LMF1000-20B SERIES

AC-DC

1000W

DIMENSIONS:

7.48 x 5.00 x 1.594"
(190 x 127 x 40.5mm)

3+1 PARALLEL REDUNDANCY

5S CONSTANT CURRENT

I2C COMMUNICATION

EN55032 LEVEL B

COMPACT SIZE

4000VAC ISOLATION

Part numbers

LMF	1000	-	20B	12	-	QQ
Series	Power (W)		Input voltage	Output voltage		Options
			90-264VAC	12 = 12VDC 15 = 15VDC 24 = 24VDC 27 = 27VDC 36 = 36VDC 48 = 48VDC 54 = 54VDC		-QQ = conformal coating both sides

Key specifications

Input range	Safety certification	Features	Efficiency	Environmental performance
90-264VAC	IEC/UL/EN 62368-1, CE, CCC, IEC 60601-1	Remote on-off Remote sense DC OK 5V/1A standby Built in fan Voltage adjust	92-94%	Operational: -40 to 70°C

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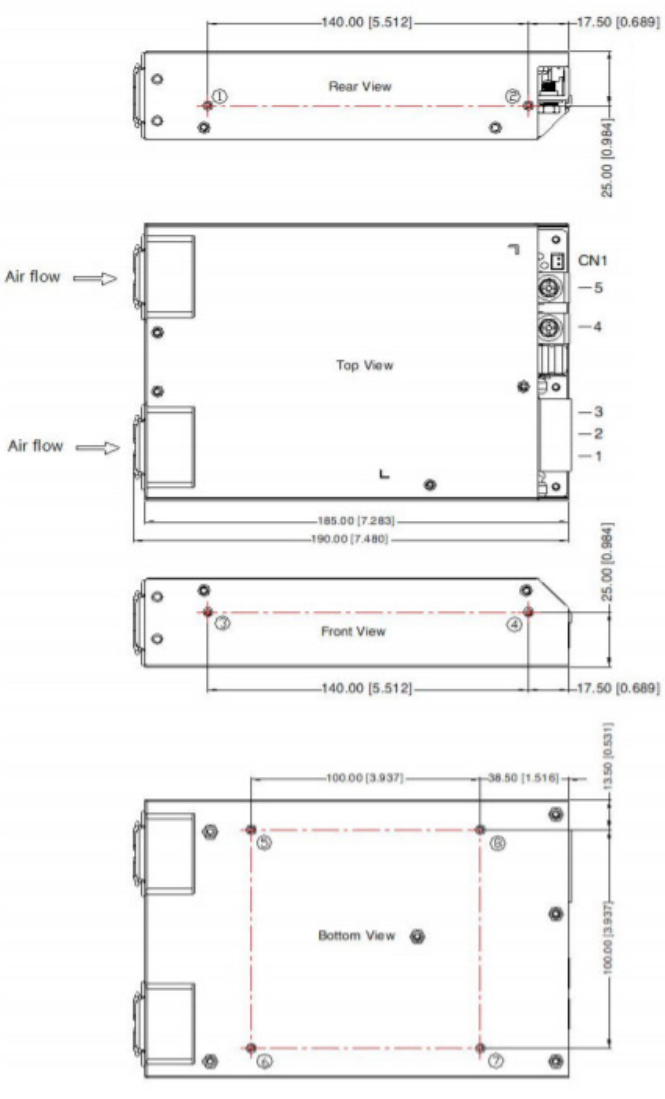
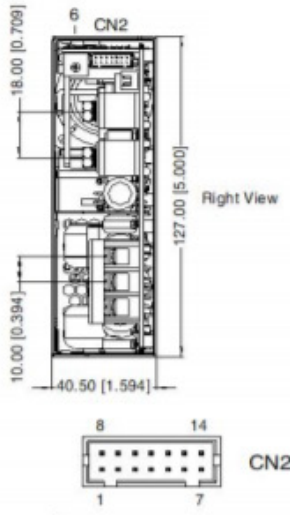
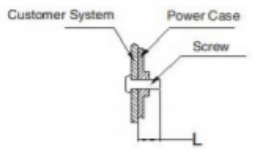
Mechanical

