## DESCRIPTIONGS

3500W, DC-DC Converter



RoHS

3 Years Warranty

CE Report EN62477-1

UKCA Report BS EN62477-1

## FEATURES

- Ultra-wide input voltage range of 350 - 1000VDC(Transient 1100VDC last for 30s)
- Transient power 4500W last for 5s
- Industrial grade operating temperature -40℃ to +85℃
- High I/O isolation voltage up to 4000VAC
- Support 3+1 parallel redundancy, current sharing
- Fanless design
- High reliability, efficiency up to 96%
- Input under-voltage protection, input reverse polarity protection, over-temperature protection, output short circuit, over-current, over-voltage protection
- Operating up to 5000m altitude
- Design refer to UL1741, EN/IEC62109, EN62477

## APPLICATIONS

- Photovoltaic inverter
- Energy storage systems
- Charging pile
- Industrial control

## Selection Guide

| Certification | Part No. | Output Power | | Nominal Output Voltage and Current (Vo/Io) | Output Voltage Adjustable Range ADJ (V) | Efficiency at 550VDC (%) Typ. | Capacitive Load (μF) Max. |
|---|---|---|---|---|---|---|---|
| | | Steady | Transient (5s) | | | | |
| EN/BS EN | DPV3500-10B-24 | 3500W | 4500W | 24V/146A | 23.5-28.5 | 95 | 20000 |
| | DPV3500-10B-48 | | | 48V/73A | 47.0-57.0 | 96 | 10000 |
| Note: 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 (30s) | | -- | -- | 1100 | |
| | | | | | 350 | -- | 1000 | VDC |
| | Input Current | | 400VDC | | -- | -- | 12 | A |
| | | | 1000VDC | | -- | -- | 5 | |
| | Inrush Current | | 550VDC | Cold start | -- | -- | 100 | |
| | | | 1000VDC | | -- | -- | 200 | |
| | Input Under-voltage Protection | | Under-voltage protection start | | 300 | -- | 330 | VDC |
| | | | Under-voltage protection release | | 330 | -- | 350 | |
| | Input Reverse Polarity Protection | | | | Available | | | |
| | External Input Fuse | | | | 1500VDC/20A, required (brand: Holiland models: HC10LPV20U15) | | | |
| | Hot Plug | | | | Unavailable | | | |
| Output Specifications | Output Voltage Accuracy | | All load range | | -- | ±2 | -- | % |
| | Line Regulation | | Rated load | | -- | ±1 | -- | |
| | Load Regulation | | 550VDC | | -- | ±2 | -- | |
| | Ripple & Noise* | | 20MHz bandwidth (peak-to-peak value) | 24V | -- | -- | 300 | mV |
| | | | | 48V | -- | -- | 500 | |
| | Stand-by Power Consumption | | 1000VDC | | -- | 10 | 20 | W |
| | Temperature Coefficient | | | | -- | ±0.02 | -- | %/℃ |
| | Short Circuit Protection | | | | Constant current, continuous, self-recovery | | | |
| | Over-voltage Protection | | 24V | | ≤35V | Output voltage hiccup | | |
| | | | 48V | | ≤63V | | | |
| | Over-current Protection | | Full input voltage range | | 120% - 170% Io, constant current limit, output voltage turn off after 5s, self-recover | | | |
| | Over-temperature Protection** | | | | Output voltage turn off, self-recovery | | | |
| | Minimum Load | | | | 0 | -- | -- | % |
| | Start-up Delay Time*** | | | | -- | 1 | 3 | s |
| General Specifications | Isolation | Input - output | Electric Strength Test for 1min., leakage current < 10mA | | 4000 | -- | -- | VAC |
| | | Input - PE | | | | | | |
| | | Output - PE | | | | | | |
| | Insulation Type | | | | Primary and secondary meet reinforced insulation | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| General Specifications | 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℃ | | 2.66 | -- | -- | %/℃ |
| | | | | +50℃ to +85℃ | Without aluminum plate | 2.29 | -- | -- | |
| | | | | +60℃ to +70℃ | With aluminum plate | 3.00 | -- | -- | |
| | | | | +70℃ to +85℃ | | 3.34 | -- | -- | |
| | | | Input voltage derating | 350VDC-500VDC | | 0.15 | -- | -- | %/VDC |
| | | | | 600VDC-850VDC | | 0.06 | -- | -- | |
| | | | | 850VDC-1000VDC | | 0.10 | -- | -- | %/VDC |
| | | | Altitude derating | 3000m - 5000m | | 10 | -- | -- | %/Km |
| | MTBF | | MIL-HDBK-217F@25℃ | | | ≥300,000 h | | | |
| Mechanical Specifications | Case Material | | Metal | | | | | | |
| | Dimensions | | 292.00 x 225.00 x 58.00mm | | | | | | |
| | Weight | | 4475g (Typ.) | | | | | | |
| | Cooling Method | | Free air convection | | | | | | |

