300,000H |
| Cooling Method | | Free air convection |

Electromagnetic Compatibility(EMC) Characteristics

| Total Items | | Sub Items | Standard | Class |
|-------------|-----|---|------------------|---|
| EMC | EMI | CE | CISPR22/EN55032 | CLASS B (see recommended circuit Photo 2) |
| | | RE | CISPR22/EN55032 | CLASS B (see recommended circuit Photo 2) |
| | EMS | RS | IEC/EN61000-4-3 | 10V/m Perf.Criteria B (see recommended circuit Photo 1) |
| | | CS | IEC/EN61000-4-6 | 3Vr.m.s Perf.Criteria B (see recommended circuit Photo 1) |
| | | ESD | IEC/EN61000-4-2 | Contact ±6KV / Air ±8KV Perf.Criteria B |
| | | Surge | IEC/EN61000-4-5 | ±1KV Perf.Criteria B |
| | | EFT | IEC/EN61000-4-4 | ±2KV Perf.Criteria B |
| | | Voltage dips, short interruptions and voltage variations immunity | IEC/EN61000-4-11 | 0%~70% Perf.Criteria B |

Packing Dimension



| Packing Code | L x W x H | |
|--------------|------------------|-----------------------|
| W2 | 89.0X63.5X25.0mm | 3.504X2.500X0.984inch |

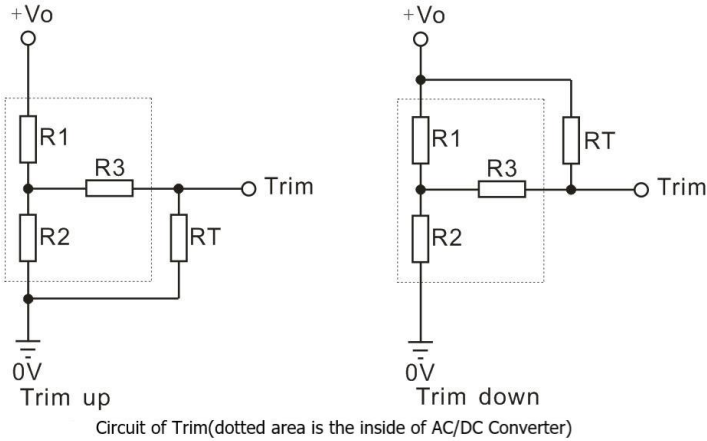
Pin Definition

| Pin-out | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|-------|-------|------|----|-----|----|-----|
| Single(S) | AC(L) | AC(N) | Trim | NC | -Vo | NC | +Vo |

Note: If the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.



Trim Pin Voltage Regulation Application Circuit



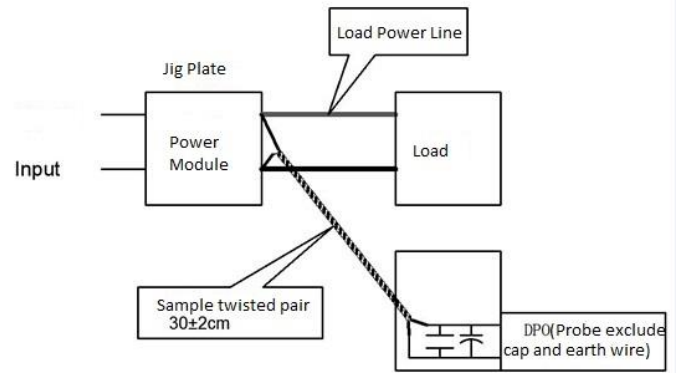
$$\text{up: } RT = \frac{aR2}{R2-a} - R3 \quad a = \frac{V_{ref}}{V_o - V_{ref}} * R1$$

$$\text{down: } RT = \frac{aR1}{R1-a} - R3 \quad a = \frac{V_{ref}}{V_o - V_{ref}} * R2$$

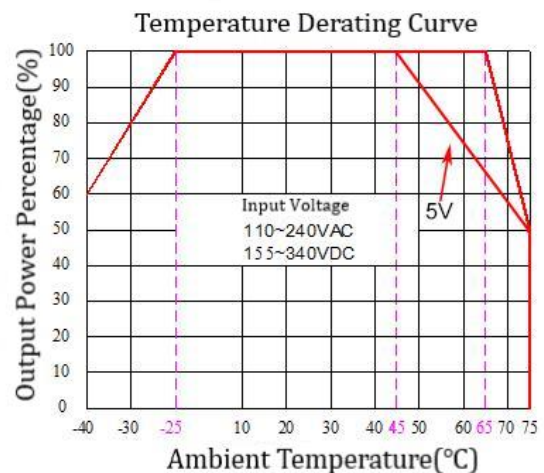
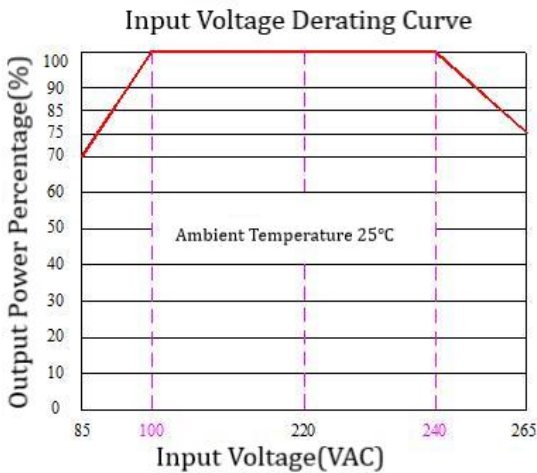
Ripple & Noise Test: (Twisted Pair Method 20MHZ bandwidth)

Test Method:

- 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.
- Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



Product Characteristic Curve



Note

- 1: Input Voltage should be derated base on Input Voltage Derating Curve when it is 85~110VAC/240~265VAC/120~155VDC/340~380VDC. Derating of FA40-220S05W2D4 based on 5V curve.
- 2: Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact with us.

