AC/DC Converter

PVA40-27Bxx Series

MORNSUN®

40W isolated AC-DC converter with ultra-wide, ultra-high 85 - 900VAC input for coalmine

RoHS

FEATURES

- Specially designed for electrical equipment in coal mining industry
- Ultra-wide 85 - 900VAC input voltage range
- Industrial grade operating temperature: -25℃ to +70℃
- High I/O isolation test voltage of 4000VAC
- High reliability, high efficiency, long lifespan
- Output short circuit, over-current and over-voltage protection
- Immunity, EFT/Surge: ±4KV perf. Criteria B

PVA40-27Bxx series is a special power supply designed for customers who provide electrical equipment for coal mining industry to meet the requirements of safety in providing power supply, easy mounting and technology innovation etc. It features ultra-wide input voltage range from 85 to 900VAC which covers 127/220/380/660VAC used in coal mining industry, high isolation voltage, excellent EMS performance, multiple protections and high efficiency. They are widely used in monitoring and security sectors of coal mining industry.

Selection Guide

Part No.*	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 380VAC (%) Typ.	Capacitive Load (μF) Max.
PVA40-27B18	40W	18V/2222mA	86	1000
PVA40-27B24	40W	24V/1667mA	86	800
PVA40-27B30	40W	30V/1333mA	86	600

Note: *Use suffix "H" for can be used in harsh working conditions in coal mines (with transient peak voltage).

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range		85	--	900	VAC
Input Current	127VAC	--	--	0.85	A
	380VAC	--	--	0.55	
	660VAC	--	--	0.35	
Inrush Current	660VAC	--	--	140	
	900VAC	--	--	180	
External Input Fuse		1000VAC/2A, required (brand: Adler models: A851200b00 base models: BH300)			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	All load range		--	±2	--	%
Line Regulation	Rated load		--	±1	--	
Load Regulation	10% - 100% load		--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	100	200	mV
Temperature Coefficient			--	±0.02	--	%/℃
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			≥110%Io, hiccup, self-recovery			
Over-voltage Protection	18V output		≤30VDC			
	24V output		≤35VDC			
	30V output		≤45VDC			
Min. Load			0	--	--	%
Hold-up Time	Room temperature, full load	380VAC input	--	60	--	ms
		660VAC input	--	240	--	

Note: * The "Tip and barrel method" is used for ripple and noise test, please refer to PV Converter Application Notes for specific information.

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General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input - output	Electric Strength Test for 1min., leakage current ≤3mA	4000	--	--	VAC
Insulation Resistance		500VDC		≥50x10⁶		Ω
Operating Temperature			-25	--	+70	℃
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	95	%RH
Power Derating		-25℃ to -10℃	2.7	--	--	%/℃
		+50℃ to +70℃	2.0	--	--	
		85V-100VAC	2.0	--	--	%/VAC
		850V-900VAC	0.3	--	--	
Switching Frequency			--	65	--	kHz
MTBF		MIL-HDBK-217F@25℃	≥300,000 h			

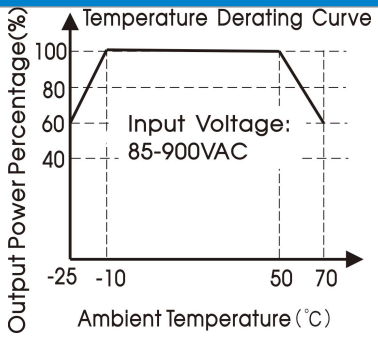
Mechanical Specifications

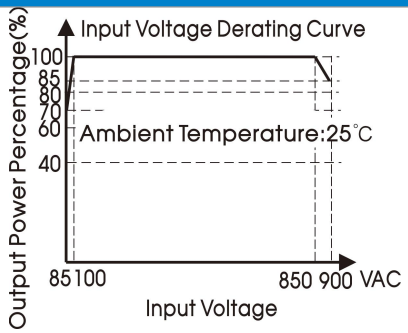
Dimensions	138.00 x 82.00 x 32.00mm
Weight	240g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

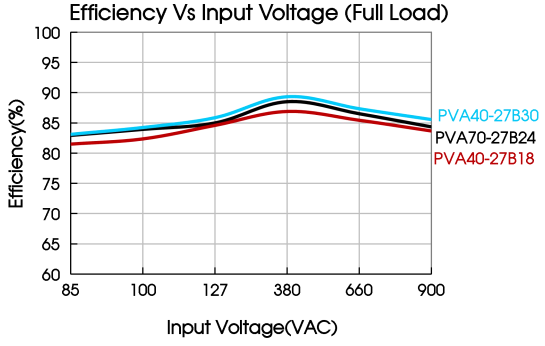
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV/line to ground ±4KV	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A