Note:*The "Tip and barrel method" and "parallel cable" method is used for ripple and noise test;

**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);

****In order to optimize the heat dissipation performance, when the aluminum plate is used for auxiliary heat dissipation, please note: 1. The size of the aluminum plate is 450mm × 450mm × 3mm; 2. The surface of the aluminum plate must be coated with thermal grease; 3. The product must be tightly attached to the aluminum plate.

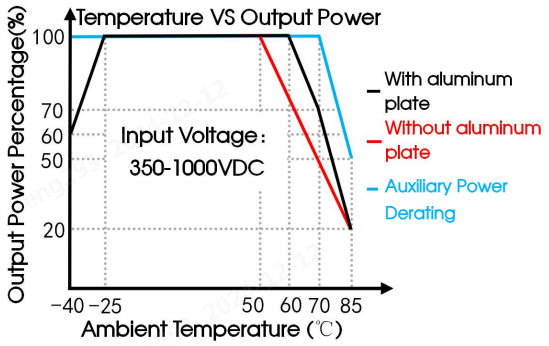
## Electromagnetic Compatibility (EMC)

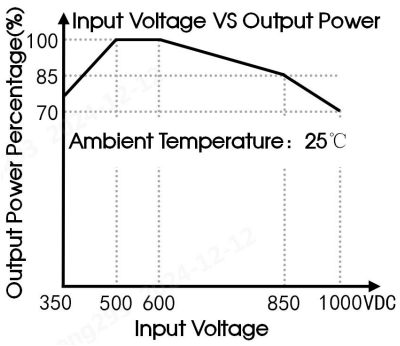
| | | | | | |
|---|---|---|---|---|---|
| Electromagnetic Compatibility (EMC) | Emissions | CE | CISPR32/EN55032 | CLASS A | |
| | | RE | CISPR32/EN55032 | CLASS A | |
| | | EN61000-6-4 | | | |
| | Immunity | ESD | IEC/EN61000-4-2 | Contact ±6KV/Air ±8KV | Perf. Criteria A |
| | | RS | IEC/EN61000-4-3 | 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 | | | |

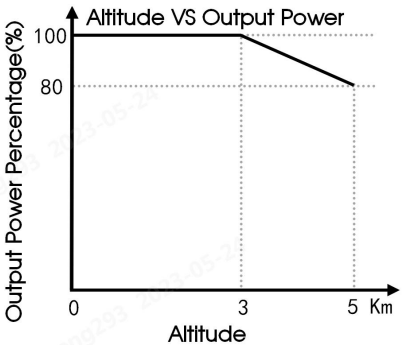
## Functional Specifications

| Product 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 | 24V | -- | -- | 30 | V |
| | | | 48V | -- | -- | 60 | |
| | Remote compensation | Total compensated voltage value when VS+ and VS- are short-circuited to output load 2 respectively | | -- | 200 | -- | mV |
| | External Enable Pin | External signal to PS_ON/OFF and AGND | | 1. Pulled high product no output 2. Disconnection or pulled low product normal output | | | / |
| | DC OK Signal | Sending TTL signal | Power on | 4.5 | -- | 5.5 | V |
| | | | Power off | -0.1 | -- | 0.5 | |
| | Auxiliary Power | 12V/0.5A | Voltage accuracy | ±10% (With short-circuit protection function) | | | |
| | | | Ripple | 150mVp-p (With short-circuit protection function) | | | |
| | | | Temperature | The derating rate of +70℃ to +85℃ is 3.33%/℃ (With short-circuit protection function) | | | |

