



# AcBel Product Specification

Acbel Part No.	DC9009-000G
Model Name	A2DM500W-48V
Description	Ac-DC Converter 85~265Vac Input, 48Vdc Output, 500W Output Power,
Revision	Draft Rev.2.5
Date Issued	02/11/2011

**High Output Power, High Efficiency AC-DC Converter,  
DC9009-000G    A2DM500W-48V  
Module: 85Vac to 265Vac Input,  
48Vdc Output, Maximum Output Power 500W.**

**World's Most Advanced Ultra High Power Density AC-DC Converters.**



**DESCRIPTION:**

AC to DC Converter A2DM500W-48V modules are high power density and high efficiency AC-DC converters designed for uses in telecom and other centralized modular and distributed power applications. All use metal baseplates, planar transformers, and surface mount construction to produce up to 500W maximum.

**FEATURES:**

- Miniature Size: 116.8mmx 61mm x12.7mm (4.59in. x 2.40in. x 0.50in.)
- High Power Density: Up to 90.78W/in.<sup>3</sup>
- High Efficiency: **88%** at 110Vac, **90%** at 230Vac
- Low Output Noise
- Industry-Standard Size
- Metal Baseplate
- Thermal Protection
- Over Voltage Protection
- Current Limit/Short Circuit Protection
- Adjustable Output Voltage: 60% to 120% of  $V_{o,set}$
- Remote Sense
- Power On Signal (ENA) Open Collector (10mA sink current). Low (ON) when output is present.
- Stand off type: Thread hole

**SPECIFICATIONS:**
**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Input Voltage AC(L) to AC(N)	85		265	Vac	
Input Power With No Damage			300	Vac	
Power Factor Correction	0.95				$V_{in}=85\sim 265\text{Vac}@$ Full Load
Storage Temperature	-55		+125	°C	
Storage Humidity	10		95	%	
Operating Temperature	-40		+100	°C	Temperature measure shall be taken from the baseplate (Tb). Refer to Fig.2 for location definition
Operating Humidity	20		95	%	

**INPUT SPECIFICATIONS:**

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Operation Input Voltage ( $V_i$ )	85		265	Vac	
Input Frequency	47		63	Hz	
Maximum Input Current ( $I_{i,max}$ )			6.2	A	$V_i=100\text{Vac}$ , $I_o=I_{o,max}$
Inrush Current			40	A	$V_i=265\text{Vac}$ Turn On, External components are needed for operation. Refer to Fig.3 for application circuit.

**OUTPUT SPECIFICATIONS:**

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Output Voltage Accuracy ( 48V )	47.04	48.0	48.96	V	$I_o,max$
Output Voltage Adjustment Range	28.8	48.0	57.6	V	$V_o \geq 48\text{V}$ , $P_o=504\text{W}$ . $V_o \leq 48\text{V}$ , Output current should be $\leq 10.5\text{A}$ .
Line Regulation		96		mV	$V_i=V_{i,min}$ to $V_{i,max}$ .
Load Regulation		96		mV	$I_o=I_{o,min}$ to $I_{o,max}$ .
Output Ripple and Noise Voltage Peak to Peak			480	mVp-p	Bandwidth 5Hz to 20MHz and with filter 0.1uF MLCC series 100 ohm Min. Output Capacitor: 220uF *2, $T_c \geq -20^\circ\text{C}$ 220uF *4, $T_c \leq -20^\circ\text{C}$
Output Current ( $I_o,max$ )			10.5	A	At $V_o \leq 48\text{V}$ , if $V_o > 48\text{V}$ Output Power ( $P_o$ ) should be $\leq 504\text{W}$
Output Current limit	105		140	% $I_o,max$	Current limit inception point $V_o=90\%$ of $V_o,set$ @ $T_b=25^\circ\text{C}$ ; Automatic recovery method.
Output Over Voltage Protection	125		145	% $V_o,set$	$I_o=0.5\text{A}$ ; Inverter shut-down method.

