

FEATURES

- ▶ Fully Encapsulated Plastic Case for PCB, Chassis and DIN-Rail Mounting Version
- ▶ Universal Input 85-264VAC
- ▶ I/O Isolation 3000VAC with Reinforced Insulation
- ▶ Operating Ambient Temp. Range -10°C to +70°C
- ▶ Overload/Voltage and Short Circuit Protection
- ▶ EMI Emission EN55011/32 Class B Approved
- ▶ EMC Immunity EN 61000-4-2,3,4,5,6,8,11 Approved
- ▶ UL508 Safety Approval (Option) Specifically for Industrial Application
- ▶ UL/cUL/IEC/EN 62368-1(60950-1) Safety Approval & CE Marking



PRODUCT OVERVIEW

The MINMAX AZF-60 series is a range of fully encapsulated AC-DC power supply modules. The product features EMI emission EN 55011/32 Class B approved and EMS compliance to EN 61000-4 standard. This series comply with international standard pinout and input voltage range of 85-264VAC for worldwide markets. For industrial applications, the models for chassis mounting can also be supplied as option with UL508 approval. The AZF-60 series provide a cost effective solution for many space critical applications in commercial and industrial electronic equipment.

Model Selection Guide

| Model Number | Output Voltage VDC | Output Current mA | Input Current 115VAC, 60Hz | | Max. capacitive Load μF | Efficiency (typ.) @Max. Load % |
|--------------|-----------------------|----------------------|-------------------------------|----------------------|----------------------------|--------------------------------------|
| | | | Max. | @No Load | | |
| | | | @Max. Load mA(typ.) | @No Load mA(typ.) | | |
| AZF-60S051 | 5.1 | 10,000 | 936 | 50 | 8000 | 79 |
| AZF-60S12 | 12 | 5000 | 1060 | 50 | 3900 | 82 |
| AZF-60S15 | 15 | 4000 | 1047 | 50 | 3300 | 83 |
| AZF-60S24 | 24 | 2500 | 1035 | 50 | 1500 | 84 |
| AZF-60S36 | 36 | 1666 | 1035 | 50 | 1000 | 84 |
| AZF-60S48 | 48 | 1250 | 1035 | 50 | 680 | 84 |

Input Specifications

| Parameter | Conditions / Model | | Min. | Typ. | Max. | Unit |
|-----------------------|--------------------|--------------------|------|------|------|------|
| Input Voltage Range | All Models | | 85 | --- | 264 | VAC |
| Input Frequency Range | | | 47 | --- | 63 | Hz |
| Input Voltage Range | | | 120 | --- | 370 | VDC |
| Inrush Current | 115VAC | Cold Start at 25°C | --- | --- | 30 | A |
| | 230VAC | | --- | --- | 50 | A |

| Output Specifications | | | | | | |
|------------------------------|---|---------------------|------|-------|------|------------------------|
| Parameter | Conditions / Model | | Min. | Typ. | Max. | Unit |
| Output Voltage Accuracy | | | --- | ±1.0 | ±2.0 | % |
| Line Regulation | Vin=Min. to Max. @Full Load | | --- | ±0.2 | ±1.0 | % |
| Load Regulation | Io=10% to 100% | | --- | ±0.5 | ±1.0 | % |
| Ripple & Noise | 0-20 MHz Bandwidth | 5.1VDC Output Model | --- | 2.0 | 3.0 | %V _{PP} of Vo |
| | | Other Output Models | --- | 1.0 | 1.3 | %V _{PP} of Vo |
| Minimum Load | | | --- | 10 | --- | %Inom. |
| Over Voltage Protection | Zener diode clamp | | --- | 120 | --- | % of Vo |
| Transient Response Deviation | (Iout=100% to Iout=50%) | | --- | ±3 | ±6 | % |
| Temperature Coefficient | | | --- | ±0.02 | --- | %/°C |
| Overshoot | | | --- | --- | 5 | % Vout |
| Over Load Protection | Foldback, auto-recovery | | 105 | --- | --- | %Inom. |
| | (long term overload condition may cause damage) | | | | | |
| Short Circuit Protection | Hiccup mode, Automatic Recovery | | | | | |

