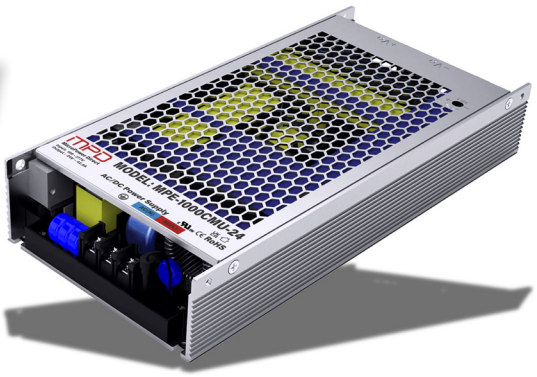
MPE-1000CMU

1000W, High Isolation AC/DC Power Supplies



Key Features:

- 1000W Output Power
- 85-305 VAC Input
- 4,000 VAC Isolation
- Efficiency to 96%
- -40°C to +85°C Temp
- Active PFC
- Meets EN 55032 B
- >300 kHour MBTF
- Reinforced Insulation

Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input

Parameter	Conditions		Min.	Typ.	Max.	Units
Input Voltage Range		AC Input	85		305	VAC
		DC Input	180		430	VDC
Input Frequency			47		63	Hz
Input Current		115 VAC		10.1		A
		230 VAC		5.3		
Inrush Current (Cold Start)		115 VAC		15		A
		230 VAC		35		
Power Factor	25°C, Full Load	115 VAC	0.99			--
		230 VAC	0.95			
Leakage Current	240 VAC	Contact leakage			0.75	mA

Output

Parameter	Conditions				Min.	Typ.	Max.	Units
Output Voltage Accuracy	Full Load					±1		%
Line Regulation	Rated Load					±0.5		%
Load Regulation	230 VAC					±0.5		%
Ripple & Noise (20 MHz)				12V Output			120	mV P - P
				24/36V Outputs			200	
				48V Output			240	
Hold-Up Time	25°C, full load, 115/230 VAC					15		ms
Temperature Coefficient						±0.03		%/°C
Temperature Derating	With Heat Sink or 23.5CFM Fan	110 VAC	12/24/ 36/48V	40 - 80°C	1.67			%/°C
		230 VAC	12V	45 - 85°C	2			
			24/36/ 48V	50 - 85°C	2.5			
	Without Heat Sink	110 VAC	12V	40 - 85°C	1			
			24/36/ 48V	40 - 85°C	1.167			
		230 VAC	12V	45 - 85°C	1.2			
			24/36/ 48V	50 - 85°C	1.75			
Input Voltage Derating	85 - 180 VAC				0.33			%/VAC
Over Temperature Protection	Full Load	Protection Start			55			°C
		Protection Release			50			
Over Current Protection	Room temperature				>110%Io, constant current protection, turn off after 3s, recover			
Short Circuit Protection	Constant Current Limit				Turn off output after 3s delay, recover after restart			

General

Parameter	Conditions		Min.	Typ.	Max.	Units
Isolation Voltage	See Note 3	Input - Output	4000			VAC
		Input - Ground	2000			
		Output - Ground	1750			
Isolation Resistance	See Note 7		100			MΩ

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40		+85	°C
Storage Temperature Range		-40		+85	°C
Coling Method		Free Air Convection			
Operating Humidity	Non-Condensing	20		90	%RH
Storage Humidity		10		95	

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	300			kHours
Safety Standards	See Model Selection Guide				
Safety Class	Class I				

MicroPower Direct
46 Eastman Street
Unit 1
Easton, MA 02375
USA

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E: sales@micropowerdirect.com
W: www.micropowerdirect.com

MICROPOWER DIRECT

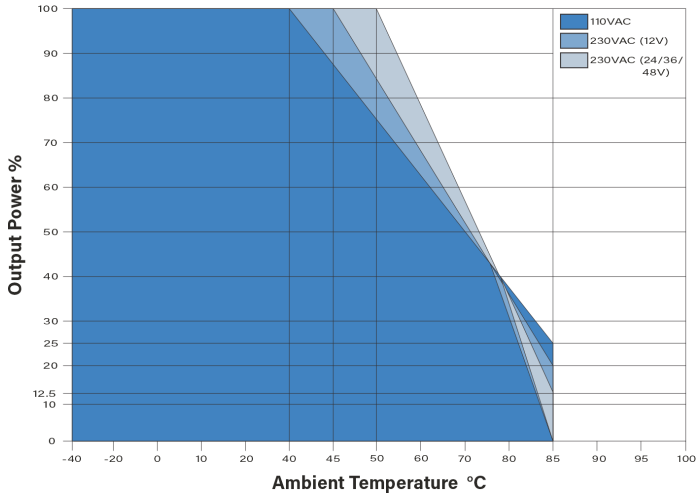
Model Selection Guide

UL	Model Number	Input		Output				Over Voltage Protection (VDC)	Output Capacitive Load (μF Max)	Efficiency (%, Typ)
		Current (A)		Voltage (VDC)	Adjustable Output Voltage Range (VDC)	Current (A, Max)	Power (W)			
		115 VAC	230 VAC							
	MPE-1000CMU-12	10.1	5.3	12	12 - 14.4	80	960	14.5 - 16.5	40000	94
	MPE-1000CMU-24	10.1	5.3	24	24 - 28.8	42	1008	29 - 33	20000	95
	MPE-1000CMU-36	10.1	5.3	36	36 - 43.2	28	1008	43.5 - 49	16000	95.5
▪	MPE-1000CMU-48	10.1	5.3	48	48 - 57.6	21	1008	59 - 66	12000	96
	* MPE-1000CMU-48 has UL/cUL 62368 recognition (UL certificate). Contact factory for safety standard status of other models.									

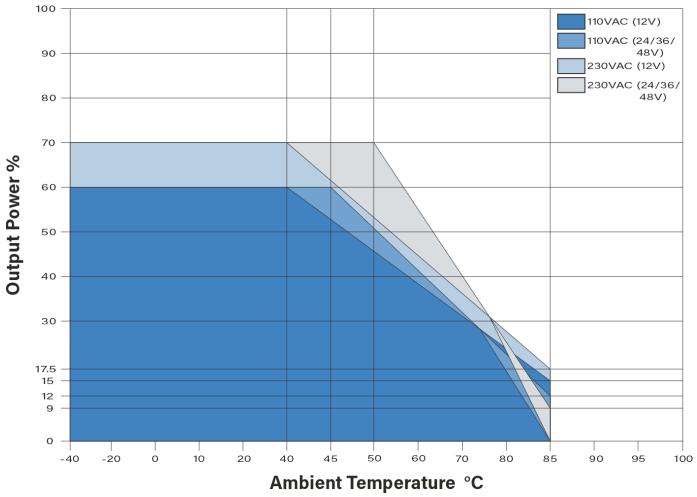
Notes:

1. The "tip and barrel method" is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 0.1uF ceramic capacitor.
2. EMC performance indicators are on page 4.
3. Input-output isolation is tested for 60 seconds with a leakage current of <5 mA.
4. A temperature derating of 5°C/1000m is required for operating altitude greater than 2000m.
5. The output voltage can be adjusted by the ADJ knob. Turn clockwise to increase and counterclockwise to decrease.
6. At light load an audible noise is generated in order to improve efficiency. This does not affect performance or reliability.
7. Isolation resistance is given for input - output, input - ground and output - ground. It is tested at 500VDC, ambient temperature 25±5°C, 95%RH non-condensing humidity.