**OUTPUT SPECIFICATIONS (CONTINUED):**

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Efficiency		88 90		% %	Vi=110Vac, Vi=230Vac, Vo=48V, Io= 100%Io,max @ Tb=25°C
Dynamic Response: Peak Deviation Settling Time		3	300	%Vo,set us	25% - 50% -75% load, 0.1A/us; With Cap. 440uF/100V Tb=25 °C, Vi=200Vac

**CONTROL SPECIFICATIONS:**

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Turn-On Time			3	Sec	Io= Io,max, Vo with 90% Vo,set
Output Voltage Adjustment Output Voltage Trim Range	60		120	%Vo,set	With Cap.440uF/100V, @Tb=25 °C
Over Temperature Protection Shutdown Recovery	90	110		°C °C	Auto. Recovery

**ISOLATION SPECIFICATIONS:**

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Input to Output		3000		Vac	60 seconds
Input to Case		2500		Vac	60 seconds
Output to Case		1500		Vdc	60 seconds
Input to Output Capacitance		2000		pF	
Isolation Resistance	100			Mohm	at Tb=25°C and 70%RH, Output to Baseplate - 500VDC

**STRUCTURAL DYNAMICS:**

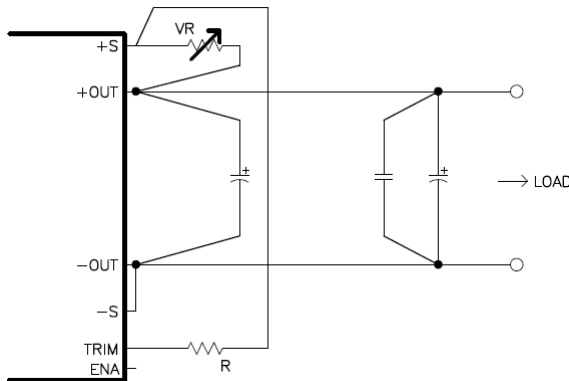
PARAMETER	CONDITIONS
Vibration	Sine Wave, 10-55Hz (Sweep for 1 min.), Amplitude 0.825mm Constant (Maximum 0.5g) X,Y,Z 1 Hour each, At No Operating,
Shock	196.1m/S <sup>2</sup>

**GENERAL SPECIFICATIONS:**

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
MTBF		1.59		Mhrs	Tb=40 °C, Io=80% Io,max, Vi=220V
Weight		200		g	
Size (WxHxD)		116.8x12.7x61		mm	

**TRIM CIRCUIT:**

Output Voltage Adjusted by using external resistor and/or variable resistor:



Assign  $R=42.2K\Omega$ ,

$$VR = \left( \frac{V_{o_{trim}}}{1.472} \right) - 19.532 \text{ (UNIT:K}\Omega\text{)}$$

Fig1 The schematic of output voltage adjusted by using external resistor and/or variable resistor.

**BASEPLATE MEASURE POINT:**

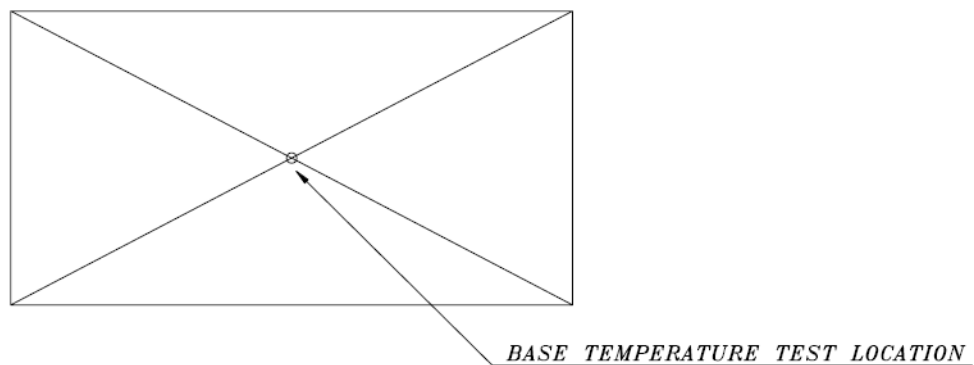


Fig2 Baseplate Temperature Measure Point.

