

# AC/DC Converter

## PVA120-27BxxR2 Series

MORNSUN®

120W 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: -25°C to +70°C
- High I/O isolation voltage up to 4000VAC
- High reliability, high efficiency, long lifespan
- Output short circuit, over-current, over-voltage protection
- Built-in additional circuits to protect the optocoupler effectively

PVA120-27BxxR2 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. With its own additional circuits protection optocoupler and complaint with requirements of intrinsically safe certifications. 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.
PVA120-27B24R2	120	24V/5A	85	1500
PVA120-27B28R2		28V/4.286A		1500
PVA120-27B35R2		35V/3.428A		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		--	--	2.5	A	
	330VAC		--	--	1.5		
	660VAC		--	--	0.8		
Inrush Current	330VAC	Cold start	--	100	--		
	660VAC		--	210	--		
	900VAC		--	310	--		
Required External Input Fuse			3.5A/1000VAC, required				
Hot Plug			Unavailable				

### Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	All load range		--	±2.0	--	%
Line Regulation	Rated load		--	±0.5	--	
Load Regulation	330VAC		--	±1.0	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	--	350	mV
Temperature Coefficient	330VAC input, full load output		--	±0.02	--	%/°C
Short Circuit Protection			Hiccup, continuous, self-recovery			

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Over-current Protection			≥110%Io, hiccup, self-recovery			
Over-voltage Protection	24V		≤35V	Output voltage clamp or hiccup		
	28V		≤40V			
	35V		≤45V			
Minimum Load			0	--	--	%
Hold-up Time	Room temperature, full load	660VAC input	--	80	--	ms
Start-up Delay Time			--	0.5	1.0	s
Note: *The "parallel cable" method is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to PV Converter Application Notes for specific information.						

## General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input - output	Electric Strength Test for 1min., leakage current $\leq 3mA$	4000	--	--	VAC
Insulation Resistance	500VDC		50	--	--	M $\Omega$
Operating Temperature			-25	--	+70	°C
Storage Temperature			-40	--	+85	
Storage Humidity	Non-condensing		--	--	95	%RH
Power Derating	-25°C to -10°C		2.6	--	--	% / °C
	+50°C to +70°C		2.0	--	--	
	85VAC-100VAC		3.3	--	--	% / VAC
	850VAC-900VAC		1.0	--	--	
Switching Frequency			--	60	--	kHz
MTBF	MIL-HDBK-217F@25°C		$\geq 300,000$ h			

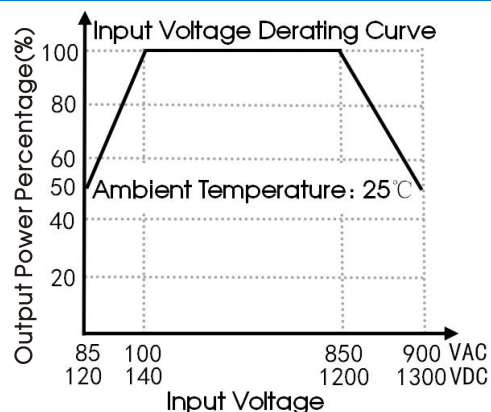
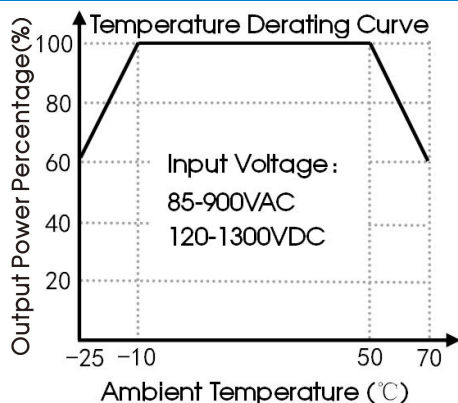
## Mechanical Specifications

Dimensions	139.97 x 89.98 x 37.50mm
Weight	325g (Typ.)
Cooling Method	Free air convection

