

**FEATURES**

- ▶ Fully Encapsulated Plastic Case for PCB, Chassis and DIN-Rail Mounting Version
- ▶ Universal Input 85~264VAC, 47~440Hz
- ▶ Protection Class II as per IEC/EN 60536
- ▶ I/O Isolation 4000VAC with Reinforced Insulation
- ▶ Operating Ambient Temp. Range -40°C to +80°C
- ▶ Overload/Voltage and Short Circuit Protection
- ▶ Designed-in EMI Emission meets EN55011/22 Class B & FCC Level B
- ▶ Designed-in EMC Immunity meets EN61000-4-2,3,4,5,6,8,11
- ▶ Medical EMC Standard meets EMI EN55011 & EMS EN60601-1-2
- ▶ Medical Safety meets 2xMOPP per 3<sup>rd</sup> Edition of IEC/EN 60601-1 & ANSI/AAMI ES60601-1
- ▶ UL508 Safety Approval Specifically for Industrial Application
- ▶ UL/cUL/IEC/EN 60950-1 Safety Approval & CE Marking


**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. 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	Output Voltage	Output Current	Input Current		Max. capacitive Load	Efficiency (typ.)
			115VAC, 60Hz	230VAC, 50Hz		
			Max.	@Max. Load		
	VDC	mA	mA (typ.)		μF	%
APM-40S05	5	8000	716	429	8000	81
APM-40S12	12	3330	689	414	3900	84
APM-40S15	15	2660	680	408	3900	85
APM-40S24	24	1660	687	413	680	84
APM-40D12	±12	±1660	687	413	1500#	84
APM-40D15	±15	±1330	680	408	1000#	85

# For each output

**Input Specifications**

Parameter	Conditions / 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	115VAC	Cold Start at 25°C	---	---	30	A
	230VAC		---	---	60	A

Output Specifications						
Parameter	Conditions / Model	Min.	Typ.	Max.	Unit	
Output Voltage Setting Accuracy		---	±2.0	---	%Vnom.	
Line Regulation	Vin=Min. to Max. @Full Load	---	±0.5	---	%	
Load Regulation	Io=0% to 100%	Single Output Model	---	±1.0	---	%
		Dual Output Models	---	±2.0	---	%
Minimum Load	No minimum Load Requirement					
Ripple & Noise <sub>(3)</sub>	0-20 MHz Bandwidth	5V Output Models	---	1.5	1.8	%V <sub>PP</sub> of Vo
		Other Output Models	---	1.0	1.3	%V <sub>PP</sub> 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 (long term overload condition may cause damage)	105	---	---	% Inom.	
Short Circuit Protection	Hiccup mode, Automatic Recovery					

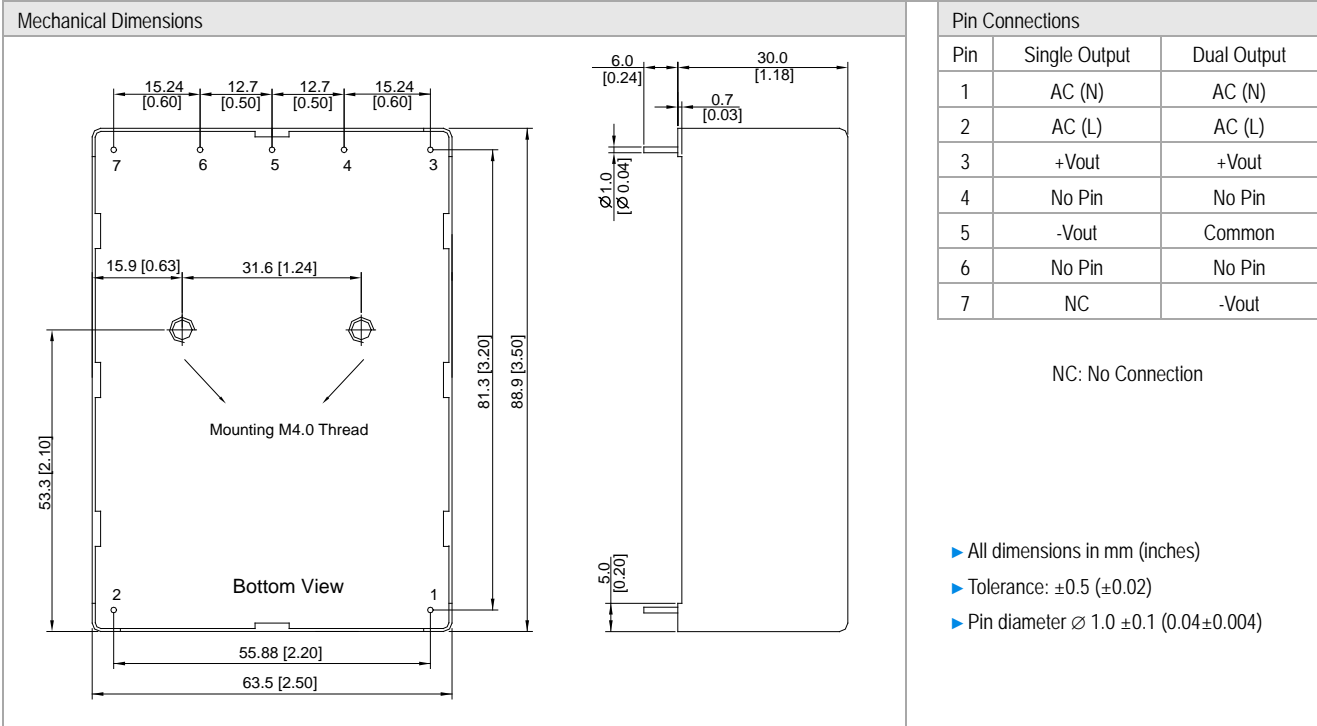
General Specifications					
Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	Reinforced Insulation, Rated For 60 Seconds	4000	---	---	VACrms
Leakage Current		---	80	---	μA
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
Switching Frequency		---	130	---	KHz
Hold-up Time	115VAC, 60Hz	---	25	---	ms
	230VAC, 50Hz	---	80	---	ms
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	200,000			Hours
Protection Class II	According IEC/EN 60536				
Safety Standards	UL/cUL 60950-1, CSA C22.2 No 60950-1				
	ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1				
	IEC/EN 60950-1, IEC/EN 60601-1 3 <sup>rd</sup> Edition 2xMOPP				
Safety Approvals	UL508, CSA C22.2 No.107.1-01				
	UL/cUL 60950-1 recognition (UL certificate), IEC/EN 60950-1 (CB-report), UL/cUL 508 listed certificate ANSI/AAMI ES60601-1 2xMOPP recognition (UL certificate), IEC/EN 60601-1 3 <sup>rd</sup> Edition (CB-report)				