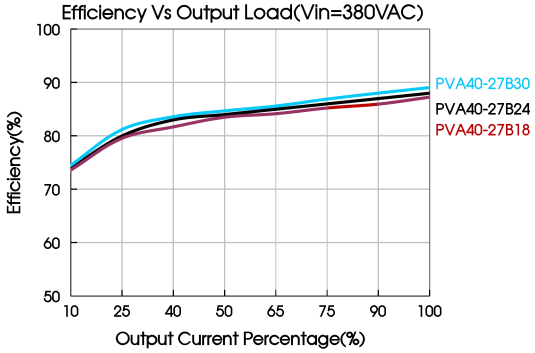
Product Characteristic Curve





Note: ① With an input between 85 - 100VAC/850 -900VAC, the output power must be derated as per temperature derating curves;
② The point-solution capacitors have a constant lifetime, the service life depends on the actual ambient temperature, operating in harsh environments can affect the life of a product, shorten the service life of the product, it is not recommended that the product work in high temperature environment below 65℃ for a long time;
③ This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.





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Design Reference

1. Typical application

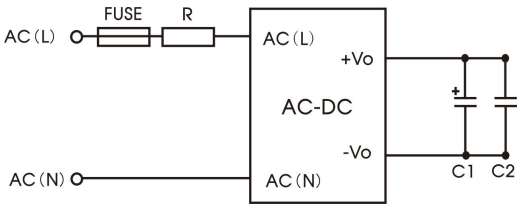
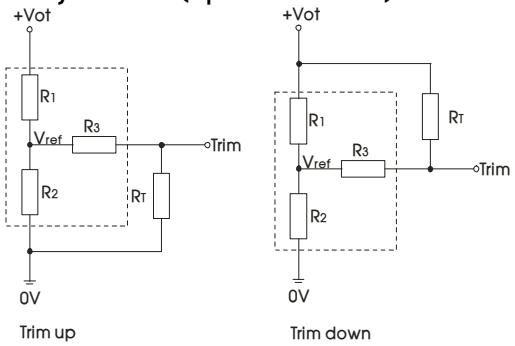


Fig. 1

Model	FUSE	C1	C2	R
PVA40-27Bxx	1000VAC/2A, required (brand: Adler models: A851200b00 base models: BH300)	1uF	10uF	1.4Ω/≥5W

Output Filter Components:
We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C1 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C2 is a ceramic capacitor used for filtering high-frequency noise.

2. Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

$$\text{up: } R_T = \frac{aR_2}{R_2-a} - R_3 \qquad a = \frac{V_{ref}}{V_{ot}-V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1-a} - R_3 \qquad a = \frac{V_{ot}-V_{ref}}{V_{ref}} \cdot R_2$$

RT = Trim Resistor value;
a = Self-defined parameter;

Vout	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)	Vot(V)
18V	6.20	1	1	2.5	Resulting trimmed output voltage, range ≤ ±10%
24V	8.66	1	1	2.5	
30V	8.80	0.79	1	2.5	

3. For more information Please find the application notes on www.mornsun-power.com

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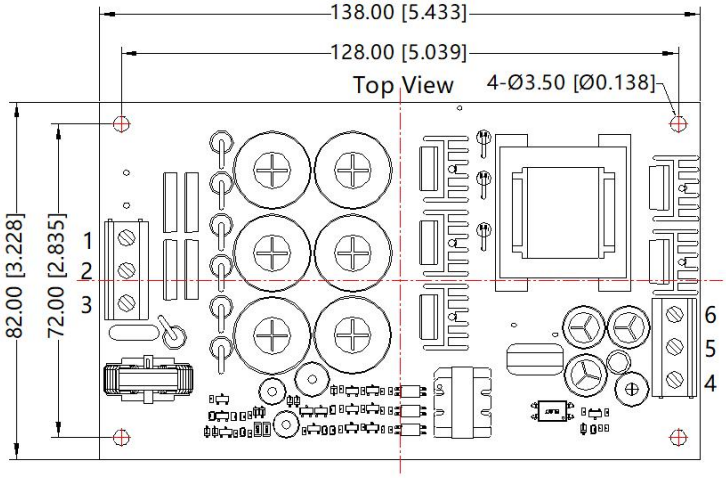
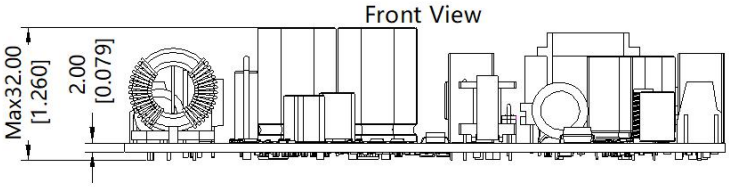
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Pin-Out	
Pin	Function
1	AC(L)
2	NC
3	AC(N)
4	Trim
5	-Vo
6	+Vo



Note:
Unit: mm[inch]
Wire range: 24~12AWG
Tightening torque: Max 0.4N·m
General tolerances: ±1.00[±0.039]
The layout of the device is for reference only, please refer to the actual product

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220072;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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