DC-DC

Features

- Ultra-wide 300~1500V DC input voltage range (Transient 1600VDC last for 10s)
- Transient power 650W last for 3s
- High I/O isolation test voltage of 4000V AC
- Industrial grade operating temperature -40°C ~ +85°C
- High efficiency, low ripple & noise
- Input RPP, UVP, Output SCP, OCP, OVP
- Operating up to 5000m altitude
- Support 3+1 parallel redundancy, current sharing

Ideal Power's 36PV500-29Bxx 500W DC/DC Enclosed Power Supply Series are certified to RoHS & EN 62109-1/IEC 62109-1/BS EN 62109-1 Standards and comply with the relevant Efficiency Regulations. These are primarily used in Photovoltaic Industries, and customised solutions are available upon request.

Models

Part No.*	Output Power**		Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range ADJ (V)	Efficiency at 1000VDC (%) Typ.	Capacitive Load (μF) Max.
	Steady	Transient (duration 3s)**				
36PV500-29B24	504W	650W	24V/21.0A	21.6-26.4	94	4400
36PV500-29B48			48V/10.5A	43.2-52.8		2200

Note: *Use suffix "W" for lead type version.
**24V transient power output needs to be≤24.48V; 48V transient power output needs to be≤48.96V.

Input Specifications

Parameter	Conditions		Min	Typ	Max	Unit
Input Voltage Range	Transient (10s)		--	--	1600	VDC
			300	--	1500	
Input Current	300VDC		--	--	3	A
	800VDC		--	--	1	
Inrush Current	1500VDC	Cold start	--	280	--	
Input Under-voltage Protection	Lockout activation range		255	--	275	VDC
	Lockout deactivation range		275	--	295	
Input Reverse Polarity Protection				Available		
External Input Fuse				8A/1500VDC,		
Hot Plug				Unavailable		

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Output Specifications

Parameter	Conditions		Min	Typ	Max	Unit
Output Voltage Accuracy	All load range		--	±1	±2	%
Line Regulation	Rated load		--	±0.1	±0.5	
Load Regulation	800VDC		--	±0.5	±2	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	70	150	mV
Stand-by Power Consumption	300VDC		--	1.5	3	W
	1000VDC		--	2	4	
	1500VDC		--	3	5	
Temperature Coefficient			--	±0.02	--	%/℃
Short Circuit Protection	Recovery time < 15s after the short circuit disappears		Constant current hiccup, continuous, self-recovery			
Over-voltage Protection	24V		≤35V	Output voltage hiccup		
	48V		≤60V			
Over-current Protection	All input voltage range		130% - 200% Io, hiccup, self-recovery			
Over-temperature Protection**	800VDC, rated load	Over-temperature protection start	70	--	85	℃
		Over-temperature protection release	55	--	70	
Minimum Load			0	--	--	%
Hold-up Time	Room temperature, full load	800VDC input	--	5	--	ms
Start-up Delay Time***	Room temperature		--	1	3	s

Note: *The " Tip and barrel method" is used for ripple and noise tests. Please refer to PV Converter Application Notes for specific information.
**Output voltage turn off, self-recovery after fault conditions are removed. The over-temperature point is the ambient temperature of the product.
***Full input voltage/output load range (The cooling time between input power-off and power-on again is greater than 15s).

General Specifications

Parameter		Conditions		Min	Typ	Max	Unit
Isolation	Input-output	Electric strength test for 1min., leakage current <5mA		4000	--	--	VAC
	Input - PE	Electric strength test for 1min., leakage current <10mA		4000	--	--	
	Output - PE	Electric strength test for 1min., leakage current <5mA		4000	--	--	
Insulation Type				Primary and secondary meet reinforced			
Insulation Resistance	Input-output	Testing voltage: 500VDC		100	--	--	MΩ
	Input - PE						
	Output - PE						
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+85	
Storage Humidity		Non-condensing		--	--	95	%RH
Power Derating		Operating temperature derating	-40℃ to -25℃	1.33	--	--	%/℃
			+50℃ to +70℃	2.0	--	--	
			+70℃ to +85℃	3.67	--	--	
		Input voltage derating	1400-1500VDC	0.2	--	--	%/VDC
		Altitude derating	2000- 5000m	6.7	--	--	%/Km
Safety Standard				Design refers to CSA-C22.2 No.107.1-16, UL1741, EN/IEC/BS EN62109-1			
Safety Class				Class I (terminal), Class II (lead type)			
MTBF		MIL-HDBK-217F@25℃		≥300,000 h			