**APPLICATION CIRCUIT:**

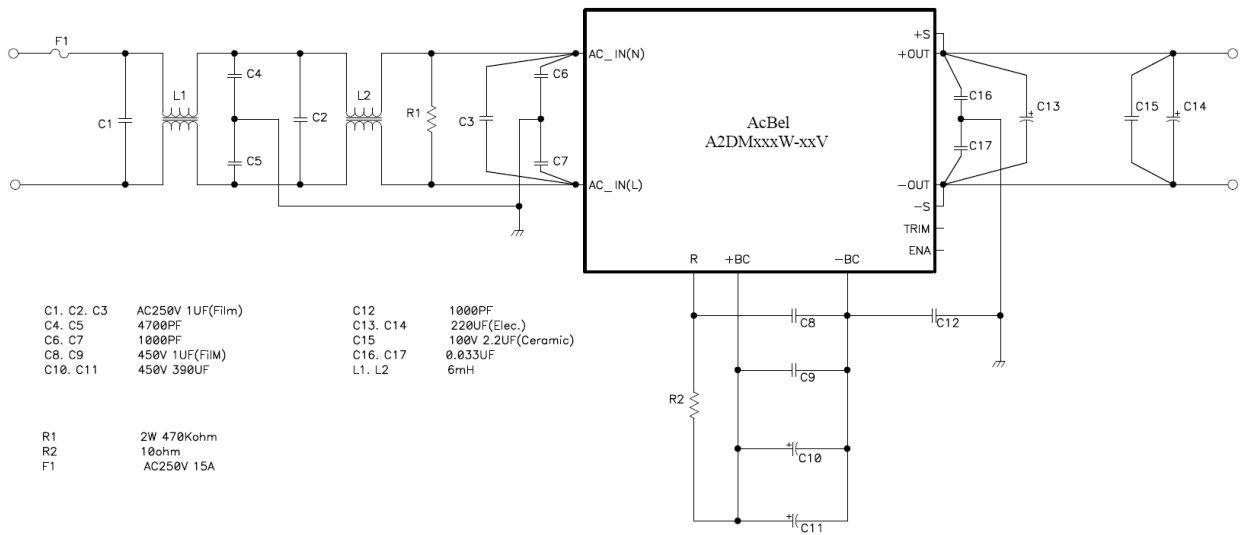


Fig. 3 Application Circuit.

**EFFICIENCY CURVE:**

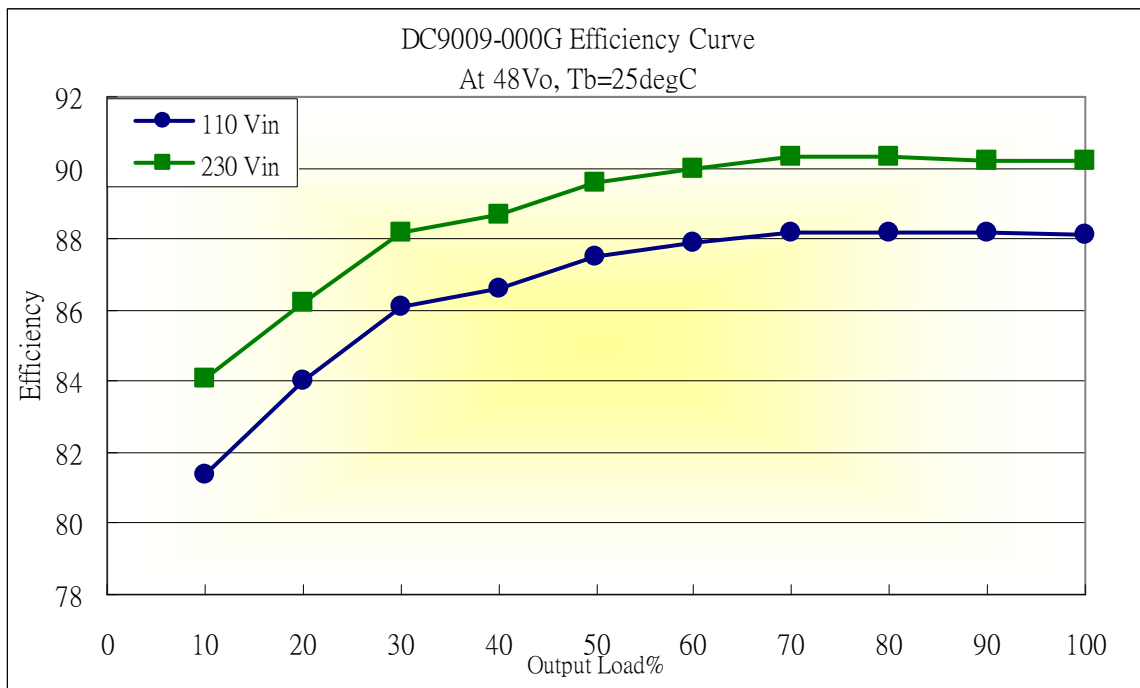


Fig. 4 Efficiency curve.