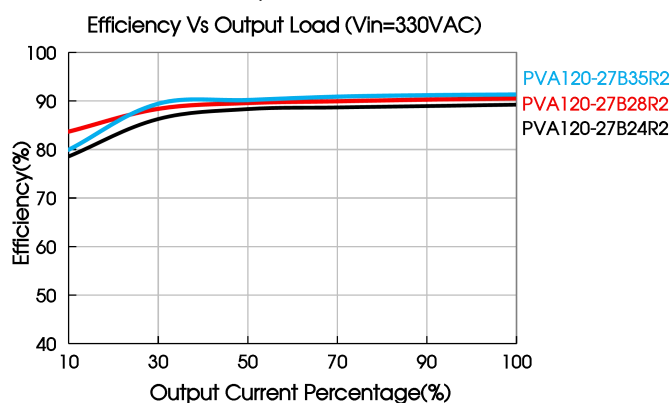
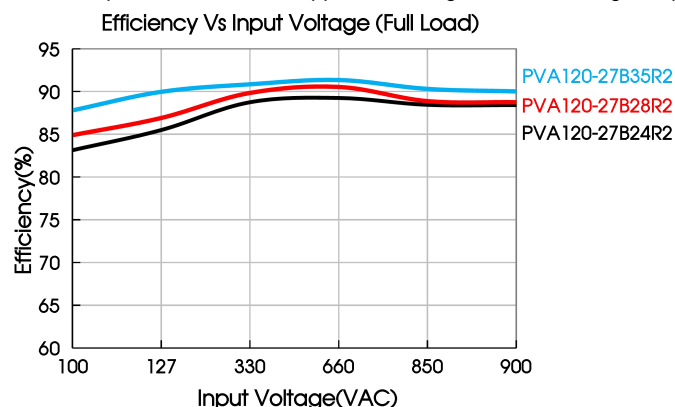
## Electromagnetic Compatibility (EMC)

Immunity	ESD	IEC/EN61000-4-2	Contact $\pm 6KV$	Perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 4KV$	Perf. Criteria A
	Surge	IEC/EN61000-4-5	Line to line $\pm 2KV$	Perf. Criteria A
	CS	IEC/EN61000-4-6	10Vr.m.s	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 natural air cooling; for applications in closed environment please consult Mornsun FAE.



## Design Reference

### 1. Typical application

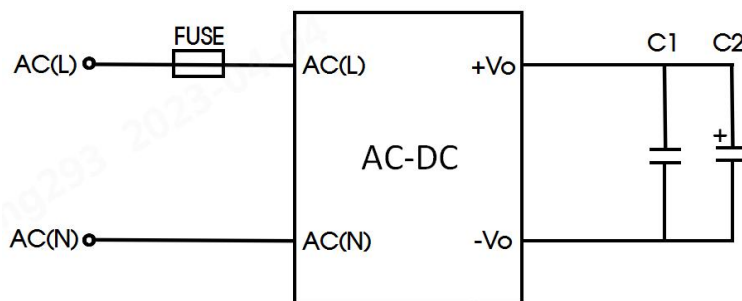


Fig. 1

Part No.	FUSE	C1	C2
PVA120-27BxxR2	3.5A/1000VAC, required	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, in other words not exceeding 80%. C1 is a ceramic capacitor, used to filter high-frequency noise.