Typical EMC Application and Recommend Circuit

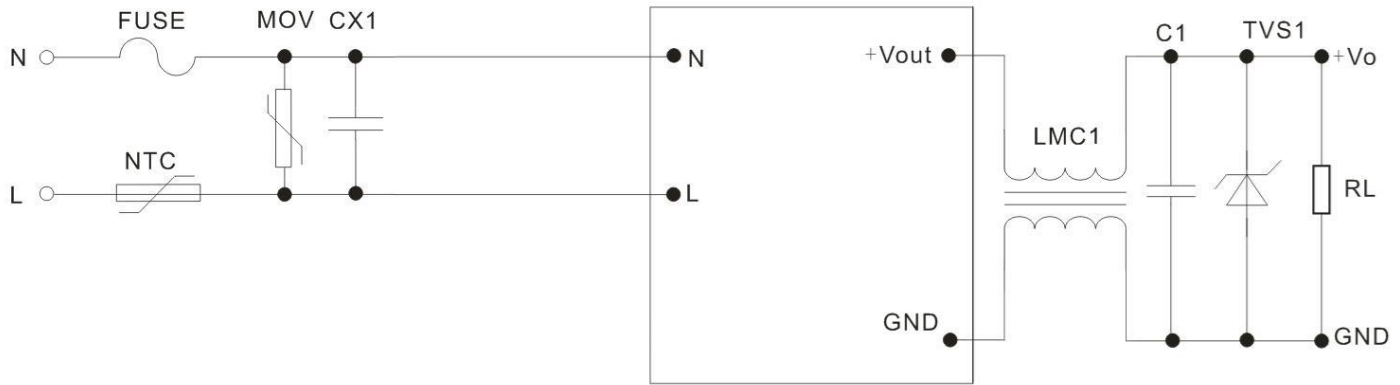


Photo 1

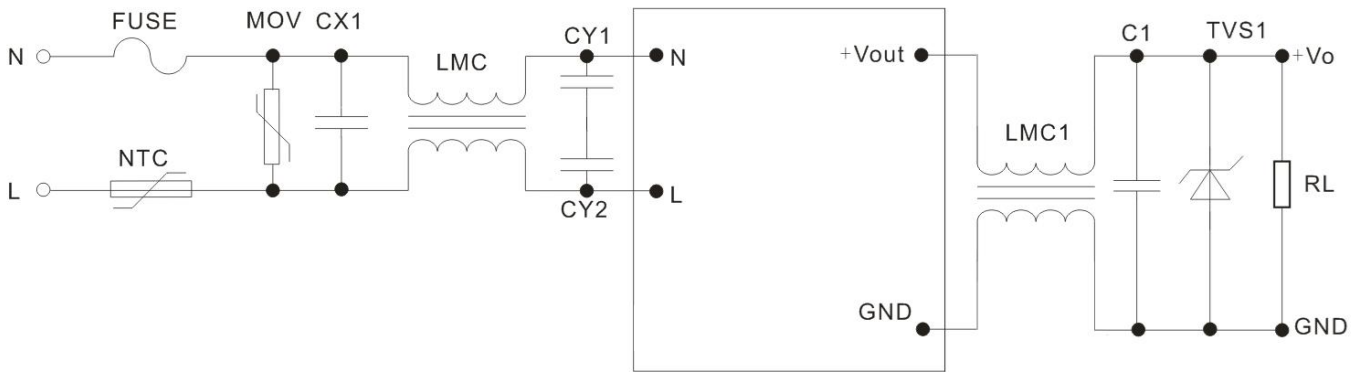


Photo 2

Note:

1. Output filter capacitors C1 filters high frequency noise, recommend to use 1 μ F ceramic capacitor, capacitance withstand voltage derating should be 80% or above.
2. TVS is a recommended component to protect post-circuits if converter fails, recommend to use 600W model.
5V output recommend: SMBJ7.0A, 9V output recommend: SMBJ12.0A, 12V output recommend: SMBJ20A, 15V output recommend: SMBJ20.0A, 24V output recommend: SMBJ30.0A, 48V output recommend: SMBJ64A.
3. MOV is voltage depend resistor, recommend model: 10D561K, to protect converter from damage when lightning surge
4. For customer's normal application request, use Photo 1 recommended circuit, if has higher EMC request, use Photo 2 recommended circuit. The spec for Photo 2 as below:
 - 1) MOV: voltage dependent resistor, recommend model: 10D-561K, to protect converter from damage when lightning surge.
 - 2) NTC: Thermistors, 10D-9;
 - 3) CY1,CY2: safety capacitor,1000pF/400VAC;
 - 4) CX: safety capacitor,0.1 μ F/275VAC;
 - 5) LCM: common mode inductor,15mH-30mH;
 - 6) LCM1: common mode inductor, 30uH-50uH;
 - 6). FUSE: necessary, recommend model 3.15A/250V, slow fusing.

**Note:**

- 1.The product should be used under the specification range, otherwise it will cause permanent damage to it.
- 2.Product's input terminal should connect to fuse;
- 3.If the product operated below the minimum load request, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
- 4.If the product worked beyond the load range, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
- 5.Unless otherwise specified, data in this datasheet are tested under conditions of **Ta=25°C**, **humidity<75%** when inputting nominal voltage and outputting rated load(pure resistance load);
- 6.All index testing methods in this datasheet are based on our Company's corporate standards.
- 7.The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, please directly contact our technician for specific information;
- 8.We can provide customized product service;
- 9.The product specification may be changed at any time without prior notice.