

350W isolated DC-DC converter with ultra-wide, ultra-high 200(300) -1500VDC input for Renewable Energy



CE Report CB  
EN62109-1 IEC62109-1

UK  
BS EN62109-1

RoHS



## FEATURES

- Input voltage up to 1700VDC (Transient, duration: 10s)
- Ultra-wide input voltage range of 200(300) - 1500VDC
- Industrial grade operating temperature -40°C to +85°C
- High I/O isolation voltage up to 4000VAC
- High efficiency, low ripple & noise
- High reliability, long lifespan
- Input under-voltage protection, input reverse polarity protection, over-temperature protection, output short circuit, over-current, over-voltage protection
- Operating up to 5000m altitude
- Safety according to CSA-C22.2 No.107.1, UL1741

PV350-29Bxx is a regulated DC-DC series converter with an ultra-wide and ultra-high DC input of 200(300)-1500VDC, which design based on standard of CSA-C22.2 No. 107.1, EN/IEC62109, UL1741. The products feature high efficiency, high reliability, high insulation and a high level of safety protection. It is widely used in renewable energy industries, such as photovoltaic inverter, energy storage systems, industrial control. The converters provide multiple protection features and guarantee stable and safe operating environments even under abnormal working conditions. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

## Selection Guide

Certification	Part No.*	Output Power(W)**	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range ADJ (V)	Efficiency at 1100VDC (%) Typ.	Capacitive Load (μF) Max.
EN/IEC	PV350-29B12	250.8	12V/20.9A	/	90	10000
	PV350-29B24	350.4	24V/14.6A	21.6-26.4	92	2200
	PV350-29B28		28V/12.5A	25.2-30.8		1500
	PV350-29B32		32V/10.95A	28.8-35.2		1500
	PV350-29B48		48V/7.3A	43.2-52.8		1500

Note: \*PV350-29B24/28/32/48 use suffix "W" for wire output version; For 12V version the input terminals are cold pressed pin type, the output is wire type;

\*\*If need parallel connection to increase the power, please consult Mornsun FAE for solution.

## Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Input Voltage Range	Transient (10s)		--	--	1700	VDC	
	12V		200	--	1500		
	24V/28V/32V/48V		300	--	1500		
	300VDC		--	--	2		
Input Current	1100VDC		--	--	0.75	A	
	1500VDC		--	--	0.6		
	1500VDC		--	300	--		
Input Under-voltage Protection	Lockout activation range	12V	140	--	195	VDC	
	Lockout deactivation range		165	--	205		
	Lockout activation range	24V/28V/32V/48V	240	--	295		
	Lockout deactivation range		265	--	305		
Input Reverse Polarity Protection				Available			
External Input Fuse				6A/1500VDC, required			
Hot Plug				Unavailable			

## Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	All load range, constant voltage mode		--	±1	±2	%
Line Regulation	Rated load		--	±0.25	0.5	

Load Regulation	0% - 100% load		--	±0.5	±1	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	12V	--	--	200	mV
		24V/28V/32V/48V	--	--	300	
Temperature Coefficient			--	±0.02	--	%/°C
Instantaneous overload capability**	Full voltage range, for 1s		150%Io	200%Io	--	--
Over-current Protection	All input voltage range	Normal temperature, high temperature	110% - 300% Io, hiccup, constant current lasts for 1s before turn off, self-recovery			
		Low temperature	≥110% Io, hiccup, constant current lasts for 1s before turn off, self-recovery			
Short Circuit Protection	Recovery time < 15s after the short circuit disappear.		Hiccup, constant current lasts for 1s before turn off, continuous, self-recovery			
Over-voltage Protection	12V output		≤16VDC	Output voltage clamp or hiccup		
	24V output		≤35VDC			
	28V output		≤40VDC			
	32V output		≤45VDC			
	48V output		≤58VDC			
Over-temperature Protection***			Output voltage turn off, self-recovery			
Minimum Load			0	--	--	%
Hold-up Time	Room temperature, full load	1100VDC input	--	8	--	ms
Start-up Delay Time****	Room temperature		--	3	5	s

