

FEATURES

- ▶ Fully encapsulated Plastic Case
- ▶ 3 Mounting Versions:
 - PCB Mounting with Solder Pins
 - Chassis Mounting with Screw Terminals
 - DIN-Rail Mounting
- ▶ Package Dimension 88.9x63.5x30.0 mm (PCB Version)
- ▶ Universal Input 85-264VAC, 47-440 Hz
- ▶ Protection Class II
- ▶ Extended Operating Temp.Range -40°C to +60°C at full Load
- ▶ LED Output Indicator (Chassis Version Models)
- ▶ Eco Design, compliant to Energy Star specification and ErP Directive 2009/125/EC
- ▶ Industrial Safety to UL/IEC/EN 90650-1 and UL508
- ▶ Medical Safety Approval to UL/IEC/EN 60601-1 3rd Edition
- ▶ Over Load and Over Temperature Protection
- ▶ 3 Year Product Warranty



PRODUCT OVERVIEW

The new MINMAX APM-40 series is a range of fully encapsulated AC/DC power modules. These high performance products feature an extended operating temperature range of -40°C to +80°C. Universal input voltage 85-264VAC and UL/IEC/EN safety approvals including medical safety and UL508 listing qualify these power supplies modules for applications in products with worldwide markets. The modules comply with the latest European ErP Directive and meet Energy Star requirements. EMI-filter meets EN55022, class B and FCC, part15, class B.

The APM-40 series power modules provide an economical solution for many space critical applications in commercial, medical and industrial electronic equipment.

Model Selection Guide

| Model Number PCB Mounting (For model with Chassis Mounting, add suffix C) | Output Voltage VDC | Output Current Max. mA | Input Current | | Max. capacitive Load μF | Efficiency (typ.) @Max. Load, 115VAC % |
|--|-----------------------|------------------------------|------------------------|--------------|----------------------------|--|
| | | | 115VAC, 60Hz | 230VAC, 50Hz | | |
| | | | @Max. Load mA(typ.) | | | |
| APM-40S05 | 5 | 8000 | 698 | 419 | 8000 | 83 |
| APM-40S12 | 12 | 3330 | 698 | 419 | 3900 | 83 |
| APM-40S15 | 15 | 2660 | 698 | 419 | 3900 | 83 |
| APM-40S24 | 24 | 1660 | 687 | 413 | 680 | 84 |
| APM-40D12 | ±12 | ±1660 | 687 | 413 | 1500# | 84 |
| APM-40D15 | ±15 | ±1330 | 687 | 413 | 1000# | 84 |

For each output

Input Specifications

| Parameter | Model | Min. | Typ. | Max. | Unit |
|-------------------------------------|------------|------|------|------|------|
| AC Voltage Input Range | All Models | 85 | --- | 264 | VAC |
| Input Frequency Range | | 47 | --- | 440 | Hz |
| DC Voltage Input Range | | 120 | --- | 370 | VDC |
| No-Load Power Consumption | | --- | --- | 0.3 | W |
| Inrush Current (Cold Start at 25°C) | 115VAC | --- | --- | 25 | A |
| | 230VAC | --- | --- | 50 | A |

Output Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|--------------------------|--|------|-------|------|------------------------|
| Output Voltage Accuracy | | --- | ±2.0 | --- | % |
| Line Regulation | | --- | ±0.5 | --- | % |
| Load Regulation | Single Output Model | --- | ±1.0 | --- | % |
| | Dual Output Models | --- | ±2.0 | --- | % |
| Min.Load | No minimum Load Requirement | | | | |
| Ripple & Noise (20MHz) | 5VDC Output Models | --- | 1.5 | 1.8 | %V _{PP} of Vo |
| | Other Output Models | --- | 1.0 | 1.3 | %V _{PP} of Vo |
| Over Voltage Protection | Zener diode clamp | --- | 120 | --- | % of Vo |
| Temperature Coefficient | | --- | ±0.02 | --- | %/°C |
| Overshoot | | --- | --- | 5 | % |
| Current Limitation | 85VAC, Hiccup Mode, auto-recovery | 105 | --- | --- | % Inom. |
| Short Circuit Protection | Hiccup mode, indefinite (automatic recovery) (long term overload condition may cause damage) | | | | |

General Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------------|-----------------------------------|---|------|------|----------------------|
| I/O Isolation Voltage (reinforced) | | 4000 | --- | --- | VACrms |
| Leakage Current | | --- | 80 | --- | μA |
| I/O Isolation Resistance | 500 VDC | 1000 | --- | --- | MΩ |
| Switching Frequency | | --- | 130 | --- | KHz |
| Hold-up Time | 115VAC, 60Hz | --- | 25 | --- | ms |
| | 230VAC, 50Hz | --- | 80 | --- | ms |
| MTBF (calculated) | MIL-HDBK-217F@25°C, Ground Benign | TBD | --- | --- | Hours |
| EMC Emission | Conducted and radiated | EN 55011 class B, EN 55022 class B, FCC part 15 Class B | | | |
| | Standard | Specification Requirement | | | Performance Criteria |
| EMC Immunity according EN61000-6-1 | EN61000-4-2 | Air ±8KV Cont. ±4KV | | | B |
| | EN61000-4-3 | 80~1000MHz, 10V/m 80% AM, 1KHz modulation | | | A |
| | EN61000-4-4 | AC port ±2KV DC, SL, TL ±2KV not less than 1 min. | | | B |
| | EN61000-4-5 | 1.2/50μS(8/20μS) AC dif. ±2KV DC ±1KV | | | B |
| | EN61000-4-6 | 0.15~80MHz, 10Vrms (functional earth ports included) | | | B |
| | | 80% AM, 1KHz modulation | | | |
| | EN61000-4-8 | 50Hz/60Hz, 30A/m | | | A |
| | EN61000-4-11 | 30%, 10ms | | | B |
| | | 60%, 100ms, 95%, 5000ms | | | C |
| Protection Class II | | According IEC/EN 60536 | | | |
| Safety (Approvals pending) | | IEC/EN 60950-1, 60601-1 3 rd , 2XMOPP cUL/UL 60950-1, 60601-1 3 rd , 2XMOPP, UL 508 listed | | | |

Input Fuse

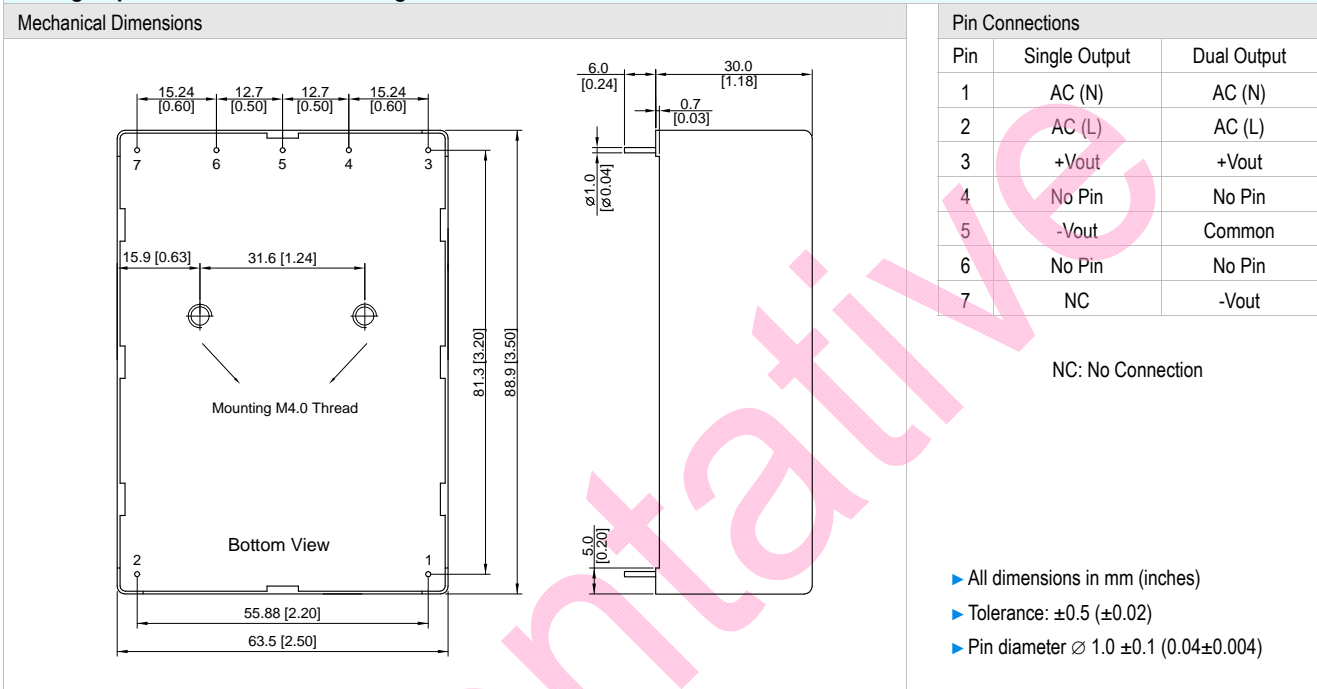
| All Models | |
|-----------------------------|------------------------|
| External Fuse (Recommended) | 3.15A Slow – Blow Type |