Environmental Specifications					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature Range	Natural Convection	-40	---	+80	°C
Storage Temperature Range		-40	---	+95	°C
Power Derating	Above +60°C	1.5			W / °C
Thermal Shutdown	Shutdown, Internal IC Junction Temperature	---	142	---	°C
	Automatic Recovery, Internal IC Junction Temperature	---	67	---	°C
Humidity (non condensing)		---	---	95	% rel. H
Cooling	Natural Convection				
Lead Temperature (1.5mm from case for 10Sec.)		---	---	260	°C

EMC Specifications			
Parameter	Standards & Level		Performance
EMI	Conduction and Radiation	EN55011, EN55022, EN61000-6-4, EN61000-6-3, FCC part 15	Class B
EMS	EN60601-1-2, EN55024, EN61000-6-2, EN61000-6-1		
	ESD	EN61000-4-2 Air ± 8kV, Contact ± 4kV	
	Radiated immunity	EN61000-4-3 10V/m	
	Fast transient	EN61000-4-4 ±2kV	
	Surge	EN61000-4-5 ±1kV	
	Conducted immunity	EN61000-4-6 10Vrms	
	PFMF	EN61000-4-8 30A/m	
	Dips	EN61000-4-11 30% 10ms	
Interruptions	EN61000-4-11 >95% 5000ms		B