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

\*\*When the output current is less than the trigger point of the over-current protection, the normal output can be maintained. When the output current is greater than the trigger point of the over-current protection, the output voltage will drop with the increase of the current, which belongs to the normal working mode; the over-current can be restored within 1s is normal working state, otherwise it enters the hiccup state of overcurrent protection, which belongs to the normal protection mode. It is suitable for short-term high-current applications such as closing coils and capacitors;

\*\*\*Output voltage turn off, self-recovery after fault conditions is removed;

\*\*\*\*Full input voltage / 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 <10mA		4000	--	--	VAC	
	Input - PE			4000	--	--		
	Output - PE			4000	--	--		
Insulation Type					Primary and secondary meet reinforced insulation			
Insulation Resistance	Input - output	500VDC		50	--	--	MΩ	
Operating Temperature					-40	--	+85	
Storage Temperature					-40	--	+85	
Storage Humidity					--	--	95 %RH	
Power Derating	-40°C to 0°C +50°C to +70°C +55°C to +70°C +50°C to +70°C +70°C to +85°C -40°C to 0°C	200-300VDC 300-1400VDC 1400-1500VDC 200-1500VDC 300-400VDC 400-1400VDC	12V	0.50	--	--	%/°C	
				2.50	--	--		
				3.33	--	--		
				2.50	--	--		
				3.00	--	--		
				0.50	--	--		
	+50°C to +70°C +55°C to +70°C +50°C to +70°C +70°C to +85°C 200-300VDC 300-400VDC	300-1400VDC 1400-1500VDC 300-1500VDC 300-1500VDC 12V 24V/28V/32V/48V	24V/28V/32V/ 48V	2.50	--	--	%/VDC	
				3.33	--	--		
				2.50	--	--		
				3.00	--	--		
				0.20	--	--		
				0.20	--	--		
	1400-1500VDC		0.20		--	--	%/Km	
	3000- 5000m		10.00		--	--		

Switching Frequency		-	65	-	kHz
Safety Standard		Design refer to IEC62109-1 & EN62109-1, BS EN62109-1, CSA-C22.2 No.107.1-16, UL1741			
MTBF	MIL-HDBK-217F@25°C	$\geq 300,000$ h			

### Mechanical Specifications

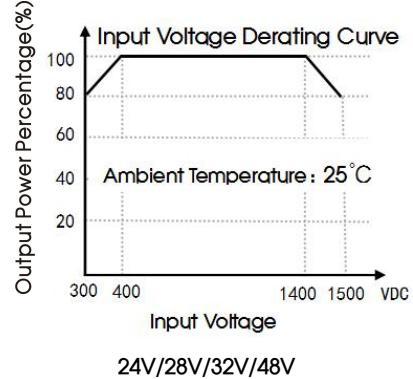
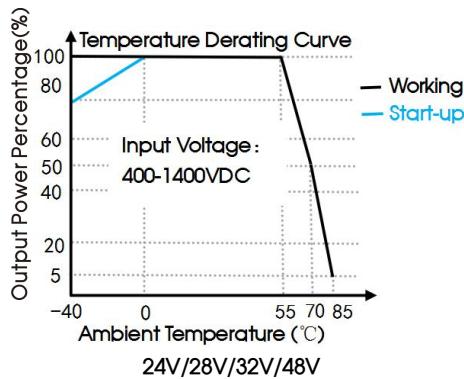
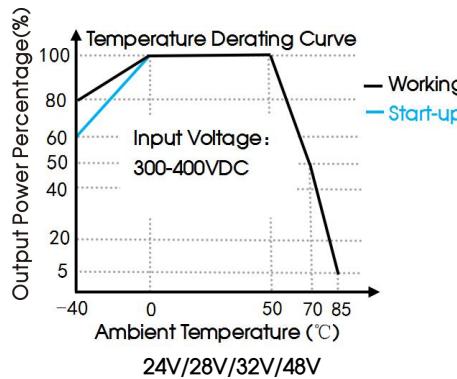
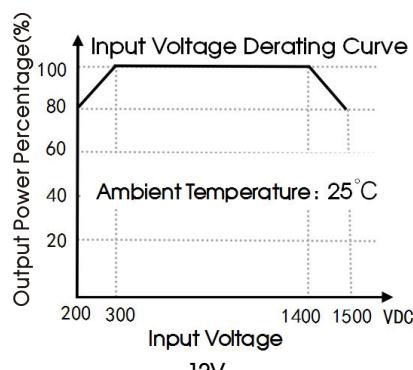
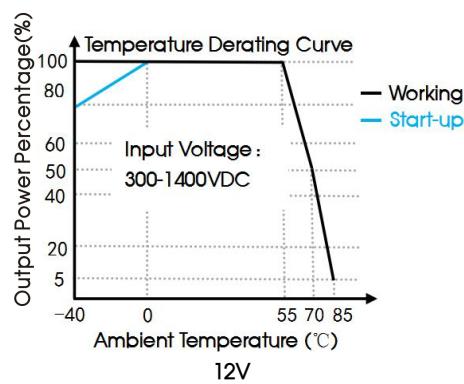
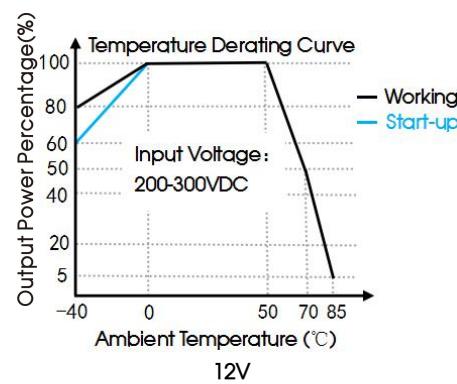
Case Material	Metal
Dimensions	215.00 x 125.00 x 50.00mm
Weight	1500g (Typ.)
Cooling Method	Free air convection

