DESCRIPTIONS 450W, AC-DC Open Frame Power Supply



RoHS

c UL us CE Report UK CA Report CB

UL60601-1 EN62368-1 BS EN62368-1 IEC60335-1
UL62368-1 IEC61558-1

FEATURES

- Universal 90 - 264VAC or 127 - 370VDC input voltage
- Compact size 5” × 3”
- Operating ambient temperature range: -40℃ to +70℃
- Built-in active PFC function
- Output short circuit, over-current, over-voltage protection, over-temperature protection
- 250W with air cooling, 450W with 25CFM
- 5VDC standby output, 12VDC fan supply
- PG signal and remote sensing function
- The base plate with conformal coating
- Safety according to medical certification, suitable for BF application
- Installing in system of Safety Class I/II is available
- Operating altitude up to 5000m
- Safety according to IEC62368, GB4943, IEC/EN60335

APPLICATIONS

- Industrial
- LED
- Street light control
- Electricity
- Security
- Telecommunications
- Smart home
- Medical

Selection Guide

Certification	Part No*	Cooling Method	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
EN/BS EN	AOF450-2B-12	Air cooling	250	12V/20.8A	11.4-12.6	91	6000
		25CFM	400	12V/33.3A			
	AOF450-2B-15	Air cooling	250	15V/16.7A	14.25-15.75	92	6000
		25CFM	400	15V/26.7A			
	AOF450-2B-18	Air cooling	250.2	18V/13.9A	17.1 - 19.9	92.5	6000
		25CFM	399.6	18V/22.2A			
	AOF450-2B-19	Air cooling	250.8	19V/13.2A			
		25CFM	400.9	19V/21.1A			
UL/EN/ BS EN/IEC	AOF450-2B-24	Air cooling	250	24V/10.5A	22.8-25.2	93	6000
		25CFM	450	24V/18.75A			
EN/BS EN	AOF450-2B-27	Air cooling	250	27V/9.3A	25.65-28.35	93.5	4000
		25CFM	450	27V/16.7A			
	AOF450-2B-36	Air cooling	250	36V/6.95A	34.2 - 37.8	93	3000
		25CFM	450	36V/12.5A			
	AOF450-2B-48	Air cooling	250	48V/5.3A	45.6-50.4	94	2000
		25CFM	450	48V/9.4A			
	AOF450-2B-54	Air cooling	250	54V/4.63A	51.3-56.7	94	2000
		25CFM	449.8	54V/8.33A			

Notes: 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. *AOF Products with shell is also available, named AOF450-2B-xx-C/CF.

4. 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	AC input		90	--	264	VAC
		DC input		127	--	370	VDC
	Input Frequency			47	--	63	Hz
	Input Current	90VAC/115VAC		--	--	5.2	A
		230VAC		--	--	3	
	Inrush Current	115VAC	Cold start	--	40	--	A
		230VAC		--	80	--	
	Power Factor	115VAC	Full load	0.98	--	--	--
		230VAC		0.95	--	--	--

Input Specifications	Leakage Current	264VAC, 50Hz	Contact leakage current	< 0.1mA			
			Earth leakage current	< 0.5mA			
	Hot Plug			Unavailable			
Output Specifications	Output Voltage Accuracy*	Full load	12V/15V/18V/19V/24V	--	±2	--	%
			27V/36V/48V/54V	--	±1	--	
	Line Regulation	Rated load		--	±0.5	--	
	Load Regulation	0%-100% load		--	±1	--	
	Ripple & Noise*	20MHz band width (peak-to-peak value)		--	--	200	mV
	Temperature Coefficient			--	±0.03	--	%/℃
	Minimum Load			0	--	--	%
	Hold-up Time	25℃, 115VAC input		12	--	--	ms
		25℃, 230VAC input		16	--	--	
	Stand-by Power Consumption	Room temperature, 230VAC input (PS_ON low potential)	15V/18V/19V/27V/36V/54V	--	--	0.5	W
			12V/24V/48V	--	--	0.6	
	Short Circuit Protection	Recovery time <5s after the short circuit disappear	15V/18V/19V/27V/36V/54V	Hiccup, continuous, self-recover			
		Recovery time <10s after the short circuit disappear	12V/24V/48V	Hiccup mode, constant current works 1s, turn off 10s, continuous, self-recover			
	Over-current Protection			≥105%Io, hiccup, self-recover			
	Over-voltage Protection	12V		≤15.6V		Output voltage turn off, re-power on for recover	
		15V		≤19.5V			
		18V		≤23.4V			
		19V					
		24V		≤31.2V			
		27V		≤35.1V			
		36V		≤46.8V			
		48V		≤60.0V			
		54V		≤63.0V			
	Over-temperature Protection			Protection when over-temperature, recover automatically 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