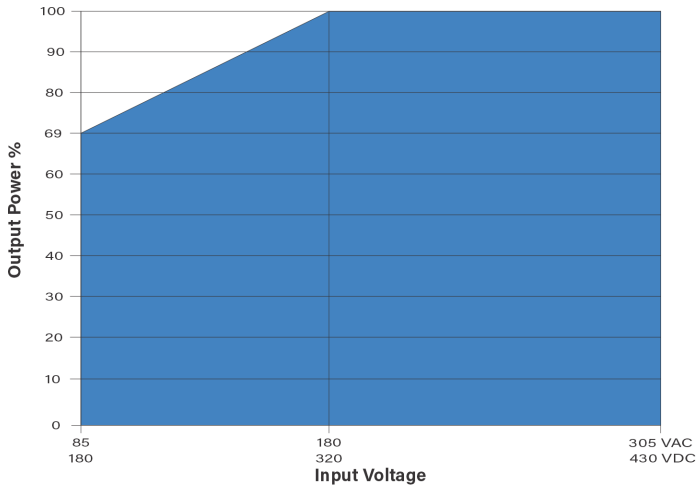
Temperature Derating with Heat Sink or 23.5 CFM



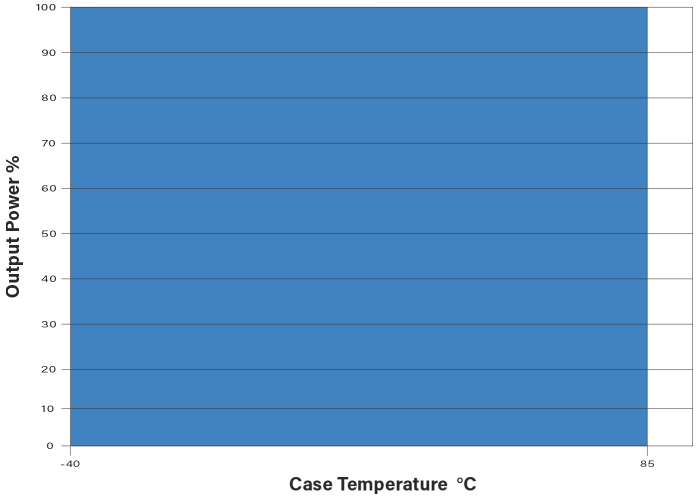
Temperature Derating: No Heat Sink



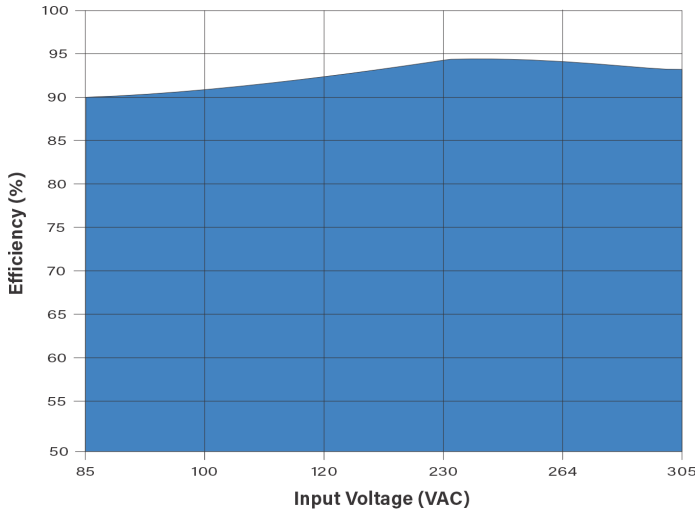
Input Voltage Derating (+25°C)



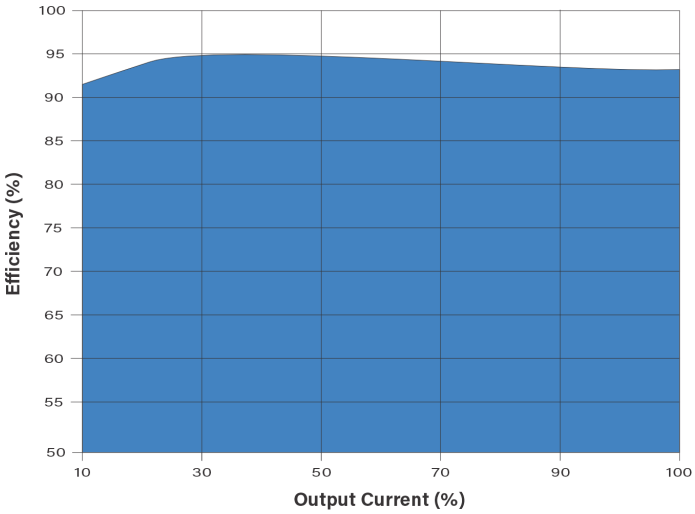
Case Temperature Derating



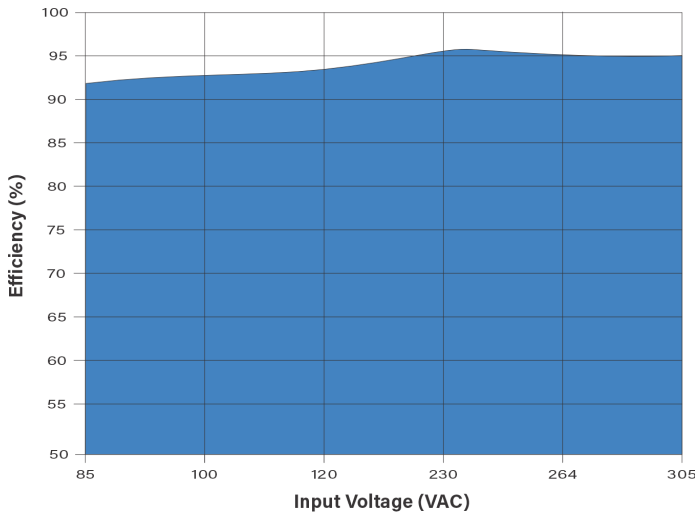
Efficiency vs Input Voltage: 12V (Full Load)



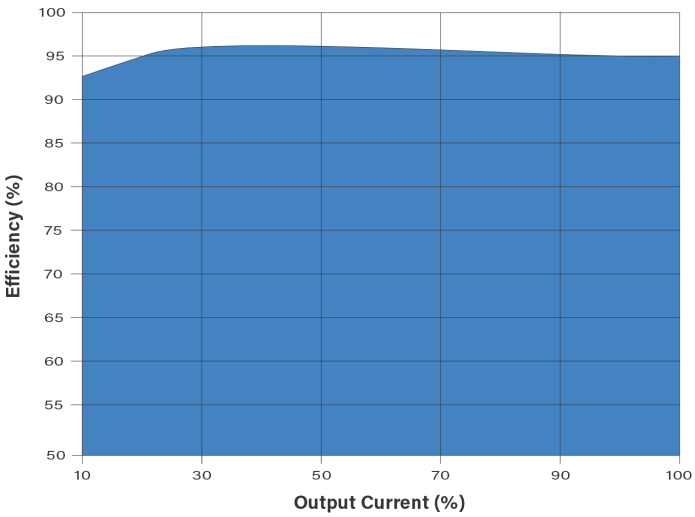
Efficiency vs Output Load: 12V (230VAC)



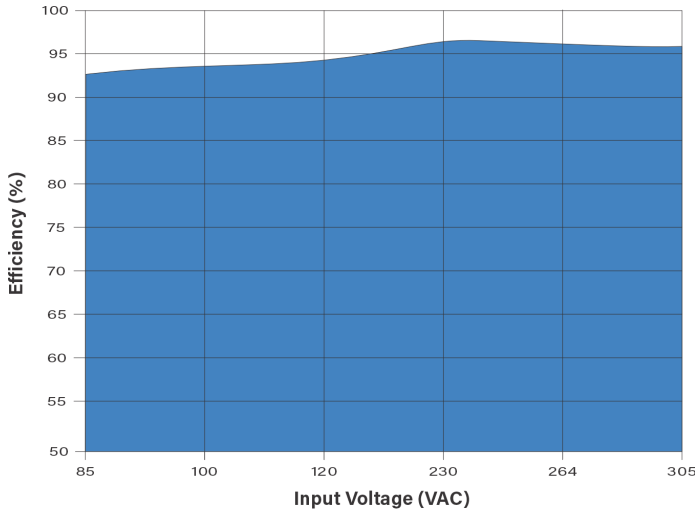
Efficiency vs Input Voltage: 24V (Full Load)



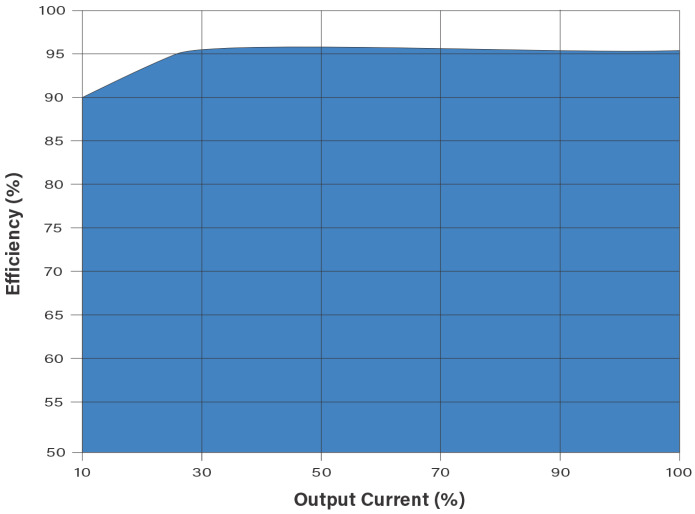
Efficiency vs Output Load: 24V (230VAC)



