150W isolation DC-DC converter with ultra-wide, ultra-high 250 - 2200VDC input for Renewable Energy

RoHS

FEATURES

- Ultra-wide 250 - 2200VDC input voltage range (Transient 2300VDC last for 30s)
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation voltage up to 5000VAC
- High reliability, efficiency up to 92%
- Input under-voltage protection, input reverse polarity protection, output short circuit, over-current, over-voltage, over-temperature protection
- Operating altitude up to 5000m
- Safety Class I, Class II
- Design refer to UL1741, EN/IEC/BS EN62109, IEC62477

PV150-2GBxx is a regulated DC-DC series converter with an ultra-wide and ultra-high DC input of 250-2200VDC, which design based on standard of UL1741, EN/IEC/BS EN62109, IEC62477. 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, charging pile, industrial control. The converters provide multiple protection features and guarantee stable and safe operating environments even under abnormal working conditions.

Selection Guide

Certification	Part No.	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range ADJ (V)	Efficiency at 1000VDC (%) Typ.	Capacitive Load (μF) Max.
/	PV150-2GB12	120	12V/10.0A	12-15	87	3500
	PV150-2GB24	150	24V/6.25A	24-29	90	2000
	PV150-2GB28		28V/5.36A	28-33.6	91	1500
	PV150-2GB36		36V/4.20A	36-43.2	91	1500
	PV150-2GB48		48V/3.125A	48-58	92	1000

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Transient (30s)		--	--	2300	VDC
			250	--	2200	
Input Current	250VDC		--	--	0.8	A
	800VDC		--	--	0.4	
Inrush Current	800VDC	Cold start	--	--	100	
	2000VDC		--	--	250	
Input Under-voltage Protection	Under-voltage protection start		120	150	180	VDC
	Under-voltage protection release		180	210	250	
Input Reverse Polarity Protection			Available			
Start-up Delay Time*			--	3	5	s
External Input Fuse**			2500VDC/4A, required			
			2000VDC/4A, required (brand: adler models: A901400b00 base models: BH300-01)			
Hot Plug			Unavailable			

Note: *Continuous start time < 15s;
**This fuse can be used when the system input voltage is less than 2000VDC.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	All load range	--	--	±2	%
Line Regulation	Rated load	--	--	±1	
Load Regulation	1000VDC	--	--	±1	
Minimum Load		0	--	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	--	300	mV
Stand-by Power Consumption	1500VDC	--	3	5	W
Temperature Coefficient		--	±0.02	--	%/℃
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		110% - 330% Io, self-recovery after fault conditions is removed			
Over-voltage Protection	12V	≤20V			
	24V	≤32V	Output voltage clamp		
	28V	≤45V			
	36V	≤48V			
	48V	≤60V			
Over-temperature Protection**	800VDC	Output voltage turn off, self-recovery			
Hold-up Time	1000VDC, full load	--	10	--	ms

Note: *The "Tip and barrel method" is used for ripple and noise test, 12V with a 1uf parallel capacitor, please refer to PV Converter Application Notes for specific information;
**Output voltage turn off, self-recovery after fault conditions is removed.

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input - output	Electric strength test for 1min., leakage current <10mA		5000	--	--	VAC
	Input - PE			5000	--	--	
	Output - PE	Electric strength test for 1min., leakage current <5mA		2000	--	--	
Insulation Resistance	Input - output	Test voltage: 500VDC		100	--	--	MΩ
	Input - PE						
	Output - PE						
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+85	
Storage Humidity		Non-condensing		--	--	95	%RH
Output Power Derating		Operating temperature derating	-40℃ to -25℃	3.33	--	--	%/℃
			+55℃ to +85℃	2.67	--	--	
		Input voltage derating	250 - 300VDC	0.4	--	--	%/VDC
			300 - 400VDC	0.2	--	--	
			2000 - 2200VDC	0.1	--	--	
		Altitude derating	2000 - 5000m	10	--	--	%/Km
Safety Standard				Design refer to UL1741, EN/IEC/BS EN62109-1, IEC62477			
Safety Class				Class I, Class II			
MTBF		MIL-HDBK-217F@25℃		≥300,000h			

