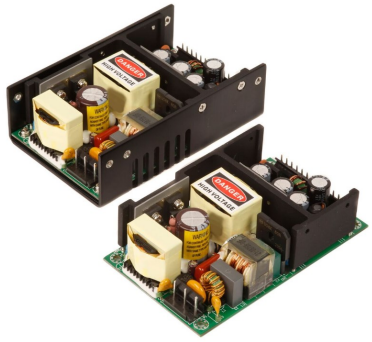
SUF120 Series

FiDUS
power in motion...

120 Watts

- 120W Convection cooled
- U-Channel & Open frame options
- Robust mechanics
- Single, Dual and Triple outputs
- Optional power fail
- EN55022 Level B conducted & radiated
- 3 Year warranty



The SUF120 series provides 120W of convection cooled power in either a 3" x 5" open frame or U-channel package. The range is ultra versatile, offering a wide selection of single, dual and triple output versions with voltages between 5 and 48VDC. In addition, the range offers a low temperature variant as well as the option of a power fail detect circuit. All come with a FiDUS 3 year warranty.

Dimensions:

U-Channel version: 3.21 x 5 x 1.72" (81.6 x 127 x 43.7mm)
Open Frame: 3 x 5 x 1.32" (76.2 x 127 x 33.6mm)

Models & Ratings

INSTALLATION ADVICE PG5

Model Number(1)	Output Power	Output 1			Output 2			Output 3			Efficiency
		Voltage	Current Max	Current Min	Voltage	Current Max	Current Min	Voltage	Current Max	Current Min	
SUF12005B	110W	5V	22A	0A							70%
SUF12009B	120W	9V	13.33A	0A							75%
SUF12012B	120W	12V	10.0A	0A							75%
SUF12015B	120W	15V	8A	0A							78%
SUF12018B	120W	18V	6.66A	0A							78%
SUF12024B	120W	24V	5.0A	0A							82%
SUF12028B	120W	28V	4.28A	0A							82%
SUF12036B	120W	36V	3.33A	0A							82%
SUF12048B	120W	48V	2.5A	0A							82%
SUF120D02B	120W	5V	15A	1.5A	12V	6A	0.8A				77%
SUF120D04B	120W	5V	15A	1.5A	24V	3.5A	0.4A				80%
SUF120D07B	120W	28V	3.92A	0.4				5V	2A	0A	80%
SUF120T01B	120W	3.3V	15A	1.5A	12V	6A	0.6A	-12V	0.8A	0A	75%
SUF120T02B	120W	3.3V	15A	1.5A	12V	6A	0.6A	12V	0.8A	0A	75%
SUF120T03B	120W	5V	15A	1.5A	12V	6A	0.8A	-5V	0.8A	0A	77%
SUF120T04B	120W	5V	15A	1.5A	12V	6A	0.8A	5V	0.8A	0A	77%
SUF120T05B	120W	5V	15A	1.5A	12V	6A	0.8A	-12V	0.8A	0A	80%
SUF120T06B	120W	5V	15A	1.5A	12V	6A	0.8A	12V	0.8A	0A	80%
SUF120T07B	120W	5V	15A	1.5A	15V	6A	1.0A	-15V	0.8A	0A	80%
SUF120T08B	120W	5V	15A	1.5A	15V	6A	1.0A	15V	0.8A	0A	80%
SUF120T09B	120W	5V	15A	1.5A	24V	3.5A	0.45A	-24V	0.8A	0.25A	80%
SUF120T10B	120W	5V	15A	1.5A	24V	3.5A	0.45A	24V	0.8A	0.25A	80%

Notes

1. Remove suffix 'B' from model number for open frame version
2. For covered U-channel version, add suffix '-C' e.g. SUF12036B-C
3. Add suffix '-P' for optional Power Fail Detect. E.g. SUF120D04B-P
4. Add suffix '-L' for -40°C low temperature operation version. E.g. SUF12024B-L
5. Loom kits available, see Installation Advice, pg5

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	90		260	VAC	No derating
Operating temperature	0		70	°C	Derate linearly from 100% load at 50°C to 50% load at 70°C. Optional –40°C low temperature option (-L)
Efficiency	65		80	%	
Dimensions	U-Channel version: 3.21 x 5 x 1.72" (81.6 x 127 x 43.7mm). Open Frame: 3 x 5 x 1.32" (76.2 x 127 x 33.6mm)				
EMC	EN55022 Level B conducted and radiated. EN61000-3 and EN61000-4, harmonics, flicker, Surge, EFT, ESD, conducted and radiated				
Safety	IEC 62368-1, UL 62368-1, CAN/CSA-C22.2 NO.62368-1, EN 62368-1:2014 CE				

