AC/DC 240W Din-Rail Power Supply

LIMF240-23Bxx Series

MORNSUN®

RoHS

FEATURES

- Universal 85 - 277VAC or 120 - 390VDC Input voltage
- Efficiency up to 95.5%
- Operating ambient temperature range: -40℃ to +85℃
- 150% peak load
- Active PFC, PF＞0.99
- DC OK function
- Double-sided conformal coating, salt-spray proof, explosion-proof
- Operating altitude up to 5000m
- 5 years warranty
- Output short circuit, over-current, over-voltage, over-temperature protection
- ATEX, IECEx increased safety type explosion-proof certification approved
- Safety according to IEC/EN/UL/BS EN62368, UL61010, UL508

LIMF240-23Bxx is Mornsun explosion-proof Din-rail power supply featuring with energy saving, high performance, high reliability, high efficiency. With 150% peak load capacitity is enough to support heavy loads such as DC motors or capacitive loads, up to 95.5% efficiency can greatly improve power supply reliability and service life. With good EMC performance and compliant with international standards of IEC/EN/UL/BS EN 62368, UL61010, UL508 for EMC and safety. The power supply meets the "ec" increased safety and "nC" isolation short-circuit n-type explosion-proof certification and is suitable for explosive environment where the equipment protection level is Gc in zone 2. They are widely used in wind power industry, DCS, industrial control equipment, machine control, LED, street light control, electric power, security, 5G communication and other fields.

Selection Guide

Part No.*	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (μF)
LIMF240-23B12	192	12V/16A	12.0-14.0	94	100000
LIMF240-23B24	240	24V/10A	24.0-28.0	95.5	50000
LIMF240-23B48		48V/5A	48.0-53.0		25000

Note: 1. *When the output voltage rises, the total power of the product should not exceed the rated power;
2. *Please refer to the derating curve, when the 48V output voltage is adjusted to 53V - 56V.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)		100	--	240	VAC
	AC input		85	--	277	
	DC input		120	--	390	VDC
Maximum Input Voltage	Lasts for 2h without damage		--	--	305	VAC
Input Voltage Frequency			47	--	63	Hz
Input Switching Voltage			--	80	--	VAC
Input Turn-off Voltage			--	60	--	
Input Current	115VAC		--	--	3	A
	230VAC		--	--	1.5	
Inrush Current	115VAC	Cold start	--	14	--	
	230VAC		--	26	--	
Inrush Current Integral (I^2t)	115VAC		--	0.25	--	A^2s
	230VAC		--	0.867	--	

Power Factor	Rated load	115VAC		--	0.99	--	--
		230VAC	24V/48V	--		--	
			12V	--	0.98	--	
THD	230VAC, rated load			--	3	--	%
Start-up Delay Time	115VAC/230VAC, rated load			--	520	--	ms
Rise Time				--	19	--	
Input Fuse	Built-in fuse			--	8	--	A
DC OK Signal	Resistive load			30VDC/1A Max.			
Hot Plug				Unavailable			

Output Specifications

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range			--	±1.0	--	%
Line Regulation	Rated load			--	±0.25	--	
Load Regulation	0% - 100% load			--	±0.5	--	
Power Consumption*	230VAC, rated load	12V		--	11.5	--	W
		24V/48V		--	10.8	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	12V/48V		--	--	150	mV
		24V		--	--	100	
Hold-up Time				--	37	--	ms
Over-current Protection*	115VAC/230VAC			110	150	--	%
Short Circuit Protection*				Hiccup mode, constant current works 1s (Typ.), turn off 10s, continuous, self-recovery			
Over-voltage Protection	12V			⩽18VDC (Hiccup, self-recovery)			
	24V			⩽35VDC (Hiccup, self-recovery)			
	48V			⩽60VDC (Hiccup, self-recovery)			
Over-temperature Protection*	230VAC, rated load	Over-temperature protection start		--	--	105	℃
		Over-temperature protection release		60	--	--	

Note: 1. *The "Tip and barrel method" is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to Enclosed Switching Power Supply Application Notes for specific information;
2. *Over-temperature protection: Put the product into a high temperature box. After the ambient temperature stabilizes, increase the temperature slightly (3℃ to 5℃), and the load remains unchanged. After the product reaches thermal equilibrium, increase the temperature until the product triggers over-temperature protection;
3. *Power consumption curve, over-current protection mode and short circuit protection mode see product characteristic curve.

