# APHMU25-2B-xx Series

## DESCRIPTIONS

25W, AC-DC Converter



RoHS

CE Report UKCA Report

EN62368-1 BS EN62368-1

## FEATURES

- Universal Input: 85 - 264VAC, 100 - 370VDC, 50/60Hz
- Regulated output, Low ripple & noise
- Low no-load power consumption < 0.1W
- High efficiency up to 89%
- Output short circuit, over-current, over-voltage protection
- Mounting: PCB mounting, Chassis mounting, DIN-Rail mounting available
- Meets 5000m altitude requirements

## APPLICATIONS

- Medical
- Industrial
- Civil applications

## Selection Guide

| Certification | Part No. | Output Power (W) | Nominal Output Voltage and Current(Vo/Io) | Efficiency at 230VAC (%) Typ. | Capacitive Load (uF) Max. |
|---|---|---|---|---|---|
| -- | APHMU25-2B-05 | 20.5 | 5V/4100mA | 82 | 10000 |
| EN/BS EN | APHMU25-2B-12 | 25 | 12V/2100mA | 88 | 5000 |
| -- | APHMU25-2B-15 | | 15V/1600mA | 88 | 4000 |
| -- | APHMU25-2B-18 | | 18V/1400mA | 88 | 3000 |
| EN/BS EN | APHMU25-2B-24 | | 24V/1100mA | 89 | 1000 |

Note: 1.*Use suffix " E2" for chassis and suffix " D4" for DIN-Rail mounting.
2.The product picture is for reference only. For details, please refer to the actual product.

## Specifications

| Product Specifications | Item | | Operating Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Input Specifications | Input Voltage Range | | AC input | 85 | -- | 264 | VAC |
| | | | DC input | 100 | -- | 370 | VDC |
| | Input frequency* | | | 47 | -- | 440 | Hz |
| | Input current | | 115VAC | -- | -- | 0.6 | A |
| | | | 230VAC | -- | -- | 0.34 | |
| | Inrush current | | 115VAC | -- | 10 | -- | |
| | | | 230VAC | -- | 25 | -- | |
| | Leakage current | | 264VAC/60Hz | 0.1mA RMS Typ. | | | |
| | Recommended External Input Fuse | | Chassis mounting, DIN-Rail mounting package series include fuse | 3.15A/250V, slow-blow | | | |
| | Hot Plug | | | Unavailable | | | |
| Output Specifications | Output Voltage Accuracy | | | -- | ±2 | -- | % |
| | Line Regulation | | Full load | -- | ±0.5 | -- | |
| | Load Regulation | | | -- | ±1 | -- | |
| | Ripple & Noise* | | 20MHz bandwidth (peak-peak value) | -- | 50 | 150 | mV |
| | Temperature Coefficient | | | -- | ±0.02 | -- | %/°C |
| | Short Circuit Protection | | | Continuous, self-recover | | | |
| | Over-current Protection | | | ≥110%Io, self-recover | | | |
| | Over-voltage Protection | | 5VDC Output | ≤7.5VDC | | | |
| | | | 12 /15VDC Output | ≤20VDC | | | |
| | | | 18VDC Output | ≤25VDC | | | |
| | | | 24VDC Output | ≤30VDC | | | |
| | Stand-by Power Consumption | | | -- | -- | 0.1 | W |
| | Min. Load | | | 0 | -- | -- | % |
| | Hold-up Time | | 115VAC input | -- | 15 | -- | ms |
| | | | 230VAC input | -- | 80 | -- | |
| General Specifications | Isolation | Input-output | Electric Strength Test for 1min., leakage current <5mA | 4000 | -- | -- | VAC |
| | Operating Temperature | | | -40 | -- | +70 | °C |
| | Storage Temperature | | | -40 | -- | +85 | |
| | Storage Humidity | | | -- | -- | 95 | %RH |
| | Welding Temperature | | Wave-soldering | 260 ± 5°C; time:5 - 10s | | | |
| | | | Manual-welding | 360 ± 10°C; time:3 - 5s | | | |
| | Switching Frequency | | | -- | 65 | -- | kHz |