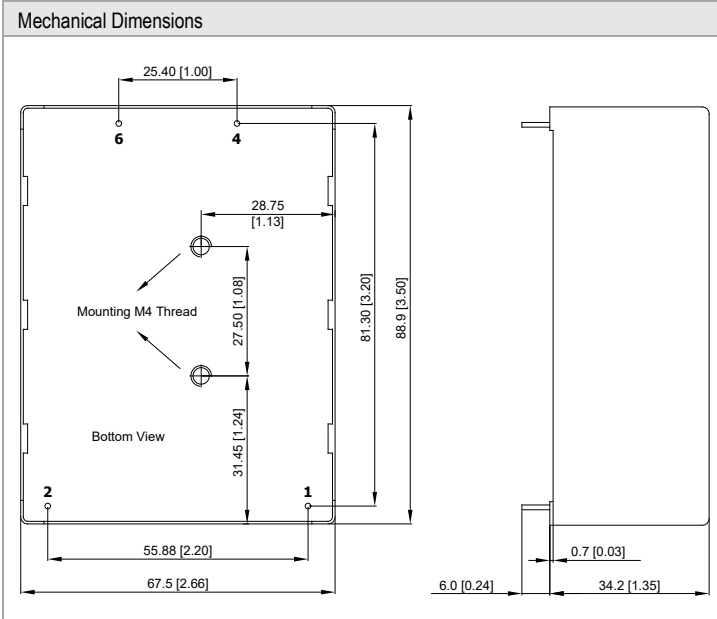
| General Specifications | | | | | | |
|--------------------------|---|--|---------|------|------|-------|
| Parameter | Conditions | | Min. | Typ. | Max. | Unit |
| I/O Isolation Voltage | Input to Output, 60 Seconds | | 3000 | --- | --- | VAC |
| I/O Isolation Resistance | 500 VDC | | 100 | --- | --- | MΩ |
| Switching Frequency | | | --- | 100 | --- | kHz |
| Hold-up Time | | | --- | 20 | --- | ms |
| MTBF (calculated) | MIL-HDBK-217F@25°C, Ground Benign | | 125,000 | | | Hours |
| Safety Approvals | UL/cUL 60950-1 recognition (UL certificate), IEC/EN 60950-1 (CB-report) | | | | | |
| | UL/cUL 62368-1 recognition (UL certificate), IEC/EN 62368-1 (CB-report) | | | | | |
| | UL/cUL 508 listed certificate | | | | | |

| EMC Specifications | | | | |
|--------------------|--------------------------------------|---------------------------------------|---|-----------------------------|
| Parameter | Standards & Level | | | Performance |
| EMI | Conduction | EN 55011, EN 55032, EN 61000-6-4, | | Without external components |
| | Radiation | EN 61000-6-3 | | |
| EMS | EN 55024, EN 61000-6-2, EN 61000-6-1 | | | |
| | ESD | EN 61000-4-2 Air ± 8kV, Contact ± 4kV | | B |
| | Radiated immunity | EN 61000-4-3 10V/m | | A |
| | Fast transient | EN 61000-4-4 ±2kV | | B |
| | Surge | EN 61000-4-5 ±1kV | | B |
| | Conducted immunity | EN 61000-4-6 10Vrms | | B |
| | PFMF | EN 61000-4-8 30A/m | | A |
| | Dips | EN 61000-4-11 30% 10ms | | B |
| Interruptions | EN 61000-4-11 >95% 5000ms | | C | |

| Environmental Specifications | | | | | | |
|---|--|---------------------|------|------|------|----------|
| Parameter | Conditions | | Min. | Typ. | Max. | Unit |
| Operating Ambient Temperature Range | | | -10 | --- | +70 | °C |
| Power Derating (5.1Vout) | +40°C to +70°C | 5.1V Output Model | 2.25 | | | W / °C |
| Power Derating | +50°C to +70°C | Other Output Models | 2.25 | | | W / °C |
| Storage Temperature Range | | | -40 | --- | +85 | °C |
| Thermal Shutdown | Shutdown, Internal IC Junction Temperature | | --- | 142 | --- | °C |
| | Automatic Recovery, Internal IC Junction Temperature | | --- | 67 | --- | °C |
| Humidity (non condensing) | | | --- | --- | 95 | % rel. H |
| Lead Temperature (1.5mm from case for 10Sec.) | | | --- | --- | 260 | °C |

| Notes | |
|-------|---|
| 1 | All specifications typical at Ta=+25°C, resistive load, 115VAC, 60Hz input voltage and after warm-up time rated output current unless otherwise noted. |
| 2 | These power modules require a minimum output loading to maintain specified regulation, operation under no-load conditions will not damage the power supplies however they may not meet all listed specifications. |
| 3 | Other input and output voltage may be available, please contact factory. |
| 4 | Specifications are subject to change without notice |

