

LMF200-23B Series

200 Watts

- 85-305VAC Active Power Factor Correction
- EN/IEC/UL 62368-1 Approval
- Designed to meet EN60335-1, EN61558-1, EN61558-2-16 for home appliances
- -30 to 70°C operation
- EN55032 Level B conducted & radiated
- 3 Year Warranty



Dimensions:

7.047 x 3.898 x 1.18" (179 x 99 x 30mm)

The LMF200-23B series of industrial enclosed AC-DC power supplies offer up to 201.6W of convection cooled power accepting an extended input range from 85-305VAC. The series has the latest ITE/AV safety approval IEC/EN/UL 62368-1 and meets EN60335-1, EN61558-1, EN61558-2-16 for home appliances and conforms to EMC level B EN55032 conducted and radiated. Outputs are available from 12 to 48V complete with short circuit, over current and over voltage protections.

Models & Ratings

INSTALLATION ADVICE PG5

Model Number ⁽¹⁾	Output power	Output voltage	Output voltage adjustable range	Output current	Efficiency ⁽²⁾	Capacitive load
LMF200-23B12	200.4W	12V	11.4-12.6V	16.7A	88%	4000uF
LMF200-23B15	201W	15V	14.25-15.75V	13.4A	88%	3300uF
LMF200-23B24	201.6W	24V	22.8-25.2V	8.4A	90%	1500uF
LMF200-23B48	201.6W	48V	45.6-50.4V	4.2A	89%	470uF

Notes

1. Add suffix '-C' for terminal cover and 'Q' for conformal coating

2. Typical at 100% load 230VAC.

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	85		305	VAC	See page 3 for de-rating curve
Operating temperature	-30		70	°C	See page 3 for de-rating curve
Efficiency	88		90	%	See table above
Dimensions	7.047 x 3.898 x 1.18" (179 x 99 x 30mm)				
EMC	EN55032 Level B Conducted and Radiated. EN61000-3 and EN61000-4, harmonics, flicker, Surge, EFT, ESD, conducted and radiated				
Safety	IEC/UL/EN 62368-1, CE, CCC				

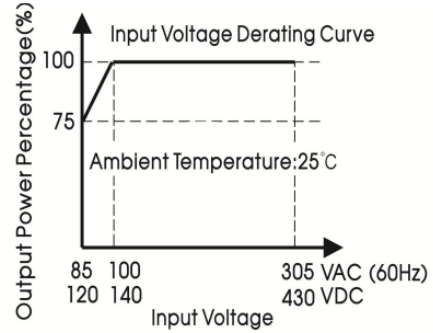
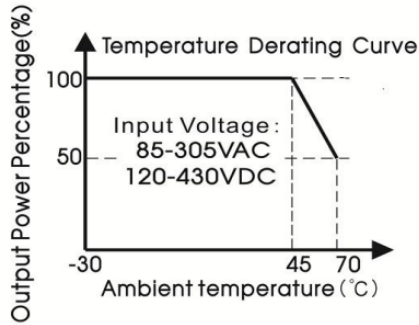
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Input					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Input voltage	85		305	VAC	See page 3 for de-rating curve, 120-430DC
Input frequency	47		63	Hz	
Input current		2.5	3	A	115VAC
		1.3	2		230VAC
Inrush current		35			115 VAC cold start at 25°C
		65			230 VAC cold start at 25°C
Power factor		0.98			At full load 115VAC
		0.95			At full load 230VAC
Standby power		0.75	1	W	230VAC

Output					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	12		48	VDC	See Model & Ratings table
Set point accuracy		±1		%	
Line regulation		±0.5		%	At rated load
Load regulation		±0.5		%	0-100% load 230VAC
Ripple & Noise		150	240	mVpp	20MHz BW 47uF and 0.1uF cap. 150mV for 12/15/24V, 240mV for 48V.
Hold up time		8		mS	230VAC
Overload / Short circuit protection	105		200	%	Trip & restart <5s
Over temperature protection			85	°C	Restart <55°C
Overvoltage protection			16.2	VDC	12V hiccup
			21.8		15V hiccup
			32.4		24V hiccup
			60		48V Hiccup