## Product Characteristic Curve

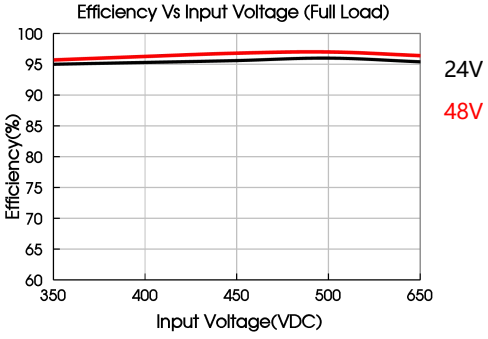


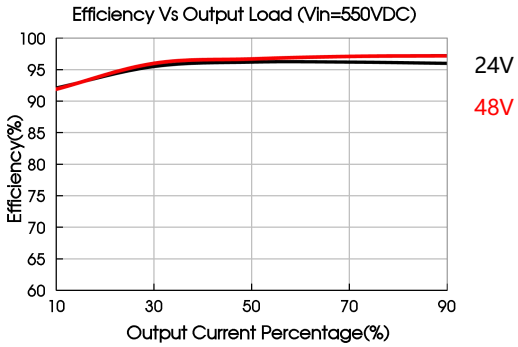




Note: 1. With an input between 350-500VDC/600-1000VDC, the output power must be derated as per temperature derating curves;

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



## Design Reference

1. Typical application

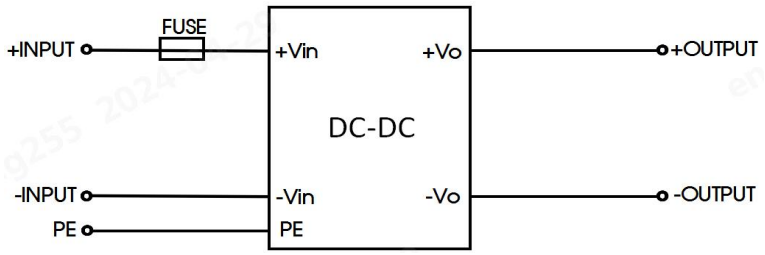



Fig. 1

| Part No. | FUSE |
|---|---|
| DPV3500-10B-xx | 1500VDC/20A, required |

2. EMC compliance recommended circuit

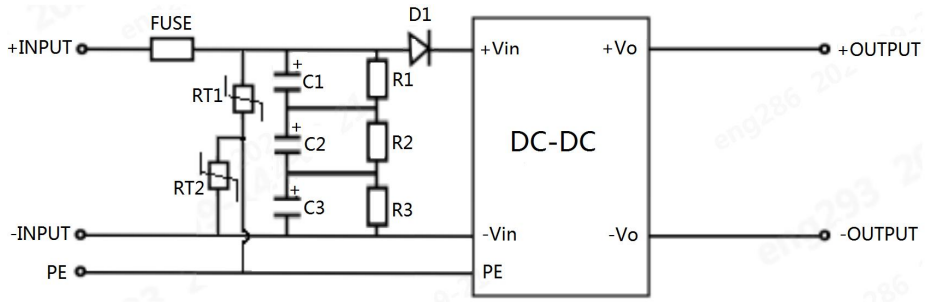


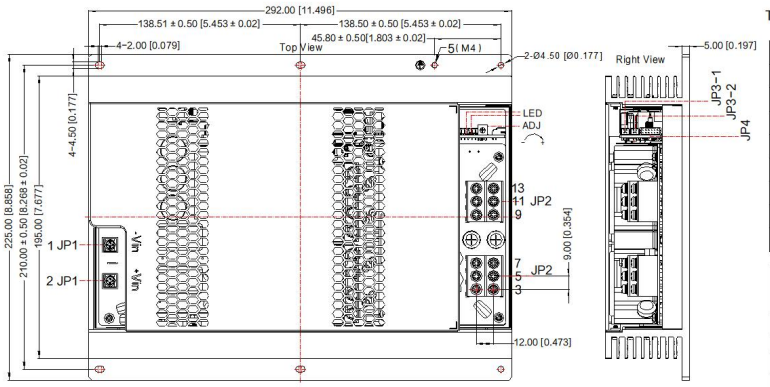

Fig. 2

| Model | Recommended value |
|---|---|
| FUSE | 1500VDC/20A, required |
| D1 | 4000V/150A (three 1000V/50A rectifier Bridges are connected in one group, and two groups are connected in series) |
| C1/C2/C3 | 560μF/450VDC |
| R1/R2/R3 | 1MΩ/2W |
| RT1/RT2 | 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.