Package Specifications PCB Mounting



Pin Connections

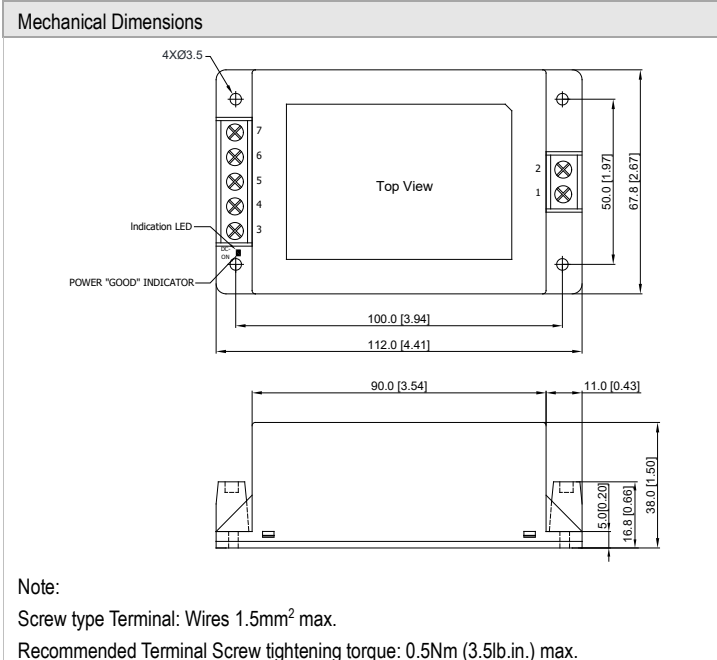
| Pin | Function | Diameter mm (inches) |
|-----|--------------------|----------------------|
| 1 | AC(N) – AC Neutral | ∅ 1.0 [0.04] |
| 2 | AC(L) – AC Line | ∅ 1.0 [0.04] |
| 4 | +Vout | ∅ 1.0 [0.04] |
| 6 | -Vout | ∅ 1.0 [0.04] |

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: ±1.0 (±0.04)
- ▶ Pin pitch tolerance: ±0.25 (±0.01)
- ▶ Pin diameter ∅ 1.0 ±0.1 (0.04±0.004)

Physical Characteristics

| | |
|---------------|--|
| Case Size | : 88.9x67.5x34.2mm (3.50x2.66x1.35 inches) |
| Case Material | : Plastic resin (flammability to UL 94V-0 rated) |
| Pin Material | : Copper Alloy |
| Weight | : 345g |

Package Specifications Chassis Mounting (order code suffix C)



Connections

| Pin | Function |
|-----|--------------------|
| 1 | AC(N) – AC Neutral |
| 2 | AC(L) – AC Line |
| 3 | NC |
| 4 | +Vout |
| 5 | NC |
| 6 | -Vout |
| 7 | NC |

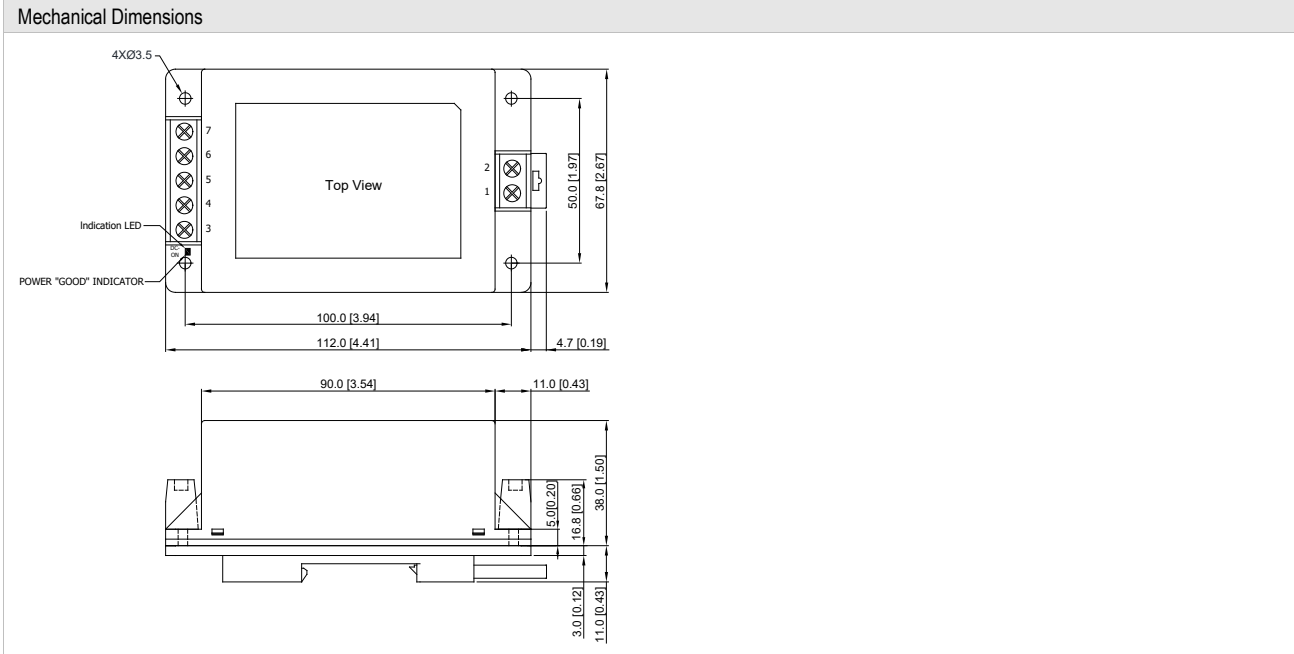
NC: No Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: ±1.0 (±0.04)

