SUF350 Series

FiDUS
power in motion...

350 Watts

- 250W Convection cooled / 350W Fan cooled
- Latest EN/IEC/UL 623681-1 safety approval
- EN55032 Level B conducted and radiated
- Universal input no derating (90-264VAC)
- -40 to 70°C Operation
- 3 Year warranty

The SUF350 series offers 250W convection cooled and 350W fan cooled in a 3" x 5" open frame package, with the latest IEC/EN/UL 62368-1 approvals. The range has a wide operating temperature of -40 to 70°C, with a range of voltages from 12V to 48V. All units come with a Fidus 3 year warranty.

Dimensions:

3 x 5 x 1.46" (76.2 x 127 x 37mm)

Models & Ratings

INSTALLATION ADVICE PG4

Model Number[1]	Output Power[2]	Output voltage	Output Current		Efficiency
			Convection	Fan cooled 12 CFM	
SUF35012	350W	12V	20.83A	29.16A	92%
SUF35015	350W	15V	16.66A	23.33A	92%
SUF35019	350W	19V	13.15A	18.42A	93%
SUF35024	350W	24V	10.42A	14.58A	94%
SUF35030	350W	30V	8.33A	11.66A	94%
SUF35036	350W	36V	6.94A	9.72A	94%
SUF35048	350W	48V	5.21A	7.30A	95%

Notes

1. Add suffix '-P' for optional 12V 100mA fan power output. Example: SUF35024-P
2. Requires 12 CFM

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	90		264	VAC	No derating
Operating temperature	-40		70	°C	Derate linearly from 100% load at 50°C to 50% load at 70°C
Efficiency	92		95	%	
Dimensions	3 x 5 x 1.46" (76.2 x 127 x 37mm)				
EMC	EN55032 Level B conducted and radiated. EN61000-3 and EN61000-4, harmonics, flicker, Surge, EFT, ESD, conducted and radiated				
Safety	UL62368-1, CSA22.2 No 62368-1 as per cUL, CE,CB, IEC/EN 62368-1 A11 2017				

Input

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Input voltage	90		264	VAC	No derating
Input frequency	47		63	Hz	
Power factor	0.95				EN61000-3-2 class A compliant
Input current			4.4	A	Low line. Full load, Vin=100VAC
			1.7	A	High line. Full load, Vin=240VAC
Inrush current			60	A	Low line. Full load, 25°C cool start, Vin=100VAC
			136		High line. Full load, 25°C cool start, Vin=240VAC
No load input power			0.5	W	
Earth leakage current			750 (max)	uA	240VAC 60Hz Class I construction

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Output

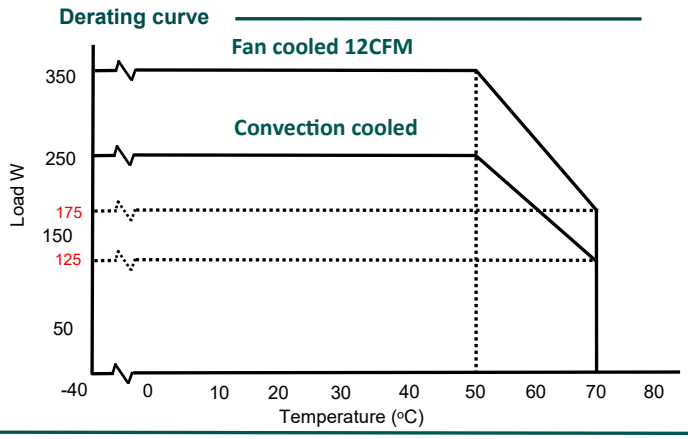
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	12		48	VDC	
Set point accuracy			±1	%	
Line regulation			1	%	Full load, Vin=100 to 120VAC. Line regulation is defined by changing ±10% of input voltage from nominal line at rated load
Total regulation	±2	±3	±5	%	±5% 12-19V, ±3% 24 and 30V, ±2% for 36 and 48V
Minimum load					No minimum load
Time of Transient response			4	ms	Full load to half load, Vin=110VAC
Ripple & Noise	12V model 120mVp-p, 15V model 150mVp-p, 19V model 190mVp-p, 24-48V models 240mVp-p			% V pk-pk	All models measured with 0.1uF and 0.47uF capacitor at rated load and nominal line. 20MHz bandwidth.
Hold up time	16			ms	Full load. Vin=100VAC
Overload protection	105		150	%	Recovers automatically after fault condition is removed
Short circuit protection					Trip and restart
Overvoltage protection	112		132	%	Latch reset