## Dimensions and Recommended Layout



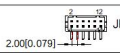

THIRD ANGLE PROJECTION

| Pin-Out | | | |
|---|---|---|---|
| Pin | Mark | Pin | Mark |
| 1 | −Vin | 8 | +Vo |
| 2 | +Vin | 9 | −Vo |
| 3 | +Vo | 10 | −Vo |
| 4 | +Vo | 11 | −Vo |
| 5 | +Vo | 12 | −Vo |
| 6 | +Vo | 13 | −Vo |
| 7 | +Vo | 14 | −Vo |




JP3 ( The two terminals are parallel ports )

| Pin-Out | | Customer Connector |
|---|---|---|
| Pin | Mark | Connector：TKP DH2-4P or HRS DF11-4DS-2C or equivalent<br>Terminal：TKP DHT or HRS DF11-22SC or equivalent |
| 1 | AGND | |
| 2 | Share | |
| 3 | VS+ | |
| 4 | VS− | |




JP4

| Pin-Out | | | | Customer Connector |
|---|---|---|---|---|
| Pin | Mark | Pin | Mark | A2006H-2x6P ( CHANGJIANG CONNECTORS ) or equivalent |
| 1 | AGND | 2 | PS_ON/OFF | |
| 3 | AGND | 4 | NC | |
| 5 | AGND | 6 | DC_OK | |
| 7 | NC | 8 | NC | |
| 9 | GND-AUX | 10 | +12V-AUX | |
| 11 | GND-AUX | 12 | +12V-AUX | |

Note:
JP1、JP2 tightening torque: M4, Max0.9N·m
JP1 Wire range: 16−12AWG
JP2 Wiring spec.:
Button-head: Ximenkan RNY 3.5−4,
Wire range: 10−6AWG
JP3 spec.: A2004WR−02A
JP4 spec.: CJT A2006WR−2x6P
Unit: mm[inch]
General tolerances: ± 1.00[ ± 0.039]

⚠WARNING:

AVERTISSEMENT:

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 1000VDC.



# DPV3500-10B-xx Series Parallel Redundancy, and Current Sharing and installation mode 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 146A, and 3+1 are only connected in parallel to build a 3*146A=438A redundant system.

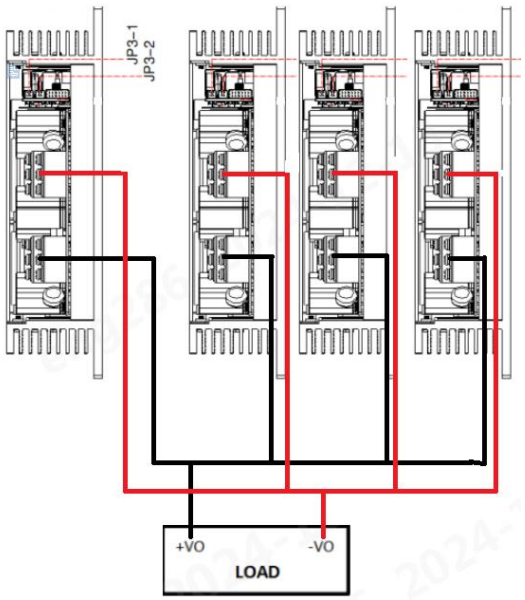
The power modules support 3+1 parallel redundant operation. When any power module in the parallel connection fails, other power modules can continue to work.

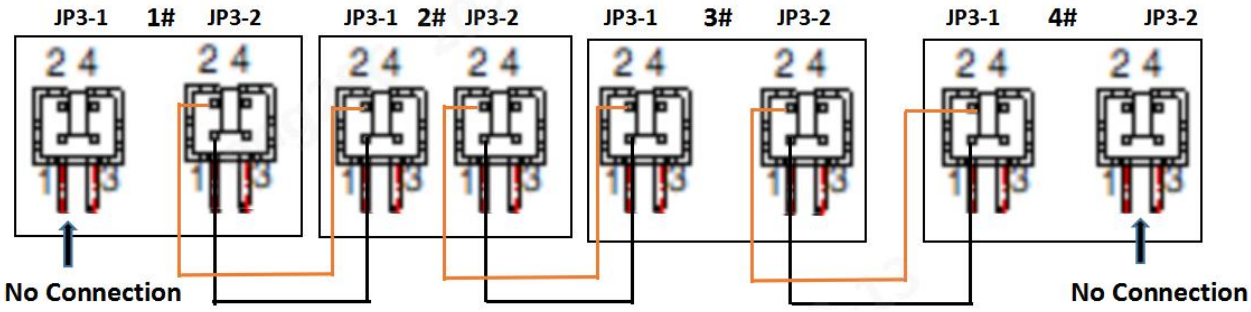
Note: When used in parallel, the maximum load current cannot exceed the maximum output current of a single power module at startup, otherwise the entire parallel power supply system will not be able to start and work normally. When any power supply in the parallel connection fails, its current-sharing 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 (JP3-1 and JP3-2). 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 JP3-1 and JP3-2 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:

