FEATURES

- Fully Encapsulated Plastic Case for PCB, Chassis and DIN-Rail Mounting Version
- Universal Input 85~264VAC, 47~440Hz
- I/O Isolation 4000VAC with Reinforced Insulation
- Operating Ambient Temp. Range -40℃ to +80℃
- Overload/Voltage and Short Circuit Protection
- EMI Emission EN 55011/32 Class B Approved
- EMC Immunity EN 61000-4-2,3,4,5,6,8,11 Approved
- Medical EMC Standard with 4th Edition of EMI EN 55011 & EMS EN 60601-1-2 Approved
- Medical Safety with 2xMOPP per 3rd Edition of IEC/EN 60601-1 & ANSI/AAMI ES 60601-1 Approved
- UL508 Safety Approval Specifically for Industrial Application
- Risk Management Report Acquisition according to ISO 14971
- UL/cUL/IEC/EN 62368-1(60950-1) Safety Approval & CE Marking

LISTED ANSI/AAMI ES60601-1 UL 62368-1 UL 60950-1 CB Scheme

IEC 60601-1 YEAR WARRANTY RoHS Compliant

PRODUCT OVERVIEW

Introducing the innovative MINMAX AJM-24 series, a range of fully encapsulated AC-DC power modules designed for high performance in diverse applications. With an impressive extended operating temperature range of -40℃ to +80℃, these modules ensure reliable functionality in challenging environments. Boasting a universal input voltage of 85-264VAC and holding essential safety approvals such as UL/IEC/EN, including compliance with medical safety standards and UL 508 listing, the AJM-24 series is poised for integration into products destined for global markets.

Furthermore, these power modules adhere to stringent EMI Emission standards, having received EN 55011/32 Class B approval. This exceptional feature makes them an ideal choice for applications in commercial, medical, and industrial electronic equipment, particularly those with space constraints.

In alignment with ISO 14971 Medical Device Risk Management standards, the AJM-24 series undergoes a meticulous risk assessment process. This ensures that the power modules not only meet the highest quality and safety benchmarks but also adhere to the stringent risk management protocols outlined in ISO 14971.

Model Selection Guide

Model Number	Output Voltage	Output Current	Input Current		Max. capacitive Load	Efficiency (typ.)
			115VAC, 60Hz	230VAC, 50Hz		
		Max.	@Max. Load			@Max. Load, 115VAC
	VDC	mA	mA(typ.)		μF	%
AJM-24S05	**5**	**3000**	282	169	2200	77
AJM-24S09	**9**	**2666**	424	255	1000	82
AJM-24S12	**12**	**2000**	419	252	1000	83
AJM-24S15	**15**	**1600**	424	255	680	82
AJM-24S24	**24**	**1000**	409	246	470	85
AJM-24D12	**±12**	**±1000**	414	249	470#	84
AJM-24D15	**±15**	**±800**	414	249	330#	84

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℃	---	---	20	A
	230VAC		---	---	40	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	---	±0.5	---	%
		Dual Output Models	---	±2.5	---	%
Minimum Load	No minimum Load Requirement					
Ripple & Noise	0-20 MHz Bandwidth	5V 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	%
Over Load Protection	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	---	---	VAC
Leakage Current		---	80	---	μA
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
Switching Frequency		---	132	---	kHz
Hold-up Time	115VAC, 60Hz	---	20	---	ms
	230VAC, 50Hz	---	80	---	ms
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	400,000			Hours
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 3rd Edition 2xMOPP				
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)				
	ANSI/AAMI ES60601-1 2xMOPP recognition (UL certificate), IEC/EN 60601-1 3rd Edition (CB-report)				

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 60601-1-2 4th, EN 55035, EN 61000-6-2, EN 61000-6-1				
	ESD	EN 61000-4-2 Air ± 15kV, Contact ± 8kV			A
	Radiated immunity	EN 61000-4-3 10V/m			A
	Fast transient	EN 61000-4-4 ±2kV			A
	Surge	EN 61000-4-5 ±1kV			A
	Conducted immunity	EN 61000-4-6 10Vrms			A
	PFMF	EN 61000-4-8 30A/m			A
	Dips & Interruptions	EN 61000-4-11	0% of 230VAC	0.5 cycle	A
			0% of 230VAC	1 cycle	A
			70% of 230VAC	25/30 cycle	A
			0% of 230VAC	250/300 cycle	B