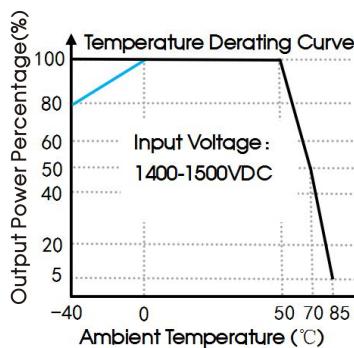
### Electromagnetic Compatibility (EMC)

Emissions*	CE	CISPR32/EN55032 CLASS A	
	RE	CISPR32/EN55032 CLASS A	
Immunity	ESD	IEC/EN61000-4-2 Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$	Perf. Criteria A
	RS	IEC/EN61000-4-3 10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4 $\pm 4\text{KV}$	Perf. Criteria A
	Surge	IEC/EN61000-4-5 Line to line $\pm 1\text{KV}$ /line to PE $\pm 2\text{KV}$	Perf. Criteria A
	CS	IEC/EN61000-4-6 10Vr.m.s	Perf. Criteria A

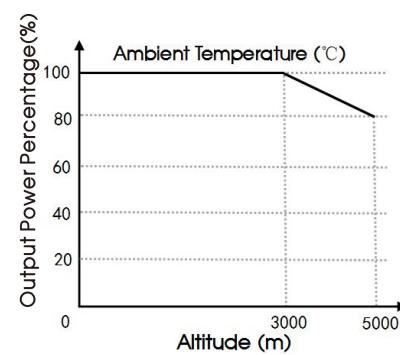
Note: \*During conduction and radiation testing, in order to avoid new interference brought by the input line, it is necessary to cover the input line with a nickel-zinc ferrite or nanocrystalline magnetic ring.