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

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

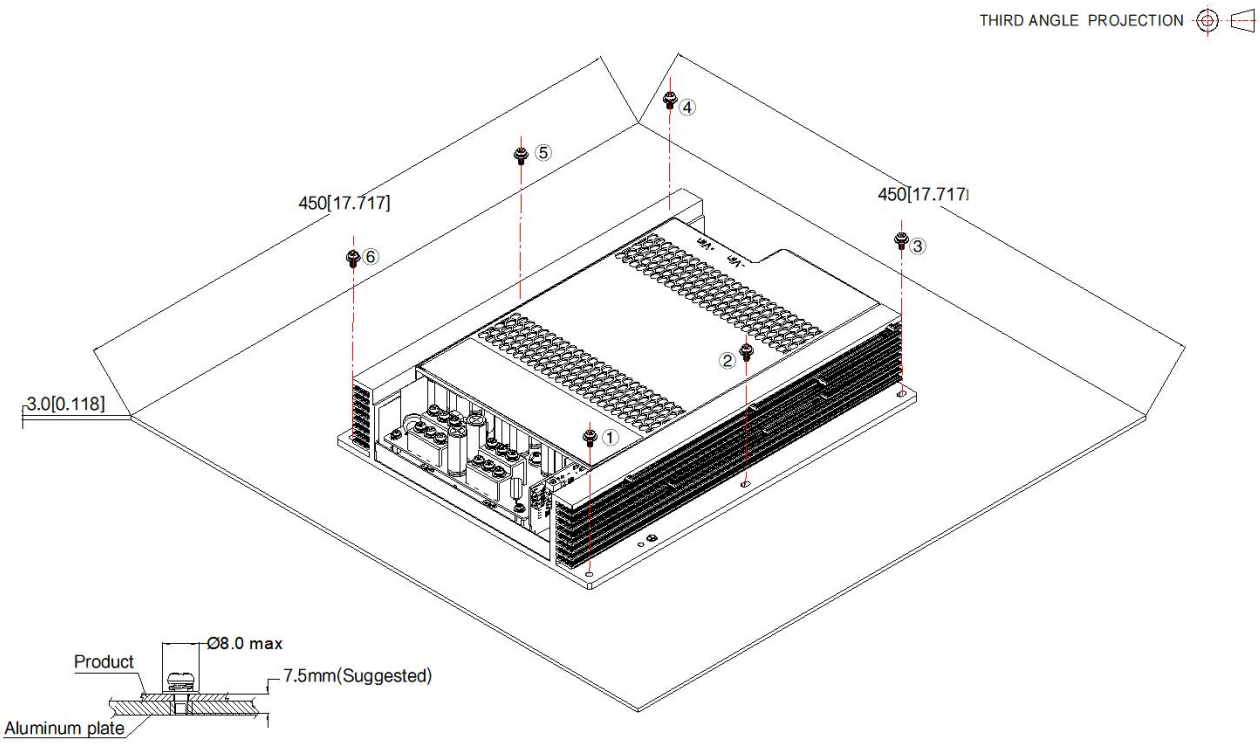
Iomin: The minimum output current value of the power modules connected in parallel

## Installation method

Add aluminum plates as follows

In order to comply with the "derating curve" and "static characteristic curve", the DPV3500-10B-xx series must be mounted on an aluminum plate (or a case of the same size), the size of the aluminum plate is 450mm*450mm*3mm, Installation is shown below:

Note: In order to optimize the heat dissipation performance, the surface of the aluminum plate must be smooth (or evenly coated with thermal grease), and the power module must be installed in the center of the aluminum plate.







| Position | Screw Spec. | L(Suggested) | Torque(max) |
|---|---|---|---|
| ① - ⑥ | M4 | 9MM | 0.9N · m |

Note: 1. In order to meet the "Derating Curve", the product testing must be installed onto an aluminum plate. The size of the suggested aluminum plate is shown as above. And for optimizing thermal performance, it is necessary to apply thermal grease on the bottom of the product.
2. It is suggested to install the product with M4 x 9 combination screws, and the product must be firmly installed at the center of the aluminum plate.