Physical Characteristics

| | |
|---------------|--|
| Case Size | : 112.0x67.8x38.0mm (4.41x2.67x1.50 inches) |
| Case Material | : Plastic resin (flammability to UL 94V-0 rated) |
| Weight | : 332g |

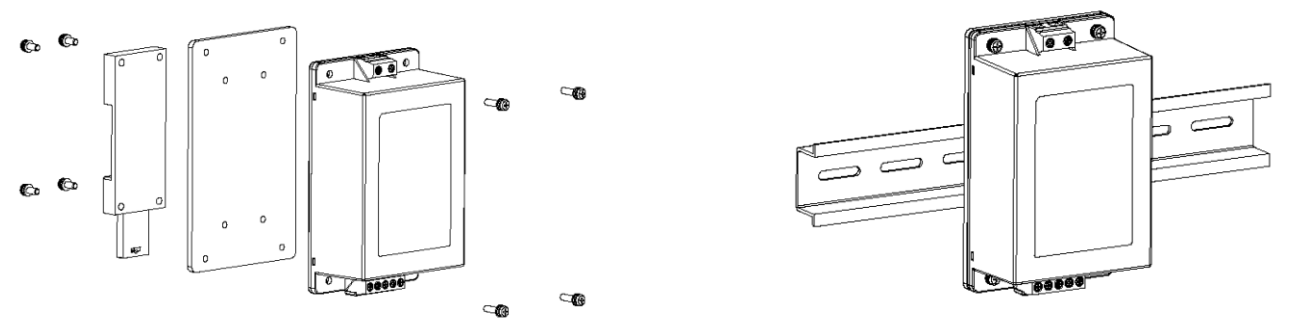
Package Specifications with DIN Rail Mounting Bracket



Physical Characteristics

| | |
|---------------|--|
| Case Size | : 112.0x67.8x38.0mm (4.41x2.67x1.50 inches) |
| Case Material | : Plastic resin (flammability to UL 94V-0 rated) |
| Weight | : 386g |

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



Order Code Table

| PCB Mounting | Chassis Mounting | PCB Mounting With UL508 | Chassis Mounting With UL508 | With DIN Rail Mounting by two Order Code | | Chassis Mounting with UL508 & DIN Rail Mounting by two Order Code | |
|--------------|------------------|-------------------------|-----------------------------|--|-----------|---|-----------|
| AZF-60S051 | AZF-60S051C | AZF-60S051ICE | AZF-60S051CICE | AZF-60S051C | AC-DIN-02 | AZF-60S051CICE | AC-DIN-02 |
| AZF-60S12 | AZF-60S12C | AZF-60S12ICE | AZF-60S12CICE | AZF-60S12C | AC-DIN-02 | AZF-60S12CICE | AC-DIN-02 |
| AZF-60S15 | AZF-60S15C | AZF-60S15ICE | AZF-60S15CICE | AZF-60S15C | AC-DIN-02 | AZF-60S15CICE | AC-DIN-02 |
| AZF-60S24 | AZF-60S24C | AZF-60S24ICE | AZF-60S24CICE | AZF-60S24C | AC-DIN-02 | AZF-60S24CICE | AC-DIN-02 |
| AZF-60S36 | AZF-60S36C | AZF-60S36ICE | AZF-60S36CICE | AZF-60S36C | AC-DIN-02 | AZF-60S36CICE | AC-DIN-02 |
| AZF-60S48 | AZF-60S48C | AZF-60S48ICE | AZF-60S48CICE | AZF-60S48C | AC-DIN-02 | AZF-60S48CICE | AC-DIN-02 |