Input

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Input voltage	90		260	VAC	No derating
Input frequency	47		63	Hz	
Power factor					EN61000-3-2 class A compliant
Input current			1.75	A	Low line. Full load, Vin=100VAC
			0.72		High line. Full load, Vin=240VAC
Inrush current			37	A	Low line. Full load, 25°C cool start, Vin=100VAC
			88		High line. Full load, 25°C cool start, Vin=240VAC
No load input power		5	5.5	W	5W for single outputs. 5.5W for dual and triple output models
Earth leakage current			0.75	mA	Class I construction
Input protection	Internal fuse. T3.15A/250 VAC in line.				

Output

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	5		48	VDC	
Output voltage trim			±5	%	Output 1 only, 3.3V model: ±10%
Set point accuracy	2		5	%	All multi output version rails + 5V singles: 5% Other single outputs: between 2-4%
Total regulation	±2		±7	%	±2% 24-48V, ±3% 12-18V, ±4% 9V, ±5% single 5V & dual & triple outputs accept ±7% of 3.3V of T02
Minimum load					See Models & Ratings table
Time of Transient response			4	ms	Full load, Vin=110VAC
Ripple & Noise		1		% V pk-pk	All models measured with 0.47uF capacitor at rated load and nominal line. 20MHz bandwidth.
Hold up time	16			ms	Full load. Vin=100VAC
Overload protection	110		150	%	Recovers automatically after fault condition is removed
Short circuit protection					Trip and restart
Overvoltage protection	112		132	%	

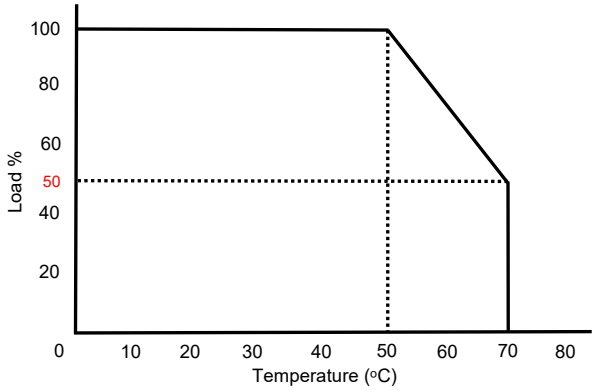
General

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	70		82	%	
Isolation	Input to Output: 3000, Input to Ground: 1500, Output to Ground: 500			VAC	
Switching frequency					PFC 100 KHz (typical), PWM 67KHz (typical)
Power density	U-Channel version 6.1. Open frame 4.3			W/In^3	
MTBF	0.1			MHrs	As per MIL-HDBK-217F, 25°C GB
Weight	U-Channel 476-582g. Open frame 350-428g (approx.)			g	

Environmental

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	0		70	°C	Derate linearly from 100% load at 50°C to 50% load at 70°C. Optional –40°C low temperature option (-L)
Storage temperature	-40		85	°C	
Cooling					Convection cooled
Temperature coefficient			±0.04	%/°C	
Humidity	0		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

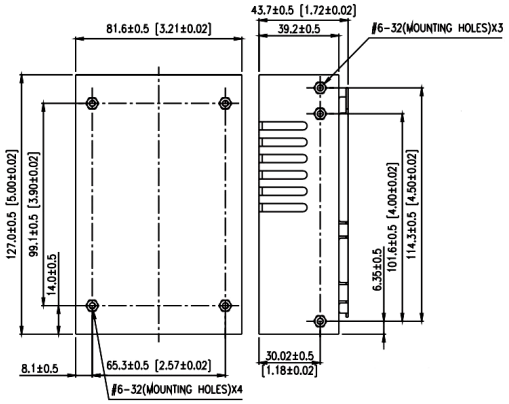
	Standard	Test level	Criteria	Notes & Conditions
ESD	EN61000-4-2	2/3	A	Level 2 contact, Level 3 air
Radiated	EN61000-4-3	2	A	
EFT	EN61000-4-4	2	A	
Surges	EN61000-4-5	Installation Class 3	A	
Conducted	EN61000-4-6	2	A	
Dips and interruptions	EN61000-4-11	Dips: 30% 10ms, 60% 100ms, >95% 5000ms. Perf criteria A,B,B		