Environmental Specifications

| Parameter | Conditions | | |
|---------------------------------|---|-------|------------|
| Temperature Range (operational) | Ambient | -40°C | +80°C |
| Power Derating | Above +60°C | | 1.5W / °C |
| Storage Temperature Range | | -40°C | +95°C |
| Over Temperature Protection | Shutdown at 90°C (automatic recovery at approx. 67°C) | | |
| Humidity (non condensing) | | --- | 95% rel. H |
| Cooling | Free-Air convection | | |

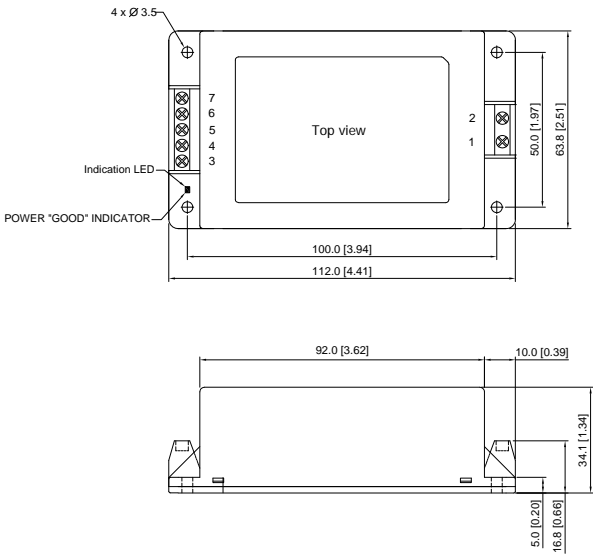
Notes

- 1 **This product is not designed for use in critical life support systems, equipment used in hazardous environment, nuclear control systems or other such applications which necessitate specific safety and regulatory standards other the ones listed in this datasheet.**
- 2 Specifications typical at Ta=+25°C, resistive load, 115VAC, 60Hz input voltage, after warm-up time rated output current unless otherwise noted.
- 3 Ripple & Noise measurement bandwidth is 0~20 MHz, measured with a 0.1µF/50V MLCC and a 1µF/50V Aluminum electrolytic.
- 4 Safety approvals cover frequency 47-63 Hz.
- 5 All AC/DC modules should be externally fused at the front end for protection.
- 6 Other input and output voltage may be available, please contact factory.
- 7 To order the module with chassis mount package, please add a **suffix C** (e.g. APM-40S05C).
- 8 Part number for DIN-Rail mounting bracket: **AC-DIN-02**
- 9 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 10 Specifications are subject to change without notice.