### Product Characteristic Curve



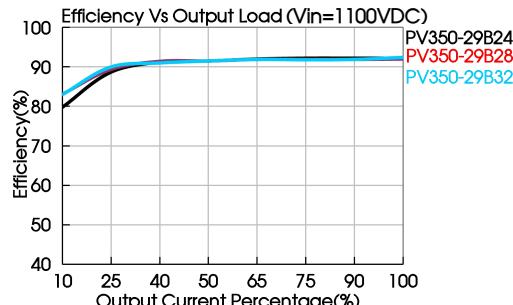
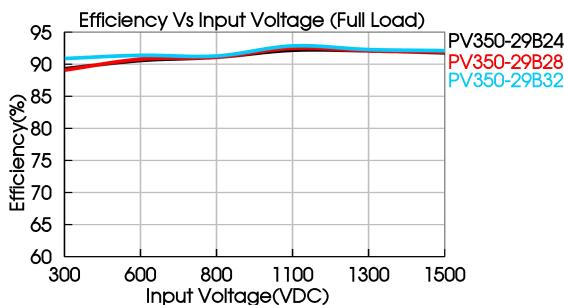
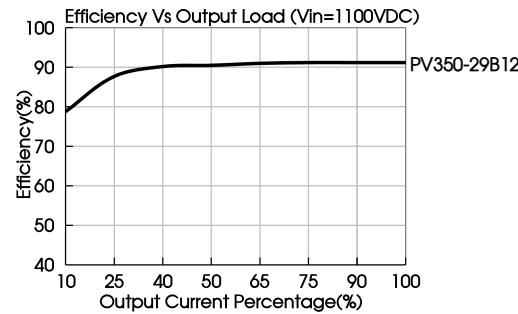
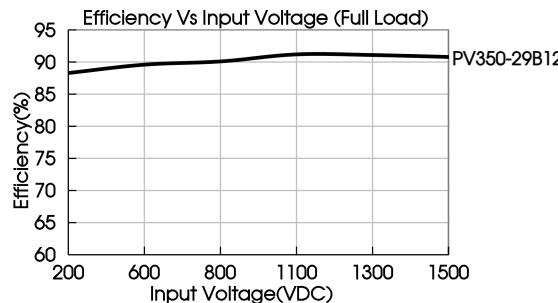


PV350-29Bxx



PV350-29Bxx

Note: ① With an input between 200-300VDC(12V)/300-400VDC(24V/28V/32V/48V)/1400 -1500VDC, the output power of PV350-29Bxx parts must be derated as per temperature derating curves;  
 ② This product is suitable for applications using natural free air convection; For applications in closed environment please consult Mornsun FAE.



