DESCRIPTIONS

500W, DC/DC Converter



RoHS

CE Report EN62109-1

UKCA Report BS EN62109-1

FEATURES

- Ultra-wide input voltage range of 300 - 1500VDC (Transient 1600VDC last for 10s)
- Transient power 650W last for 3s
- Industrial grade operating temperature -40℃ to +85℃
- High I/O isolation voltage up to 4000VAC
- Support 3+1 parallel redundancy, current sharing
- Fanless design
- Input under-voltage protection, input reverse polarity protection, over-temperature protection, output short circuit, over-current, over-voltage protection
- High efficiency, low ripple & noise
- Operating up to 5000m altitude
- Meets Class I (terminal), Class II (lead type)
- Design refer to CSA-C22.2 No.107.1, EN/IEC/BS EN62109

APPLICATIONS

- photovoltaic inverter
- energy storage systems
- industrial control

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.
		Steady	Transient (duration 3s)**				
--	DPV500-15B-12	350.4	450	12V/29.2A	10.8-13.2	90	6600
EN/BS EN	DPV500-15B-24	504	650	24V/21.0A	21.6-26.4	94	4400
--	DPV500-15B-28			28V/18.0A	25.5-30.5		4000
EN/BS EN	DPV500-15B-48			48V/10.5A	43.2-52.8		2200

Note:1.*Use suffix "W" for lead type version;
2.**12V transient power output needs to be≤12.24V; 24V transient power output needs to be≤24.48V; 28V transient power output needs to be≤28.56V; 48V transient power output needs to be≤48.96V.
3.The product picture is for reference only. For details, please refer to the actual product.

Specifications

Product Specifications	Item		Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	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, required			
	Hot Plug				Unavailable			
Output Specifications	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 disappear.		Constant current hiccup, continuous, self-recovery			
	Over-voltage Protection		12V		≤25V		Output voltage hiccup	
			24V		≤35V			
			28V		≤35V			
			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
General Specifications	Isolation	Input - output	Electric Strength Test for 1min.,leakage current < 5mA		4000	--	--	VAC
		Input - PE	Electric Strength Test for 1min.,leakage current < 10mA					
		Output - PE	Electric Strength Test for 1min.,leakage current < 5mA					
	Insulation Type				Primary and secondary meet reinforced insulation			
	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
	Output 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 Class			Class I (terminal), Class II (lead type)			
	MTBF	MIL-HDBK-217F@25℃		≥300,000 h			
Mechanical Specifications	Case Material	Metal					
	Dimensions	237.00 x 100.00 x 41.00mm					
	Weight	1180g (Typ.)					
	Cooling Method	Free air convection					

Note: *The " Tip and barrel method" is used for ripple and noise test, please refer to Converter Application Notes for specific information;
**Output voltage turn off, self-recovery after fault conditions is 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).

Electromagnetic Compatibility (EMC)

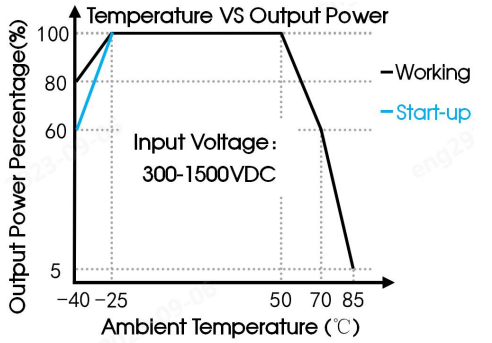
Electromagnetic Compatibility (EMC)	Emissions	CE	CISPR32/EN55032 CLASS A	
		RE	CISPR32/EN55032 CLASS A	
		EN61000-6-4		
	Immunity	ESD	IEC/EN61000-4-2 Contact ±6KV/Air ±8KV	Perf. Criteria A
		RS	IEC/EN61000-4-3 10V/m	Perf. Criteria A
		EFT	IEC/EN61000-4-4 ±4KV	Perf. Criteria A
		Surge	IEC/EN61000-4-5 Line to line ±1KV/line to PE ±2KV	Perf. Criteria A
			IEC/EN61000-4-5 Line to line ±2KV/ Line to PE ±4KV(See Fig. 2 for recommended circuit)	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		

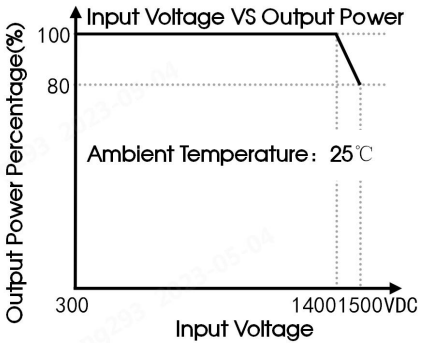
Note: PE connection is required for CLASS I (terminal) application; no PE connection is required for CLASS II (lead type) application.