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Mechanical Specifications

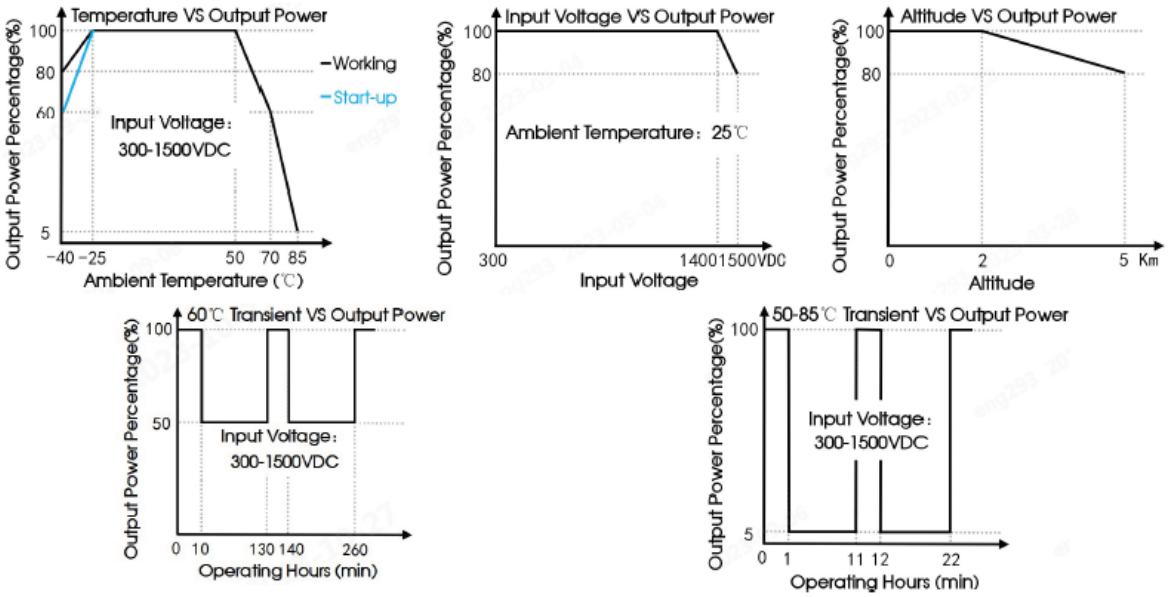
Case Material	Metal
Dimensions	237.00 x 100.00 x 41.00mm
Weight	1180g (Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

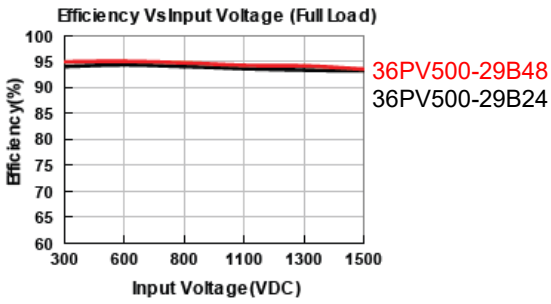
Parameter		Conditions		Level
Emissions	CE	CISPR32/EN55032	CLASS A	
	RE	CISPR32/EN55032	CLASS A	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	Perf. Criteria B
	Surge	IEC/EN61000-4-5	Line to line ±2KV/line to PE ±4KV (See Fig. 2 for recommended circuit)	Perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A
	PFMF	IEC/EN61000-4-8	30A/m	

Note: PE connection is required for **CLA**SS I (terminal); no PE connection is required for CLASS II (lead type) application.