Output Specifications	PG Signal*	Power off/Power fail	The TTL signal goes low at least 1ms before output below 90% of rated value			1	--	--	ms
		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.)							
General Specifications	Isolation Test	Input - output	Electric strength test for 1min., leakage current <5mA			4000	--	--	VAC
		Input - ⏚				2000	--	--	
		Output - ⏚				1500	--	--	
	Insulation Resistance	Input - output	Environment temperature: 25±5℃, Relative humidity: <95%RH, non-condensing Testing voltage: 500VDC			100	--	--	MΩ
		Input - ⏚				100	--	--	
		Output - ⏚				100	--	--	
	Isolation level	Input - output				2 × MOPP			
		Input - ⏚				1 × MOPP			
		Output - ⏚				1 × MOPP			
	Operating Temperature					-40	--	+70	℃
	Storage Temperature					-40	--	+85	
	Storage Humidity	Non-condensing				10	--	95	%RH
	Operating Humidity					20	--	90	
	Power Derating	Operating temperature derating	Air cooling (250W)	115VAC	+40℃ to +60℃	4.5	--	--	W/℃
				230VAC	+45℃ to +60℃	4.0	--	--	
			25CFM	+50℃ to +70℃		2.0	--	--	%/℃
		Input voltage derating		90VAC - 115VAC		1.0	--	--	%/VAC
	Safety Class					CLASS I (with PE and must be connected)/CLASS II (without PE)			
	MTBF	MIL-HDBK-217F@25℃				>200,000 h			
Mechanical Specifications	Case Material	Open frame							
	Dimension	127.00mm × 76.20mm × 38.50mm							
	Weight	400g (Typ.)							
	Cooling Method*	Air cooling (250W) / 25CFM (400W/450W)							

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 (Low ESR) and 0.1uF ceramic capacitor;
3. *For fan power connection method, please refer to 5, 6 in the external dimension drawing;
4. *For PS_ON, 5V standby connection method, please refer to CN6 in the external dimension drawing;
5. *For PG standby connection method, please refer to CN2 in the external dimension drawing;
6. *Cooling method and power derating refer to typical characteristic curves.

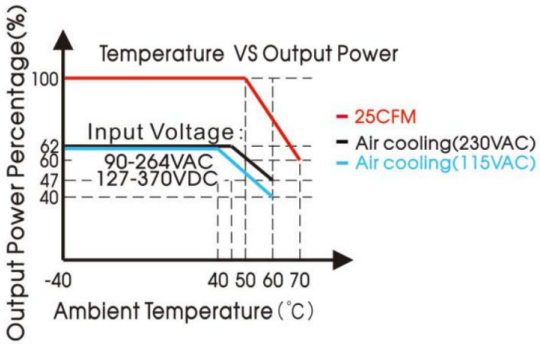
Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions (EMI)	CE	EN55032(CISPR32)/EN55011(CISPR11) CLASS B (Category I, CLASS B; Category II, CLASS A)	
		RE	EN55032(CISPR32)/EN55011(CISPR11) CLASS B (Category I, CLASS B; Category II, CLASS A)	
		Harmonic current	IEC/EN61000-3-2 CLASS A and CLASS D	
		Flicker	IEC/EN61000-3-3	
	Immunity (EMS)	ESD	IEC/EN61000-4-2 Contact ±8KV/Air ±15KV	Perf. Criteria A
		RS	IEC/EN61000-4-3 10V/m	Perf. Criteria A
		EFT	IEC/EN61000-4-4 ±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 10Vr.m.s	Perf. Criteria A
		Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11 0%, 70%	Perf. Criteria B