Efficiency vs Input Voltage: 48V (Full Load)



Efficiency vs Output Load: 48V (230VAC)



EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions (RE)	CISPR32/EN55032		B
Conducted Emissions (CE)	CISPR32/EN55032		B
Harmonic Current	IEC/EN61000-3-2		A
Voltage Flicker	IEC/EN61000-3-3		
ESD	IEC/EN61000-4-2	A	Contact ±8KV/Air ±15KV
RS	IEC/EN61000-4-3	A	10V/m
EFT	IEC/EN61000-4-4	A	±2KV
Surge	IEC/EN61000-4-5	A	line to line ±2KV/line to ground ±4KV
CS	IEC/EN61000-4-6	A	10 Vr.m.s
PFMF	IEC/EN61000-4-8	A	30A/m
Voltage Dips, Short, Interruption	IEC/EN61000-4-11	B	95% drip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods

Function Specifications

Function	Conditions		Min.	Typ.	Max.	Units
Output Voltage Regulation			Output voltage adjustable to 50-120% of rated voltage			
Output Current Regulation			Output current adjustable to 20-100% of rated current			
Remote Control Switch	Power on: short circuit		0		0.5	V
	Power off: open circuit		2		5	
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)			
		Ripple	150mV P-P (with short circuit protection)			
Note: The auxiliary power supply needs to be derated when operating at 70°C to 85°C.						

MPD has a very wide range of high performance AC/DC power supplies ranging from 600W UChannel units to 1W units in miniature Single-In-Line (SIP) packages. All are designed and certified to international safety and EMC/EMI standards.
We have AC/DC supplies approved for use in medical equipment, DIN rail supplies, "Green" energy supplies and constant power supplies.
We also offer a wide variety of DC/DC converters, POL regulators and IGBT drivers. All products are available with short lead times. Call today for complete information or product samples. Or go to our website:

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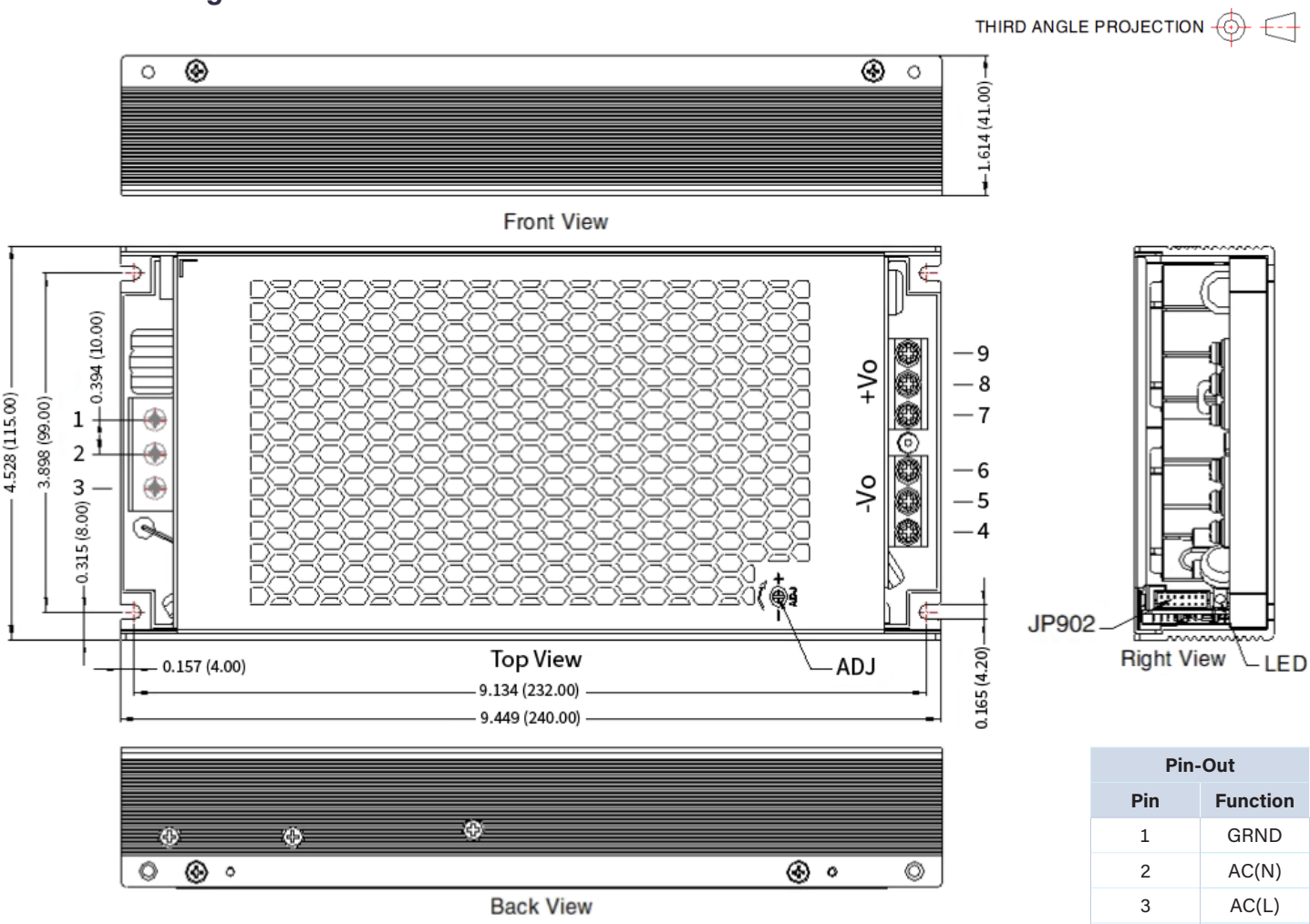
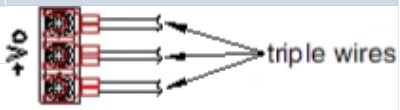
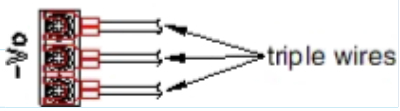
Mechanical Diagrams

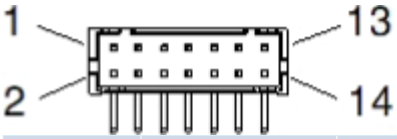


Pin-Out	
Pin	**Function**
1	GRND
2	AC(N)
3	AC(L)
4	-Vo
5	-Vo
6	-Vo
7	+Vo
8	+Vo
9	+Vo

Notes:
- All dimensions are typical in inches (mm)
- ADJ: Output voltage adjustable
- LED: Output status indicator LED
- General tolerances: ±0.039 (±1.00)

Weight:
- 57.32 oz (1625g)