### 2. EMC compliance recommended circuit

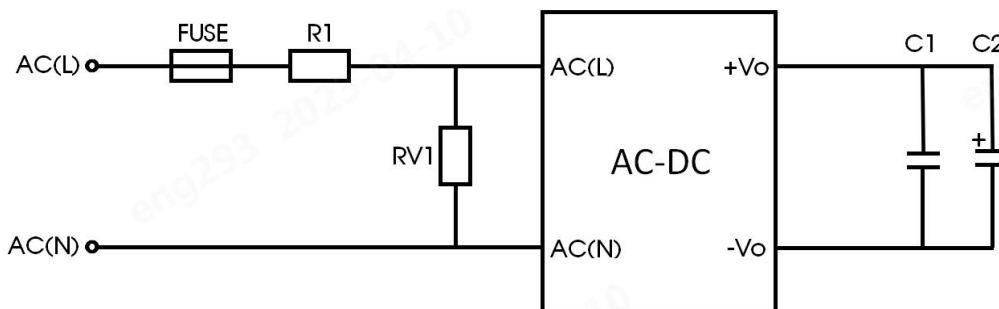


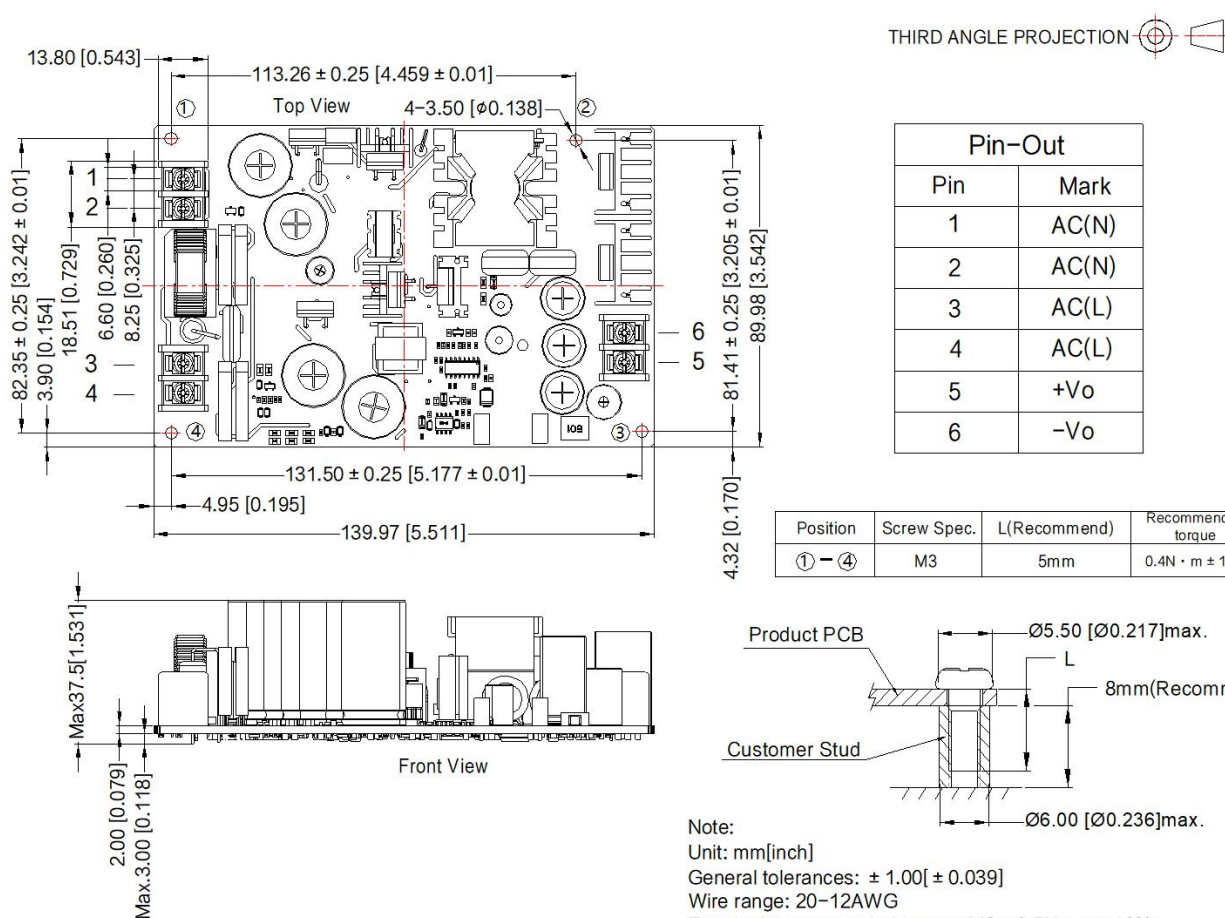
Fig. 2

Component	Recommended value
FUSE	3.5A/1000VAC, required
R1	2Ω /20W
RV1	14D162K
C1	1uF
C2	10uF

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.

3. For additional information please refer to application notes on [www.mornsun-power.com](http://www.mornsun-power.com).

## Dimensions and Recommended Layout



Note:

Unit: mm[inch]

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

Wire range: 20-12AWG

Terminal recommended torque: M3,  $0.5\text{N} \cdot \text{m} \pm 10\%$

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

It is recommended 10mm distance between the PCB and other components for safety purpose

Note:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220071;
2. 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;
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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