200W 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℃ to +70℃
- High I/O isolation voltage up to 4000VAC
- High reliability, high efficiency, long lifespan
- Output short circuit, over-current, over-voltage protection
- Operating altitude up to 5000m
- EFT/Surge immunity meets Level 4

PVA200-27BxxR2 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. 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)	Output Voltage Adjustable Range ADJ(V) *	Efficiency at 660VAC (%) Typ.	Capacitive Load (μF) Max.
PVA200-27B24R2	200	24V/8.33A	21.6-26.4	89	1500
PVA200-27B28R2		28V/7.14A	25.2-30.8	89	1200
PVA200-27B35R2		35V/5.71A	31.5-38.5	90	1000

Note: * During output voltage regulation, the load must be ⩾10%.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	900	VAC
	DC input	120	--	1300	VDC
Input Voltage Frequency		47	--	63	Hz
Input Current	127VAC	--	--	5.0	A
	330VAC	--	--	3.0	
	660VAC	--	--	1.5	
Inrush Current	660VAC	--	25	--	
Start-up Delay Time		--	--	2	s
Required External Input Fuse		6A/1000VAC, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	All load range	--	±1	--	%
Line Regulation	Rated load	--	±1	--	
Load Regulation	0% - 100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	--	200	mV
Stand-by Power Consumption	220VAC	--	2	3	W
	660VAC	--	3	4	
	900VAC	--	4	5	
Temperature Coefficient		--	±0.02	--	%/℃

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Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			≥110%Io, hiccup, self-recovery			
Over-voltage Protection	24V output		≤35VDC	Output voltage clamp or hiccup		
	28V output		≤40VDC			
	35V output		≤45VDC			
Minimum Load			0	--	--	%
Hold-up Time	Room temperature, full load	660VAC input	--	100	--	ms
Note: * The "parallel cable" method is used for ripple and noise test, 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 ≤3mA		4000	--	--	VAC
	Input - PE			3000	--	--	
	Output - PE			1000	--	--	
Insulation Resistance	Input - output	Test voltage: 500VDC		100	--	--	MΩ
	Input - PE						
	Output - PE						
Operating Temperature				-25	--	+70	℃
Storage Temperature				-40	--	+85	
Storage Humidity		Non-condensing		--	--	95	%RH
Output Power Derating		Operating temperature derating	-25℃ to -10℃	2.6	--	--	%/℃
			+50℃ to +70℃	2	--	--	
		Input voltage derating	85 - 100VAC	3.3	--	--	%/VAC
			850 - 900VAC	1	--	--	
		Altitude derating	2000 - 5000m	10	--	--	%/Km
MTBF		MIL-HDBK-217F@25℃		≥300,000 h			

Mechanical Specifications

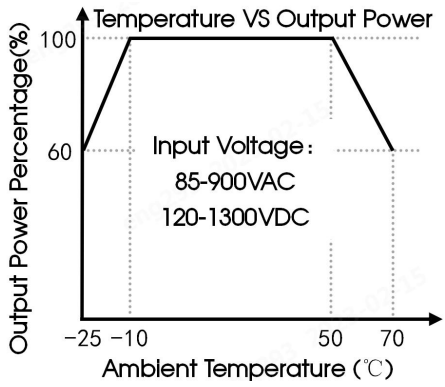
Dimensions	199.00 x 110.00 x 55.00mm
Weight	800g (Typ.)
Cooling Method	Free air convection

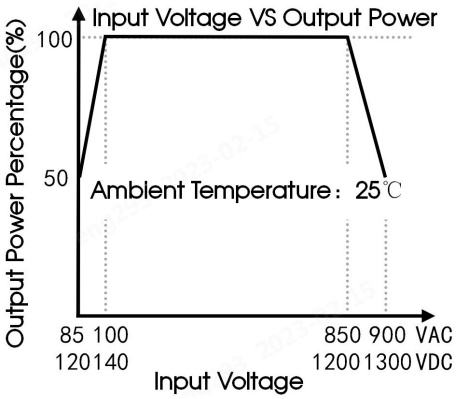
Electromagnetic Compatibility (EMC)

