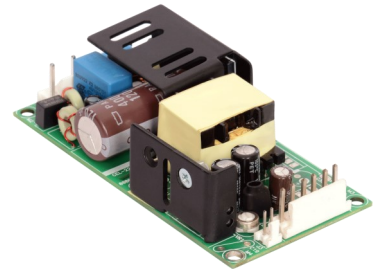


MWLT60 Series

60 Watts

- 4 x 2" footprint
- -20 to 70°C operation
- Single / triple outputs
- Cover kit available
- EN55011 Level B conducted & radiated
- 5 Year warranty



Dimensions:

4 x 2 x 1.2" (101.6 x 50.8 x 30.48mm)

The MWLT60 series of low profile, open frame AC-DC power modules offer 50-65W convection cooled standard 4" x 2" package. They are chassis mount, low noise, low no load (<0.3W), have a cover kit option and have a wide operating temperature of -20 to 70°C, in a range of voltages from 5V to 48V in single / triple outputs and all come with a FiDUS 5 year warranty.

Models & Ratings

INSTALLATION ADVICE PG5

Model Number ⁽¹⁾	Voltage 1	Maximum Load 1 ⁽²⁾	Minimum Load 1 ⁽³⁾	Voltage 2	Maximum Load 2 ⁽²⁾	Minimum Load 2 ⁽³⁾	Voltage 3	Maximum Load 3 ⁽²⁾	Minimum Load 3 ⁽³⁾
LFMWLT60-1000	5.1V	10.0A	0A						
LFMWLT60-1001	12V	5.42A	0A						
LFMWLT60-1002	15V	4.33A	0A						
LFMWLT60-1003	24V	2.71A	0A						
LFMWLT60-1004	48V	1.53A	0A						
LFMWLT60-3000	5.2V	8.0A	0.5A	12.5V	3.0A	0.1A	-12.8V	0.5A	0A
LFMWLT60-3001	5.2V	8.0A	0.5A	24V	1.5A	0.1A	-12.8V	0.5A	0A
LFMWLT60-3002	5.2V	8.0A	0.5A	15V	2.5A	0.1A	-15V	0.5A	0A
LFMWLT60-3003	3.3V	6.0A	1.0A	5.2V	3.0A	0.1A	-12.8V	0.5A	0A

Notes

1. For cover kit add -CK. Add suffix "-2" for class II product. Cover kit derates to 70%
2. Single outputs deliver 65W except MWLT60-1001 (50W). Triple outputs deliver 60W except MWLT60-3003 (45W). Max load per channel – do not exceed rated power
3. Minimum load required to meet cross regulation

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	80		264	VAC	Derate output linearly to 80% from 90VAC to 80VAC
Operating temperature	-20		70	°C	See derating curve p3.
Efficiency	>85% (at 120VAC), for MWLT60-3003 75% typical				
Dimensions	4 x 2 x 1.2" (101.6 x 50.8 x 30.48mm)				
EMC	EN55011 Level B conducted and radiated EN61000-3 and EN61000-4, harmonics, flicker, surge, EFT, ESD, conducted and radiated. EN60601-1-2 immunity				
Safety	IEC60601-1, EN60601-1, ES60601-1, CSA22.2 No 60601-1, CE				

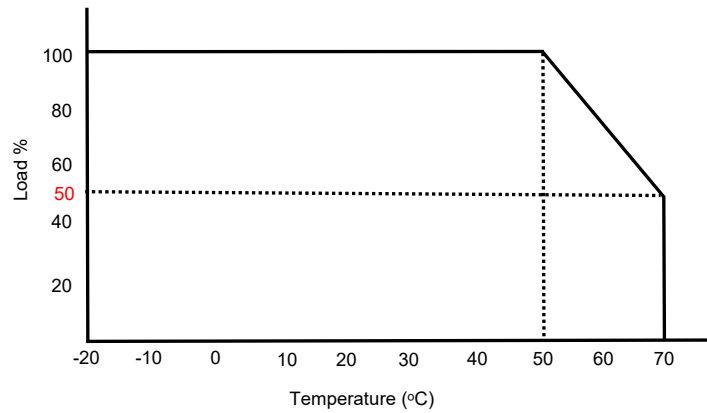
Input					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Input voltage	80		264	VAC	Derate output linearly to 80% from 90VAC to 80VAC
Input frequency	47		63	Hz	400Hz units available, please ask sales
Power factor					EN61000-3-2 class A compliant, at full load.
Input current (rms)			1.5	A	At 120VAC
			0.75		At 230VAC
Inrush current			<30	A	120VAC cold start at 25°C
			<60		230VAC cold start at 25°C
No load input power	<0.3		<0.5	W	0.3W for single outputs and 0.5W for triple outputs