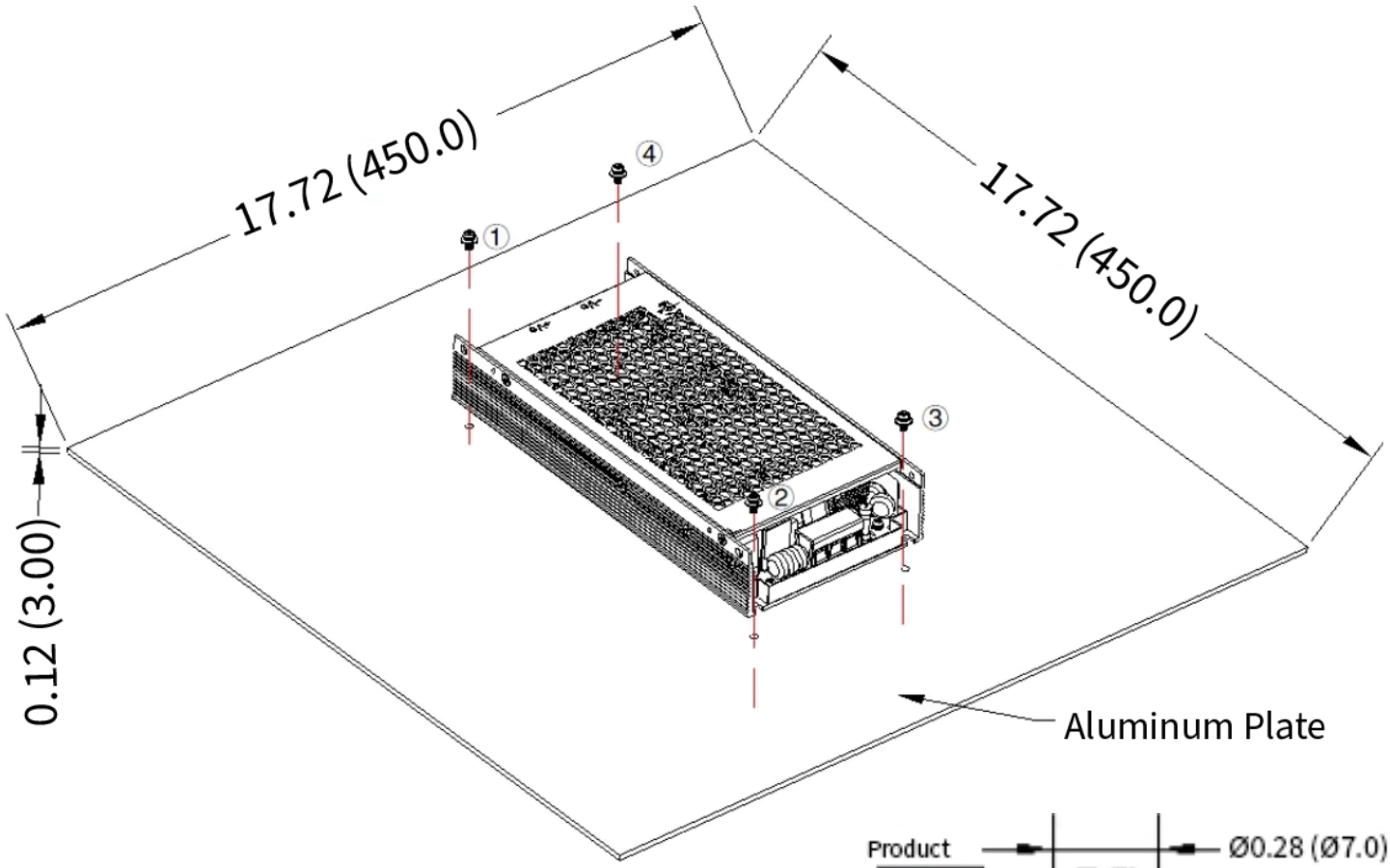
Connector Wires Range			
Model	**Input Connector**	**Output Connector**	**Output Connector (Double Wires)**
12V	14AWG	12AWG	
24V		14-12AWG	
36/48V		16-12AWG	
Screw/Torque	M4.0, Max 0.9N · m	M4.5, Max 0.9N · m	

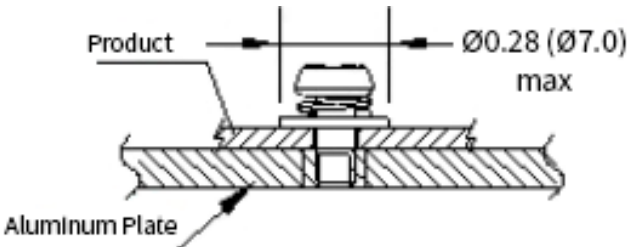


JP902

Pin	Function	Product Connector	Customer Connector
1, 3	PV	JST S14B-PHDSS or equivalent	JST B14B-PHDSS or equivalent
2	PV-DIS		
4, 8, 10, 12	GND signal		
5	+12V AUX		
6	GND AUX		
7	Remote ON/OFF		
9	DC OK		
11	PC		
13	Vccs		
14	PC-DIS		

Installation Diagram





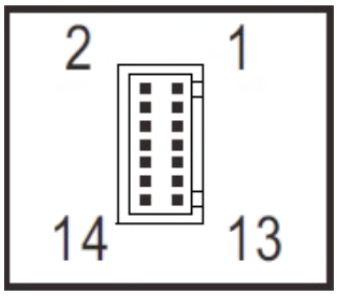
Position	Screw Spec	Torque (max)
1 - 4	M3	0.4N · m

Notes:

1. In order to meet the derating curve, the product must be installed onto an aluminum plate heat sink. The size of the suggested aluminum plate is shown above. To optimize thermal performance, it is necessary to apply thermal grease on the bottom of the product.
2. It is suggested to install the produxt with M3 combination screws, and the product must be firmly installed at the center of the aluminum plate.

Client Terminal (JP902)

Pin	Function	Description
1, 3	PV	Output voltage adjustable pin
2	PV-DIS	If the output voltage programming function is not active, please short PV (pin 1) and PV-DIS (pin 2).
4, 8, 10, 12	GND (Signal)	Negative output voltage signal.
5	+12V-AUX	The auxiliary output voltage to GND-AUX (pin 6) is 10.8-13.2V, and the maximum load current is 0.5A. This output is not controlled by the remote ON/OFF signal.
6	GND-AUX	Auxiliary output voltage GND, this signal loop is isolated from the main output (+V & -V).
7	Remote ON/OFF	The output can be turned on/off by electrical signal or dry contact between remote on/off. Short circuit (0-0.5V): power on Open circuit (2-5V): power off The maximum output voltage is 5.5V.
9	DC OK	Low level signal (-0.1-0.5V): When the output voltage is ≤80%±5% High level signal (4.5-5-5V): When the output voltage is ≥80%±5% The maximum sink current is 10mA.
11	PC	Constant current value adjustable pin.
13	Vccs	Positive output voltage signal.
14	PC-DIS	If the output current programming function is not active, please short Vccs (pin 13) and PC-DIS (pin 14).



MPE-1000CMU Application Notes

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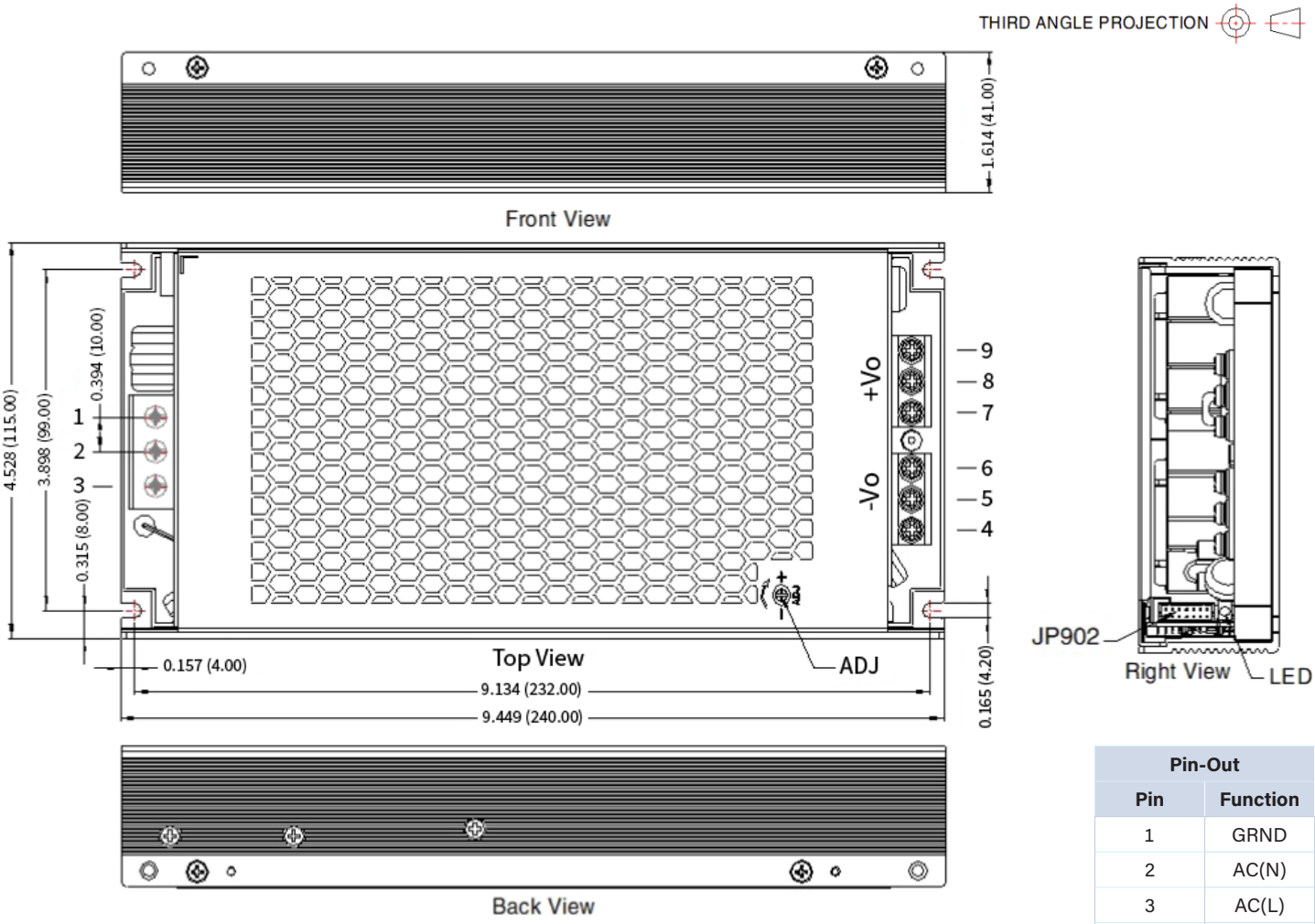
1. Overview