## Design Reference

### 1. Typical application circuit

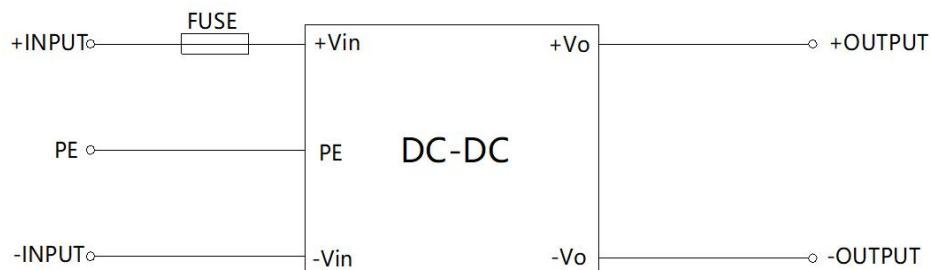


Fig. 1

Model	Recommended value
FUSE	6A/1500VDC, required

2. Customer specific application circuit (PV350-29B12)

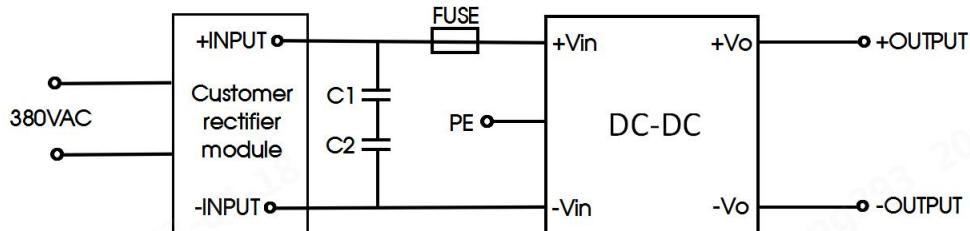


Fig. 2

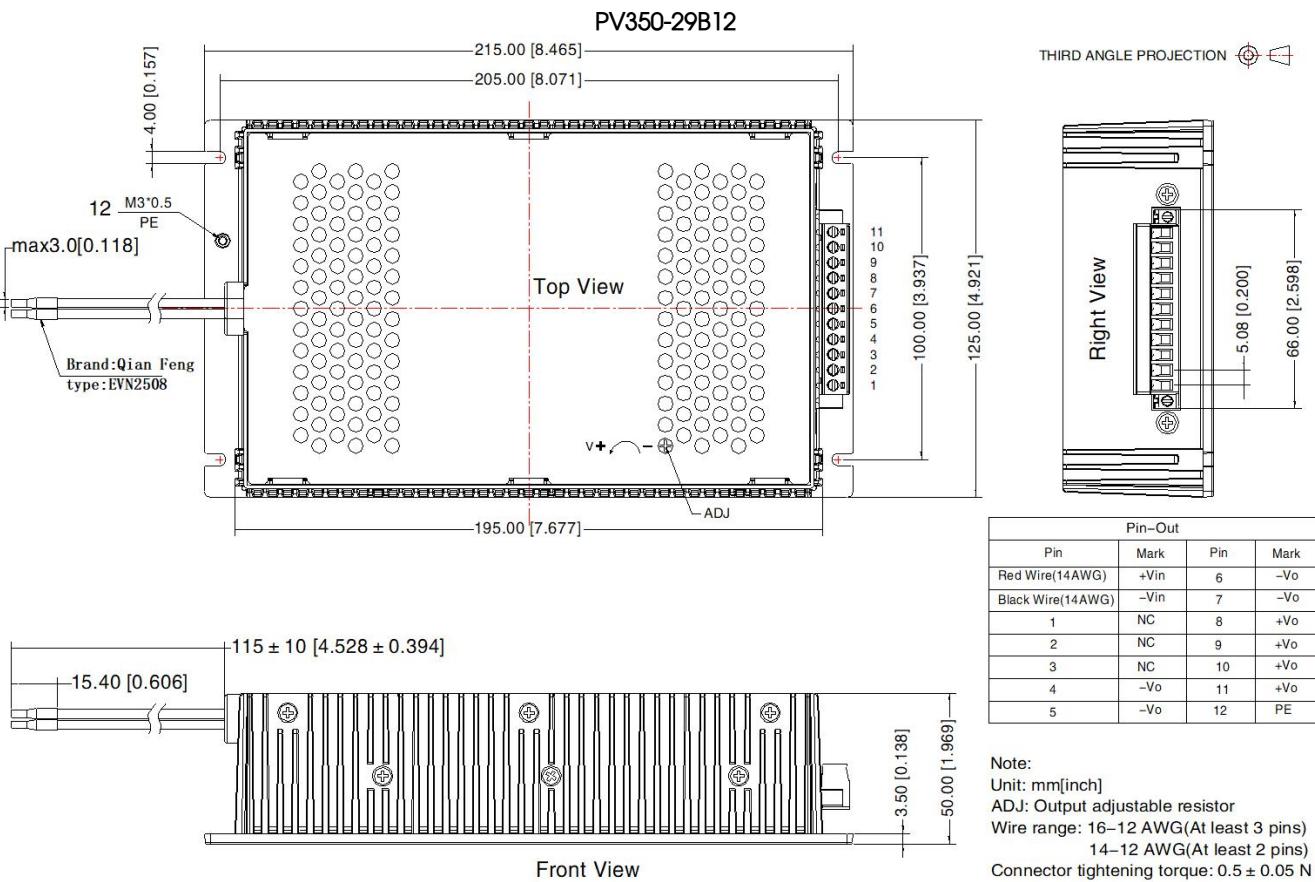
Model	Recommended value
C1/C2	150μF/400V
FUSE	6A/1500VDC, required

Note: 1.The rectified DC signal of 380VAC three-phase power needs to be filtered by C1 and C2 capacitors;