THIRD ANGLE PROJECTION

Position	Screw Spec.	L(Recommend)	Torque(max)
①－⑧	M3	3mm	0.8N・m







Connector	Pin/Function
1	AC(L)
2	AC(N)
3	GND
4	-VO
5	+VO
6	ADJ

JST PHDR-14VS			
Pin	Function	Pin	Function
1	VS+	2	CURRENT SHARE
3	DC_OK	4	SCL
5	SDA	6	PS_ON
7	GND	8	VS-
9	ADDRESS0	10	ADDRESS1
11	ADDRESS2	12	RXD
13	TXD	14	GND

Notes

1. All dimensions shown in mm [Inch]
2. General tolerance ±1.00 [±0.039]
3. Pin 1,2,3 wire range: 22-12AWG
4. Pin 1,2,3 Connector lightening torque: M4, 1.2N-m
5. Pin 4,5 Connector lightening torque: M5, 2.3N-m

Weight	1250g

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Models & Ratings

Model Number(1)	Output power	Output voltage	Output voltage adjustable range	Output current	Efficiency (2)	Capacitive load
LMF1000-20B12	960W	12V	12-14.4V	80A	92%	40000uF
LMF1000-20B15	960W	15V	15-18V	64A	92%	20000uF
LMF1000-20B24	1008W	24V	24-28.8V	42A	94%	10000uF
LMF1000-20B27	1007W	27V	27-32.4V	37.3A	94%	8000uF
LMF1000-20B36	1008W	36V	35-43.2V	28.8A	94%	6000uF
LMF1000-20B48	1008W	48V	48-56V	21A	94%	4000uF
LMF1000-20B54	1009W	54V	54-58V	18.7A	94%	3000uF

1. Add -QQ for conformal coating
2. Typical at 100% load 230VAC
3. Remote sense compensation 500mV
4. 5V 2A stand by supports max capacitive load of 100uF

Input

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Input voltage	90		264	VAC	See page 5 for derating curve, 120-370DC
Input frequency	47		63	Hz	
Input current (rms)			12	A	115VAC
			6		230VAC
Inrush current		20/40		A	115/230VAC cold start at 25°C
Power factor	0.95		0.99		Full load. 0.99 at 115VAC and 0.95 230VAC
Leakage current			0.5	mA	

Output

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Output voltage	12		54	VDC	See Models & Ratings table
Set point accuracy		±1		%	±2 for 5V standby
Line regulation		±0.5		%	At rated load, ±1for 5V standby
Load regulation		±0.5		%	0-100% load 230VAC, ±1 for 5V standby
Ripple & noise	100	150	200	mVpp	20 MHz bandwidth, 47uF, 0.1uF cap 100mV for 5V SB, 150mV for 12-27V, 200mV for others
Hold up time		12		mS	115 or 230VAC

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Features

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Remote control	PS_On (CN2 Pin6) and GND (CN2 Pin7/14) are short				Power on
	PS_On (CN2 Pin6) and GND (CN2 Pin7/14) are open				Power off
DC OK signal	2.5		5	V	Power on
			0.5	V	Power off
Current share accuracy		5		%	When in parallel each unit must be loaded >50%
Remote sense		200		mV	Line drop compensation
Oring					Support direct parallel use, achieve 3+1 parallel redundancy
SDA, SCL for I2C					Internal 2.4 KΩ pull-up resistor to internal 3.3V
LED status signal					Normal output : Green, Abnormal output/ protected : Red Power off : light off

Protections

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Overload	110			%	Trip and restart
Short circuit					Trip and restart. Automatic recovery <3sec
Overvoltage	5V standby hiccup model - 7V 12V model - 16.5V 15V model - 21V 24V model - 33V 27V model - 35V 36V model - 48V 48V model - 60V 54V model - 63V			VDC	Max figures. Hiccup

Safety

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Safety standards	IEC/UL/EN 62368-1, CE, CCC, IEC60601-1				CE & CCC
Isolation: Input to output	4000			VAC	
Isolation: Input to ground	2000			VAC	1500VAC from output to ground
Insulation resistance	100			MΩ	500VDC, 25°C <95% RH