1.1 Dimensions



Pin-Out	
Pin	**Function**
1	GRND
2	AC(N)
3	AC(L)
4	-Vo
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7	+Vo
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9	+Vo

Notes:
- All dimensions are typical in inches (mm)
- ADJ: Output voltage adjustable
- LED: Output status indicator LED
- General tolerances: ±0.039 (±1.00)

Weight:
- 57.32 oz (1625g)

Connector Wires Range			
Model	**Input Connector**	**Output Connector**	**Output Connector (Double Wires)**
12V	14AWG	12AWG	+Vo triple wires
24V		14-12AWG	
36/48V		16-12AWG	-Vo triple wires
Screw/Torque	M4.0, Max 0.9N · m	M4.5, Max 0.9N · m	

2. Function Manual

2.1 Input Requirements

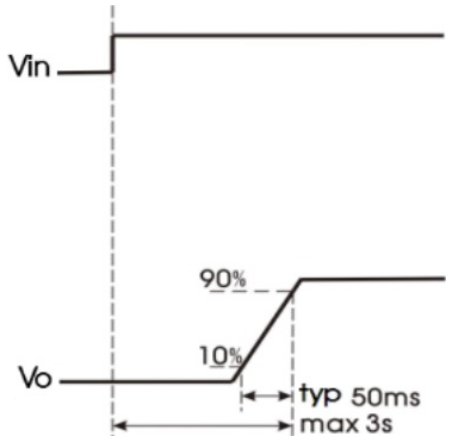
The AC input voltage and DC input voltage must be within the defined voltage range, otherwise the power supply may not work properly or malfunction.

2.2 Output Requirements

Main Output
At any voltage value, the maximum output current and power must not exceed the rated/specified value. The output current must not exceed the maximum output current value.
Auxiliary Output
The auxiliary circuit supports a maximum current of 0.5A.

2.3 Startup Timing

Main Output
At any voltage value, the maximum output current and power must not exceed the rated/specified value. The output current must not exceed the maximum output current value.
Auxiliary Output
The auxiliary circuit supports a maximum current of 0.5A.

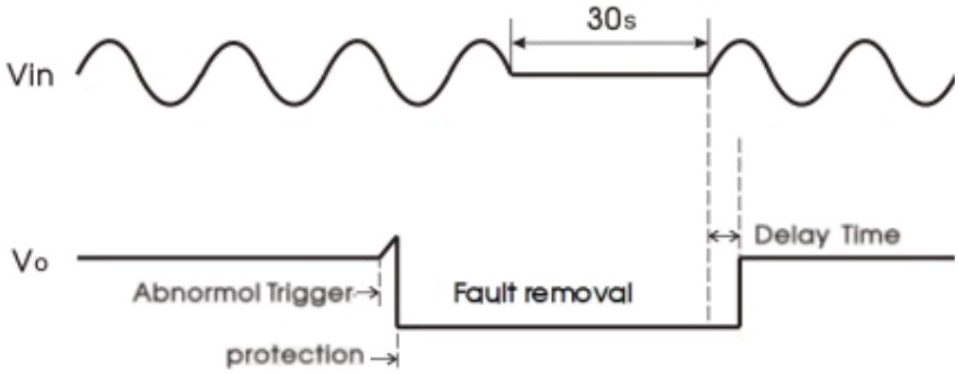


Item	Operating Conditions		Min.	Typ.	Max.	Unit
Power Off Hold Time	Room Temperature, Full Load	115VAC		15		ms
		230VAC		15		
Start Delay Time	230VAC, Full Load				3	s

2.4 Output Over Voltage Protection (OVP)

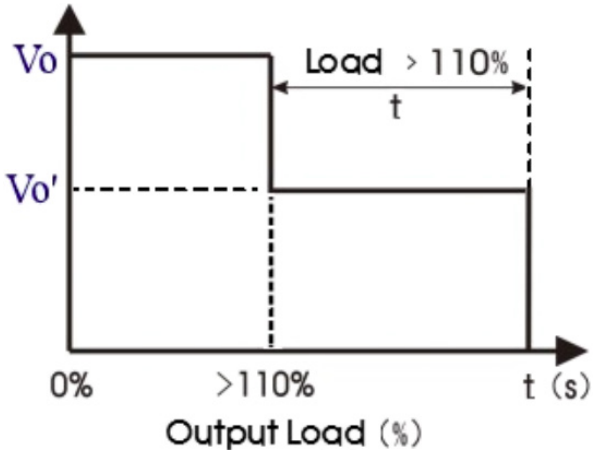
Main Output

The over voltage protection function is to close the main output when the output voltage reaches the protection voltage range. When the main circuit over voltage protection occurs, the main circuit output voltage of the module will be shut off, and the auxiliary circuit output will not be affected. The main circuit output can be restored after disconnecting the input power for at least 30 seconds.



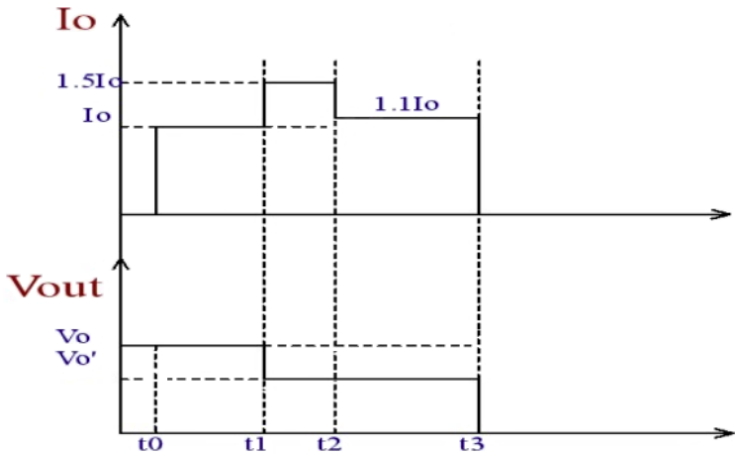
2.5 Output Over Current Protection (OCP), Peak Power

Over Current (OCP)



When the main outputcurrent exceeds 110% (min.) of the rated current, the output is closed after the constant current output is 3s (typ.), recover after restart, does not affect the output voltage of the auxiliary circuit.

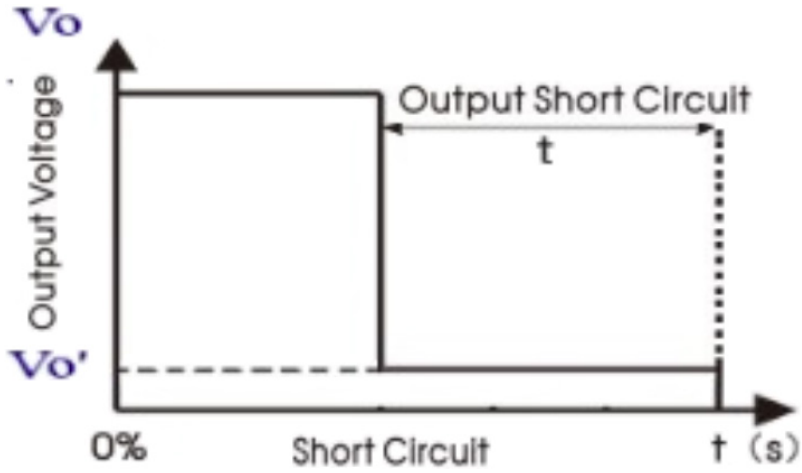
Peak Power:



t0--t1 time: output current nominal Io, output voltage nominal Vo.
t1--t2 time: output current Io' is 150%Io, output voltage Vo' < Vo, maintenance time is 10ms.
t2--t3 time: 110% Io constant current output 3s (typ.) after the output is turned off, recover after restart.