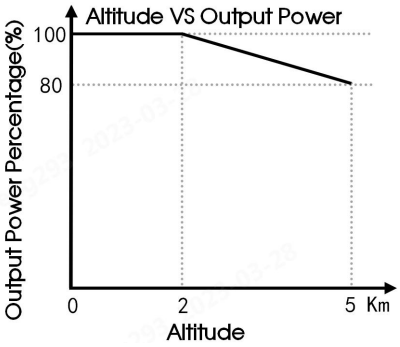
Functional Specifications

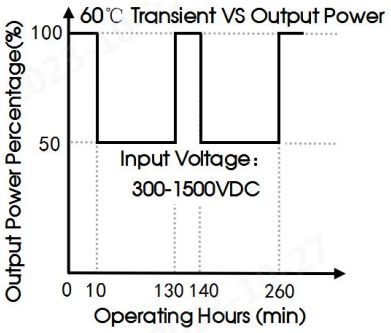
	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Functional Specifications	Current Sharing Accuracy (parallel)	Full input voltage range, when units in parallel, each power supply needs to carry a rated load of more than 50%		-5	--	+5	%
	Backflow Prevention	Applied voltage, product without damaging	12V	--	--	15	V
			24V	--	--	28	
			28V	--	--	32	
			48V	--	--	54	

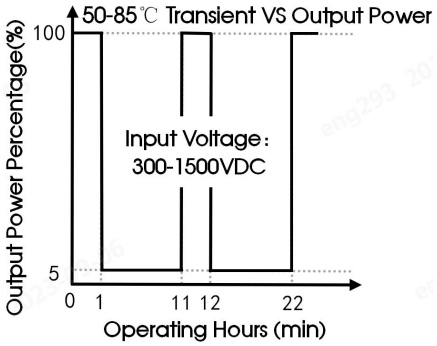
Product Characteristic Curve





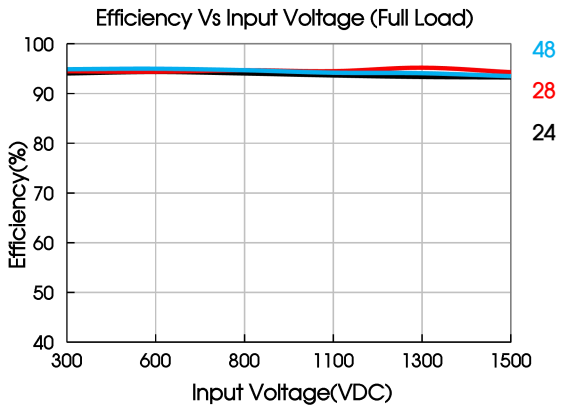


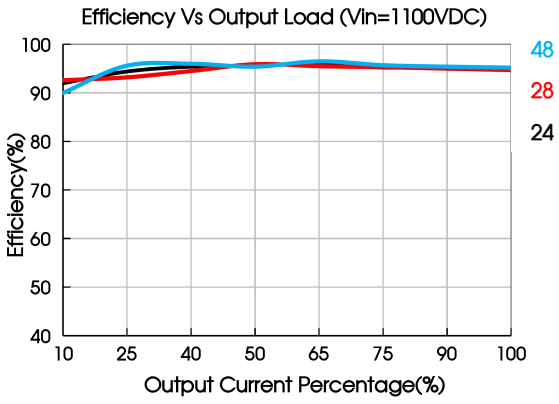




Note: 1.With an DC input between 1400-1500VDC, the output power must be derated as per temperature derating curves;

2.This product is suitable for applications using natural free air cooling.





Design Reference

1. Typical application

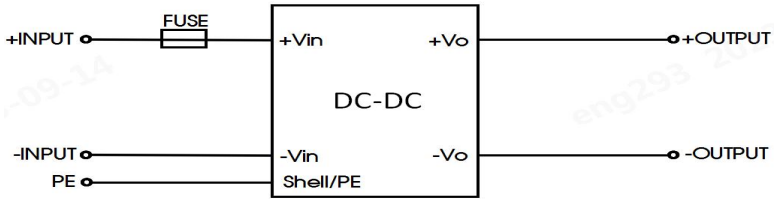


Fig. 1

Part No.	FUSE
DPV500-15B-xx	8A/1500VDC, required
Note: No PE connection is required for CLASS II application.	