Environmental Specifications

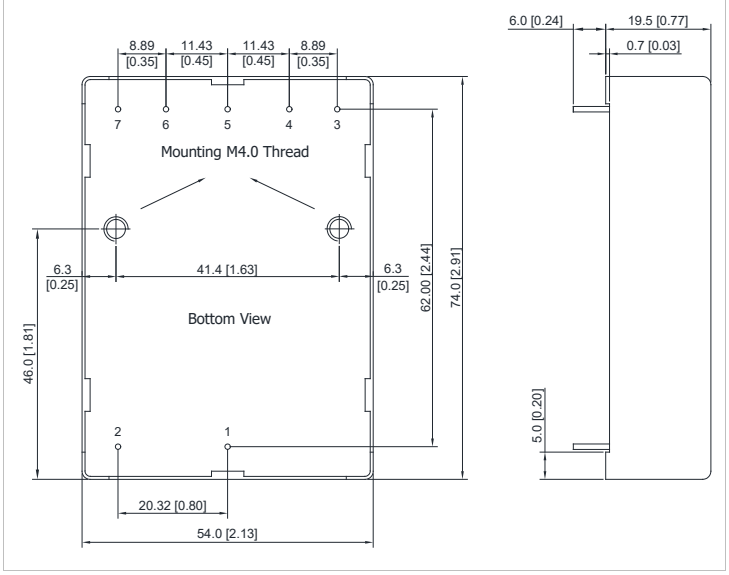
Parameter	Conditions / Model		Min.	Typ.	Max.	Unit
Operating Ambient Temperature Range			-40	---	+80	℃
Power Derating	Above +65℃	5V Output Models	---	---	0.75	W / ℃
		Other Models	---	---	1.2	W / ℃
Storage Temperature Range			-40	---	+95	℃
Thermal Shutdown	Shutdown, Internal IC Junction Temperature		---	142	---	℃
	Automatic Recovery, Internal IC Junction Temperature		---	67	---	℃
Humidity (non condensing)			---	---	95	% rel. H
Lead Temperature (1.5mm from case for 10Sec.)			---	---	260	℃

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℃, resistive load, 115VAC, 60Hz input voltage, after warm-up time rated output current unless otherwise noted.
3. Safety approvals cover frequency 47-63 Hz.
4. We recommend to protect the converter by a slow blow fuse in the input supply line.
5. Other input and output voltage may be available, please contact MINMAX.
6. Specifications are subject to change without notice.
7. 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

Pin	Single Output	Dual Output	Diameter mm (inches)
1	AC (N)	AC (N)	Ø 1.0 [0.04]
2	AC (L)	AC (L)	Ø 1.0 [0.04]
3	No Pin	No Pin	Ø 1.0 [0.04]
4	-Vout	-Vout	Ø 1.0 [0.04]
5	No Pin	Common	Ø 1.0 [0.04]
6	+Vout	+Vout	Ø 1.0 [0.04]
7	No Pin	No Pin	Ø 1.0 [0.04]

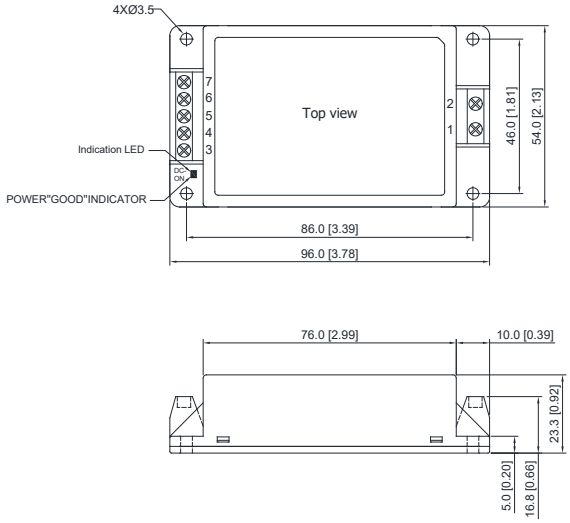
- All dimensions in mm (inches)
- Tolerance: ±0.5 (±0.02)
- Pin pitch tolerance: ±0.25 (±0.01)
- Pin diameter tolerance: X.X±0.1 (X.XX±0.004)

Physical Characteristics

Case Size	:	74.0x54.0x19.5mm (2.91x2.13x0.77 inches)
Case Material	:	Plastic resin (flammability to UL 94V-0 rated)
Pin Material	:	Copper Alloy
Weight	:	137g

Package Specifications Chassis Mounting with screw terminal (order code suffix C)

Mechanical Dimensions



Note:
Screw type Terminal: Wires 1.5mm^2 max.
Recommended Terminal Screw tightening torque: 0.5Nm (3.5lb.in.) max.

