AC/DC 750W Open Frame Power Supply

LOF750-20Bxx Series

MORNSUN®

CE Report EN62368-1 EN60601-1 UKCA BS EN62368-1 RoHS

FEATURES

- Universal 90 - 264VAC or 127 - 370VDC input voltage
- Compact size 5" x 3"
- Operating ambient temperature range: -40℃ to +70℃
- Built-in active PFC function
- Operating altitude up to 5000m
- Output short circuit, over-current, over-voltage, over-temperature protection
- 450W with air cooling, 750W with 25CFM
- 5VDC standby output, 5VDC fan supply
- PG signal and remote sensing function
- Design to meet medical approvals and be suitable for BF type applications
- The base plate with conformal coating
- 3 years warranty
- Installing in system of Safety Class I/II is available
- Safety according to IEC62368, ES60601, EN60335, GB4943

LOF750-20Bxx series is one of Mornsun's 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/EN62368-1, EN/ES60601-1, EN60335-1, GB4943.1 standards and they are widely used in areas of industrial, LED, street light control, electricity, security, telecommunications, smart home, etc.

Selection Guide

Certification	Part No.	Cooling Method	Input Voltage Range (V)	Output Power (W)*	Nominal Output Voltage and Current (Vo/Io)	Output Adjustable Range ADJ (V)	Efficiency at 230VAC (%) Typ. *	Capacitive Load (μF) Max.
EN	LOF750-20B12	Air cooling	Full voltage range	399.6	12V/33.3	11.4-12.6	92	5000
		25CFM		699.6	12V/58.3			
	LOF750-20B15	Air cooling	Full voltage range	400.5	15V/26.7	14.25-15.75	92	5000
		25CFM		700.5	15V/46.7			
	LOF750-20B24	Air cooling	115VAC	400.8	24V/16.7	22.8-25.2	94	3000
			230VAC	451.2	24V/18.8			
		25CFM	Full voltage range	748.8	24V/31.2			
	LOF750-20B27	Air cooling	115VAC	399.6	27V/14.8	25.65-28.35	94	3000
			230VAC	450.9	27V/16.7			
		25CFM	Full voltage range	750.6	27V/27.8			
	LOF750-20B36	Air cooling	115VAC	399.6	36V/11.1	34.2-37.8	94.5	2000
			230VAC	450.0	36V/12.5			
		25CFM	Full voltage range	748.8	36V/20.8			
	LOF750-20B48	Air cooling	115VAC	398.4	48V/8.3	45.6-50.4	95	2000
			230VAC	451.2	48V/9.4			
		25CFM	Full voltage range	748.8	48V/15.6			
	LOF750-20B54	Air cooling	115VAC	399.6	54V/7.4	51.3-56.7	95	1000
			230VAC	449.8	54V/8.33			
		25CFM	Full voltage range	750.0	54V/13.89			

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.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		90	--	264	VAC
	DC input		127	--	370	VDC
Input Frequency			47	--	63	Hz
Input Current	115VAC		--	--	8	A
	230VAC		--	--	4	
Inrush Current	115VAC	Cold start	--	50	--	
	230VAC		--	80	--	
Power Factor	115VAC	Full load	0.98	--	--	--
	230VAC		0.95	--	--	
Leakage Current	264VAC	Contact leakage current	<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/15V/24V/27V	--	±2.0	--	%
		36V/48V/54V	--	±1.0	--	
Line Regulation	Rated load		--	±0.5	--	
Load Regulation	0%-100% load		--	±1.0	--	
Ripple & Noise*	20MHz band width (peak-to-peak value)		--	--	200	mV
Temperature Coefficient			--	±0.03	--	%/℃
Minimum Load			0	--	--	%
Hold-up Time	25℃, 115VAC/230VAC		10	--	--	ms
Stand-by Power Consumption	Room temperature, 230VAC input (PS_ON Low and 5Vsb without load (including fan))		--	--	0.5	W
Short Circuit Protection	Recovery time <5s after the short circuit disappear		Hiccup, 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			
	24V		⩽31.2V			
	27V		⩽35.1V			
	36V		⩽46.8V			
	48V		⩽60.0V			
	54V		⩽64.0V			
Over-temperature Protection			Protection when over-temperature, recover automatically after the temperature drops			
Fan Power*			The 5Vsb serves as the standby power supply and also supplies power to the fan, the maximum output current of the fan and 5Vsb is 2A			
PS_ON Input Signal*	Power on	PS_ON High	2	--	5	V
	Power off	PS_ON Low	0	--	0.6	
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 1A without fan, the load capacity is 2A 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 (Low ESR) and 0.1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information;
3. *For fan power supply, please refer to CN5 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 connection method, please refer to CN2 in the external dimension drawing;
6. *For all the above test items, please refer to our company standard "AC-DC Black Box Test Specification" for specific test specifications and methods.