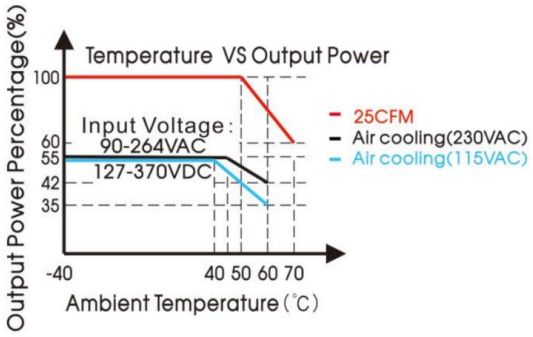
Note: 1.*The power supply should be considered as a part of the components in the system. All EMC performance are been tested on a metal plate with a thickness of 1mm and a length of 360mm × 360mm. The power supply must be combined with the terminal equipment for electromagnetic compatibility confirmation.
2.*Category I products with PE, category II products without PE.

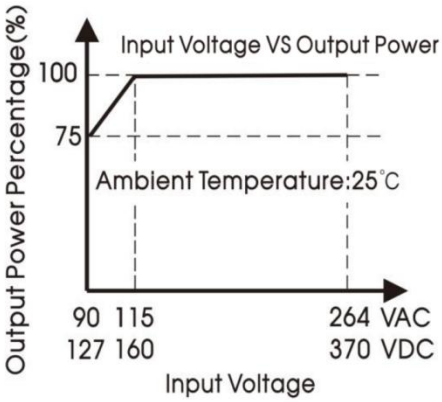
Characteristic Curve

12/15/18/19V
(full load 400W with 25CFM)

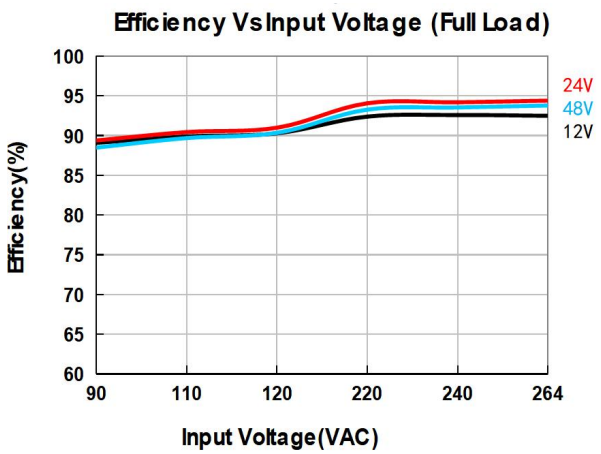


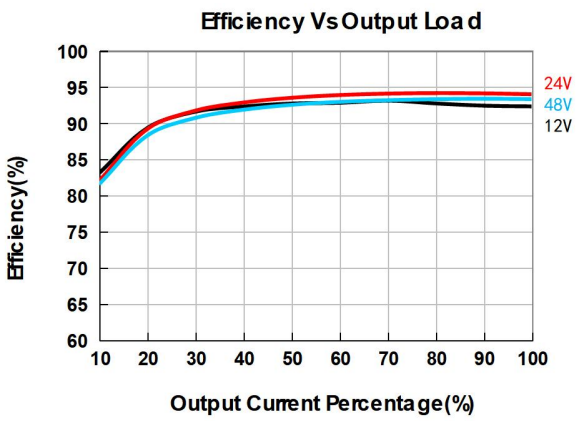
24/27/36/48/54V
(full load 450W with 25CFM)