Safety Approvals

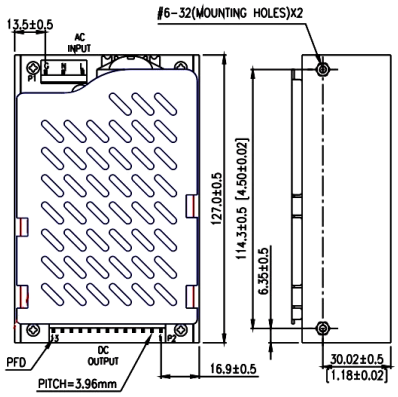
	Safety standard	Notes & Conditions
UL	UL 62368-1, CAN/CSA-C22.2 NO.62368-1-14	
CB	IEC 62368-1 Ed 2	
TUV	EN 62368-1 2014	
CE		2015/863/EU RoHS Directive and 2014/35/EU Low Voltage Directive
Equipment protection class		Class I

Mechanical Details

U-channel (B)

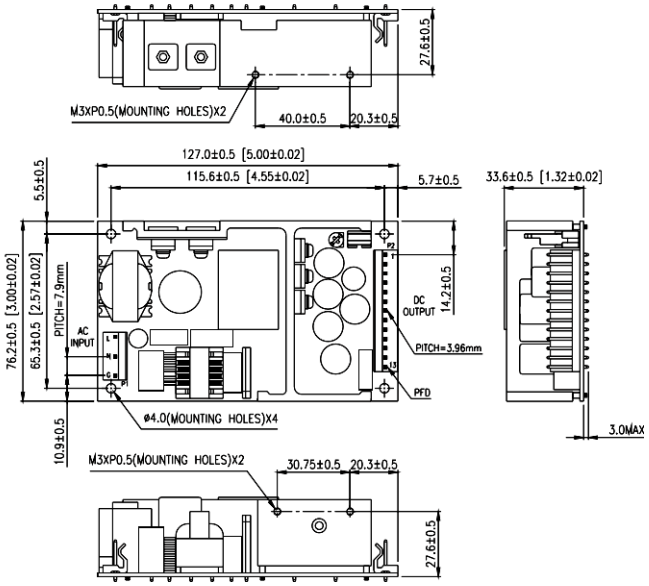


Covered (B-C)



Input Pin Connections[2]	
Pin Connections	
Pin	Function
L	AC Line
N	AC Neutral
G	GND

Open Frame



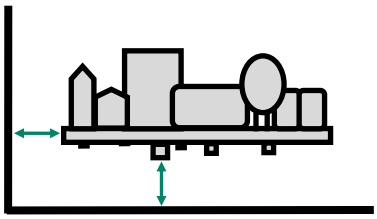
Output Pin Connections[3]				
Pin	Single	Dual	Triple	SUF120D06(B) and SUF120D07(B)
1	V1	V2	V2	N/C
2	V1	V2	V2	N/C
3	V1	V1	V1	V1
4	V1	V1	V1	V1
5	V1	V1	V1	V1
6	V1	V1	V1	V1
7	Return	0V	0V	0V
8	Return	0V	0V	0V
9	Return	0V	0V	0V
10	Return	N/C	V3	V3
11	Return	0V	0V	0V
12	Return	0V	0V	0V

Notes

1. All dimensions in mm (inches)
2. Input connector header: Molex 09-65-2058
mating parts: Molex housing 09-52-4054 and Molex 2478 series crimp terminal
3. Output connector header: equivalent Molex 26-60-4130
mating parts: Molex housing 09-52-4134 and Molex 2478 series crimp terminal

Installation Advice

Safety

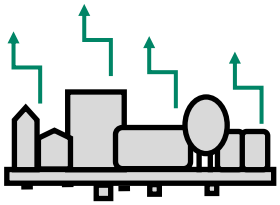


On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

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

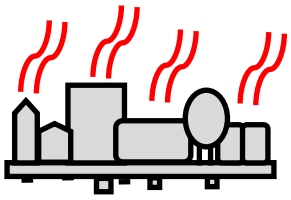


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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

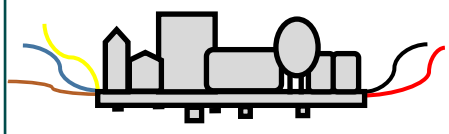
Thermal



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 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 09-65-2058	Molex 09-52-4054 (crimp terminal 2478)
Output	Molex 26-60-4130	Molex 09-52-4134 (crimp terminals 09-52-4134)
Loom Kit	Single output: SUF120 LK 1 Dual output: SUF120 LK 2 Triple output: SUF120 LK 3 D06/D07: SUF120 LK D06/7	