450W AC-DC Open Frame
Switching Power Supplies

multicomp PRO

RoHS Compliant

Features

- Universal 90V AC to 264V AC or 127V DC to 370V DC input voltage
- Compact size 5” × 3”
- Operating ambient temperature range: -40°C to +70°C
- Built-in active PFC function
- Output short circuit, over-current, over-voltage protection, over-temperature protection
- 250W with air cooling, 450W with 25CFM
- 5V DC Standby Output, 12V DC fan supply, power good, power fail and remote sense
- Suitable for BF application
- Operating Altitude upto 5000m

These series is one of AC-DC Miniaturize open frame power supply and suitable for all kinds of BF type (be accessible to patients) medical system equipment. It features universal AC input and at the same time accepts DC input voltage, cost-effective, low no load power consumption, high efficiency, high reliability and double or reinforced insulation. These converters offer excellent EMC performance and meet IEC/EN/UL62368, GB4943, IEC/EN60335, IEC/EN61558, IEC/EN/ES60601 standards and they are widely used in areas of industrial, LED, street light control, electricity, security, telecommunications, smart home etc.

Selection Guide

Part Number	Cooling Methhod	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Output adj. Range (V)	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (μF)
MPOF450-20B12	Air cooling	250	12V/20.8	11.4-12.6	91	6000
	25CFM	400	12V/33.3			
MPOF450-20B24	Air cooling	250	24V/10.5	22.8-25.2	93	
	25CFM	450	24V/18.75			
MPOF450-20B48	Air cooling	250	48V/5.3	45.6-50.4	94	2000
	25CFM	450	48V/9.4			

Note: 1.*Under any conditions, the total power of the product should not exceed the rated power. When the output voltage is increased, the total output power cannot exceed the rated output power, when the output voltage is decreased, the output current cannot exceed the rated output current;
2. *When measuring the full load efficiency, the fan should be connected to an external power supply. Fan loss is not included in the input power.
3.*MPOF Products with shell is also available.

Input Specifications						
Item	**Operating Conditions**		**Min.**	**Typ.**	**Max.**	**Unit**
Input Voltage Range	AC input		90	--	264	V AC
	DC input		127	--	370	V DC
Input Frequency			47	--	63	Hz
Input Current	90V AC/115V AC		--	--	5.2	A
	230V AC		--	--	2.6	
Inrush Current	115V AC	Cold start	--	40	--	
	230V AC		--	80	--	
Power Factor	115V AC	Full Load	0.98	--	--	--
	230V AC		0.95	--	--	
Leakage Current	264V AC	Contact leakage curren	<0.1mA			
		Earth leakage current	<0.5mA			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy*	Full load	12V/24V	--	±2	--	%
		48V	--	±1	--	
Line Regulation	Rated load		--	±0.5	--	
Load Regulation	0% - 100% load		--	±1	--	
Ripple & Noise*	20MHz bandwidth		--	--	200	mV
Temperature Coefficient			--	±0.03	--	%/°C
Minimum Load			0	--	--	%
Hold-up Time	25°C, 115V AC input		12	-	--	ms
	25°C, 230V AC in		16	-		
Stand-by Power Consumption	Room temperature, 230V AC input (PS_ON low potential		--	--	0.5	W
Short Circuit Protection	Recover time <5s after the short circuit disappear		Hiccup, continuous, self-recover			
Over-current Protection			≥110%, self-recover			
Over-voltage Protection	12V		≤15.6V DC (Output voltage turn off, re-power on for recover)			
	24V		≤31.2V DC (Output voltage turn off, re-power on for recover)			
	48V		≤60V DC (Output voltage turn off, re-power on for recover)			

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Over-temperature Protection			Output voltage turn off, auto recover after the temperature drops.			
Fan power			Offer output power of 12V/0.5A			
PS_ON Input Signal*	Power on	PS_ON High	2	--	5	V
	Power off	PS_ON Low	0	--	0.5	
PG Signal*	Power on	The PG signal goes high with 10ms to 500ms delay after power set up	10	--	500	ms
	Power off/Power fail	The TTL signal goes low at least 1ms before output below 90% of rated value	1	--	--	
	High level	High	2	--	6	V
	Low level	Low	0	--	0.6	
Remote Sense*	When RS+ and RS- are connected to the system, with function of remote voltage compensation, if not needed, left RS+ and RS open					
5V Standby	5Vsb: The load capacity is 0.6A without fan; the load capacity is 1A with fan 25CFM, tolerance 2%, ripple: 120mVp-p(max.)					

