LMF75-23B Series

FiDUS power in motion...

75 Watts

- 85-305VAC and 4000VAC isolation
- Meets EN60335-1, EN61558-1, EN61558-2-16 for home appliances
- EN/IEC62368-1 Approval
- -30 to 70°C operation
- EN55032 Level B conducted & radiated

The LMF75-23B series of indusial enclosed PFC AC-DC power supplies offer up to 76.8W of power accepting an extended input range of 85-305VAC. The series has the latest ITE/AV safety approval IEC/EN 62368-1, 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 5 to 48V complete with short circuit, over current and over voltage protections.

Dimensions:

6.26 x 3.819 x 1.181" (159 x 97 x 30mm)

Models & Ratings

INSTALLATION ADVICE PG5

Model Number (1)	Output power	Output voltage	Output voltage adjustable range	Output current	Efficiency (2)	Capacitive load
LMF75-23B05	75W	5V	4.75-5.5V	15A	81%	10000uF
LMF75-23B12	75.6W	12V	11.4-13.2V	6.3A	84%	6000uF
LMF75-23B15	75W	15V	14.3-16.5V	5A	85%	5000uF
LMF75-23B24	76.8W	24V	22.8-26.4V	3.2A	86%	1500uF
LMF75-23B48	76.8W	48V	45.6-52.8V	1.6A	88%	680uF

Notes

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

2. Typical at 100% load 230VAC.

General

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	81		88	%	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, 25±5°C <95%RH
Switching frequency		65		kHz	
Power density			2.72	W/In^3	
MTBF	300			kHrs	MIL-HDBK-217F, rated load, 25°C
Weight		380		g	
Case material	Metal (AL1100, SGCC)				

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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			1	A	115VAC
			0.6		230VAC
Inrush current		20			115 VAC cold start at 25°C
		35			230 VAC cold start at 25°C
Power factor	0.93		0.98		Full load. 0.98 at 115VAC and 0.95 at 230VAC. EN61000-23-2 Class A
leakage current	2			mA	277VAC

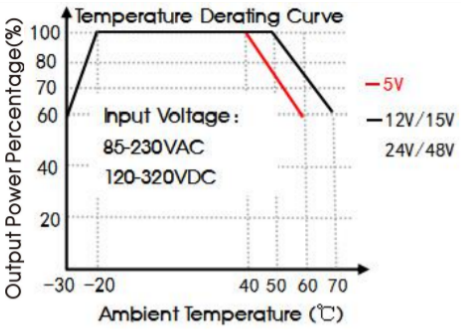
Output

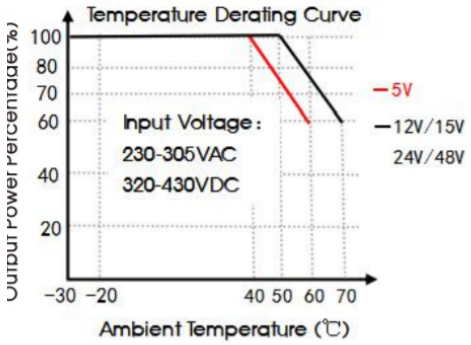
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	5		48	VDC	See Model & Ratings table
Set point accuracy		±2		%	
Line regulation		±0.5		%	
Load regulation	±0.5		±1	%	5V ±1%, all others ±0.5%
Minimum load	0			%	
Ripple & Noise: 5V-24V others			120 200	mVpp	20MHz BW 47uF and 0.1uF cap.
Hold up time		16		mS	230VAC
Overload / Short circuit protection	105			%	Trip & restart
Over temperature protection			85	°C	Restart at 50°C. Should be tested under rated full load condition
Overvoltage protection			7	VDC	5V hiccup
			20		12V hiccup
			25		15V hiccup
			32.4		24V hiccup
			60		48V Hiccup
Remote on/off	0		0.8		Power on
	4		10		Power off

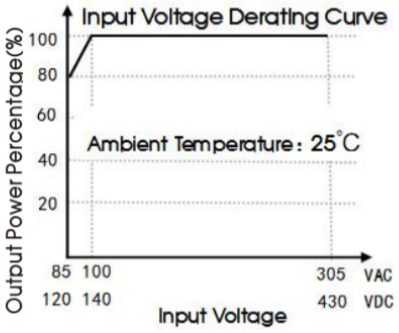
Key specifications

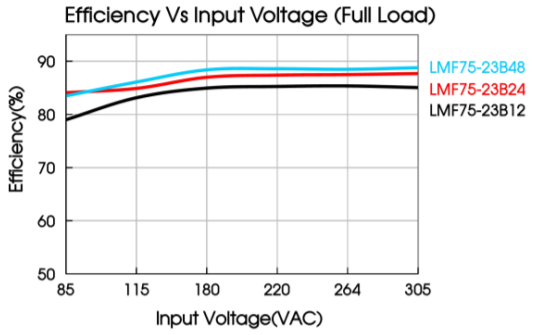
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	85		305	VAC	See page 3 for de-rating curve
Operating temperature	-30		70	°C	See page 3 for de-rating curve
Efficiency	81		88	%	See table on page 1
Dimensions	6.26 x 3.819 x 1.181" (159 x 97 x 30mm)				
EMC	EN55032 Level B Conducted and Radiated. EN61000-3 and EN61000-4, harmonics, flicker, Surge, EFT, ESD, conducted and radiated				
Safety	EN/IEC 62368-1, CE, CCC				