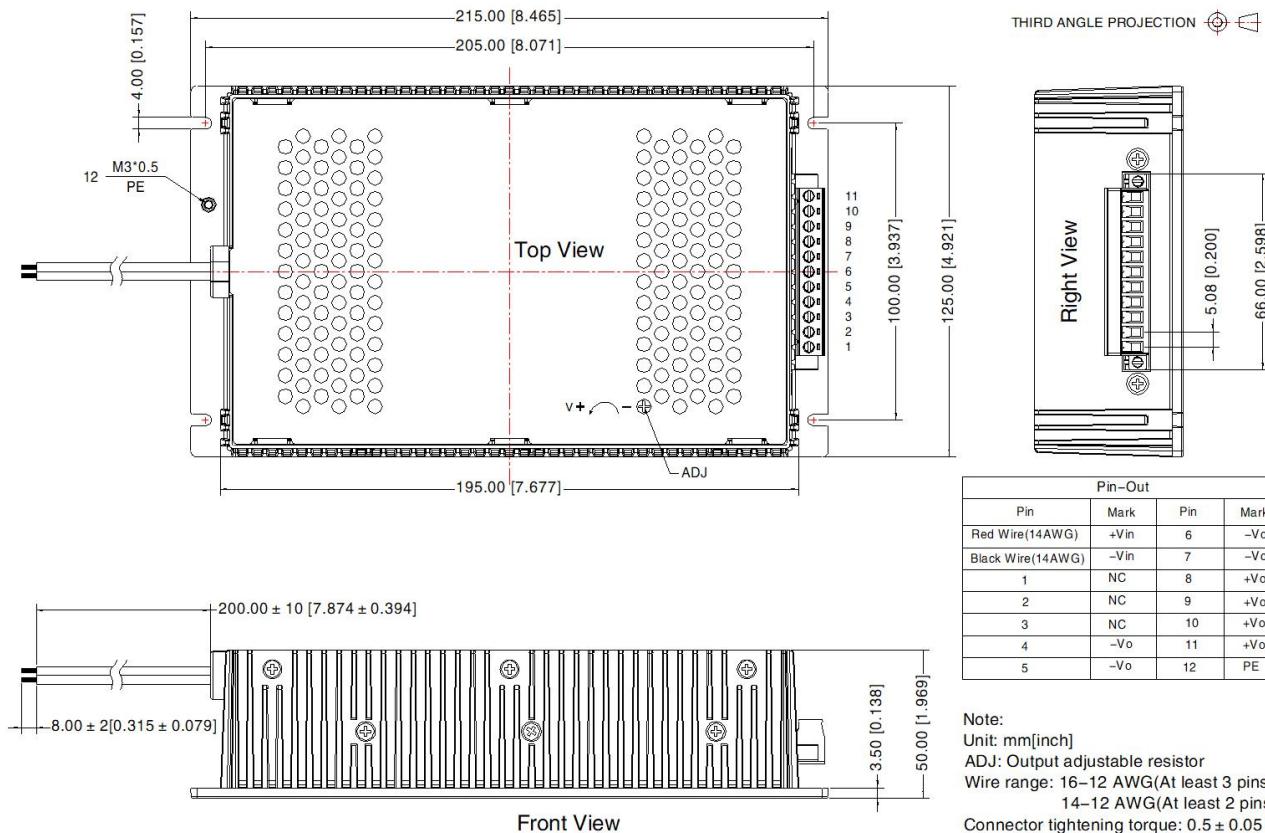
2.Please consult FAE if it needs to be applied in other environments.

3. For more information Please find the application notes on [www.mornsun-power.com](http://www.mornsun-power.com).

Dimensions and Recommended Layout (PV350-29Bxx)



PV350-29B24/28/32/48



Note:

Unit: mm[inch]

ADJ: Output adjustable resistor

Wire range: 16–12 AWG(At least 3 pins)

14–12 AWG(At least 2 pins)