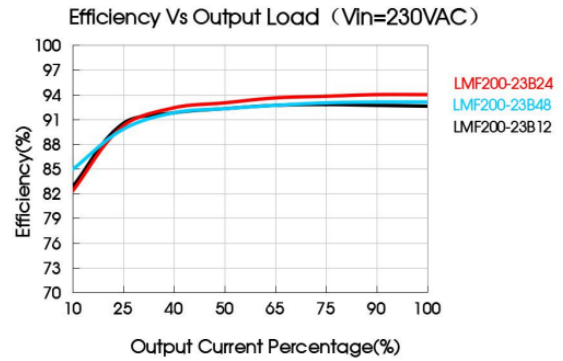
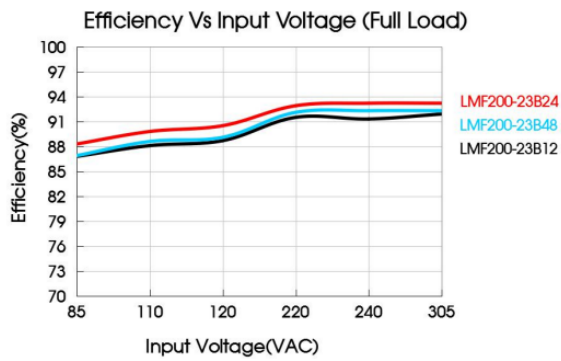
General					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	88		90	%	See models and ratings table
Isolation: Input to Output	4000			VAC	
Input to Ground	2000			VAC	
Output to Ground	500			VAC	
Insulation resistance	100			MΩ	500VDC
Power density			6.22	W/In ³	
MTBF	250			kHrs	MIL-HDBK-217F, rated load, 25°C
Weight		475		g	
Case material	Metal (AL1100, SGCC)				

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Note: 1. With an AC input voltage between 85-100VAC and a DC input between 120-140VDC, the output power must be derated as per the temperature derating curves;

2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.



Environmental

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-30		70	°C	See curve above
Storage temperature	-40		85	°C	
Cooling					Convection cooled
Temperature coefficient			0.03	%/°C	0-45°C
Humidity	20		90	%RH	Non-condensing. 10-95%RH storage
Operating altitude			5000	M	5°C/1000m derating above 2000m

EMC: Emissions

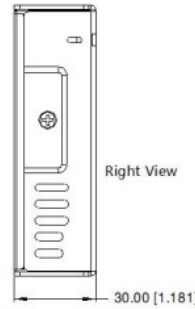
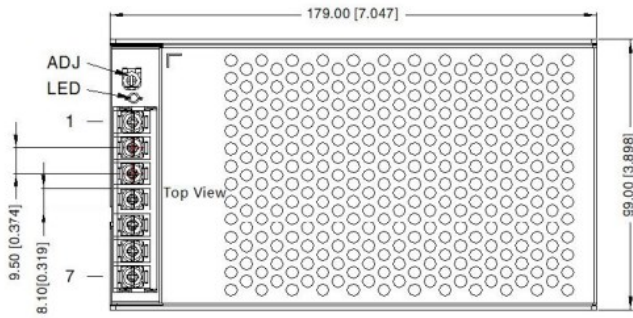
	Standard	Test level	Criteria	Notes & Conditions
Conducted	EN55032	B		
Radiated	EN55032	B		
Harmonic current	EN61000-3-2			Class A and D
Voltage flicker	EN61000-3-3			Compliant

EMC: Immunity

	Standard	Test level	Criteria	Notes & Conditions
ESD	EN61000-4-2	3	A	±6kV contact, ±8kV air
Radiated	EN61000-4-3	3	A	10V/m
EFT	EN61000-4-4	4	A	±4kV
Surges	EN61000-4-5		A	Line to line ±2kV, Common ±4kV
Conducted	EN61000-4-6	3	A	10Vrms
Dips and interruptions	EN61000-4-11	0% 70%	B	

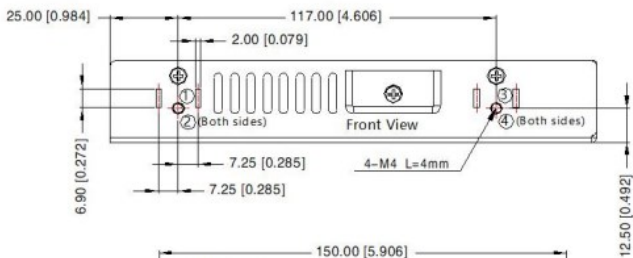
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Mechanical Details



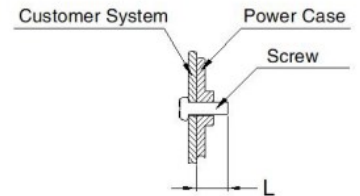
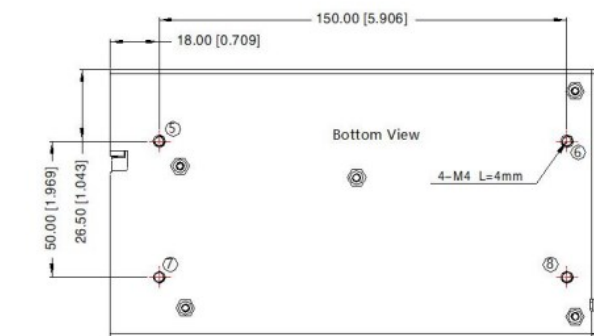
THIRD ANGLE PROJECTION