Package Specifications PCB Mounting

Physical Characteristics

| | |
|---------------|---|
| Case Size | : 88.9x63.5x30.0mm (3.50x2.50x1.18 inches) |
| Case Material | : Plastic resin + Fiberglass (flammability to UL 94V-0 rated) |
| Pin Material | : Copper Alloy with Gold Plate Over Nickel Subplate |
| Weight | : TBD |

Package Specifications Chassis Mounting (order code suffix C)

| Mechanical Dimensions | | Connections | | |
|---|----|-------------|---------------|-------------|
|  | | Pin | Single Output | Dual Output |
| | | 1 | AC (N) | AC (N) |
| | | 2 | AC (L) | AC (L) |
| | | 3 | +Vout | +Vout |
| | | 4 | NC | NC |
| | | 5 | -Vout | Common |
| | | 6 | NC | NC |
| 7 | NC | -Vout | | |

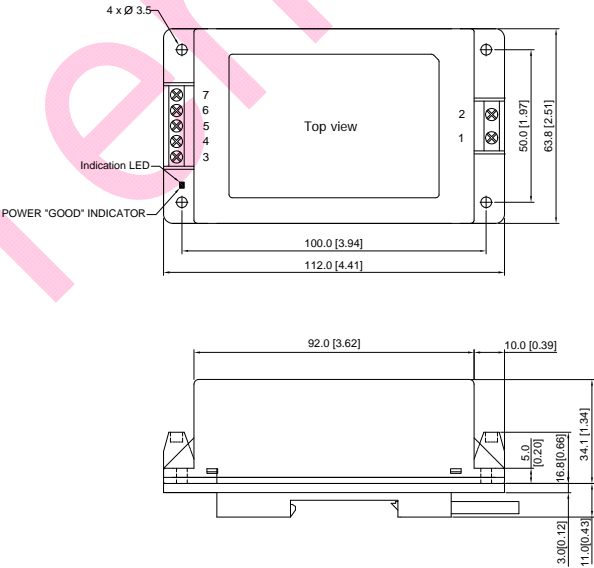
NC: No Connection

▶ All dimensions in mm (inches)
▶ Tolerance: ±0.5 (±0.02)

Physical Characteristics

| | |
|---------------|---|
| Case Size | : 112.0x63.8x34.1mm (4.41x2.51x1.34 inches) |
| Case Material | : Plastic resin + Fiberglass (flammability to UL 94V-0 rated) |
| Weight | : TBD |

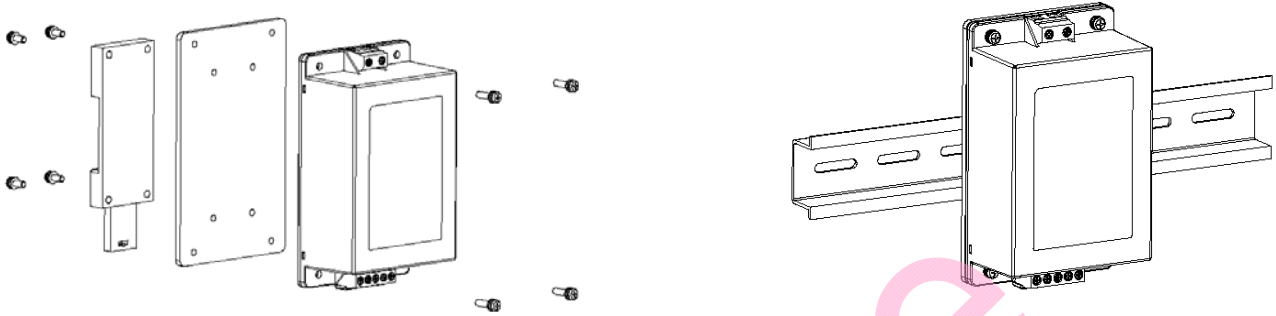
Package Specifications with DIN Rail Mounting Bracket

| Mechanical Dimensions | |
|--|--|
|  | |

Physical Characteristics

| | |
|---------------|---|
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DIN-Rail Mounting Bracket (Order code for Kit : AC-DIN-02)



Tentative