General Specifications

Item		Operating Conditions				Min.	Typ.	Max.	Unit
Isolation Test	Input - output	Electric strength test for 1min, leakage current <10mA				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 x MOPP			
	Input - ⏚					1 x MOPP			
	Output - ⏚					1 x 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	25CFM	12V/15V(700W)	+50℃ to +70℃	2.0	--	--	%/℃
				24V/27V/36V/48V/54V(750W)	+50℃ to +70℃	2.0	--	--	
			Air cooling	12V/15V(400W)	+45℃ to +70℃	7.9	--	--	W/℃
				24V/27V/36V/48V/54V (450W)	90-175VAC (400W) +45℃ to +70℃	7.0	--	--	
					176-264VAC (450W) +45℃ to +70℃	9.0	--	--	
		Input voltage derating		90VAC - 115VAC		0.8	--	--	%/VAC
				127VDC - 162VDC		0.57	--	--	%/VDC
Safety Standard						Design refer to UL62368-1 & BS EN/EN62368-1, EN60601-1, IEC62368-1, ES60601-1, EN60335-1, GB4943.1			
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 x 76.20mm x 43.00mm
Weight	625g (Typ.)
Cooling Method*	Air cooling(400W/450W) / 25CFM (700W/750W)

Note: *Cooling method and power derating refer to typical characteristic curves.

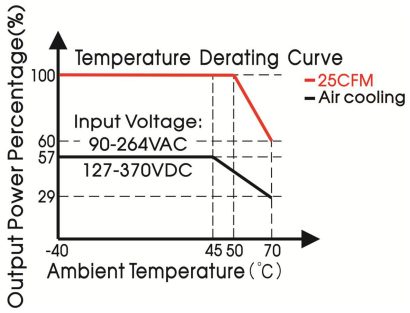
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B

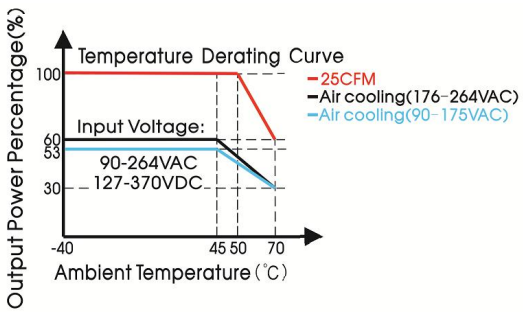
	Harmonic current	IEC/EN61000-3-2	CLASS A and CLASS D	
Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV/Air ±15KV	Perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	Perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2KV/line to ground ±4KV	Perf. Criteria A
	CS	IEC/EN61000-4-6	10 Vr.m.s	Perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%, 70%	Perf. Criteria B

Product Characteristic Curve

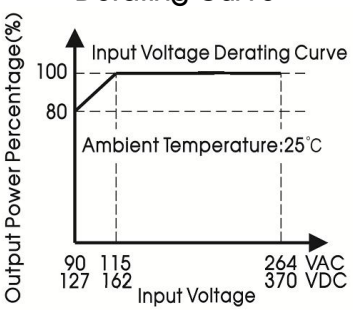
LOF750-20B12/15
(full load 700W with 25CFM)



LOF750-20B24/27/36/48/54
(full load 750W with 25CFM)

