

70W 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 and 120 - 1300VDC input voltage range
- Industrial grade operating temperature: -30°C to +70°C
- High I/O isolation test voltage of 4000VAC
- High reliability, high efficiency, long lifespan
- Output short circuit, over-current, over-voltage protection
- EFT immunity meets Level 4

PVA70-27BxxR2 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. And it is regulated AC-DC/DC-DC converter with an ultra-wide and ultra-high DC input of 120-1300VDC or AC input of 85-900VAC. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation, 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. Effective protection is added for transformers and isolated optocouplers. The design refers to GB/T 3836.4-2021 standards. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Part No.	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 330VAC (%) Typ.	Capacitive Load (μF) Max.
PVA70-27B24R2	70	24V/2.917A	87	2000
PVA70-27B28R2		28V/2.50A	87	1800
PVA70-27B35R2		35V/2.00A	89	1000

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		85	--	900	VAC
	DC input		120	--	1300	VDC
Input Frequency			47	--	63	Hz
Input Current	127VAC		--	--	1.20	A
	330VAC		--	--	0.80	
	660VAC		--	--	0.50	
Inrush Current	300VAC	Cold start	--	100	--	
	600VAC		--	190	--	
	900VAC		--	270	--	
Required External Input Fuse			1000VAC/3A, required (brand: Adler models: A851300b00 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		--	±0.5	--	
Load Regulation	330VAC		--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	≤ 130VAC	--	--	300	mV
		> 130VAC	--	--	200	
Stand-by Power Consumption	900VAC		--	--	5	W
Temperature Coefficient			--	±0.02	--	%/°C
Short Circuit Protection			Hiccup, continuous, self-recovery			

Over-current Protection			110% - 350% Io, hiccup, self-recovery			
Over-voltage Protection	24V		≤35V	Output voltage clamp or hiccup		
	28V		≤40V			
	35V		≤45V			
Minimum Load			0	--	--	%
Hold-up Time	Full load	127VAC	--	10	--	ms
		330VAC	--	40	--	
		660VAC	--	80	--	
Start-up Delay Time	85-900VAC		--	--	1	s

Note: * The "parallel cable" method is used for ripple and noise test, please refer to PV Converter Application Notes for specific information;
 ** Delay Time is tested over the full input voltage and the full output load range (The cooling-time between input power-off and power-on again is greater than 15s).

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input - output	Electric Strength Test for 1min., leakage current ≤3mA		4000	--	--	VAC
Insulation Resistance		Test voltage: 500VDC		100	--	--	MΩ
Operating Temperature				-30	--	+70	℃
Storage Temperature				-40	--	+85	
Storage Humidity		Non-condensing		--	--	95	%RH
Output Power Derating		Operating temperature derating	-30℃ to -10℃	2.0	--	--	% /℃
			+50℃ to +70℃	2.5	--	--	
		Input voltage derating	85VAC - 100VAC	2.0	--	--	% /VAC
			850VAC - 900VAC	0.4	--	--	
MTBF		MIL-HDBK-217F@25℃		≥300,000 h			

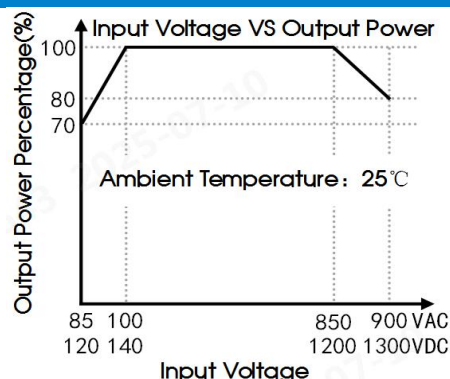
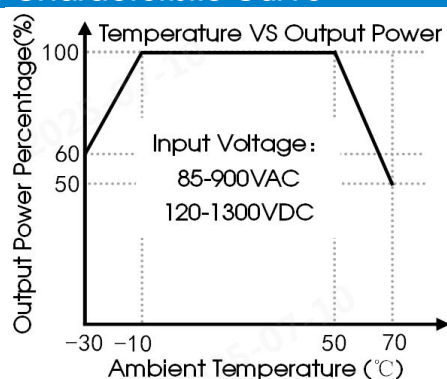
Mechanical Specifications

