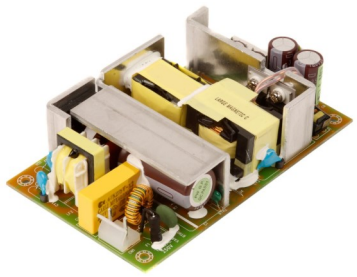
TLL120 Series

FiDUS
power in motion...

120 Watts

- 120W Convection cooled
- Industry standard 3 x 5” footprint
- Competitive pricing
- Universal input 90-264VAC
- Active PFC
- EN55022 Level B conducted & radiated
- 5 Year warranty



The TLL120 series of open frame AC-DC power supplies provide 120W of power from a 3” x 5” footprint without the need for fan cooling. The units are chassis mount and have low emissions meeting EN55022 level B for conducted emissions. The range is competitively priced for cost sensitive applications with outputs available from 12 to 48V. All come with a FiDUS 5 year warranty.

Dimensions:

5 x 3 x 1.18” (127 x 76.2 x 30mm)

Models & Ratings

INSTALLATION ADVICE PG4

Model Number	Output Power	Output voltage	Output Current	Average Efficiency
TLL12012	120W	12V	10A	85%
TLL12015	120W	15V	8A	85%
TLL12018	120W	18V	6.67A	85%
TLL12024	120W	24V	5A	85%
TLL12030	120W	30V	4A	85%
TLL12032	120W	32V	3.75A	85%
TLL12036	120W	36V	3.34A	85%
TLL12048	120W	48V	2.5A	85%

Notes

1. Loom kits available, see Installation Advice, pg4

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	90		264	VAC	No derating
Operating temperature	0		60	°C	Derate linearly from 100% power at 40°C to 50% power at 60°C
Efficiency	>85% typical at full load, 115VAC				
Dimensions	5 x 3 x 1.18” (127 x 76.2 x 30mm)				
EMC	EN55022 Level B conducted and radiated. EN61000-3 and EN61000-4, harmonics, flicker, Surge, EFT, ESD, conducted and radiated.				
Safety	IEC/EN/UL 62368-1				

Input

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Input voltage	90		264	VAC	No derating
Input frequency	47		63	Hz	
Power factor	>0.95 at 115VAC, >0.9 at 230VAC at full load				EN61000-3-2 class A compliant
Input current (rms)			2.5	A	At 115VAC
			1.25		At 230VAC max
Inrush current			<30	A	115VAC cold start at 25°C
			<60		230VAC cold start at 25°C
No load input power			1	W	

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Output

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	12		48	VDC	See Model & Ratings table
Set point accuracy			±3	%	12V output
			±2		All other models
Line regulation			±3	%	
Load regulation			±3	%	
Minimum load	0			%	
Transient response			10	%	10% max deviation (10mS for 0%-50% load and 50%
Ripple & Noise	12V output 120mV. 15V output 150mV. 18V output 180mV. 24V output 240mV. 30V output 300mV. 32V output 320mV. 36V output 360mV. 48V output 480mV.			mV(Vp-p)	All models measured with 0.1uF ceramic and 10uF electrolytic capacitor. 20 MHz bandwidth.
Hold up time		>16		ms	At full load, 115VAC
Overload protection	105		150	%	
Short circuit protection					Trip and restart. Automatic recovery
Overvoltage protection	110		130	%	Shutdown

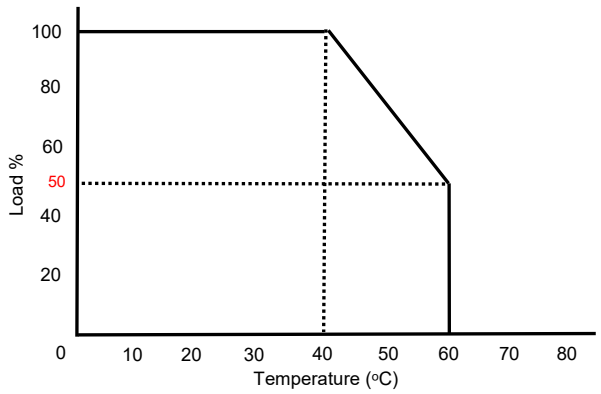
General

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	>85% typical at full load, 115VAC				
Isolation: Primary to Secondary			3000	VAC	
Primary to Ground			1500	VAC	
Touch current	0.24		0.7	mA	0.24 with “e” switch closed, 0.7 with “e” switch open
Switching frequency	50		60	KHz	
Power density			6.8	W/In^3	
MTBF		>100		KHrs	As per MIL-HDBK-217F, 25°C GB
Weight		310		g	