2. EMC compliance recommended circuit

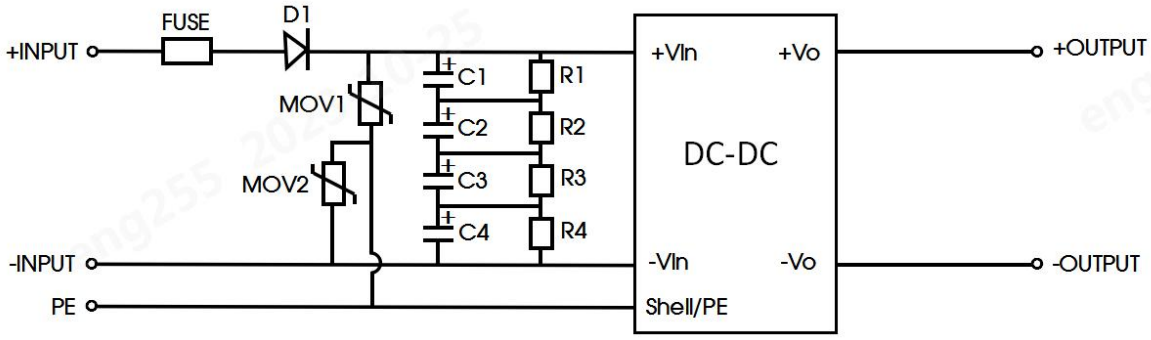


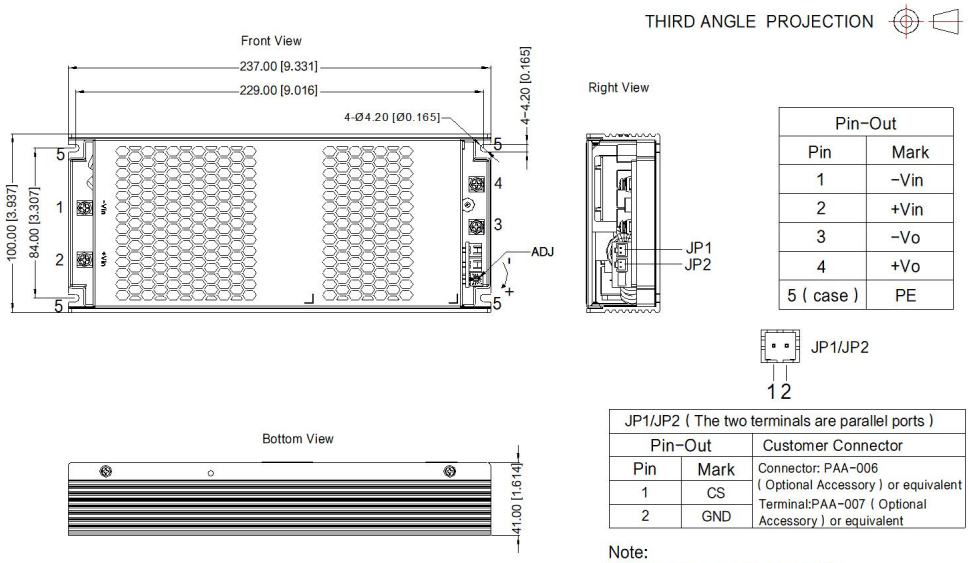
Fig. 2

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

3. 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 products in system applications.

DPV500-15B-xx Dimensions and Recommended Layout

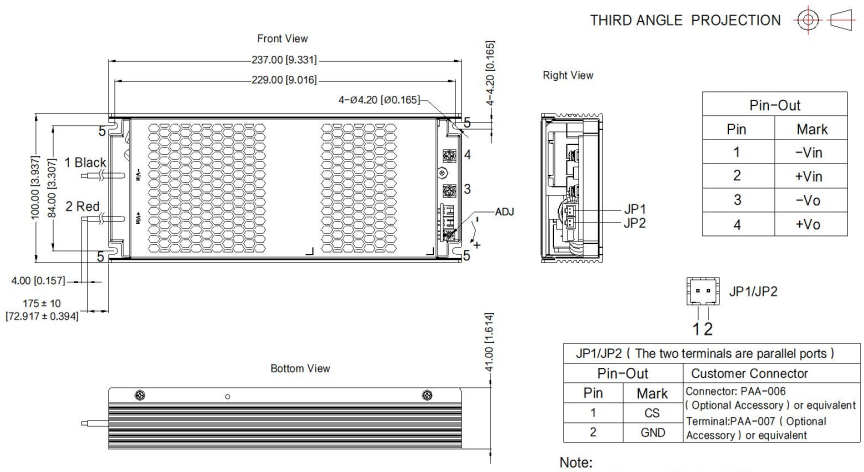


Pin-Out	
Pin	Mark
1	-Vin
2	+Vin
3	-Vo
4	+Vo
5 (case)	PE

JP1/JP2 (The two terminals are parallel ports)		
Pin-Out		Customer Connector
Pin	Mark	Connector: PAA-006 (Optional Accessory) or equivalent Terminal:PAA-007 (Optional Accessory) 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]

DPV500-15B-xx-W Dimensions and Recommended Layout



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: PAA-006 (Optional Accessory) or equivalent Terminal:PAA-007 (Optional Accessory) 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."