2.6 Output Short Circuit Protection (SCP)

When the main circuit output is short-circuited, turn off output after delay 3s, recover after restart.



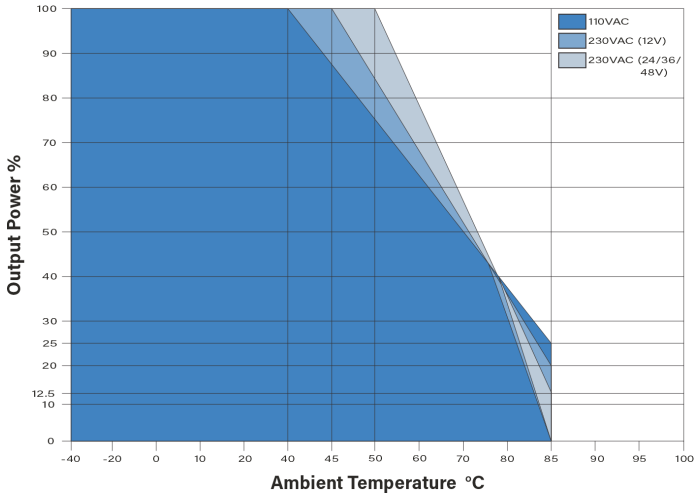
2.7 Over Temperature Protection (OTP)

When the ambient temperature of the power supply exceeds 55°C for a period of time at full load operation, the power supply will be shut down and the power supply will return to normal operation after the ambient temperature is reduced to 50°C.

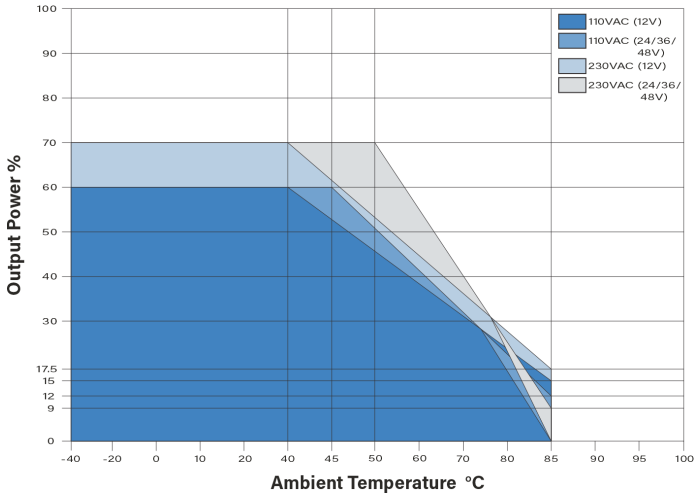
2.8 Output Power Derating

When the input voltage is greater than 180VAC (or 320VDC), derate according to the temperature derating curves. When the input voltage is lower than 180VAC (or 320VDC), the output power will be derated according to the following input voltage derating curve after temperature derating:

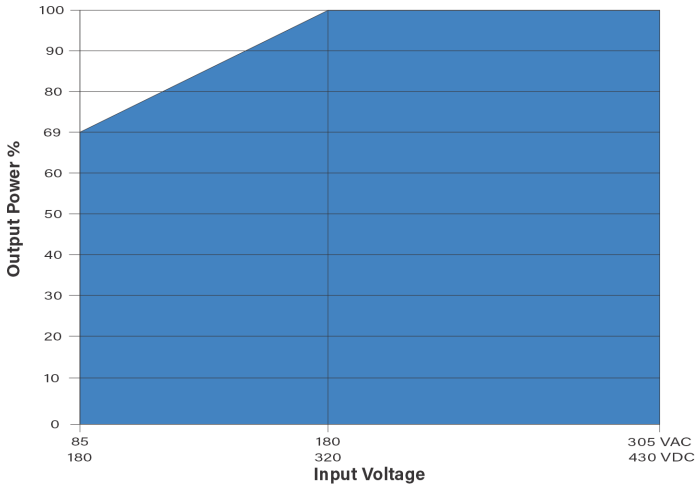
Temperature Derating with Heat Sink or 23.5 CFM



Temperature Derating: No Heat Sink

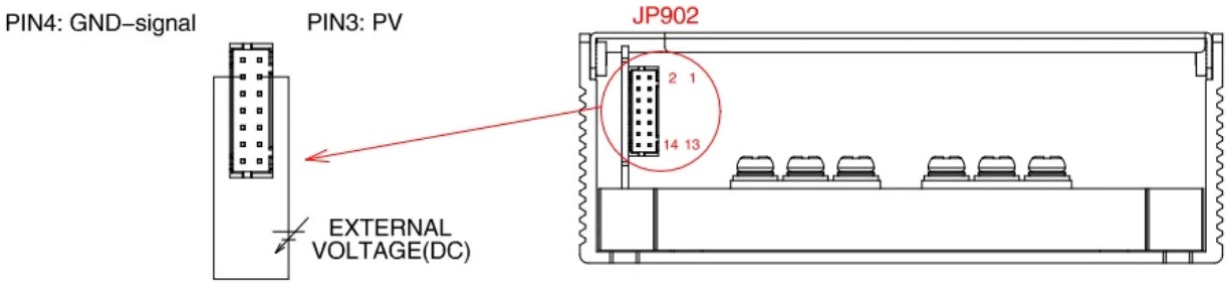


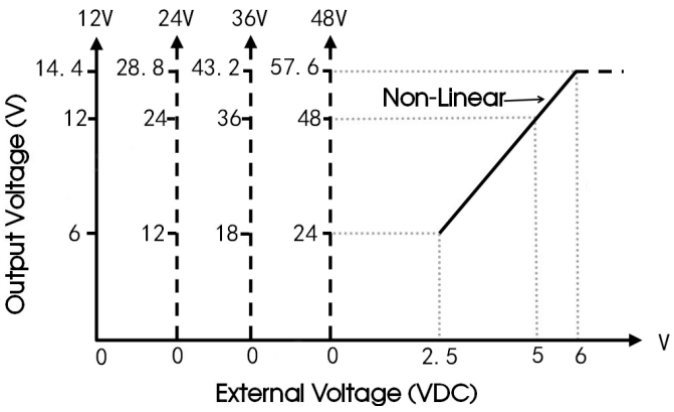
Input Voltage Derating (+25°C)

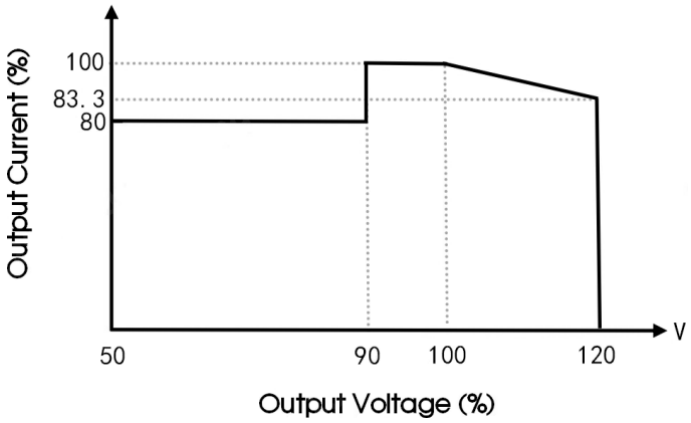


2.9 Adjustable Output Voltage

Adjustable output voltage (or PV / remote voltage adjustment / remote adjustment / margin adjustment / dynamic voltage adjustment)
Note: In addition to adjustment by internal potentiometer, the output voltage can also be adjusted by external voltage.