Output					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	5		48	VDC	See Model & Ratings table
Output Voltage Adjust		±10		%	V1
Set point accuracy	±3		±5	%	±3% V1, ±5% V2&3
Line regulation			±0.3	%	
Load regulation	±0.5		±5	%	0.5% for V1 and ±5% for V2 & 3
Minimum load				%	See table on pg1
Transient response			10	%	50% step change 0.1A/uS slew 50% duty 50Hz in <5ms
Ripple & Noise	1		1.5	%	All models measured with 0.1uF ceramic and 10uF electrolytic capacitor. 20 MHz bandwidth. At rated line and full load. 1.5% for V1 of 3003 model and V1 of triple output models.
Hold up time		>10		ms	At full load at 120VAC
Overload protection		130		%	Automatic recovery
Short circuit protection					Automatic recovery
Overvoltage protection		130		%	For V1 only. Automatic recovery
Leakage current	500		1000	uA	500uA for 120VAC, 1000uA for 230VAC

General					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	>85% (at 120VAC), for WLT60-3003 75% typical				
Isolation: Input to Output	4000			VAC	2x MOPP
Input to Ground	1500			VAC	1x MOPP
Switching frequency		67		kHz	
Power density			6.77	W/in ³	
MTBF	>1.87			MHrs	As per Telcordia-SR332- issue 3
Weight		150		g	

Environmental					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-20		70	°C	Please see derating curve on page 3
Storage temperature	-40		85	°C	
Cooling					Convection cooled
Altitude	10000		40000	ft	10000 operating 40000 non operating
Humidity			95	% RH	Non condensing

Derating curve



EMC: Emissions

	Standard	Test level	Criteria	Notes & Conditions
Conducted	EN55011	B		CISPR22-B, FCC PART15-B
Radiated	EN55011	B		
Harmonic current	EN61000-3-2	Class A		
Voltage flicker	EN61000-3-3			

EMC: Immunity

	Standard	Test level	Criteria	Notes & Conditions
ESD	EN61000-4-2	4	A	±8 contact, ±15 air.
Radiated	EN61000-4-3	3	A	10V/m 80MHz-2.7GHz sine wave 80% AM 1kHz
EFT	EN61000-4-4	3	A	2kV Power, 1kV I/O 5kHz (Ed4)
Surges	EN61000-4-5	Installation Class 3	A	1kV Live-Neutral, 2kV Live/Neutral—Earth
Conducted	EN61000-4-6	3	A	10V, 0.15 to 80MHz sine wave 80AM 1kHz
Magnetic Fields	EN61000-4-8	4	A	30A/m
Voltage Dips and Interruptions	EN61000-4-11		A,B	

Safety Approvals

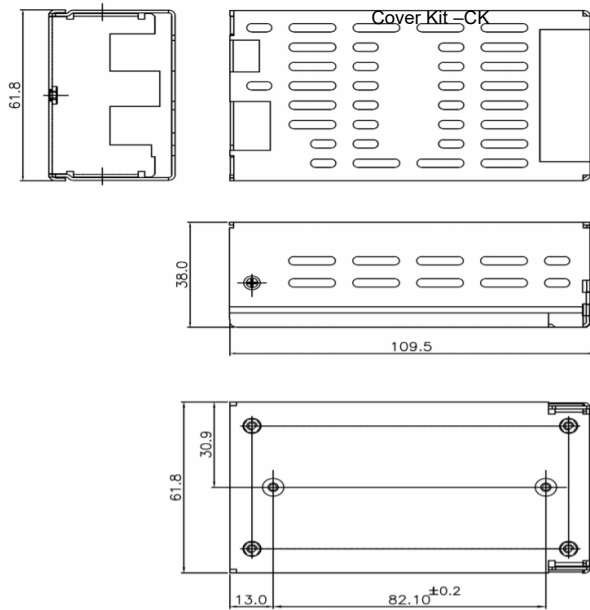
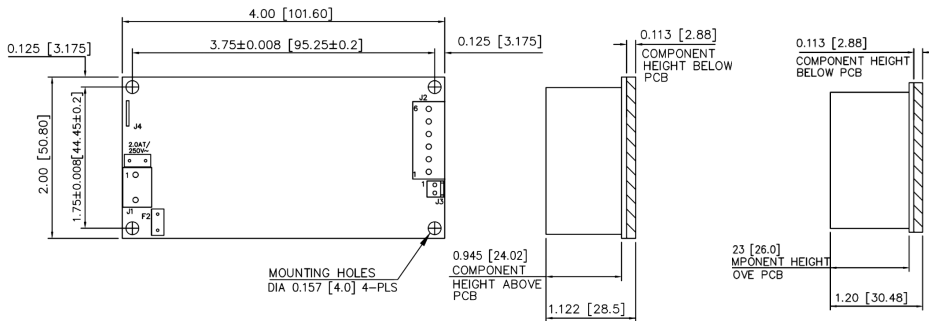
	Safety standard	Notes & Conditions
UL/CSA	ANSI/AAMI ES60601-1 (2005+C1:19+A2:10) CAN/CSA-22.2 No 60601-1 (2008)	E173812
CB	IEC60601-1 3.1 Ed	Class I NO90138, Class II NO73023
EU	EN60601-1 3rd Ed	Class I P16220642, Class II P13216630
CE		2014/35/EU Low Voltage Directive