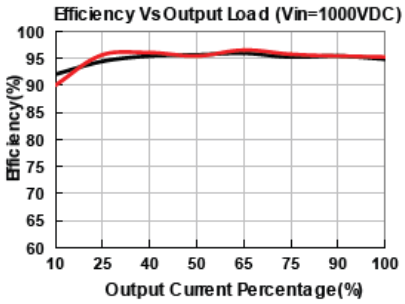
Characteristic Curve



Note: 1.With an DC input between 1400-1500VDC, the output power must be derated as per temperature derating curves;
2.This product is suitable for applications using natural air cooling;



36PV500-29B48
36PV500-29B24



36PV500-29B48
36PV500-29B24

Design Reference

1. Typical application circuit

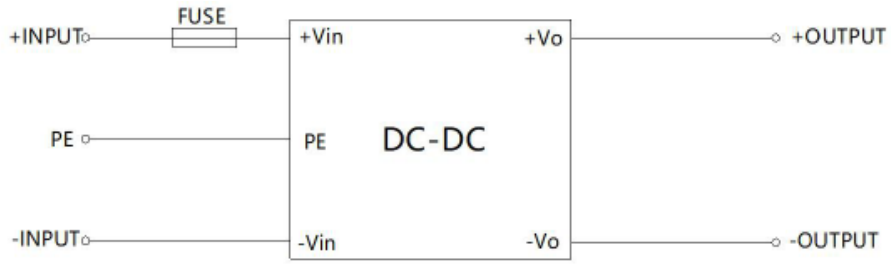


Fig. 1

Model	Fuse
PV500-29Bxx	8A/1500VDC, required
Note: No PE connection is required for **CLASS II** application.	

1. EMC compliance recommended circuit

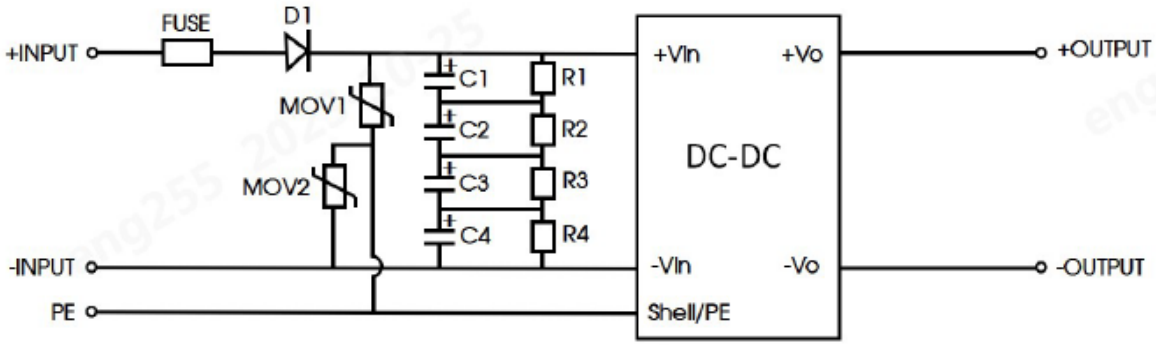


Fig. 2

Model	Recommended value
FUSE	8A/1500VDC, required
D1	4000V/20A (two 1000V/20A rectifier
C1/C2/C3/C4	100μF/450VDC
R1/R2/R3/R4	1MΩ/2W
MOV1/MOV2	S14K1000

Note: 1.For CLASS II application, no need to connect PE and no need to add the varistor (MOV1/MOV2);