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Test*	Input - ⏚	Electric strength test for 1min., leakage current <5mA (Isolation Test need to remove the screw at the mark shall ⏣ *)	2500	--	--	VAC
	Input - output		4000	--	--	
	Output - ⏚		500	--	--	
	DC OK - output		500	--	--	
Insulation Resistance	Input - ⏚	At 500VDC	500	--	--	MΩ
	Input - output		500	--	--	
	Output - ⏚		500	--	--	
Operating Temperature			-40	--	+85	℃
Storage Temperature			-40	--	+85	
Operating Humidity		Non-condensing	5	--	95	%RH
Storage Humidity			5	--	90	
Switching Frequency*		PFC	40	--	130	kHz

	DC-DC			50	--	130	
	Auxiliary source			--	65	--	
Power Derating	Operating temperature derating		-40℃ to -25℃	3.34	--	--	%/℃
			+60℃ to +70℃	3.75	--	--	
			+70℃ to +85℃	3.17	--	--	
	Input voltage derating		85VAC - 100VAC	1	--	--	%/VAC
	Output voltage derating	48V	53VDC-56VDC	6.67	--	--	%/VDC
Leakage Current	240VAC	Input - output		<0.5mA			
		Input - ⏚		<0.88mA			
Safety Standard				Design refer to IEC/EN/UL/BS EN62368-1, UL508, UL61010-1, IEC60079-0, IEC60079-7, IEC60079-15			
Safety Class				CLASS I			
MTBF	MIL-HDBK-217F@25℃			980,000 h			
	MIL-HDBK-217F@40℃			878,000 h			
Warranty	Ambient temperature: <40℃			5 years			
High and Low Voltage Crossing				NB/T 31111-2017			

Note: 1. *The gas discharge tube built into the device effectively protects the power supply against damage by asymmetric disturbance variables (eg EN 61000-4-5). Each power supply continuous withstand voltage test will cause extremely high load to the power supply. Therefore, unnecessary loading or damage to the power supply due to excessive test voltage should be avoided. If necessary, disconnect the gas discharge tube built into the device to use a higher test voltage. After successful completion of the test, reconnect the gas discharge tube. Please refer to the "LIMF240-23Bxx Installation and Application Manual" for specific operation methods;
2. *The power supply has three converters with three different switching frequencies. Auxiliary source frequency is nearly constant, other switching frequencies depend on input voltage and load.

Environmental Characteristics

Item	Operating Conditions	Standard
High and Low Temperature Working	+85℃, -40℃	GB2423.1
Sinusoidal Vibration	10 - 500Hz, 2g, three directions of X, Y, Z axis	GB2423.10
Salt Mist	+35℃, 5%NACL, 48h	GB2423.17
Alternating Hot and Humid	+25℃, 95%RH - +60℃, 95%RH	GB2423.4
Low Temperature Storage	-40℃	GB2423.1
High Temperature Storage	+85℃	GB2423.2
High Temperature Aging	+60℃	GB2423.2
Normal Temperature Aging	+25℃	GB2423.1
Temperature Shock	-40℃ to +85℃	GB2423.22
Temperature Cycle	-25℃ to +60℃	GB2423.22
Hot and Humid	+85℃, 85%RH	GB2423.50
High Temperature Elevation	+60℃, 54KPa	GB2423.26
Low Temperature Elevation	-25℃, 54KPa	GB2423.25
Constant Humid and Hot	+40℃, 95%RH	GB2423.3
Random Vibration	5 - 10Hz, ASD 0.3 - 10g²/Hz, three directions of X, Y, Z axis	GB/T 4798.2-2008, IEC60721-3-2
Sinusoidal Vibration Response	10 - 150Hz, 1g, three directions of X, Y, Z axis	GB/T 11287-2000, IEC60255-21-1
Sinusoidal Vibration Endurance Test		
Sinusoidal Impulse Response	15g, pulse duration 11ms, three times in each direction of X, Y, Z axis	GB/T 114537-1993, IEC60255-21-2
Sinusoidal Impact Endurance Test		
Packaging Drop	1m, one corner, three edges and six sides	GB2423.8

Mechanical Specifications

Case Material	Metal (AL5052, SUS304)
Dimensions	124.0 x 121.0 x 48.0mm
Weight	870g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