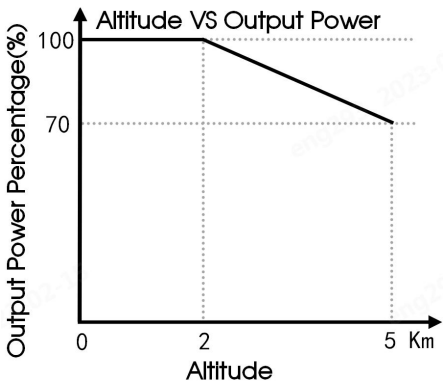
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	Perf. Criteria A
	Surge	IEC/EN61000-4-5	Line to line ±2KV/ line to ground ±4KV	Perf. Criteria A
	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A
	PFMF	IEC/EN61000-4-8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

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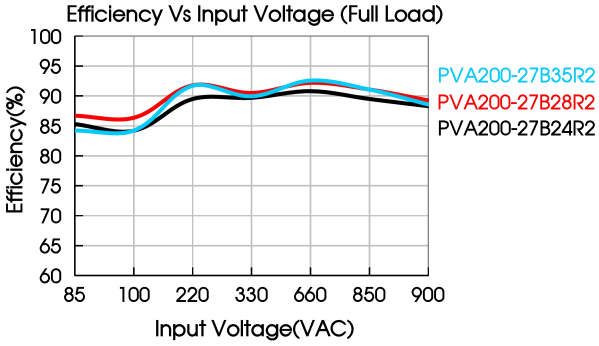
Product Characteristic Curve

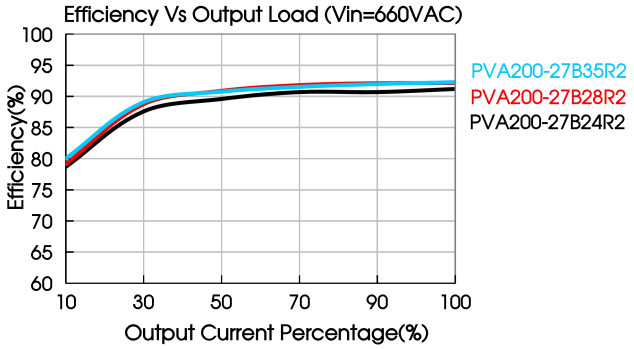






Note: 1.With an AC input between 85-100VAC/850-900VAC and a DC input between 120-140VDC/1200-1300VDC, the output power must be derated as per temperature derating curves;
2.This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun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