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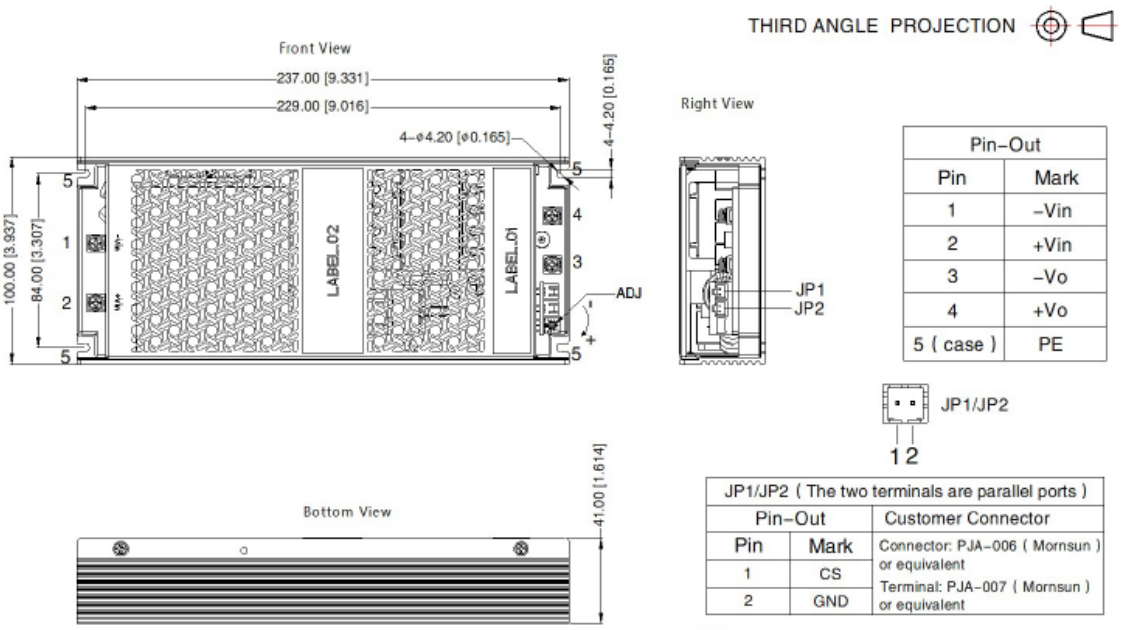
Dimensions and Recommended Layout