Environmental

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	0		60	°C	Derate linearly from 100% power at 40°C to 50% power at 60°C
Storage temperature	-10		70	°C	
Cooling					Convection cooled
Temperature coefficient			±0.05	%/°C	
Humidity	10		95	% RH	Non condensing

Derating curve



EMC: Emissions

	Standard	Test level	Criteria	Notes & Conditions
Conducted	EN55022	B		
Radiated	EN55022	B		
Harmonic current	EN61000-3-2	Class A		
Voltage flicker	EN61000-3-3			

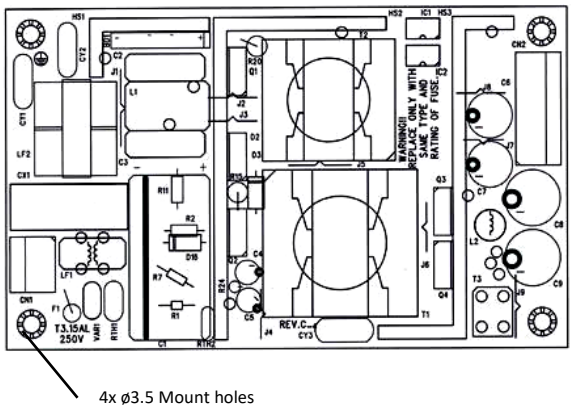
EMC: Immunity

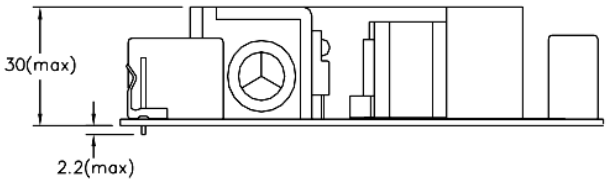
	Standard	Test level	Criteria	Notes & Conditions
ESD	EN61000-4-2	3	A	
Radiated	EN61000-4-3	3V/m	A	
EFT	EN61000-4-4	2	A	
Surges	EN61000-4-5	Installation Class 3	A	
Conducted	EN61000-4-6	3Vrms	A	
Magnetic Fields	EN61000-4-8	1A/m	A	

Safety Approvals

IEC	Safety standard	Notes & Conditions
UL	UL62368-1	
CB	IEC6236-1: 2014	
TUV	EN62368-1: 2014	
CE		2014/35/EU Low voltage directive
Equipment protection class		Class I

Mechanical Details





CN1: Input Connector[2]	
Pin Connections	
Pin	Function
1	AC Neutral
2	AC Line

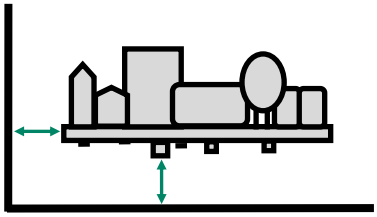
CN2: Output Connector[3]	
Pin Connections	
Pin	Function
1	+Vout
2	+Vout
3	+Vout
4	GND
5	GND
6	GND

Notes

1. All dimensions shown in millimetres (mm)
2. CN1: AC Input header: Molex 09-65-2029 mating part: Molex 09-50-1023
3. CN2: DC Output header: Molex 09-65-2068 mating part: Molex 09-50-1061
4. For EMC performance all mounting points must be connected to the ground connection on the primary side of the power supply

Installation Advice

Safety

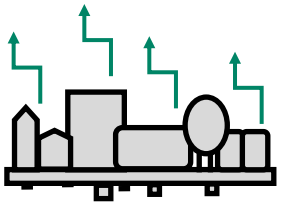


On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

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

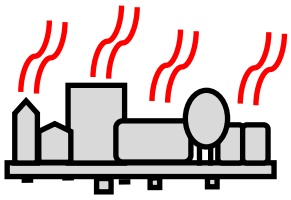


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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

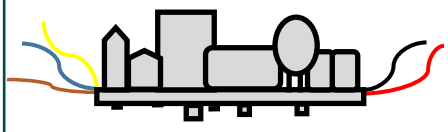
Thermal



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.

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 ferrule ended wire 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 09-65-2029	Molex 09-50-1023
Output	Molex 09-65-2068	Molex 09-50-1061
Loom Kit	TLL120 LK	