Connector tightening torque:  $0.5 \pm 0.05$  N · m

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

Tightening torque: Max 0.4 N · m

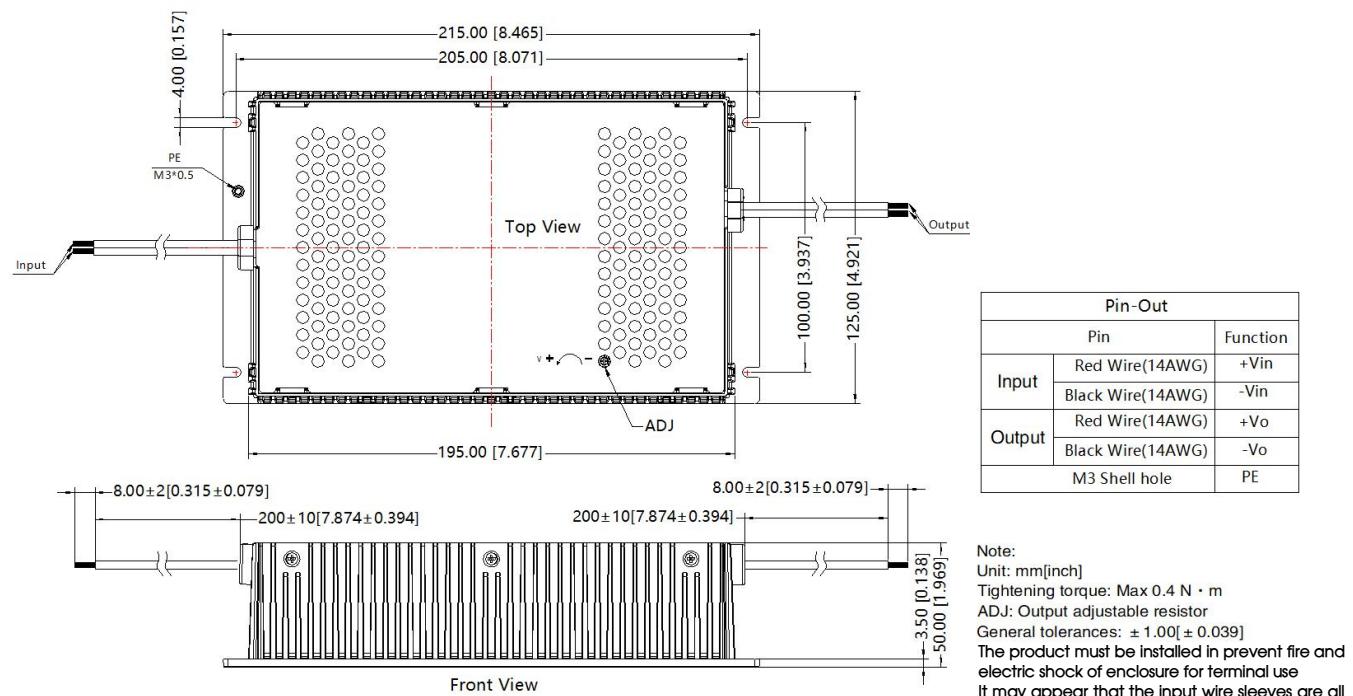
The product must be installed in prevent fire and electric shock of enclosure for terminal use

It may appear that the input wire sleeves are all black when shipped

Dimensions and Recommended Layout (PV350-29B24/28/32/48W)

PV350-29B24/28/32/48W

THIRD ANGLE PROJECTION



 **WARNING:**

1. CAUTION: "To reduce the risk of fire, connect only to a circuit provided with 6 amperes maximum branch-circuit over-current protection in accordance with the National Electrical Code, ANSI/NFPA70."
2. WARNING: REPLACE ONLY WITH THE SAME RATINGS AND TYPE OF FUSE.
3. DANGER — HIGH VOLTAGE.

**AVERTISSEMENT:**

1. Avertissement: Pour réduire le risque d'incendie, veuillez connecter uniquement à des circuits de dérivation avec protection contre les surintensités conformes au code électrique national ANSI/ NFPA 70.
2. AVERTISSEMENT : N'UTILISER QUE DES FUSIBLES DE MÊME CALIBRE ET DE MÊME TYPE QUE LE FUSIBLE D'ORIGINE.
3. DANGER : HAUTE TENSION.

**Note:**

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220053;
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;
7. If the final product application is connected to a photovoltaic array, the array needs to be grounded and The voltage between the positive and negative poles of the product shall not be greater than 1500VDC.

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