36PV500-29Bxx

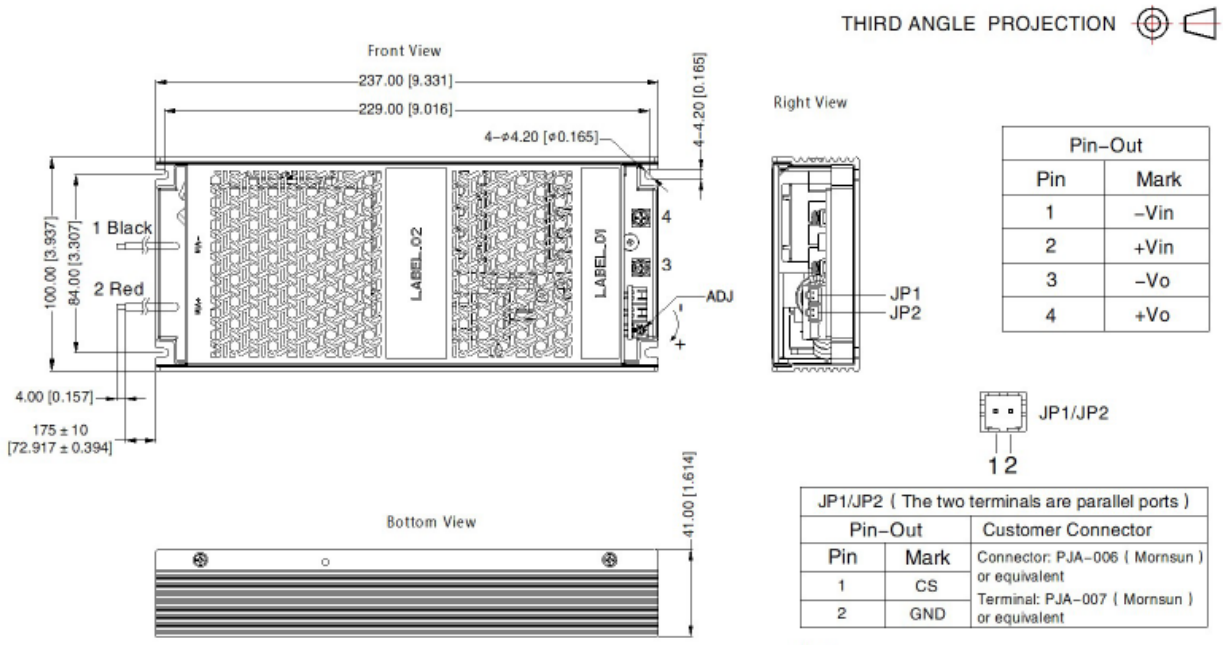


Pin-Out	
Pin	Mark
1	-Vin
2	+Vin
3	-Vo
4	+Vo
5 (case)	PE

JP1/JP2 (The two terminals are parallel ports)		
Pin-Out		Customer Connector
Pin	Mark	Connector: PJA-006 (Mornsun) or equivalent Terminal: PJA-007 (Mornsun) or equivalent
1	CS	
2	GND	

Note:
Terminal torque: M4, Max1.2N·m
JP1 spec.: XHS2.5-2A
Unit: mm[inch]
General tolerances: ± 1.00[± 0.039]

36PV500-29BxxW



Pin-Out	
Pin	Mark
1	-Vin
2	+Vin
3	-Vo
4	+Vo

JP1/JP2 (The two terminals are parallel ports)		
Pin-Out		Customer Connector
Pin	Mark	Connector: PJA-006 (Mornsun) or equivalent Terminal: PJA-007 (Mornsun) or equivalent
1	CS	
2	GND	

Note:
Terminal torque: M4, Max1.2N·m
JP1 spec.: XHS2.5-2A
1~2 wire spec.: UL3239 14AWG
Unit: mm[inch]
General tolerances: ± 1.00[± 0.039]

WARNING :

1. CAUTION: "To reduce the risk of fire, connect only to a circuit provided with 8 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.

Note:

1. For additional information on Product Packaging, please refer to www.idealpower.co.uk

   Packaging bag number: 58220326;
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's corporate standards.
4. We can provide product customisation 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 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 1500.