Pin-Out	
Pin	Function
1	+Vo
2	+Vo
3	-Vo
4	-Vo
5	⊕
6	AC(N)/DC(-)
7	AC(L)/DC(+)



① - ⑧ any position must be connected to the earth(⊕)

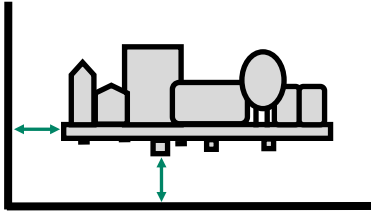
Position	Screw Spec.	L(max)	Torque(max)
① - ⑧	M4	4mm	0.9N·m



Note:
Unit: mm[inch]
Wire range: 22-12AWG
Connector tightening torque: M3.5 , 0.8N·m
General tolerances: ±1.00[±0.039]

Installation Advice

Safety



On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

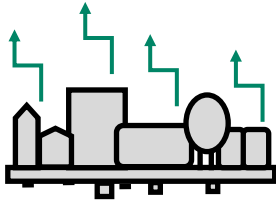
For **Class I** installations there should be 3-4mm between any part of the PSU and any earthed metal part of the enclosure. 3mm is acceptable for IT applications, 4mm required for medical applications. In Class I installations the PSU earth point must be connected to system safety ground.

For **Class II** installations distances may need to be increased if being installed into a surrounding metal enclosure.

Ensure consideration of components on the underside of the PCB or low lying spills when measuring clearance distances between the PSU and the end-equipment. Also top surface especially in tight enclosures such as 1U boxes. An insulation material can be used between PSU and metal if smaller gap required.

FiDUS recommends installing the PSU on 6mm stand offs typically, but check the distances.

EMC

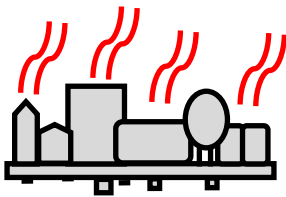


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that can be done to optimise EMC performance either as best practice, or if you are struggling for compliance:

- 1) Connect all marked EMI ground points to earth. Often these are combined with the safety earth point (in class I installations), but on some power supplies there may be additional earth tags or mounting points.
- 2) Minimise the length of input/output wiring where possible and try to maintain max distance of the conductors from the PSU, to prevent noise pick up. Avoid bundling input and output cables together. A common component to avoid placing wiring near is the PFC inductor in power factor corrected power supplies.
- 3) Apply additional filtering before the PSU input (ensure consideration of which frequencies there are issues with before selecting a filter).
- 4) When using an open frame PSU, mount the supply on a metal plate and connect EMI mounting points.
- 5) In multi circuit systems, decouple the circuits locally.
- 6) Ferrites added between the PSU and system input connector and/or the DC output cables can help in reducing radiated noise issues in systems. If seen, issues are commonly in the 30-150MHz area.

For more detailed assistance, if you still have any concerns with compliance, please get in contact with our Engineering department who are on hand to assist with any queries.

Thermal



Thermal management is an important consideration when thinking about equipment service life. Electrolytic capacitors within the PSU wear with time and are typically the first end-of-life failure. Keeping the operation temperature of key components within the PSU, such as the electrolytic capacitors, as low as possible is paramount. As a general rule, for every 10°C drop in the operating temperature of the electrolytic capacitors you double their lifetime, and thus the lifetime of the power supply. When looking at thermal performance it is helpful to test under a worst-case set of conditions, to ensure component temperatures are in an acceptable range for the required service life. Then consider the impact of operational time, load and temperature profile to estimate a more realistic lifetime for your PSU.

Also, many FiDUS power supplies offer a *Peak Power* rating to provide for customers with pulsing loads. When using a peak power capability customers must consider:

- 1) Peak duration rating: the maximum length of time the peak can be drawn for
- 2) Duty cycle: the frequency with which the peak can be drawn. (e.g. 10% duty cycle, 1 second on:9 seconds off)
- 3) Average power value: datasheets will state the maximum average power acceptable with peak power PSUs. If any of these elements are exceeded the supply may overheat, with performance and lifetime suffering as a result.