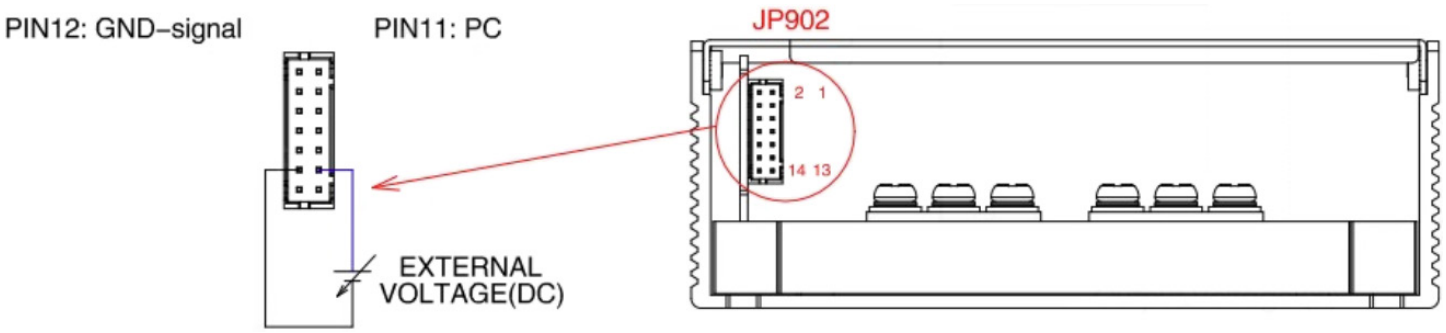


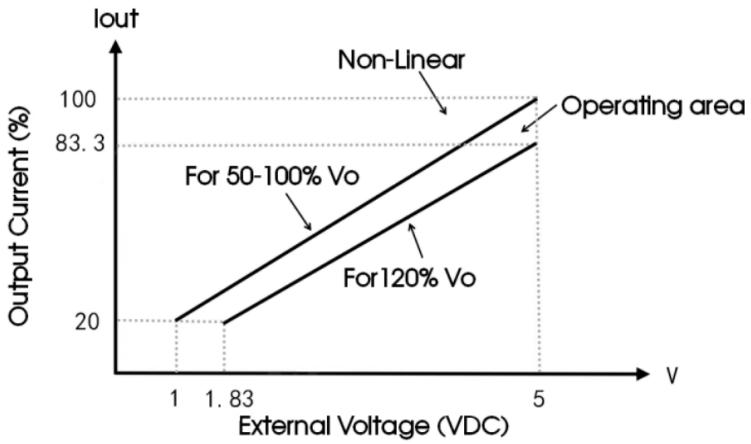


Notes:
1. By factory default, the output voltage adjustment function is not activated, and PV (pin 1) and PV-DIS (pin 2) are shorted. When this function is not required, keep the PV (pin 1) and PV-DIS (pin 2) ahort circuited. Otherwise, the power supply will have no output.
2. Keep PV (pin 1) and PV-DIS (pin 2) open when this function is required.

2.10 Constant Current Value Adjustment

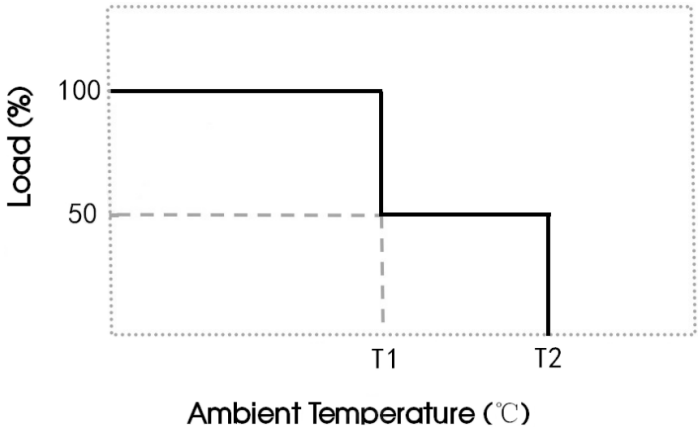
Constant current value adjustment (or PC / remote current adjustment / dynamic current adjustment)
Note: The outptu current can be adjusted to 20-110% of the rated current by external voltage.





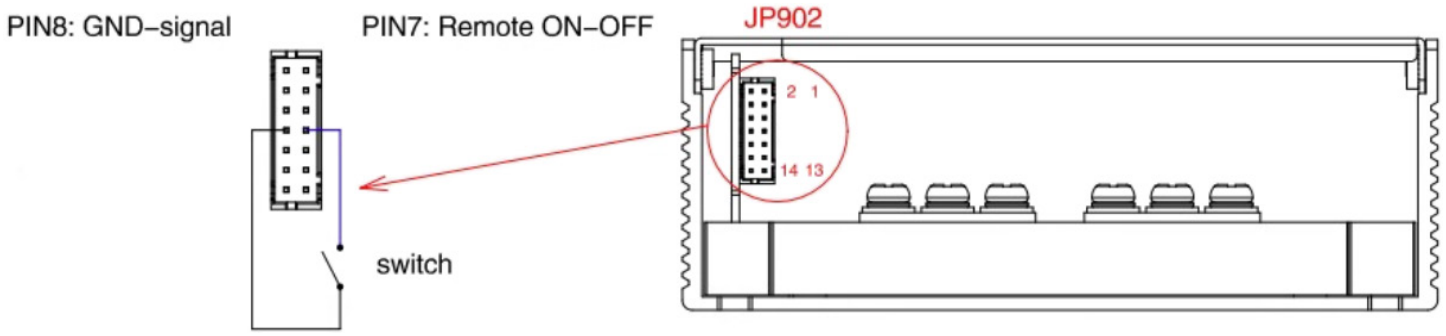
Notes:
1. By factory default, the output current adjustment function is not activated, and the Vccs (pin 13) and PC-DIS (pin 14) are shorted. When this function is not required, short-circuit the Vccs (pin 13) and PC-DIS (pin 14). Otherwise, the power supply has no output.
2. Keep Vccs (pin 13) and PC-DIS (pin 14) on when this feature is required.
3. In the overtemperature protection range, the automatic load reduction function works in PC mode.

T1 (typ.): Maximum ambient temperature at full load
T2 (typ.): T1 + 5°C



2.11 Remote Control

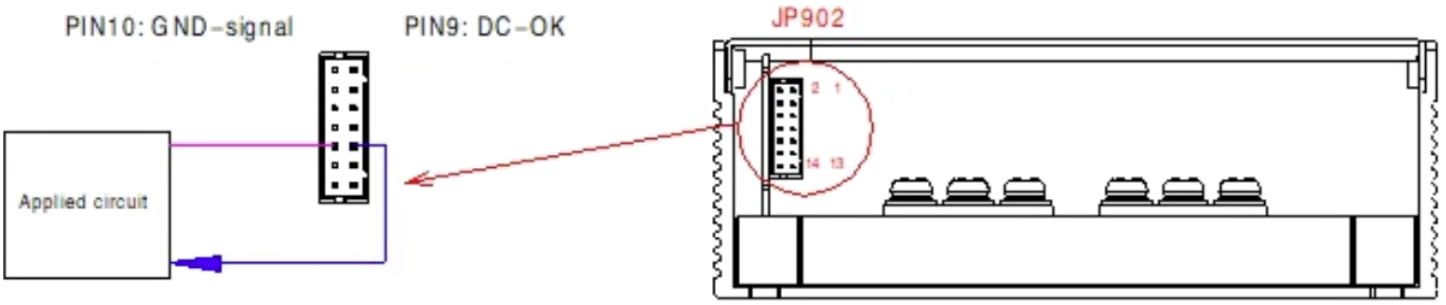
Through the remote on/off function, you can control the power supply on/off alone or with other units.



Remote Control	Power Status
Short Circuit	ON
Open Circuit	OFF

2.12 DC OK Signal

The DC OK signal is a TTL level signal. The maximum sink current is 10mA, and the maximum external voltage is 5.6V.



