

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. 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	---	%I _{nom.}	
Over Voltage Protection	Zener diode clamp	---	120	---	% of Vo	
Transient Response Deviation	(I _{out} =100% to I _{out} =50%)		±3	±6	%	
Temperature Coefficient		---	±0.02	---	%/°C	
Overshoot		---	---	5	% V _{out}	
Over Load Protection	Hiccup mode, auto-recovery (long term overload condition may cause damage)	105	---	---	%I _{nom.}	
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, EN 61000-6-3	Without external components	Class B
	Radiation			
EMS	EN 55035, 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

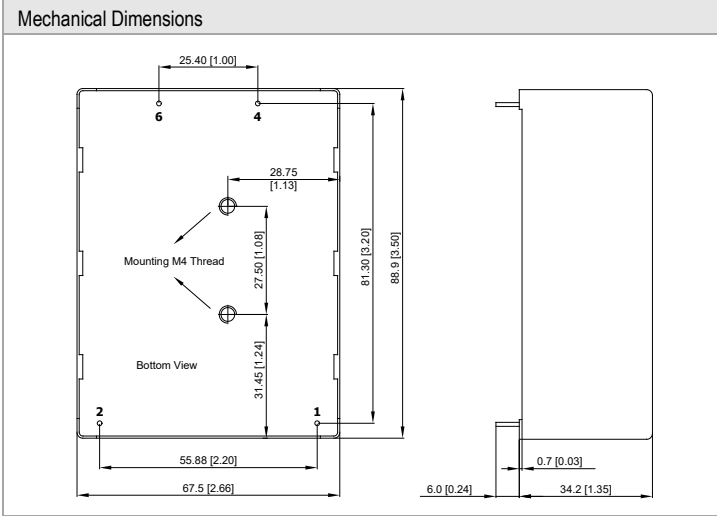
Environmental Specifications

Parameter	Conditions / Model		Min.	Typ.	Max.	Unit
Operating Ambient Temperature Range			-10	---	+70	°C
Power Derating	+40°C to +70°C	5.1V Output Model	2.25			W / °C
	+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 MINMAX.
- 4 Specifications are subject to change without notice
- 5 The repeated high voltage isolation testing of the converter can degrade isolation capability, to a lesser or greater degree depending on materials, construction, environment and reflow solder process. Any material is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage. Furthermore, the high voltage isolation capability after reflow solder process should be evaluated as it is applied on system.

Package Specifications PCB Mounting



Pin Connections

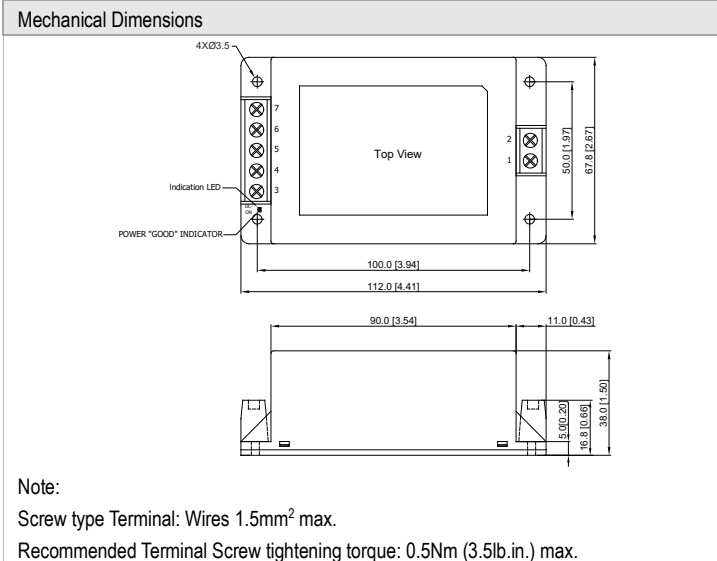
Pin	Function	Diameter mm (inches)
1	AC(N) – AC Neutral	∅ 1.0 [0.04]
2	AC(L) – AC Line	∅ 1.0 [0.04]
4	+Vout	∅ 1.0 [0.04]
6	-Vout	∅ 1.0 [0.04]