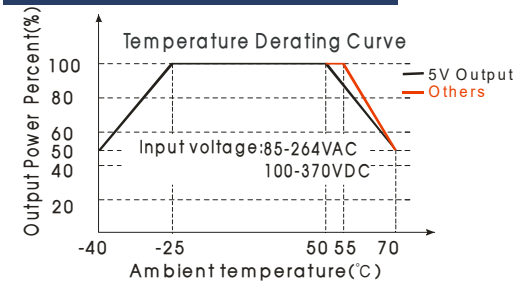
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| General Specifications | Power Derating | -40℃ to -25℃ | | 3.3 | -- | -- | %/℃ |
| | | +50℃ to +70℃ | 5V Output | 2.5 | -- | -- | |
| | | +55℃ to +70℃ | Others | 3.3 | -- | -- | |
| | Safety Class | | | CLASS II | | | |
| | Insulation Level | Primary to secondary | | 2xMOPP | | | |
| | MTBF | MIL-HDBK-217F@25℃ | | ≥300,000 h | | | |
| Mechanical Specifications | Case Material | Black plastic, flame-retardant and heat-resistant (UL94V-0) | | | | | |
| | Dimension | Horizontal package | | 70.00 x 48.00 x 23.50mm | | | |
| | | E2 chassis mounting | | 96.10 x 54.00 x 32.00mm | | | |
| | | D4 Din-Rail mounting | | 96.10 x 54.00 x 36.60mm | | | |
| | Weight | Horizontal package | | 120g (Typ.) | | | |
| | | E2 chassis mounting | | 170g (Typ.) | | | |
| | | D4 Din-Rail mounting | | 210g (Typ.) | | | |
| | Cooling Method | Free air convection | | | | | |

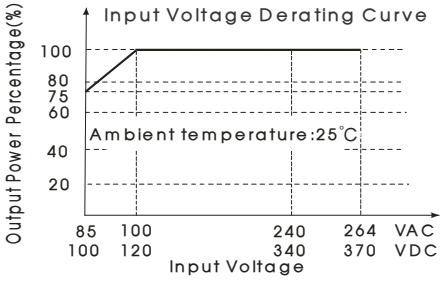
Note:The "parallel cable" method is used for ripple and noise test.

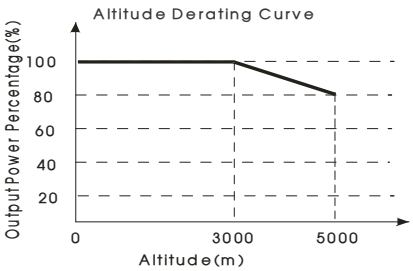
## Electromagnetic Compatibility (EMC)

| | | | | |
|---|---|---|---|---|
| Electromagnetic Compatibility (EMC) | Emissions (EMI) | CE | EN55011(CISPR11) / EN55032(CISPR32) CLASS B | |
| | | RE | EN55011(CISPR11) / EN55032(CISPR32) CLASS B | |
| | Immunity (EMS) | ESD | IEC/EN61000-4-2 Contact ±6KV/Air ±8KV | perf. Criteria B |
| | | RS | IEC/EN61000-4-3 10V/m | perf. Criteria A |
| | | EFT | IEC/EN61000-4-4 ±2KV | perf. Criteria B |
| | | | IEC/EN61000-4-4 ±4KV (See Fig. 2 for recommended circuit) | perf. Criteria B |
| | | Surge | IEC/EN61000-4-5 line to line ±1KV | perf. Criteria B |
| | | | IEC/EN61000-4-5 line to line ±2KV (See Fig. 2 for recommended circuit) | perf. Criteria B |
| | | CS | IEC/EN61000-4-6 10Vr.m.s | perf. Criteria A |
| | | Voltage dip, short interruption and voltage variation | IEC/EN61000-4-11 0%, 70% | perf. Criteria B |