Design Reference

1. Typical application

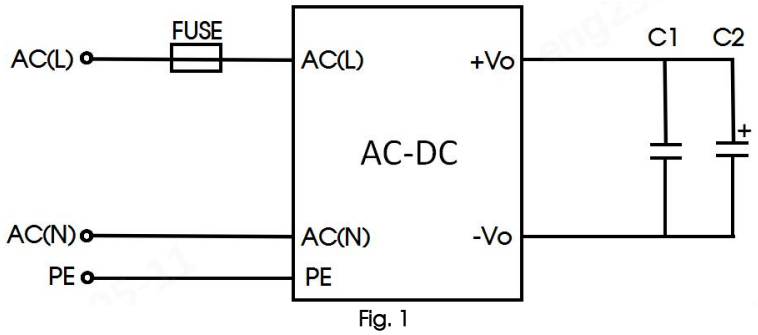


Fig. 1

Part No.	FUSE	C1	C2
PVA200-27BxxR2	6A/1000VAC, required	1uF/50V	10uF/50V

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

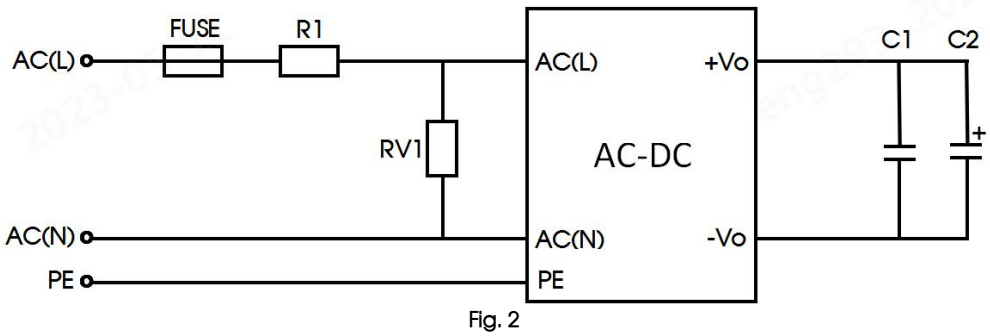


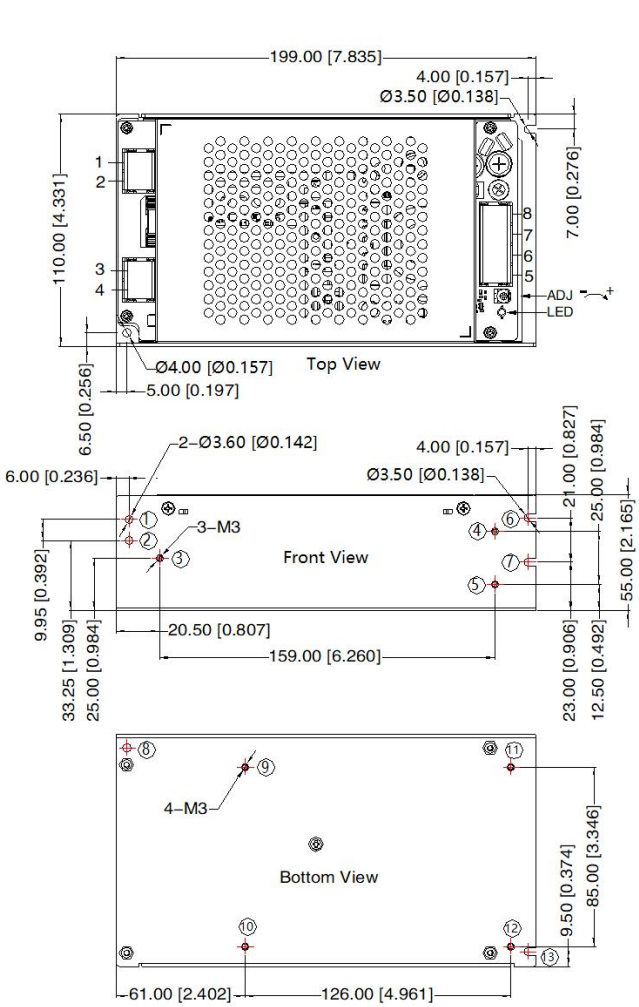
Fig. 2

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Component	Recommended value
FUSE	6A/1000VAC, required
R1	0.6Ω/20W
RV1	AC input: 14D162K/DC input: 14D182K
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 recommened 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.

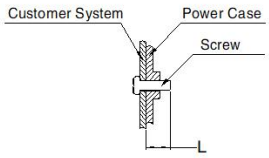
Dimensions and Recommended Layout



THIRD ANGLE PROJECTION

Pin–Out	
Pin	Function
1	AC(L)
2	AC(L)
3	AC(N)
4	AC(N)
5	+Vo
6	+Vo
7	–Vo
8	–Vo
①–⑬	PE

Position	Screw Spec.	L(max)	Torque(max)
③–⑤	M3	3mm	0.4N・m
⑨–⑫	M3	3mm	0.4N・m



Note:
Unit: mm[inch]
LED: Output status indicator LED
ADJ: Output adjustable resistor
Wire range: 18–12AWG
Connector torque: M3.5, Max 0.8N・m
General tolerances: ±1.00[±0.039]
①–⑬ any position must be connected to PE
The layout of the device is for reference only, please refer to the actual product

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Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220684;
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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