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: ±1.0 (±0.04)
- ▶ Pin pitch tolerance: ±0.25 (±0.01)
- ▶ Pin diameter tolerance: X.X±0.1 (X.XX±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 with screw terminal (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

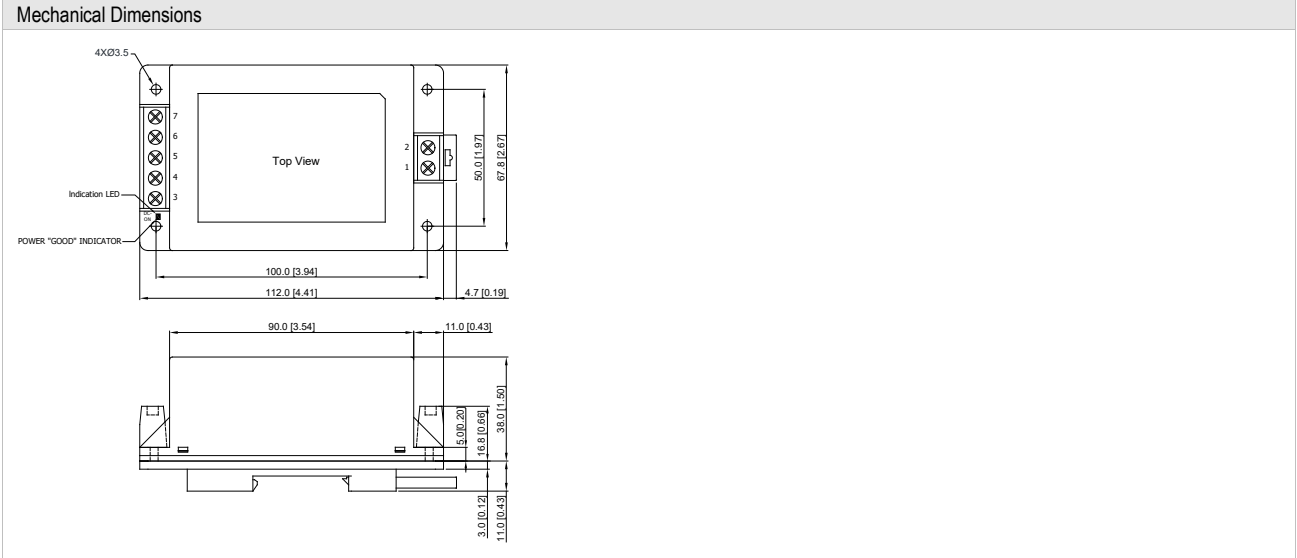
NC: No Connection

- ▶ 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

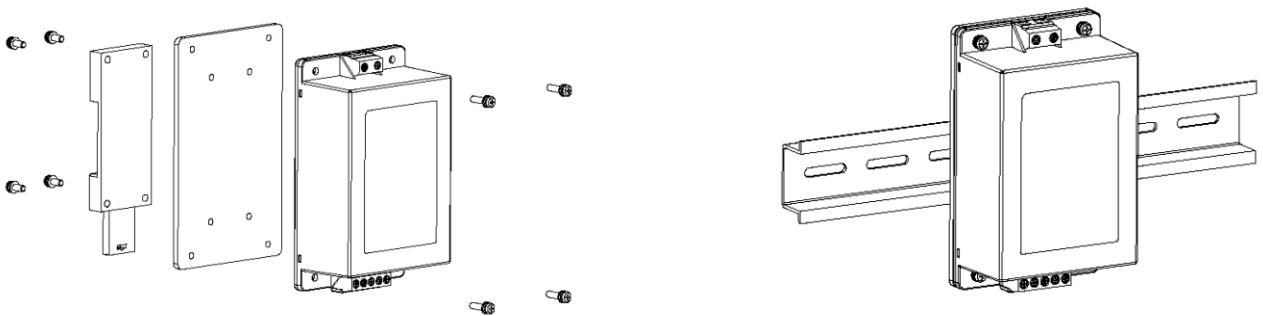
Package Specifications for screw terminal with DIN Rail Mounting (order code suffix AC-DIN-02)



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

Screw terminal with DIN Rail Mounting



Note:

Recommended tightening torque: 0.35Nm (3.1lb.in.) max.

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