Mechanical Specifications

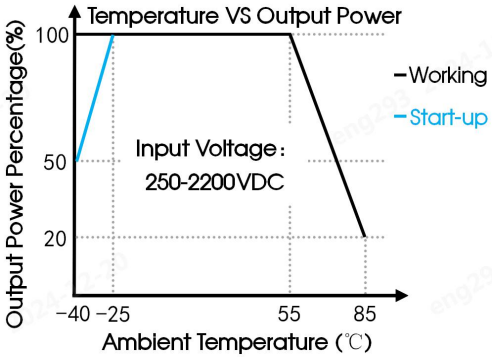
Case Material	Metal
Dimensions	201.00 x 70.00 x 42.00mm
Weight	645g (Typ.)
Cooling Method	Free air convection

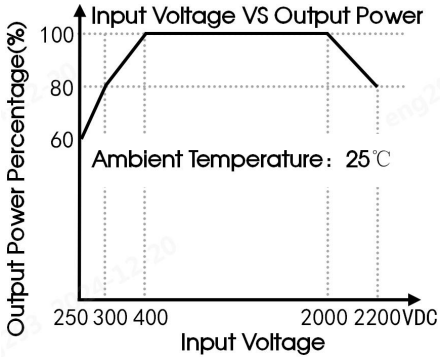
Electromagnetic Compatibility (EMC)

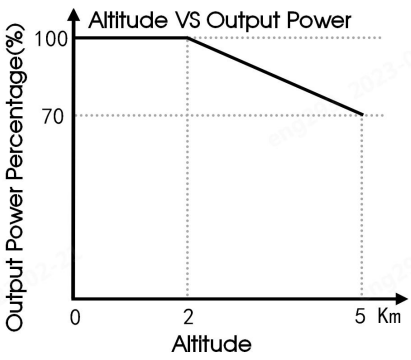
Emissions	CE	CISPR32/EN55032	CLASS A	
	RE	CISPR32/EN55032	CLASS A	
	EN61000-6-4			
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	Perf. Criteria A
	Surge*	IEC/EN61000-4-5	Line to line ±2KV /line to PE ±4KV	Perf. Criteria A
	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A
	PFMF	IEC/EN61000-4-8	30A/m	Perf. Criteria A
	EN55035、EN61000-6-2			

Note: *CLASS II applications do not need to test the line to shell.

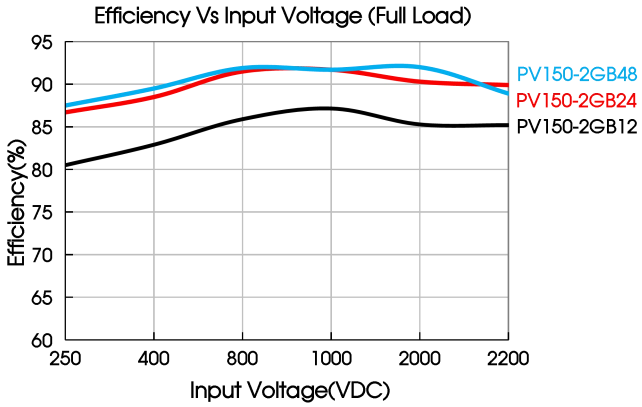
Product Characteristic Curve

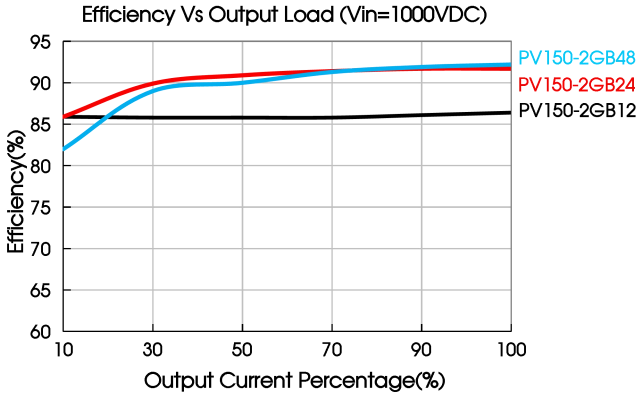






Note: 1.With an DC input between 250-400VDC/2000-2200VDC, the output power must be derated as per temperature derating curves;
2.This product is suitable for applications using natural free air cooling; for applications in closed environment please consult Mornsun FAE.





