

## FEATURES

- ▶ Fully Encapsulated Plastic Case for PCB Mounting
- ▶ Universal Input 85-264VAC, 47-440Hz
- ▶ I/O Isolation 3000VAC with Reinforced Insulation
- ▶ Wide Operating Ambient Temp. Range
- ▶ Overload/Voltage and Short Circuit Protection
- ▶ EMI Emission EN55032 Class B Approved
- ▶ EMC Immunity EN61000-4-2,3,4,5,6,8,11 Approved
- ▶ Eco Design, Compliant to Energy Star Specification and ErP Directive 2009/125/EC
- ▶ UL/cUL 60950-1 Safety Approval & CE Marking



## PRODUCT OVERVIEW

The MINMAX AHF-10 series is a range of fully encapsulated AC-DC power supply modules. The product features EMI-filter to EN 55032, class B and EMS compliance to EN 61000-4 standard. Universal input voltage 85-264VAC and International safety approvals qualifies these power modules for applications in products with worldwide markets. The AHF-10 series provide a cost effective solution for many space critical applications in commercial and industrial electronic equipment.

### Model Selection Guide

Model Number	Output Voltage	Output Current	Input Current	Max. capacitive Load	Efficiency (typ.)
			115VAC, 60Hz		
	VDC	Max. mA	@Max. Load mA(typ.)	@Max. Load %	
AHF-10S03	3.3	2000	137	3900	70
AHF-10S05	5	2000	199	3300	73
AHF-10S12	12	833	191	2200	76
AHF-10S15	15	666	191	2200	76
AHF-10S24	24	416	190	1000	76
AHF-10D12	±12	±380	172	#1000	77
AHF-10D15	±15	±300	169	#1000	77

# For each output

### Input Specifications

Parameter	Conditions / Model		Min.	Typ.	Max.	Unit
Input Voltage Range	All Models		85	---	264	VAC
Input Frequency Range			47	---	440	Hz
Input Voltage Range			120	---	370	VDC
No-Load Power Consumption			---	---	0.3	W
Inrush Current	115VAC	Cold Start at 25°C	---	---	10	A
	230VAC		---	---	20	A

Output Specifications						
Parameter	Conditions / Model	Min.	Typ.	Max.	Unit	
Output Voltage Setting Accuracy		---	±1.0	±2.0	%Vnom.	
Line Regulation	Vin=Min. to Max. @Full Load	---	±0.5	±1.0	%	
Load Regulation	Iout=Min. to Max.	Single Output Models	---	±0.5	±1.0	%
		Dual Output Models	---	±2.5	±5.0	%
Minimum Load		10	---	---	%Inom.	
Ripple & Noise	0-20 MHz Bandwidth	3.3 & 5.0VDC Output Models	---	1.5	1.8	%V <sub>PP</sub> of Vo
		Other Output Models	---	0.8	1.0	%V <sub>PP</sub> of Vo
Over Voltage Protection	Zener diode clamp	---	120	---	% of Vo	
Temperature Coefficient		---	±0.01	±0.02	%/°C	
Overshoot		---	---	5	% Vout	
Over Load Protection	Hiccup mode, 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	300,000			Hours
Safety Approvals	UL/cUL 60950-1 recognition(UL certificate)				

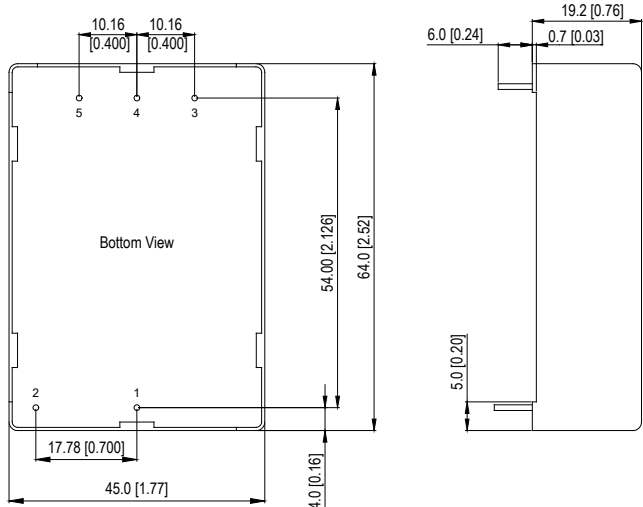
EMC Specifications				
Parameter	Standards & Level			Performance
EMI	Conduction	EN 55032	Without external components	Class B
	Radiation			
EMS	EN 55035			
	ESD	EN 61000-4-2 air ± 8kV, Contact ± 4kV		B
	Radiated immunity	EN 61000-4-3 10V/m		A
	Fast transient	EN 61000-4-4 ±2kV		B
	Surge	EN 61000-4-5 ±1kV		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		-25	---	+70	°C
Power Derating	+50°C to +70°C	0.375			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 Please do not operate the product without a minimum load condition.
- 3 We recommend to protect the converter by a slow blow fuse in the input supply line.
- 4 Other input and output voltage may be available, please contact MINMAX.
- 5 Specifications are subject to change without notice
- 6 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**

Mechanical Dimensions		Pin Connections																										
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pin</th> <th>Single Output</th> <th>Dual Output</th> <th>Diameter mm (inches)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td colspan="2">AC(N) – AC Neutral</td> <td>∅ 1.0 [0.04]</td> </tr> <tr> <td>2</td> <td colspan="2">AC(L) – AC Line</td> <td>∅ 1.0 [0.04]</td> </tr> <tr> <td>3</td> <td colspan="2">-Vout</td> <td>∅ 1.0 [0.04]</td> </tr> <tr> <td>4</td> <td>NC</td> <td>Common</td> <td>∅ 1.0 [0.04]</td> </tr> <tr> <td>5</td> <td colspan="2">+Vout</td> <td>∅ 1.0 [0.04]</td> </tr> </tbody> </table>	Pin	Single Output	Dual Output	Diameter mm (inches)	1	AC(N) – AC Neutral		∅ 1.0 [0.04]	2	AC(L) – AC Line		∅ 1.0 [0.04]	3	-Vout		∅ 1.0 [0.04]	4	NC	Common	∅ 1.0 [0.04]	5	+Vout		∅ 1.0 [0.04]		
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		NC: No Connection																										
		<ul style="list-style-type: none"> <li>▶ All dimensions in mm (inches)</li> <li>▶ Tolerance: ±0.5 (±0.02)</li> <li>▶ Pin pitch tolerance: ±0.25 (±0.010)</li> <li>▶ Pin diameter tolerance: X.X±0.1 (X.XX±0.004)</li> </ul>																										

**Physical Characteristics**

Case Size	: 64.0x45.0x19.2mm (2.52x1.77x0.76 Inches)
Case Material	: Plastic resin (flammability to UL 94V-0 rated)
Pin Material	: Copper Alloy
Weight	: 92g