EMC	Item	Standard	Range	Judge
Emissions	CE (Input port)	CISPR32 EN55032	150K - 30MHz	CLASS B
	CE (Output port)	CISPR32 EN55032	150K - 30MHz	CLASS A
	RE	CISPR32 EN55032	30MHz - 2GHz	CLASS B
	Harmonic current	IEC/EN61000-3-2		CLASS A and CLASS D
	Voltage flicker	EN61000-3-3		
Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV/Air ±15KV	perf. Criteria A
	RS	IEC/EN61000-4-3	20V/m	
	EFT (Input port)	IEC/EN61000-4-4	±4KV	
	EFT (Output port)	IEC/EN61000-4-4	±2kv	
	Surge (Input port)	IEC/EN61000-4-5	L to N ±3KV/L or N to PE ±6KV	
	Surge (Output port)	IEC/EN61000-4-5	line to line ±1KV/line to ground ±2KV	
	MS	IEC/EN61000-4-8	30A/m	
	AC power port harmonics	IEC61000-4-13	CLASS 3	
	Harmonic and network signal			
	Low frequency immunity			
	CS	IEC/EN61000-4-6	0.15 - 80MHz 20Vr.m.s	
	Voltage dips	IEC/EN61000-4-11	0% of 100Vac, 0Vac, 20ms	perf. Criteria A
			40% of 100Vac, 40Vac, 200ms	perf. Criteria C
			70% of 100Vac, 70Vac, 500ms	perf. Criteria A
			0% of 200Vac, 0Vac, 20ms	perf. Criteria A
			40% of 200Vac, 80Vac, 200ms	perf. Criteria A
			70% of 200Vac, 140Vac, 500ms	perf. Criteria A
	Voltage interruption	IEC/EN61000-4-11	0% of 200Vac, 0Vac, 5000ms	perf. Criteria C

Note: perf. Criteria:
A: The equipment shall continue to operate as intended without operator intervention;
B: After the test, the equipment shall continue to operate as intended without operator intervention;
C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

Product Characteristic Curve

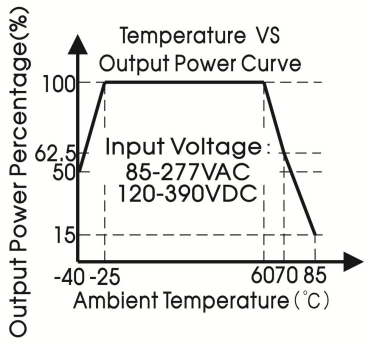


Figure 1

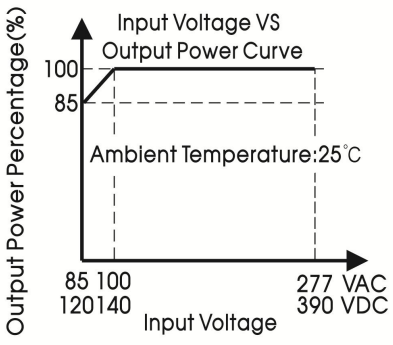


Figure 2

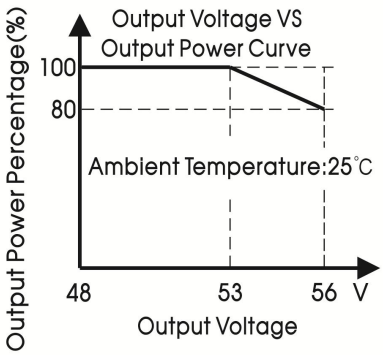


Figure 3

Output voltage VS Output current curve (Typ.)

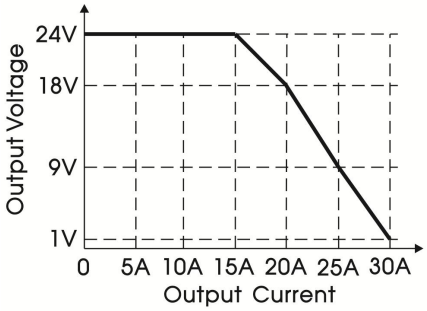


Figure 4

DC OK behavior curve (Typ.)

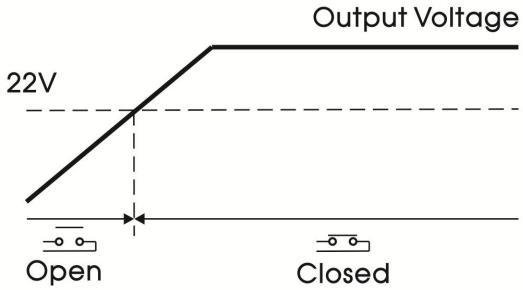


Figure 5

Over-current protection curve (Typ.)