Design Reference

1. Typical application*

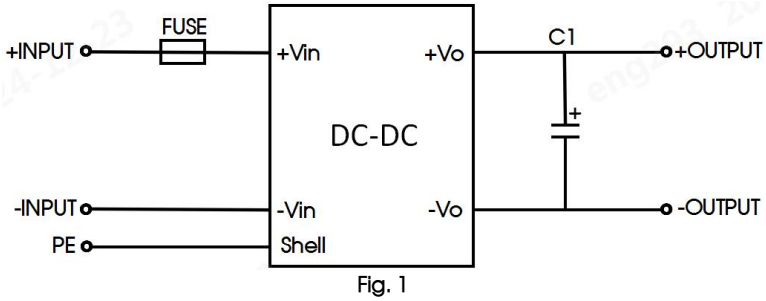


Fig. 1

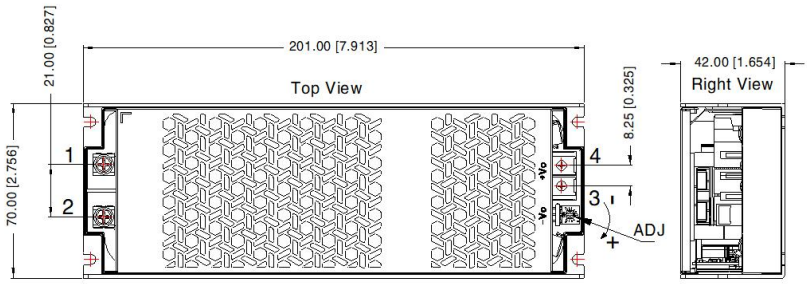
Part No.	Model	Recommended value
PV150-2GBxx	FUSE*	2500VDC/4A, required
		2000VDC/4A, required (brand: adler models: A901400b00 base models: BH300-01)
PV150-2GB12	C1	100uF/35V
Note: *No PE connection is required for CLASS II application; **This fuse can be used when the system input voltage is less than 2000VDC.		

2. IMPORTANT SAFETY INSTRUCTIONS

Additional protective devices, such as lightning protector need to be added if there is an transient pulse voltage greater than 6KV at the Input of PV products in system applications.

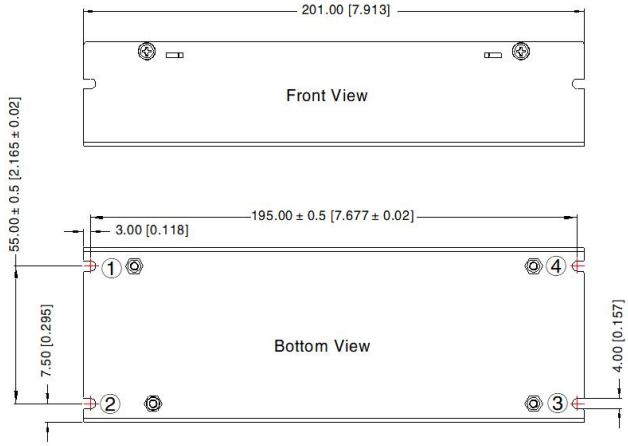
3. For additional information please refer to application notes on www.mornsun-power.com.

Dimensions and Recommended Layout

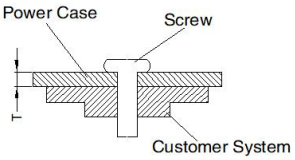


THIRD ANGLE PROJECTION

Pin–Out	
Pin	Mark
1	+Vin
2	–Vin
3	–Vo
4	+Vo
①–④	⏚



Position	Screw Spec.	T	Torque
①–④	M3	1.5mm	0.4N・m ± 10%



Note:
1. Unit: mm[inch]
2. General tolerances: ± 1.00 [± 0.040]
3. Wire range:
Input: 20–12AWG
Output: 12V 18–12AWG
24V,28V,36V,48V 20–12AWG
4. Input connector tightening torque: M4, 0.9N・m ± 10%
Output connector tightening torque: M3, 0.5N・m ± 10%

⚠WARNING:
1. CAUTION: "To reduce the risk of fire, connect only to a circuit provided with 4 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 MÊMECALIBRE ET DE MÊME TYPE QUE LE FUSIBLE DORIGINE.
3. DANGER ： HAUTE TENSION.

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220211;
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. The output voltage can be adjusted by the ADJ, clockwise to increase;
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
8. 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 2200VDC.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No.8 Nanyun 4th Road, Huangpu District, Guangzhou, China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com