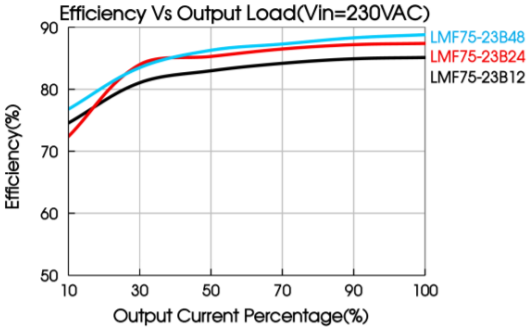
LMF75-23B Series











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	
Humidity	20		90	%RH	Non-condensing. 10-95%RH storage
Operating altitude			5000	M	5°C/1000m derating above 2000m

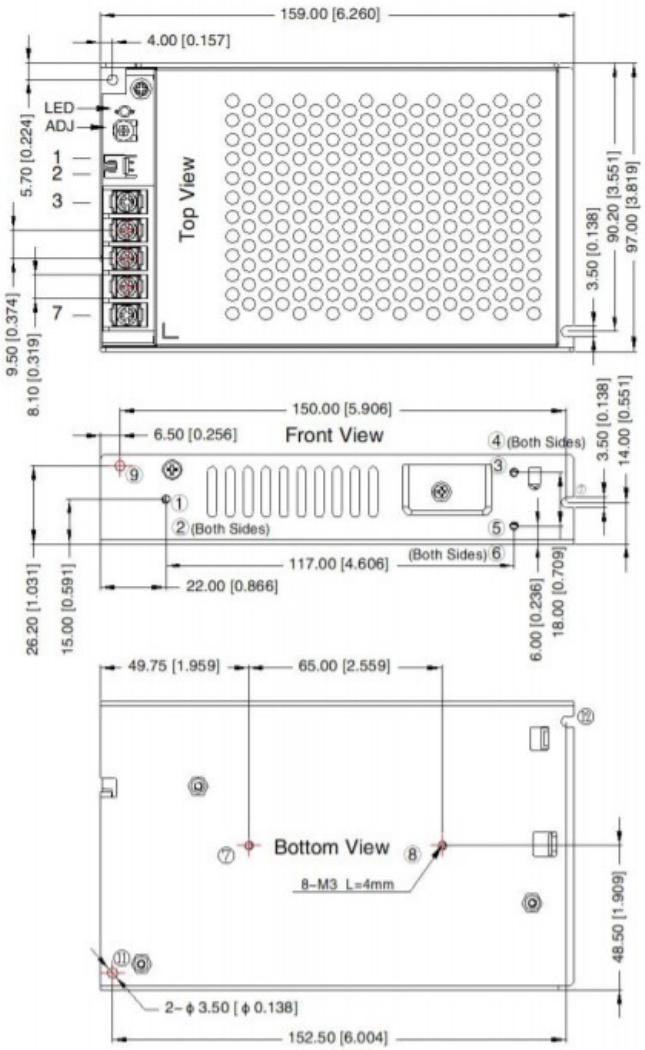
EMC: Emissions

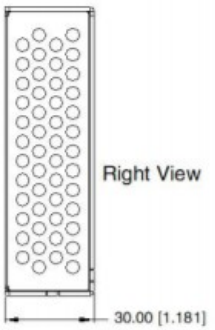
	Standard	Test level	Criteria	Notes & Conditions
Conducted	EN55032	B		
Radiated	EN55032	B		
Harmonics	EN61000-3-2			Class A
Flicker	EN61000-3-3			Compliant

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	3	A	±2kV
Surges	EN61000-4-5	Installation Class 3	A	Line to line ±2kV, Common ±4kV
Conducted	EN61000-4-6	3	A	10Vrms
Dips and interruptions	EN61000-4-11	0% 70%	B	

Mechanical Details



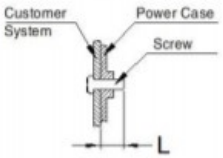


Pin–Out	
Pin	Mark
1	RC+
2	RC–
3	+Vo
4	–Vo
5	⏚
6	AC(N)
7	AC(L)

CN1: JST S2B–XH–A or equivalent			
Pin	Mark	Connector	Terminal
1	RC+	JST: XHP–2 or equivalent	JST: SXH–001T/SXH–002T or equivalent
2	RC–		

① – ⑫ any position must be connected to the earth(⏚)

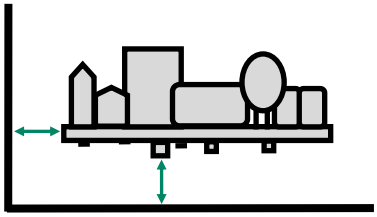
Position	Screw Spec.	L(max)	Torque(max)
① – ⑧	M3	4mm	0.4N · m



Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
Wire range: 22–12AWG
Tightening torque: M3.5, 0.8N · m(Max)
General tolerances: ± 1.00[± 0.039]

Installation Advice

Safety

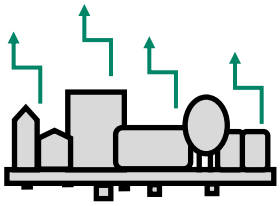


On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

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

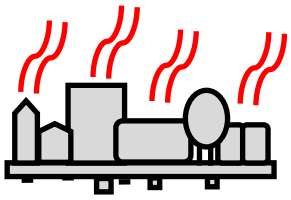


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that 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 capacitators 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.