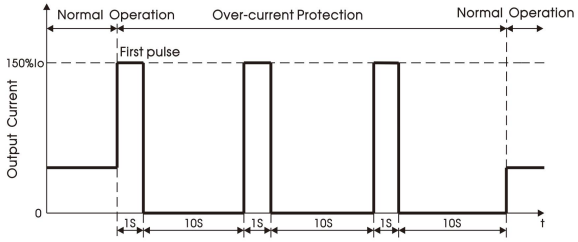


Figure 6

Short circuit protection curve (Typ.)

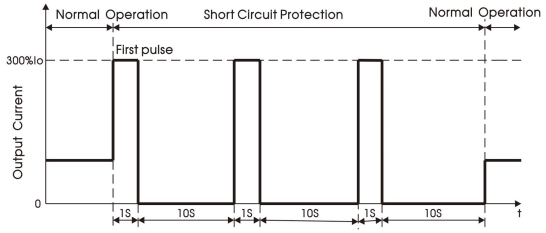


Figure 7

PF Vs Input Voltage (Full Load)

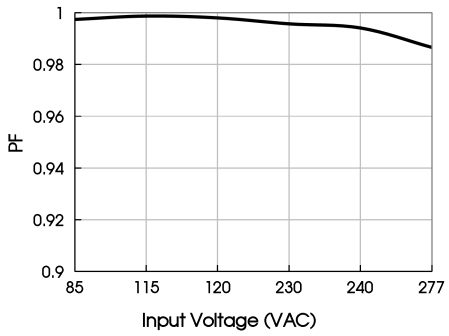


Figure 8

PF Vs Output Load (Vin=230VAC)

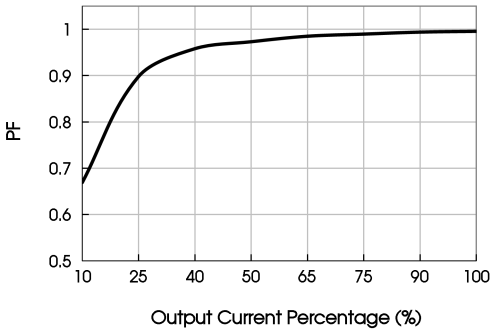


Figure 9

THD Vs Input Voltage (Full Load)

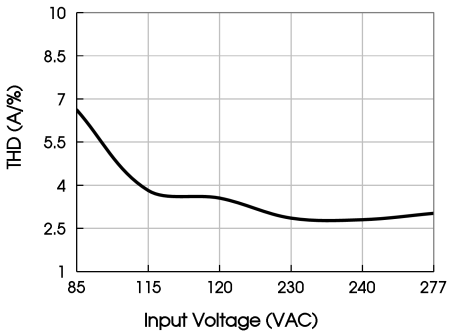


Figure 10

THD Vs Output Load (Vin=230VAC)

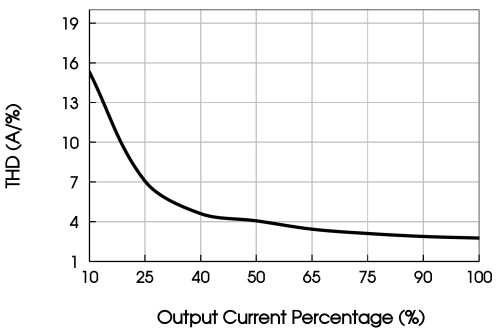


Figure 11

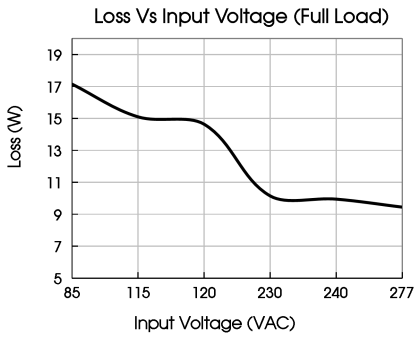


Figure 12

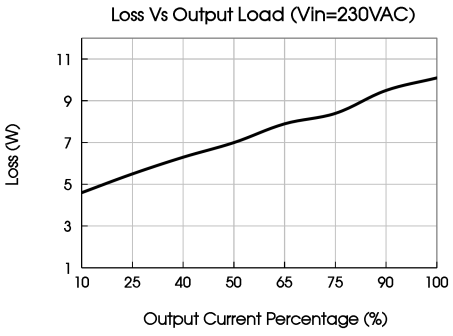


Figure 13

Note: 1.All curves are for 24V output, measured at input 230VAC, 50Hz, output Io, ambient temperature 25℃, unless otherwise stated.
2.With an AC input voltage between 85-100VAC and a DC input between120-140VDC the output power must be derated as per the temperature derating curves;
3.This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.