Note: 1.* Output Voltage Accuracy: including setting error, line regulation, load regulation;
2.* The “Tip and barrel method” is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 0.1uF ceramic capacitor.
3.* Over-temperature Protection: use the discharge pen to release the input electrolytic charge completely, and then test the restart auto recover.
4.* For fan power connection method, please refer to 5,6 in the external dimension drawing.
5.*For PS_ON, 5V standby connection method, please refer to CN6 in the external dimension drawing;
6. For PG standby connection method, please refer to CN2 in the external dimension drawing;

General Specifications								
Item		**Operating Conditions**				**Min.**	**Typ.**	**Max.**	**Unit**
Isolation Test	Input - output	Electric strength test for 1min., leakage current <5mA				4000	-	--	V AC
	Input - ⏚					2000		--	
	Output - ⏚					1500		--	
Insulation Resistance	Input - output	Environment temperature: 25 ± 5°C Relative humidity: < 95%RH, noncondensing Test voltage: 500V DC				100		--	MΩ
	Input - ⏚					100		--	
	Output - ⏚					100		--	
Isolation level	Input - output					2 × MOPP			
	Input - ⏚					1 × MOPP			
	Output - ⏚					1 × MOPP			
Operating Temperature						-40	-	+70	°C
Storage Temperature						-40		+85	
Storage Humidity		Non-condensing				10		95	%RH
Operating Humidity						20		90	
Power Derating		Operating temperature derating	Air cooling (250W)	115V AC	+40°C to +60°C	4.5		--	W/°C
				230V AC	+45°C to +60°C	4		--	
			25CFM	+50°C to +70°C		2		--	%/°C
		Input voltage derating		90V AC - 115V AC		1		--	%/VAC
Safety Standard						EN/UL62368-1/IEC/EN60601 Safety Approval & EN62368-1 (Report); Design refer to IEC/CB62368-1/ EN60335-1			
Safety Class						CLASS I			
MTBF		MIL-HDBK-217F@25°C				≥200,000 h			

Mechanical Specifications	
Case Material	Open frame
Dimensions	127mm × 76.2mm × 38.5mm
Weight	400g (Typ.)
Cooling Method*	Air cooling (250W) / 25CFM (400W/450W)
Note: *Cooling method and power derating refer to typical characteristic curves.	

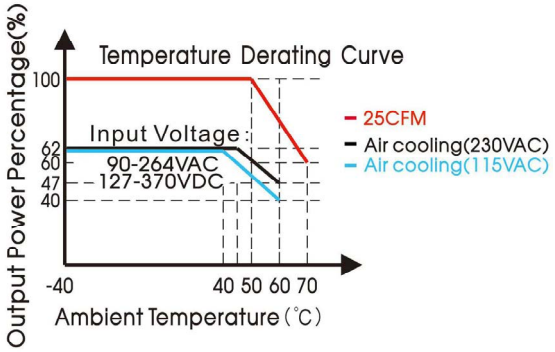
Electromagnetic Compatibility (EMC)

Emissions	CE	EN55032(CISPR32)/EN55011(CISPR32) CLASS B	
	RE	EN55032(CISPR32)/EN55011(CISPR32) CLASS B	
	Harmonic current	IEC/EN61000-3-2 CLASS A and CLASS D	
	Flicker	IEC/EN61000-3-3	
Immunity	ESD	IEC/EN61000-4-2 Contact ±8KV/Air ±15 KV	Perf. Criteria A
	RS	IEC/EN61000-4-3 10V/m	Perf. Criteria A
	EFT	IEC/EN 61000-4-4 ±2KV	Perf. Criteria A
	Surge	IEC/EN61000-4-5 line to line ±2KV, line to ground ±4KV	Perf. Criteria A
	CS	IEC/EN61000-4-6 10 Vr.m.s	Perf. Criteria A
	Voltage dips, short interruptions andvoltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B
Note: 1.*The power Should be considered as part of the components in the system, All EMC performance are been tested on a metal plate with a thickness of 1mm and a length of 360mm x 360mm. The power supply should be combined with the terminal equipment for electromagnetic compatiblity confirmation			

Product Characteristic Curve

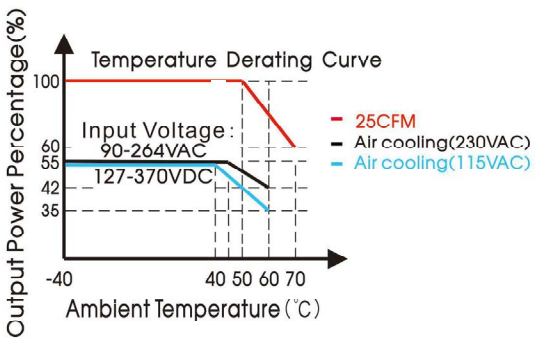
MPOF450-20B12

(full load 400W with 25CFM)