36PV500-29Bxx Series Parallel Redundancy and Current Sharing Application Notes

DC-DC

Parallel Operating

Redundancy

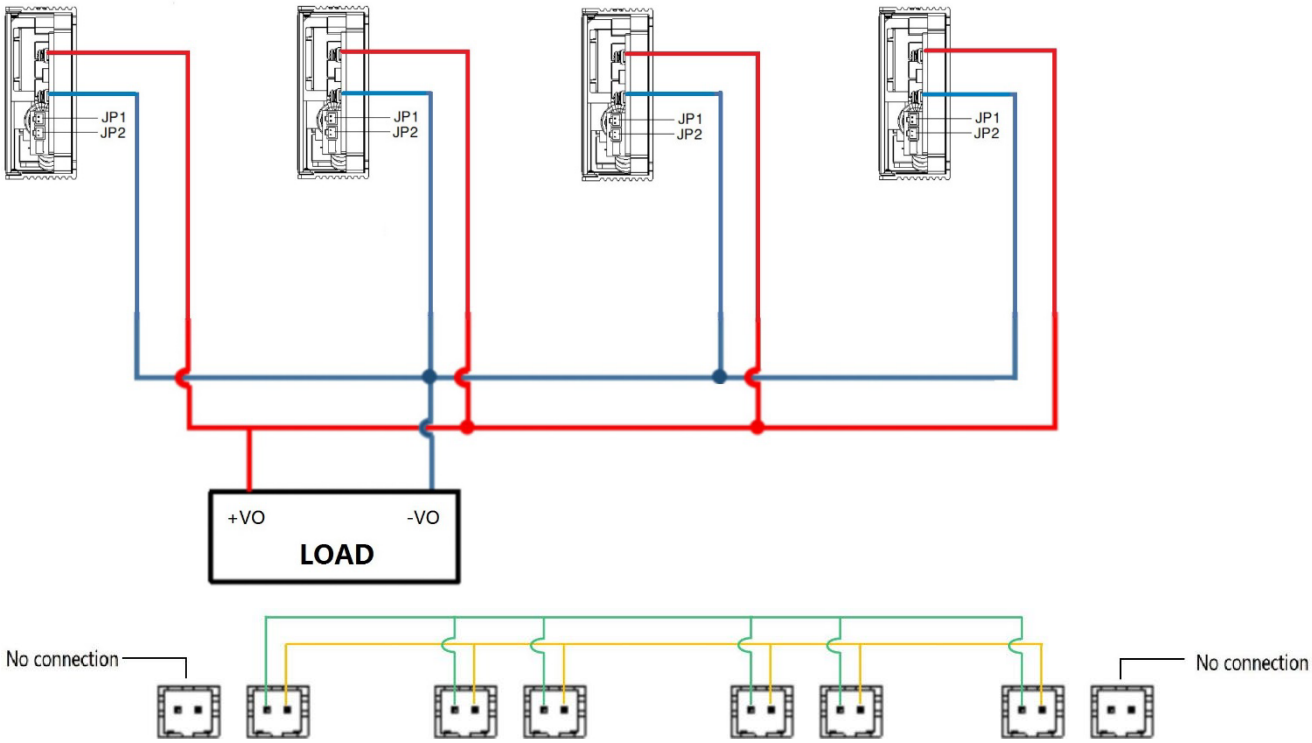
The output of the power module can be connected in parallel to achieve redundancy, thereby improving system reliability. The maximum power of the redundant system needs to be derated to ensure that the redundant system can still meet the rated load requirements when a power module fails. At present, the common practice is to build a redundant system using the N+1 method. That is, N+1 power supplies are connected in parallel. It supports the maximum load current N*Iomax, where Iomax is the rated output current of each power supply, for example, the rated output current of each power supply is 21A, and 3+1 are only connected in parallel to build a 3*21A=63A redundant system.

The power modules support 3+1 parallel redundant operation. When any power module in the parallel connection fails, other power modules can continue to work.

Note: When used in parallel, the maximum load current cannot exceed the maximum output current of a single power module at startup. Otherwise, the entire parallel power supply system will not be able to start and work normally. When any power supply in the parallel connection fails, its current-sharing connection terminal needs to be removed to prevent other power modules from being affected, resulting in a decrease in output voltage.

Current Sharing

Each power module has a current sharing connection terminal (JP1 and JP2). If the current sharing function is required, the current sharing terminals of all power modules must be connected when working in parallel. The wiring method of the current sharing function is shown in the figure below:



Note: The JP1 and JP2 ports of each power module have the same function, and there is no sequence.

The output voltage of each power module will affect the accuracy of current sharing. It is recommended that the output voltage of the power module be the rated voltage ±50mV. In practical applications, if the output voltage value needs to be adjusted, the output voltages of all

parallel-connected power modules need to be adjusted to the same voltage. The recommended voltage range is: target voltage value ±50mV.

After the output load of each power module is greater than 50% of the rated load, the current sharing accuracy is required to be ±5%. The formula for calculating the average current is:

$$\text{Current Sharing Accuracy} = \frac{Io\,\max - Io\,\min}{Io\,\max} * 100\%$$

Io max

Iomax: The maximum output current value of the power modules connected in parallel Iomin: The inimum output current value of the power modules connected in parallel

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