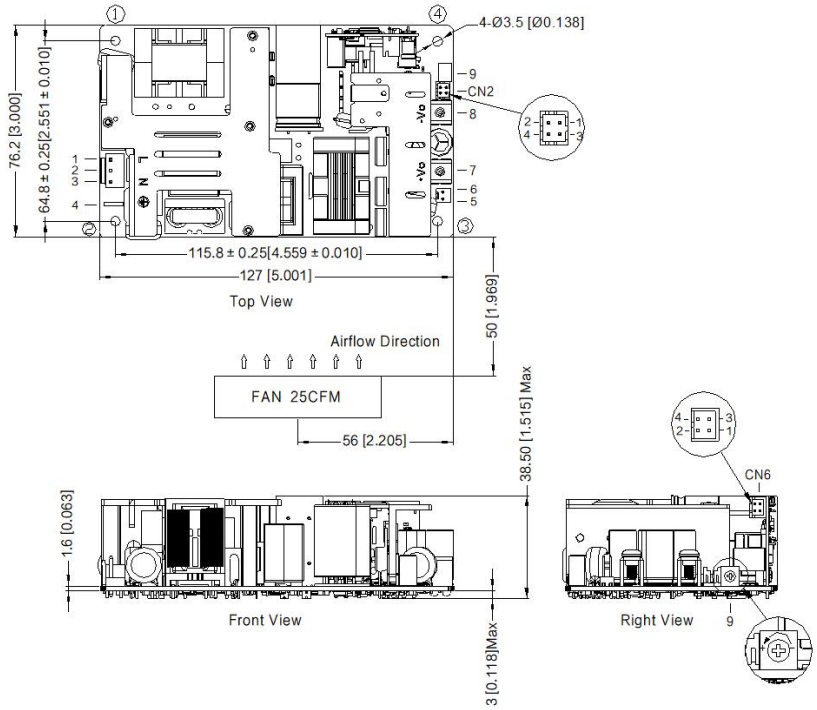
Note: With an AC input voltage between 90 - 115VAC and a DC input between 127 - 160VDC the output power must be derated as per the temperature derating curves



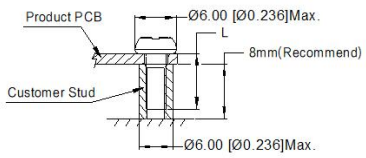


Dimensions and Recommended

THIRD ANGLE PROJECTION



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



Pin-Out		Customer Connector	
Pin	Mark		
1	AC(L)	Housing: JST VHR-3 or equivalent Contact: JST SVH-21T-P1.1 or XXX-XXX(Optional Accessory)	
2	NC		
3	AC(N)		
4	⏚	Contact: JST SPS-21T-250	
5	FAN+	CN5: Fan power output port Housing: TKP 2502 or Molex0511910200 or equivalent Contact: TKP 54T or Molex0508028100 or equivalent	
6	FAN-		
7	+Vo	Output connector (Optional Accessory)	CPJ-021(Red wire)
8	-Vo		CPJ-020(Black wire)
9	ADJ Output adjustable resistor		

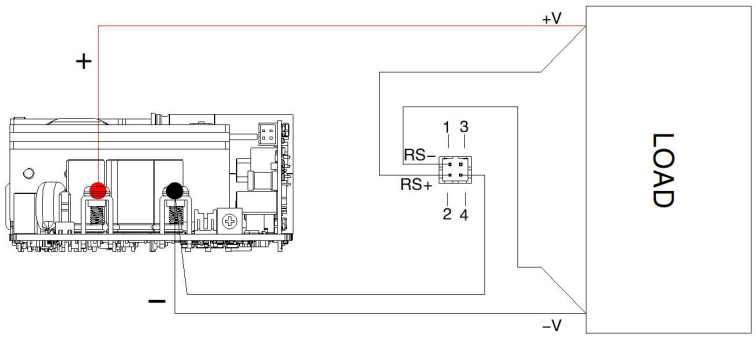
4-2-3-1 CN6: PS_ON signal input port(3-4) 5VDC Standby output(1-2)

Pin-Out		Customer Connector
Pin	Mark	
1	+5V	Housing: TKP DH2-4P or HRS DF11-4DS-2C or equivalent Contact: TKP DHT or HRS DF11-22SC or equivalent
2	GND	
3	PS-ON	
4	GND	

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

Pin-Out		Customer Connector
Pin	Mark	
1	RS-	Housing: TKP DH2-4P or HRS DF11-4DS-2C or equivalent Contact: TKP DHT or HRS DF11-22SC or equivalent
2	RS+	
3	GND	
4	PG	

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 system①②③ positions must be connected to the earth (⏚)
7. Class II system①②③ positions must be connected together



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.

CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

ATTENTION: Double pôle/fusible sur le neutre. Débrancher lalimentation avant lentretien

Note:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
2. All index testing methods in this datasheet are based on our company corporate standards;
3. 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;
4. Products are related to laws and regulations: see "Features" and "EMC";
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. All EMC tests should be confirmed with the final equipment.
7. The surface of product should keep a safe distance from the customer system (recommended ≥3mm).
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.