Dimensions	127.00 x 70.00 x 42.00mm
Weight	200g (Typ.)
Cooling Method	Free air convection

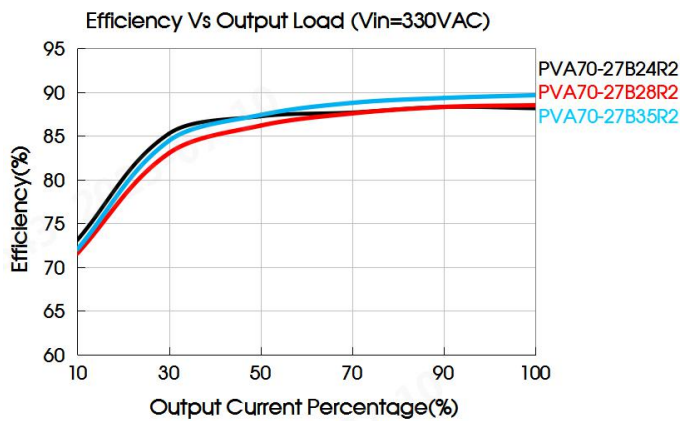
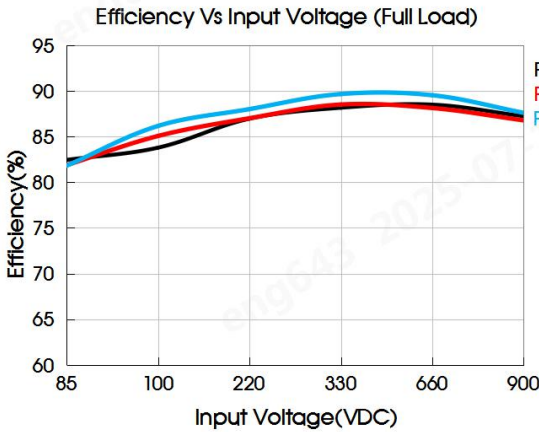
Electromagnetic Compatibility (EMC)

Immunity	ESD	IEC/EN61000-4-2	Contact ±6kV	Perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±4kV	Perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2kV	Perf. Criteria A
	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A
	PFMF	IEC/EN61000-4-8	30A/m	Perf. Criteria A

Product Characteristic Curve



Note: 1. With an AC input between 85 - 100VAC/850 - 900VAC and a DC input between 120 - 140VDC/1200 - 1300VDC, the output power must be derated as per temperature derating curves;
2. This product is suitable for applications using free air convection; for applications in closed environment please consult Mornsun FAE.



Design Reference

1. Typical application

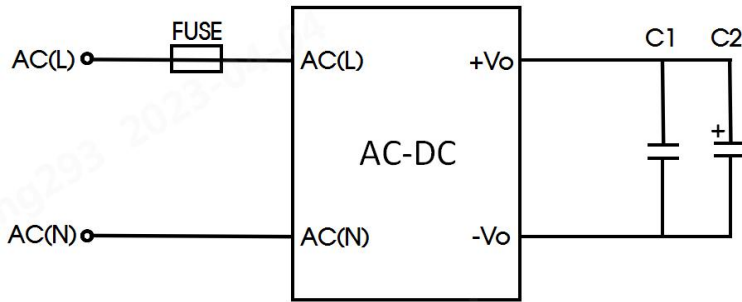


Fig. 1

Model	FUSE	C1	C2
PVA70-27BxxR2	1000VAC/3A, required (brand: Adler models: A851300b00 base models: BH300)	1uF	10uF

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin.