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.WARNING: REPLACE ONLY WITH THE SAME RATINGS AND TYPE OF FUSE.

2. AVERTISSEMENT : N'UTILISER QUE DES FUSIBLES DE MÊMECALIBRE ET DE MÊME TYPE QUE LE FUSIBLE DORIGINE.

3. DANGER – HIGH VOLTAGE.

3. DANGER : HAUTE TENSION.

4.CAUTION: RISK OF ELECTRIC SHOCK. DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE.

4.ATTENTION: RISQUES D'ÉLECTROCUTION. NE PAS RETIRER LE COUVERCLE. NE CONTIENT AUCUNE PIÈCE POUVANT ÊTRE RÉPARÉE PAR L'UTILISATEUR.

5.CAUTION: DISCONNECT ALL SOURCES OF SUPPLY BEFORE SERVICING.

5.ATTENTION: COUPER TOUTES LES SOURCES D'ALIMENTATION AVANT DE FAIRE L'ENTRETIEN ET LESL RÉPARATIONS.

6.CAUTION: RISK OF ELECTRIC SHOCK FROM STORED ENERGY. WAIT 5 MIN AFTER DISCONNECTING ALL SOURCES OF SUPPLY BEFORE ACCESSING.

6.ATTENTION:RISQUE D'ÉLECTROCUTION EN RAISON DE L'ÉLECTRICITÉ EMMAGASINÉE. ATTENDRE 5 MINUTES APRÈS AVOIR DÉBRANCHÉ TOUTES LES SOURCES D'ALIMENTATION AVANT D'Y ACCÉDER.

Note:

1. 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;
2. All index testing methods in this datasheet are based on our company corporate standards;
3. We can provide product customization service, please contact our technicians directly for specific information;
4. Products are related to laws and regulations: see "Features" and "EMC";
5. The output voltage can be adjusted by the ADJ, clockwise to increase;
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.
8. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.



DPV500-15B-xx Series Parallel Redundancy and Current Sharing Application Notes

Parallel Operating

1. Redundancy

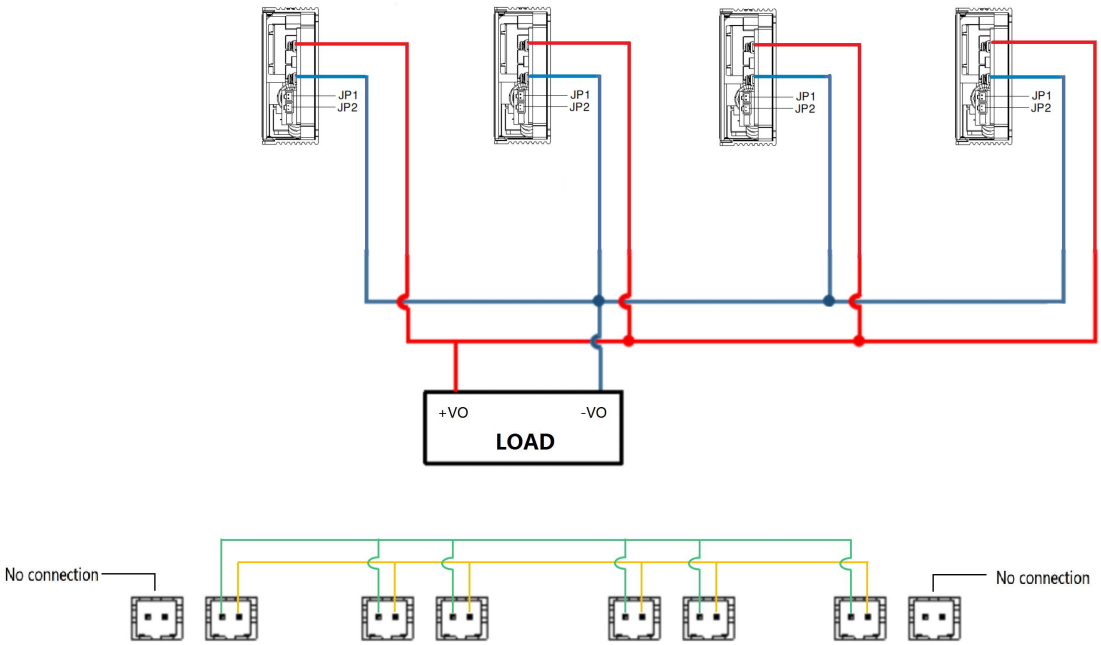
The output of the power module can be connected in parallel to achieve redundancy, thereby improving system reliability. The maximum power of the redundant system needs to be derated to ensure that the redundant system can still meet the rated load requirements when a power module fails. At present, 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 by it, resulting in a decrease in output voltage.

2. Current Sharing

The 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 together 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:

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

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

Iomin: The minimum output current value of the power modules connected in parallel