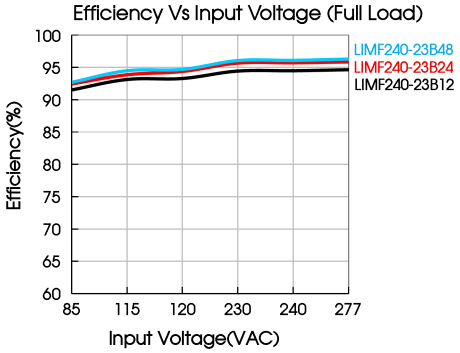


Figure 14

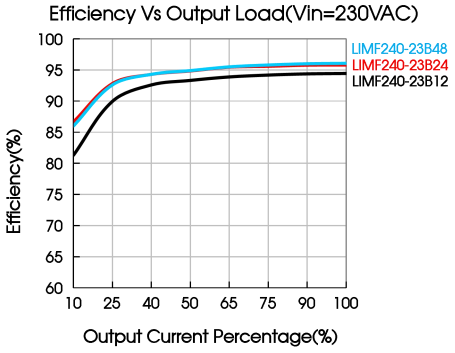
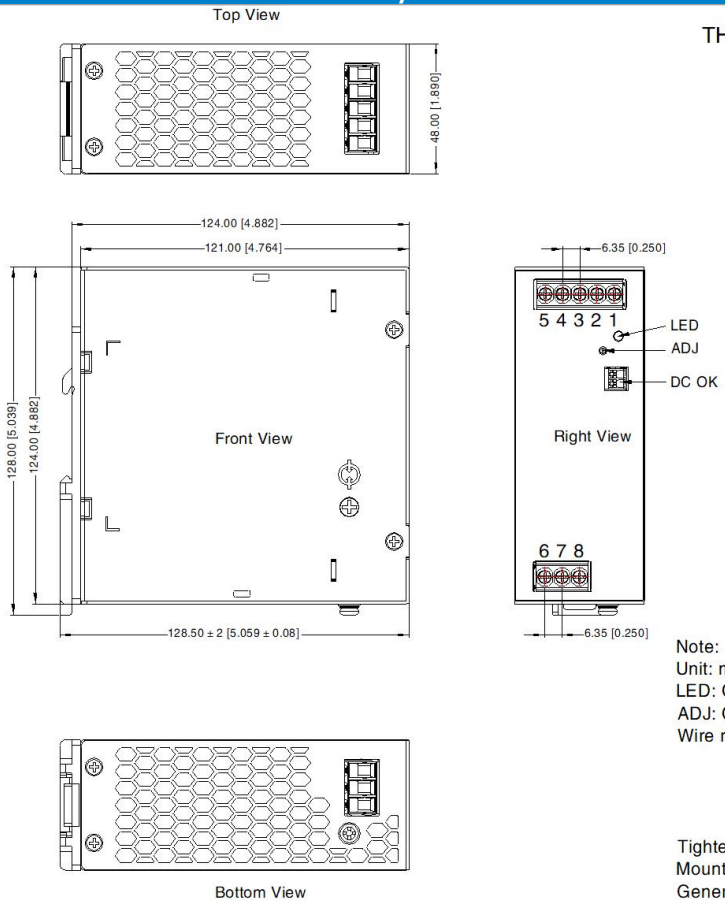


Figure 15

Dimensions and Recommended Layout



THIRD ANGLE PROJECTION

Pin–Out	
Pin	Mark
1	–Vo
2	–Vo
3	–Vo
4	+Vo
5	+Vo
6	AC(N)
7	AC(L)
8	⏚

Note:
Unit: mm[inch]
LED: Output status indicator LED
ADJ: Output adjustable resistor
Wire range: Input: 26–10AWG(12–10AWG for pin8)
Output: 12V: 12–10AWG
24V: 16–10AWG
48V: 18–10AWG
DC OK: 24–16AWG
Tightening torque: Max 0.5N・m
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: ± 1.00[± 0.039]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220282;
2. 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;
3. The room temperature derating of 5℃/1000m is needed for operating altitude greater than 2000m;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. In order to improve the efficiency at high input voltage, there will be audible noise generated, but it does not affect product performance and reliability;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;
9. The output voltage can be adjusted by the ADJ, clockwise to increase;
10. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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