2. EMC compliance recommended circuit

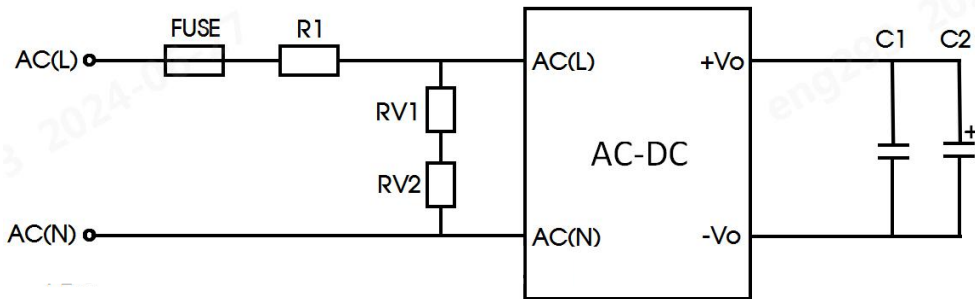
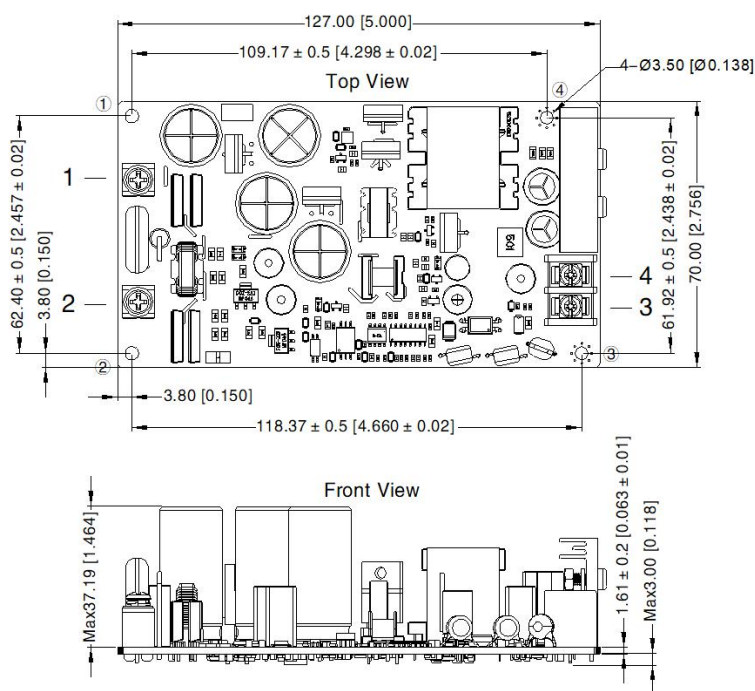


Fig. 2

Component	Recommended value
FUSE	1000VAC/3A, required (brand: Adler models: A851300b00 base models: BH300)
R1	1Ω / ≥5W
RV1/RV2	AC input: 14D821K/DC input: 14D911K
C1	1uF/50V
C2	10uF/50V

Note: 1. Please refer to Fig. 1 for common applications;
2. If the electromagnetic compatibility environment is harsh, please refer to Fig. 2;
3. This recommended list based on full input voltage, output load range. If it works under other input voltages, please consult FAE for parameter optimization.

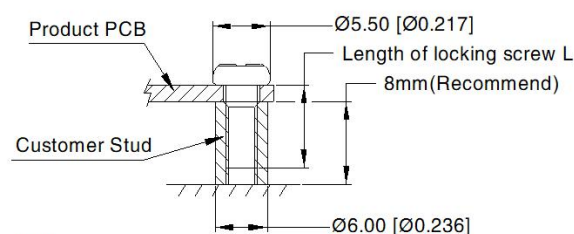
Dimensions and Recommended Layout



THIRD ANGLE PROJECTION

Pin-Out	
Pin	Mark
1	AC(L)
2	AC(N)
3	-Vo
4	+Vo

Position	Screw Spec.	L(Max)	Recommended torque
①-④	M3	6mm	0.65N·m ± 10%



Connector wires range

Pro. No	Input connector	Output connector	Output connector Pic.
24V	22-20AWG	22-20AWG	AC(L)
28V			
35V			
Screw/Recommended torque	M4, 0.9N·m ± 10%	M4, 0.9N·m ± 10%	AC(N)

Note:

Unit: mm[inch]

General tolerances: $\pm 1.00 [\pm 0.039]$

The layout of the device is for reference only, please refer to the actual product

It is recommended 15mm distance between the PCB and other components for safety purpose

Note:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220181;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^\circ\text{C}$, humidity<75% with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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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