Mechanical Details

Open frame

LFMWLT60-100X

LFMWLT60-300X



J1: Input Connector⁽²⁾

Pin Connections

Pin	Function
1	AC Line
2	AC Neutral

J2: Output Connector⁽³⁾

Pin Connections

Pin	Function
1	+V1
2	+V1
3	RTN
4	RTN
5	+V3 / NC
6	+V2 / NC

J3: I/O Connector⁽⁴⁾

Pin Connections

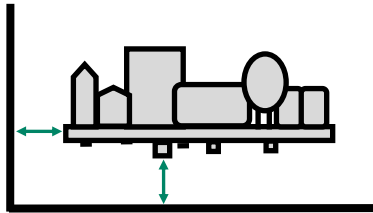
Pin	Function
1	+ Sense
2	- Sense

Notes

- All dimensions shown in mm general tolerance ± 0.5
- J1: Input connector details Molex: 26-60-4030 mating part: Molex 09-50-3031 or equivalent. Earth tab Molex 19705-4301 mating part 190030001
- J2: Output connector details Tyco: 640445-6 mating part Tyco: 647402 or equivalent
- J3: Signal connector details Molex: 22-23-2021 mating part Molex: 22-01-2021
- For PCB mount use stand off diameter 5.4mm max, screw head size 6mm diameter max and washer 6.5mm diameter max.

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.

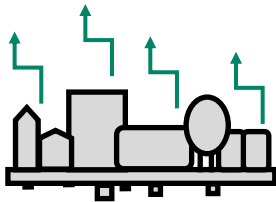
For **Class I** installations there should be 3-4mm between any part of the PSU and any earthed metal part of the enclosure. 3mm is acceptable for IT applications, 4mm required for medical applications. In Class I installations the PSU earth point must be connected to system safety ground.

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

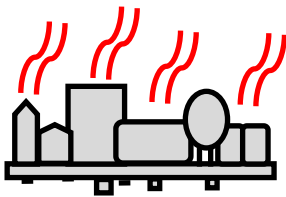


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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

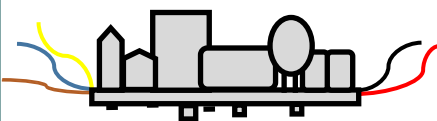


Thermal management is an important consideration when thinking about equipment service life. Electrolytic capacitors within the PSU wear with time and are typically the first end-of-life failure. Keeping the operation temperature of key components within the PSU, such as the electrolytic capacitors, 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.

Connectivity



All FiDUS Power engineering samples requested will arrive with a free of charge loom kit for ease of testing.

The loom kit connects to the input/output terminals of the PSU and provides the customer with bare wire ends to connect with.

The loom kits can also prove advantageous for ease of installation in production. Please contact sales if you are interested in including the loom kit in your quotation. Alternatively the input/output connector and mating part details can be found in the attached table.

	Part Number	Mating Part Number
Input	Molex: 26-60-4030	Molex: 09-50-3031
Output	Tyco: 640445-6	Tyco: 647402
Loom Kit	WLT40LK1 or WLT40LK3	