**OUTLINE DRAWING:**

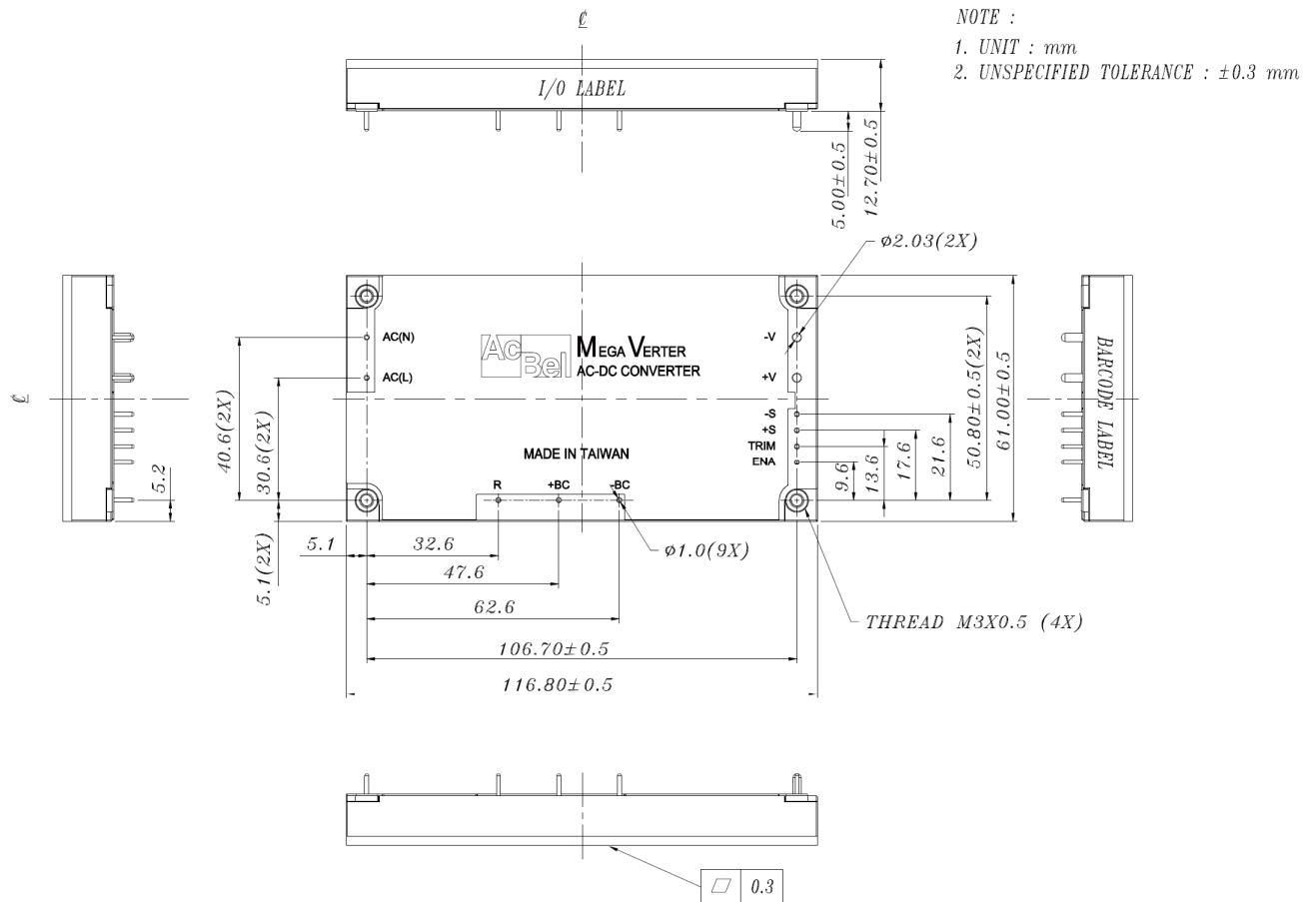


Fig. 5 Outline drawing.