DC OK Signal	Power Status
High > 4.5 - 5.5V	ON
Low < -0.1 - 0.5V	OFF

3. Installation Requirements

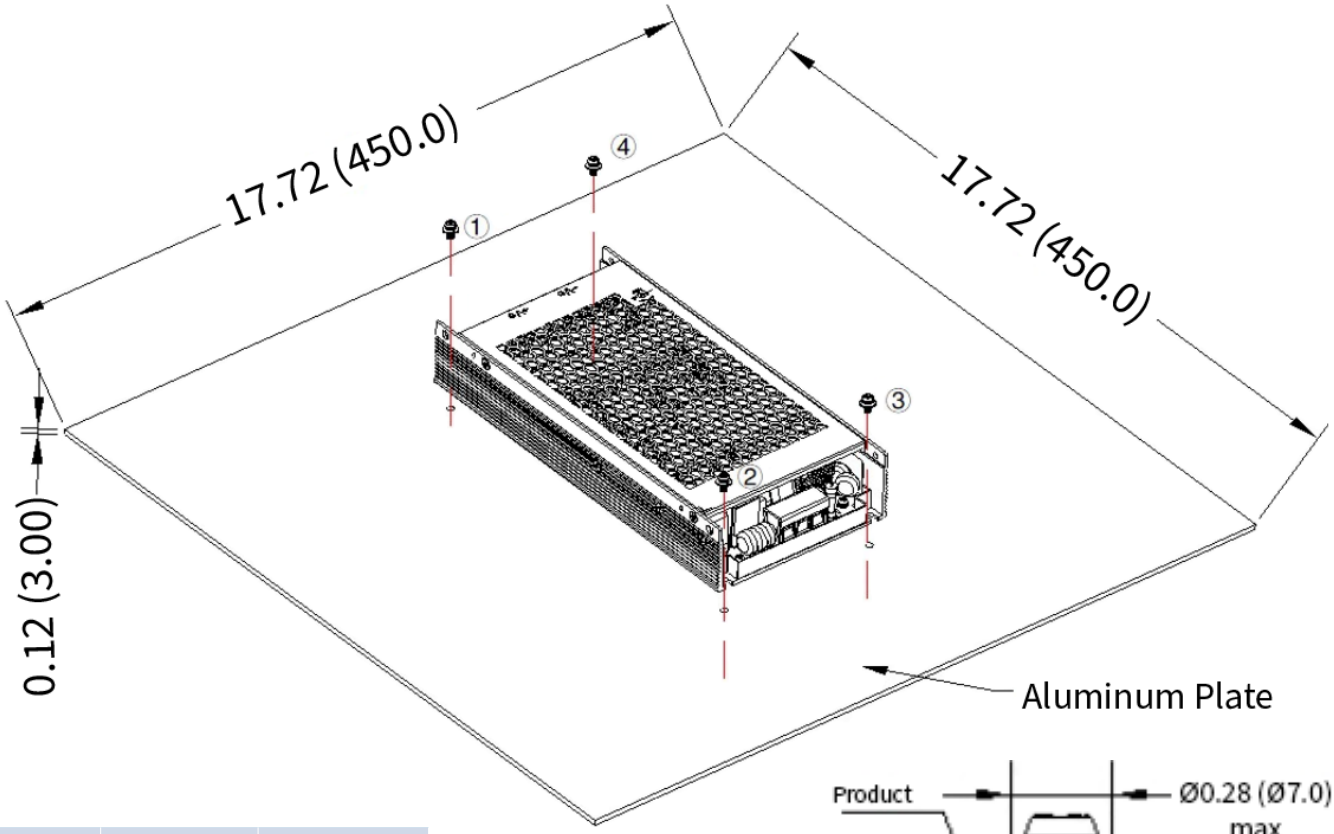
3.1 Saftey Introduction

During high voltage operation:

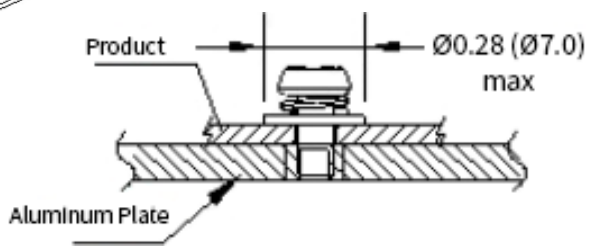
- The power supply module is disconnected from the input DC or the AC power and placed for at least 1 minute before starting to operate it.
- When installing the input wire to the power module, please connect the ground terminal first, and then connect the L line and the N line.
- When removing the input wire, please remove the L wire and the N wire first, and then remove the ground wire.
- When disassembling, make sure that no objects fall into the power module.
- Pay attention to high temperature.
- After the power module is working in a high tempwerature environment, wait for its shell to cool down before operating.
- This product needs to be installed by professionals and needs to be used with other equipment.

3.2 Installation Method

In order to comply with the derating curve, the MPE-1000CMU series must be mounted on an aluminum plate (or a case of the same size). This size of the aluminum plate is 450mm * 450mm * 3mm. See below for installation.
Note: In order to optimize the heat dissipation performance, the surface of the aluminum plate must be smooth or evenyl coated with thermal grease), and the power module must be installed in the center of the aluminum plate.

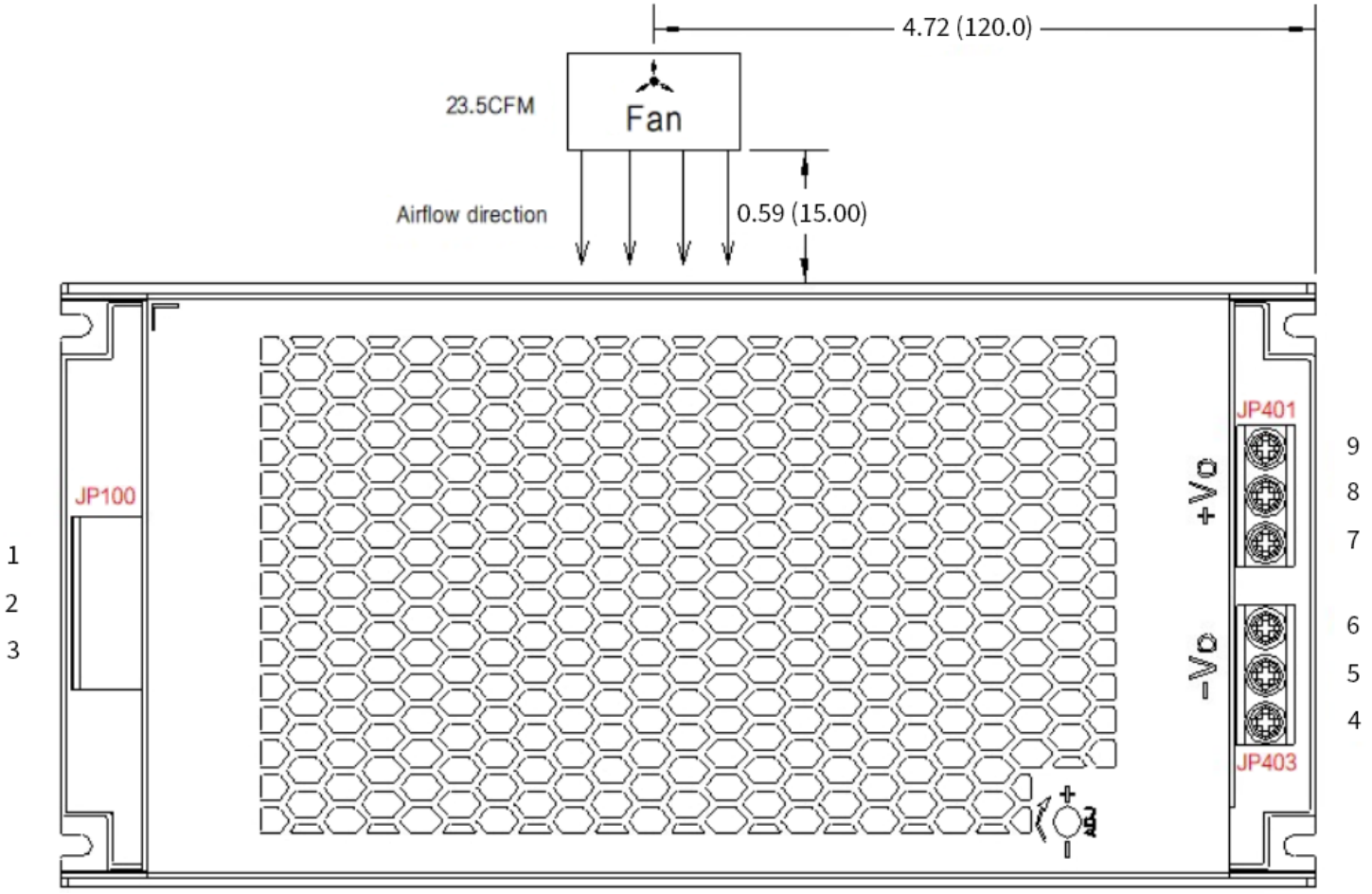


Position	Screw Spec	Torque (max)
1 - 4	M3	0.4N · m



Notes:

1. In order to meet the derating curve, the product must be installed onto an aluminum plate heat sink. The size of the suggested aluminum plate is shown above. To optimize thermal performance, it is necessary to apply thermal grease on the bottom of the product.
2. It is suggested to install the produxt with M3 combination screws, and the product must be firmly installed at the center of the aluminum plate.


4.72 (120.0)
23.5CFM
Fan
Airflow direction
0.59 (15.00)
JP100
JP401
JP403
+Vo
-Vo
1
2
3
9
8
7
6
5
4