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EMC: Immunity

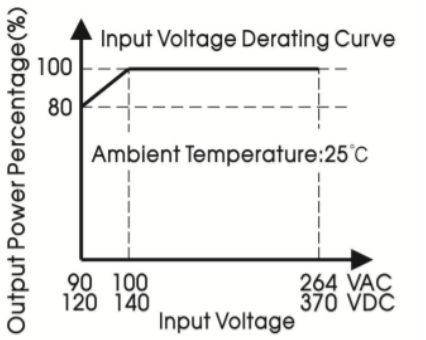
	Standard	Test level	Criteria	Notes/Conditions
ESD	EN61000-4-2	4	A	±8kV contact, ±15kV air
Radiated	EN61000-4-3	3	A	10V/m
EFT	EN61000-4-4	4	A	±4kV
Surges	EN61000-4-5		A	Line to line ±2kV, common ±4kV
Conducted	EN61000-4-6	3	A	10Vrms
Voltage dips & interruptions	EN61000-4-11	0% 70%	B	

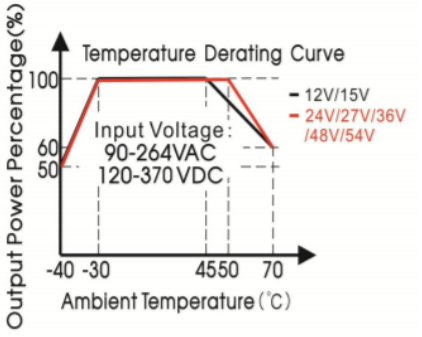
EMC: Emissions

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

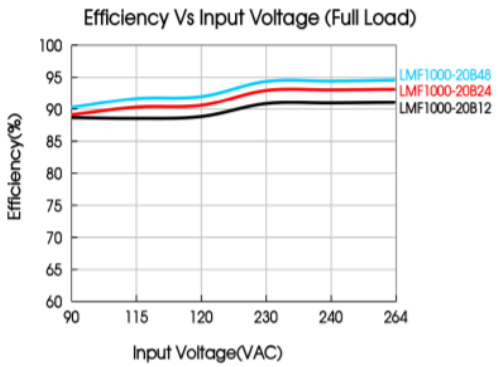
Environmental

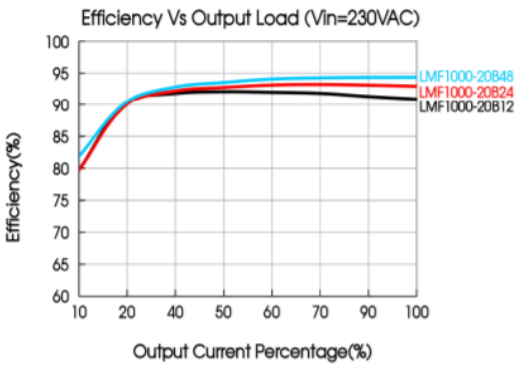
Parameter	Min	Typical	Max	Unit	Notes/Conditions
Operating temperature	-40		70	°C	See derating curve.
Storage temperature	-40		85	°C	
Cooling					Forced cooled
Temperature coefficient			0.03	%/°C	
Humidity	20		90	% RH	Non condensing. Storage 10-95% RH storage
Operating altitude			5000	M	5°C/1000m derating above 2000m
MTBF	300			kHrs	As per MIL-HDBK-217F rated load @25°C





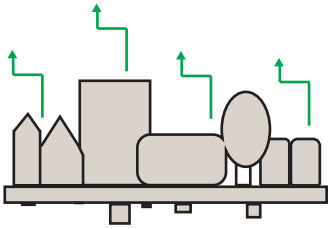
Note: With an AC input voltage between 90-100VAC and a DC input between 120-140VDC the output power must be derated as per the temperature derating curves.





Installation Advice

EMC

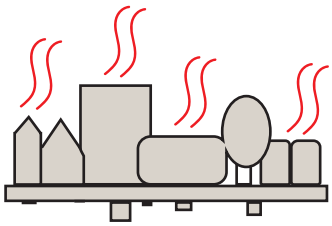


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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