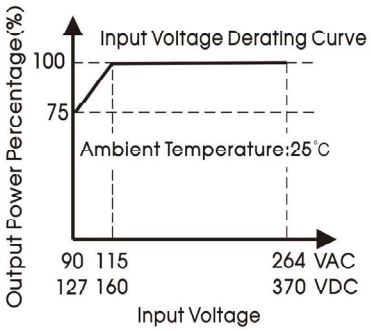


MPOF450-20B24/ MPOF450-20B48

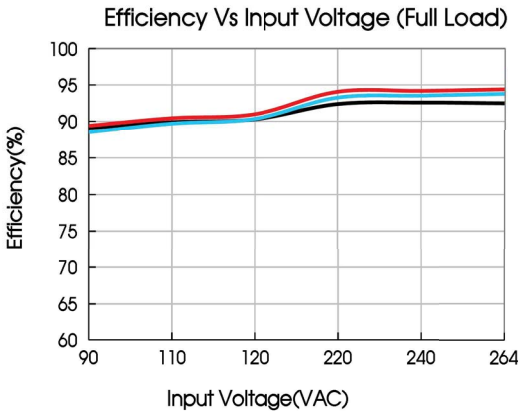
(full load 450W with 25CFM)

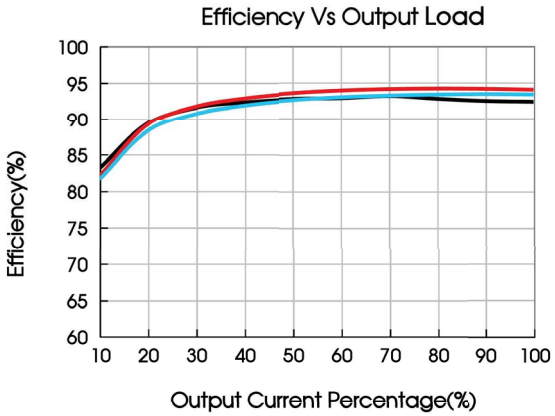


Input Voltage Derating Curve

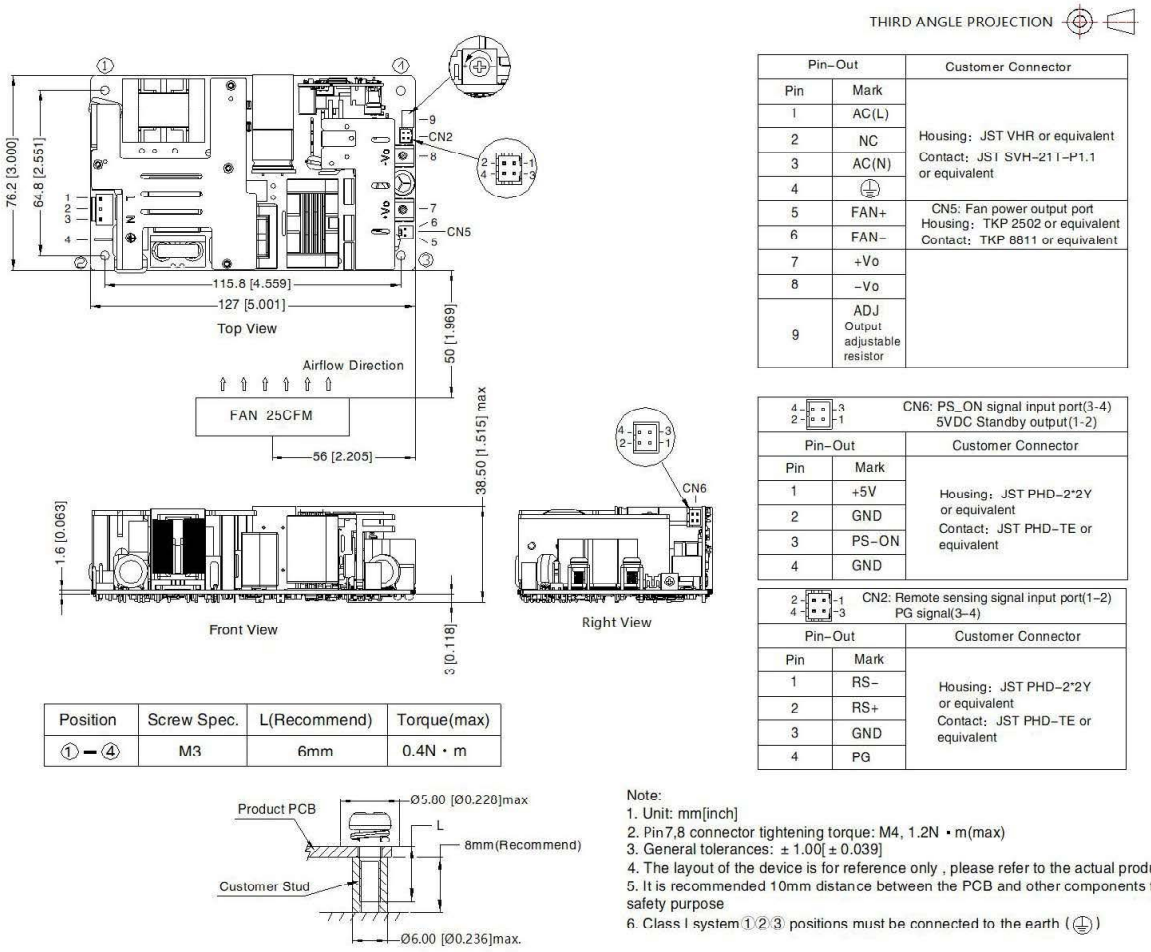


Note: With an AC input voltage between 90 - 115V AC and a DC input between 127 - 160V DC the output power must be derated as per the temperature derating curves





Dimensions and Recommended Layout



Pin-Out		Customer Connector
Pin	Mark	
1	AC(L)	Housing: JST VHR or equivalent Contact: JST SVH-21T-P1.1 or equivalent
2	NC	
3	AC(N)	
4	⏚	
5	FAN+	CN5: Fan power output port Housing: TKP 2502 or equivalent Contact: TKP 8811 or equivalent
6	FAN-	
7	+Vo	
8	-Vo	
9	ADJ Output adjustable resistor	

CN6: PS_ON signal input port(3-4) 5VDC Standby output(1-2)

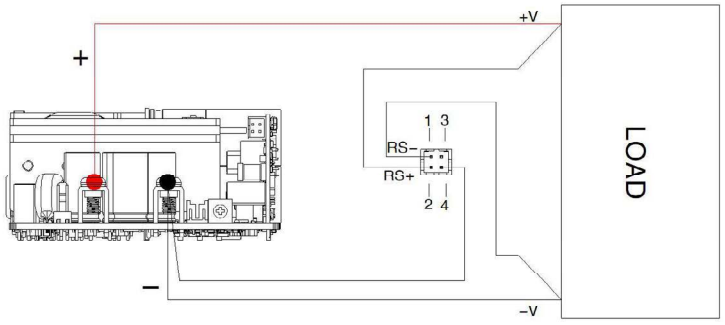
Pin-Out		Customer Connector
Pin	Mark	Housing: JST PHD-2*2Y or equivalent Contact: JST PHD-TE or equivalent
1	+5V	
2	GND	
3	PS-ON	
4	GND	

CN2: Remote sensing signal input port(1-2) PG signal(3-4)

Pin-Out		Customer Connector
Pin	Mark	Housing: JST PHD-2*2Y or equivalent Contact: JST PHD-TE or equivalent
1	RS-	
2	RS+	
3	GND	
4	PG	

Position	Screw Spec.	L(Recommend)	Torque(max)
①—④	M3	6mm	0.4N・m

Note:
1. Unit: mm[inch]
2. Pin7,8 connector tightening torque: M4, 1.2N・m(max)
3. General tolerances: ± 1.00[± 0.039]
4. The layout of the device is for reference only , please refer to the actual product
5. It is recommended 10mm distance between the PCB and other components for safety purpose
6. Class I system ①②③ positions must be connected to the earth (⏚)



Remote sensing function wiring diagram

Note:

1. RS- and RS+ cannot be shorted or reversed, otherwise the power module will be damaged;
2. The remote compensation function can compensate the voltage drop on the output cable, which includes the sum of the cable drop connected to the output positive terminal and the output negative terminal;
3. If you need to use remote compensation function, the signal pin needs to be connected with the load and with a twisted pair, otherwise the power module will be damaged.

Notes:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75%RH with nominal input voltage and rated output load;
2. In order to improve the efficiency, there will be audible noise generated when work at light load, but it does not affect product performance and reliability;
3. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;
4. CAUTION: Double pole, neutral fusing. Disconnect mains before servicing."/"ATTENTION: Double pôle/fusible sur le neutre. Débrancher lalimentation avant lentretien;
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
6. The power supply is considered a component which will be installed into a terminal equipment.