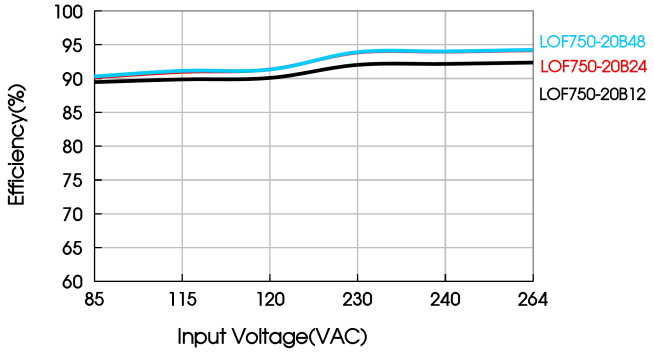


LOF750-20Bxx Input Voltage
Derating Curve

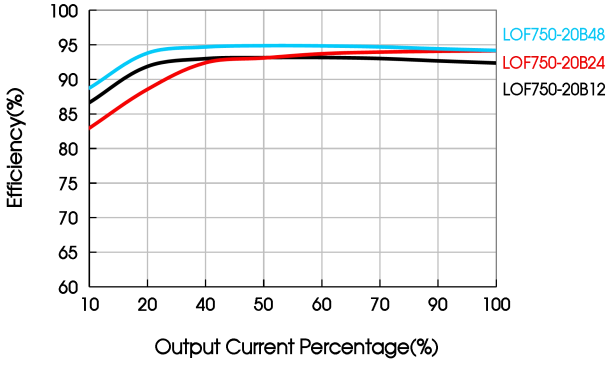


Note: With an AC input voltage between 90 - 115VAC and a DC input between 127 - 162VDC the output power must be derated as per the temperature derating curves.

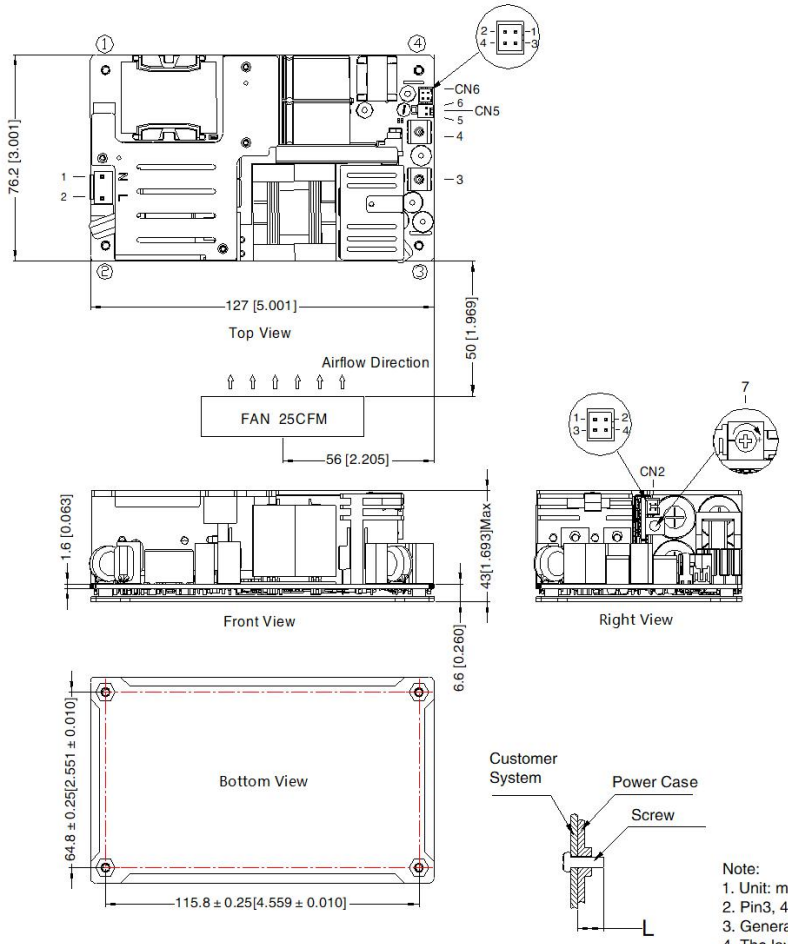
Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load (Vin=230VAC)



Dimensions and Recommended Layout



THIRD ANGLE PROJECTION

Pin-Out		Customer Connector	
Pin	Mark	Housing: JST VHR-3 or equivalent Contact: JST SVH-21T-P1.1 or PJA-016(Mornsun Accessory)	
1	AC(N)		
2	AC(L)		
3	+Vo	Output connector (Mornsun Accessory)	PJA-021(Red wire)
4	-Vo		PJA-020(Black wire)
5	FAN+	CN5: Fan power output port Housing: TKP 2502 or Molex0511910200 or equivalent Contact: TKP 54T or Molex0508028100 or equivalent	
6	FAN-		
7	ADJ Output adjustable resistor		

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

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

Position	Screw Spec.	L(Recommend)(Max)	Torque(Max)
①-④	M3	2.5mm	0.4N・m

Note:
1. Unit: mm[inch]
2. Pin3, 4 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

Note: The PJA-XXX series is the accessories of products, quotation is available.