Connections

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

NC: No Connection

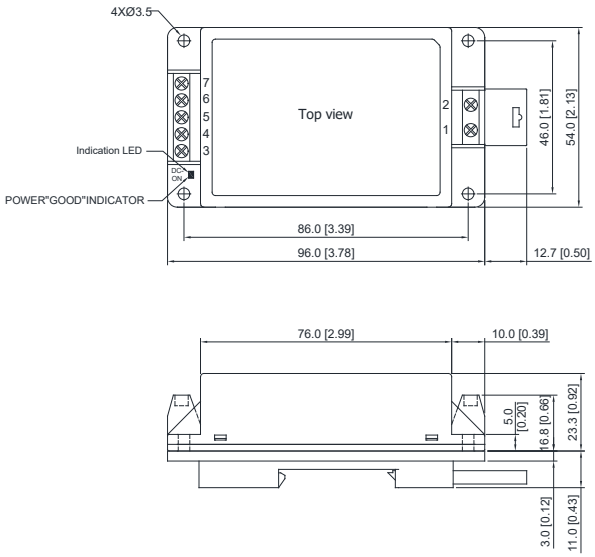
- All dimensions in mm (inches)
- Tolerance: ±0.5 (±0.02)

Physical Characteristics

Case Size	:	96.0x54.0x23.3mm (3.78x2.13x0.92 inches)
Case Material	:	Plastic resin (flammability to UL 94V-0 rated)
Weight	:	147g

Package Specifications for screw terminal with DIN Rail Mounting (order code suffix AC-DIN-01)

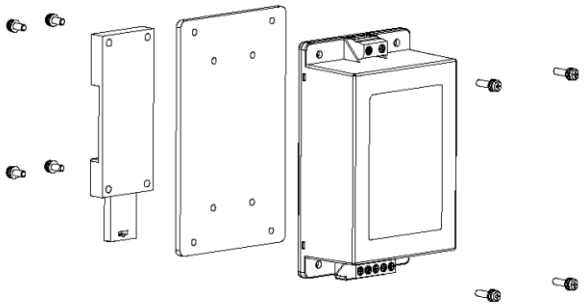
Mechanical Dimensions

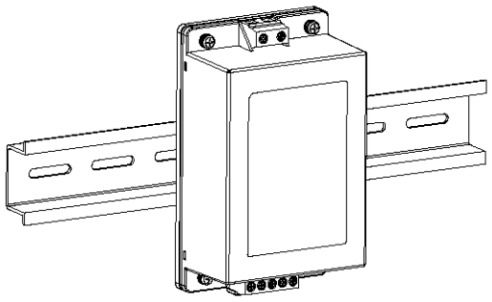


Physical Characteristics

Case Size	:	96.0x54.0x23.3mm (3.78x2.13x0.92 inches)
Case Material	:	Plastic resin (flammability to UL 94V-0 rated)
Weight	:	201g

Screw terminal with DIN Rail Mounting





Note:

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

Order Code Table

PCB Mounting	Chassis Mounting	With DIN Rail Mounting by two Order Code	
AJM-24S05	AJM-24S05C	AJM-24S05C	AC-DIN-01
AJM-24S09	AJM-24S09C	AJM-24S09C	AC-DIN-01
AJM-24S12	AJM-24S12C	AJM-24S12C	AC-DIN-01
AJM-24S15	AJM-24S15C	AJM-24S15C	AC-DIN-01
AJM-24S24	AJM-24S24C	AJM-24S24C	AC-DIN-01
AJM-24D12	AJM-24D12C	AJM-24D12C	AC-DIN-01
AJM-24D15	AJM-24D15C	AJM-24D15C	AC-DIN-01