## Characteristic Curve



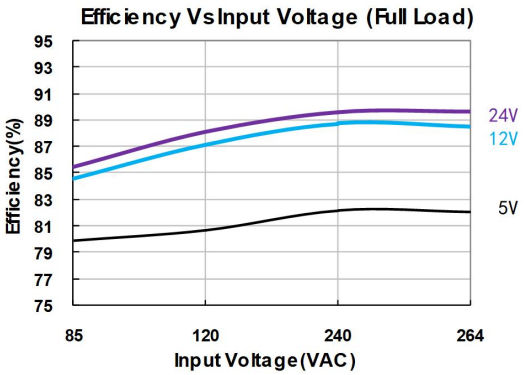



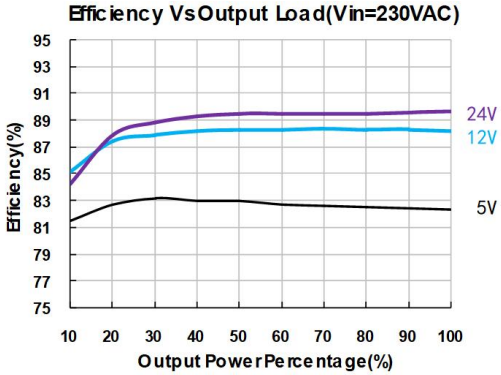




Note: ① With an AC input between 85-100VAC and a DC input between 100-120VDC, the output power must be derated as per temperature derating curves;

② Altitude should be derated based on temperature derating when it is 3000 - 5000m;

③ This product is suitable for applications using natural air cooling.




## Design Reference

### 1. Typical application

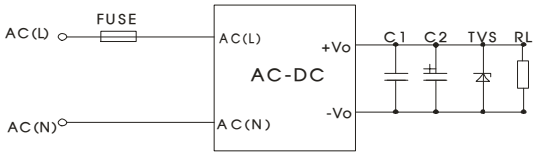



Fig. 1: Typical circuit diagram

| Part No. | FUSE | C2(uF) | TVS1 |
|---|---|---|---|
| APHMU25-2B-05 | 3.15A/250V, slow-blow | 330 | SMBJ7.0A |
| APHMU25-2B-12 | | 330 | SMBJ20A |
| APHMU25-2B-15 | | 330 | SMBJ20A |
| APHMU25-2B-18 | | 120 | SMBJ30A |
| APHMU25-2B-24 | | 68 | SMBJ30A |

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise (advice use 1uF.)and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. EMC solution-recommended circuit

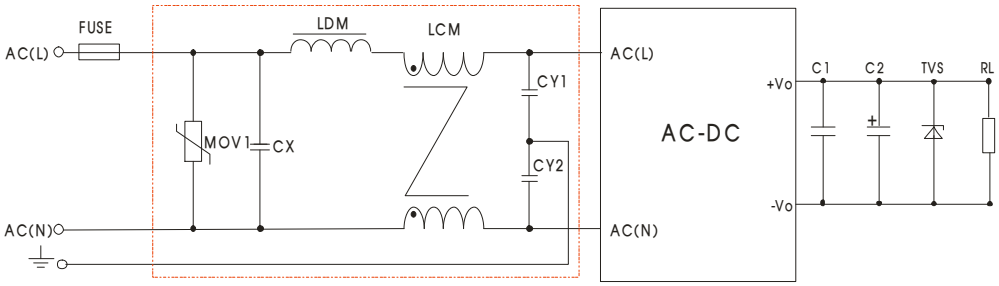
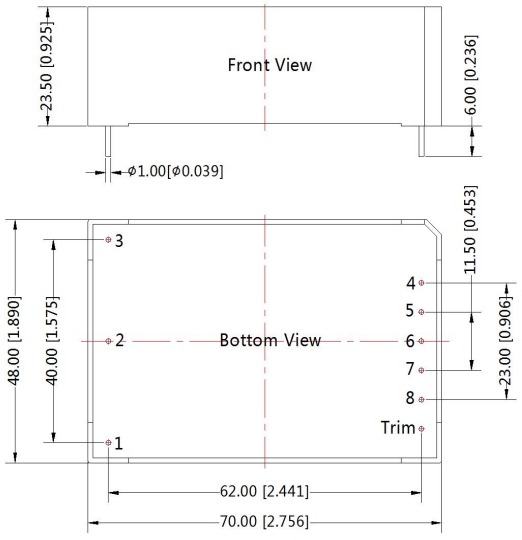