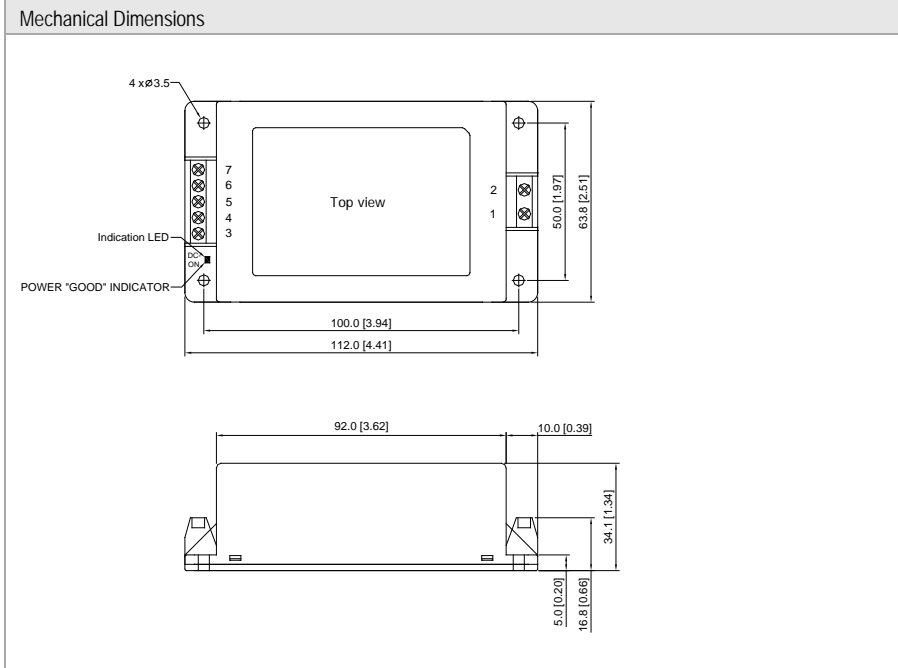
**Notes**

- 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 measured with a 0.1µF/50V MLCC and a 1µF/50V Aluminum electrolytic.
- 4 Safety approvals cover frequency 47-63 Hz.
- 5 We recommend to protect the converter by a slow blow fuse in the input supply line.
- 6 Other input and output voltage may be available, please contact factory.
- 7 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 8 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 (flammability to UL 94V-0 rated)
Pin Material	: Copper Alloy with Gold Plate Over Nickel Subplate
Weight	: 310g

### Package Specifications Chassis Mounting (order code suffix C)



**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

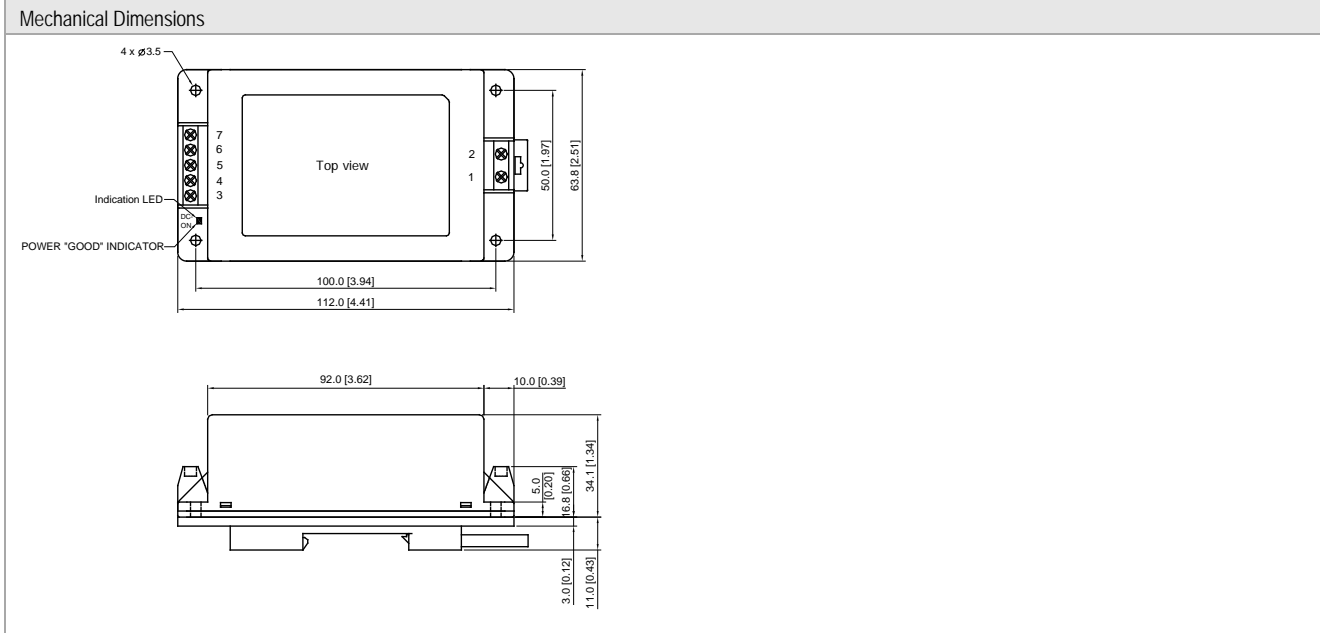
NC: No Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance:  $\pm 0.5$  ( $\pm 0.02$ )

### Physical Characteristics

Case Size	: 112.0x63.8x34.1mm (4.41x2.51x1.34 inches)
Case Material	: Plastic resin (flammability to UL 94V-0 rated)
Weight	: 320g

### Package Specifications with DIN Rail Mounting Bracket



### Physical Characteristics

Case Size	: 112.0x63.8x34.1mm (4.41x2.51x1.34 inches)
Case Material	: Plastic resin (flammability to UL 94V-0 rated)
Weight	: 374g

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


Order Code Table			
PCB Mounting	Chassis Mounting	With DIN Rail Mounting by two Order Code	
APM-40S05	APM-40S05C	APM-40S05C	AC-DIN-02
APM-40S12	APM-40S12C	APM-40S12C	AC-DIN-02
APM-40S15	APM-40S15C	APM-40S15C	AC-DIN-02
APM-40S24	APM-40S24C	APM-40S24C	AC-DIN-02
APM-40D12	APM-40D12C	APM-40D12C	AC-DIN-02
APM-40D15	APM-40D15C	APM-40D15C	AC-DIN-02
APM-40S05	APM-40S05C	APM-40S05C	AC-DIN-02