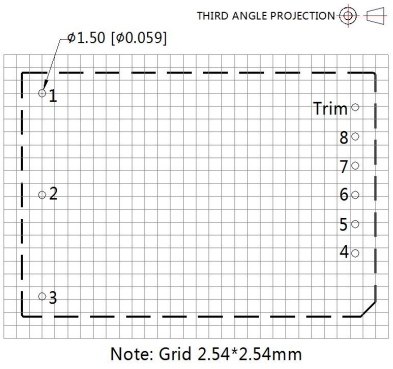

Fig 2: EMC Recommended circuit with higher requirements

| Components | Recommended value |
|---|---|
| MOV1 | S14K300 |
| CY1 , CY2 | 1nF/400VAC |
| CX | 0.1uF/275VAC |
| LCM | 10mH |
| LDM | 4.7μH/2A |
| FC-LX1D | 2KV/4KV EMC filter |
| FUSE | 3.15A/250V, slow-blow, required |

## Dimensions and Recommended



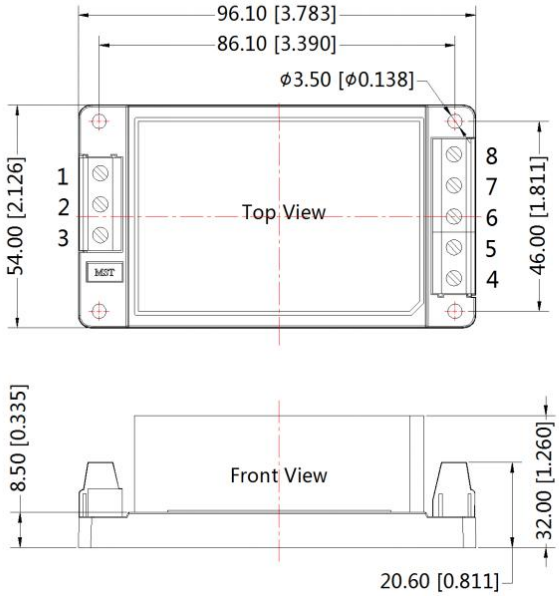

Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.50[±0.020]




Note: Grid 2.54*2.54mm

| Pin-Out | |
|---|---|
| Pin | Fuction |
| 1 | No Pin |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | No Pin |
| 6 | No Pin |
| 7 | No Pin |
| 8 | -Vo |
| Trim | No Pin |

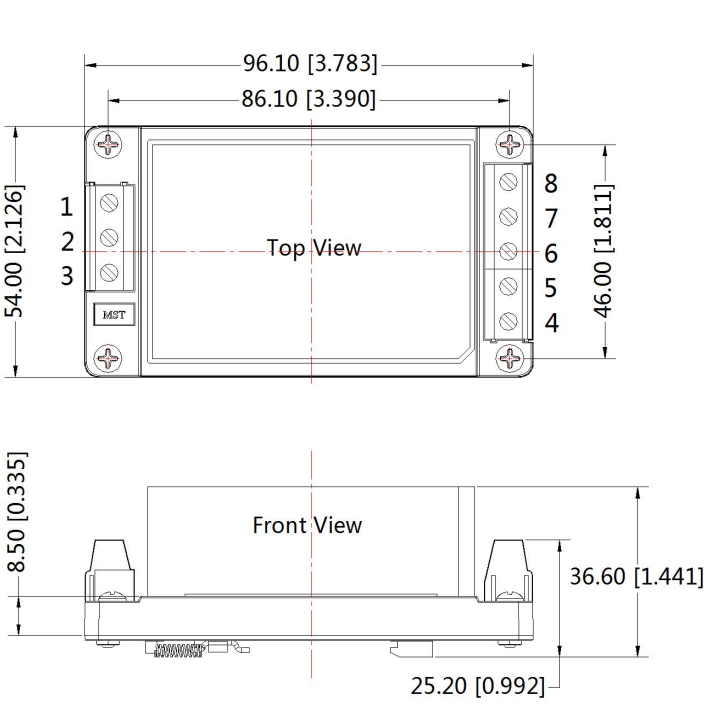
## E2 Dimension




| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | NC |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | -Vo |

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±0.50[±0.020]

## D4 Dimension




| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | NC |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | -Vo |

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: ±1.00[±0.039]

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
7. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.