General

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	92		95	%	
Isolation: primary to secondary			4242	VDC	
Isolation: primary to earth			2506	VDC	
Isolation resistance	50			M Ohm	
Power density		15.98		W/In^3	
MTBF	200			kHrs	As per MIL-HDBK-217F, 25°C GB
Weight			370	g	

Environmental

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-40		70	°C	See derating curve below. 100% load to 50°C to 50% at 70°C
Storage temperature	-40		85	°C	
Cooling					Convection cooled and fan cooled (see below)
Temperature coefficient			±0.04	%/°C	
Humidity	0		95	% RH	Non-condensing



SUF350 Series

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			

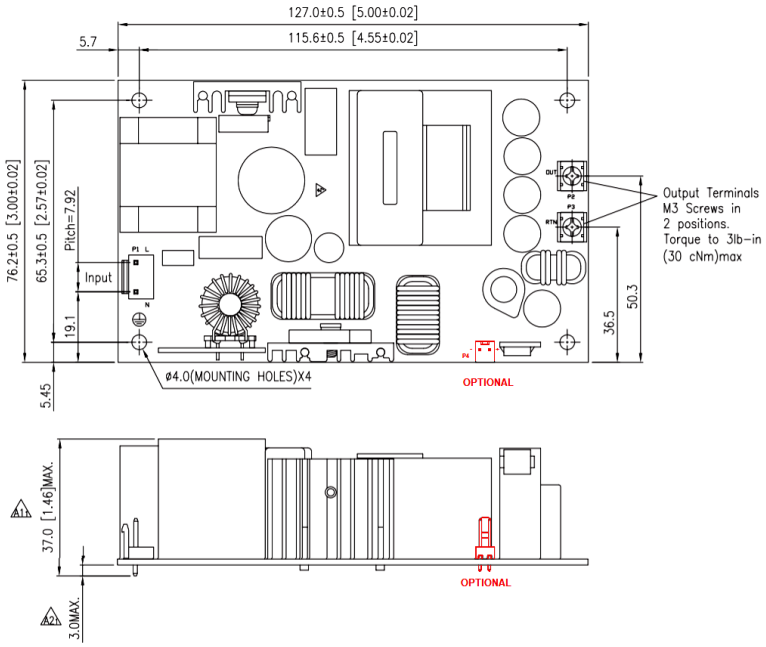
EMC: Immunity

	Standard	Test level	Criteria	Notes & Conditions
Radiated	EN61000-4-3	2	A	3V/m
EFT	EN61000-4-4	2	A	1kV
Surges	EN61000-4-5	Installation Class 3	A	1kV Line-Neutral, 2kV Line/Neutral-PE
Conducted	EN61000-4-6	2	A	3Vrms
PFMF	EN61000-4-8	1	A	1A/m
Dips and interruptions	EN61000-4-11	Dips: 30% 10ms, 60% 100ms, >95% 5000ms. Perf criteria A,A,B		

Safety Approvals

	Safety standard	Notes & Conditions
UL	UL/CSA 623681-1	
CB	IEC 62368-1 A11 2017	
CE	EN 62368-1 A11 2017	2011/65/EU RoHS Directive and 2014/35/EU Low voltage directive
Equipment protection class		Class I

Mechanical Details



Input Pin Connections P1 (2)	
Pin	Function
1	Line
2	NC
3	Neutral

Output Pin Connections(3)	
Pin	Function
P2	Vout
P3	RTN

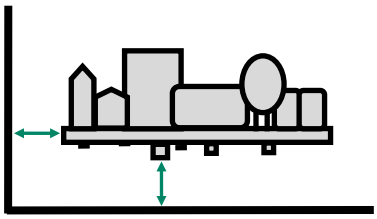
Optional Output P4(4)		
Part no	+	-
SUF350XX-P	12V 100mA	RTN

Notes

1. All dimensions in mm (inches)
2. Input connector mates with JST housing VHR-3N and JST SVH series crimp terminal
3. Output connector uses M3 panhead screws
4. Optional fan power 12V 100mA –P versions only

Installation Advice

Safety

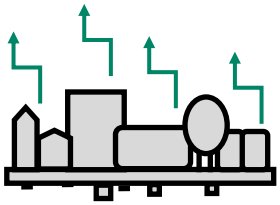


On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

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

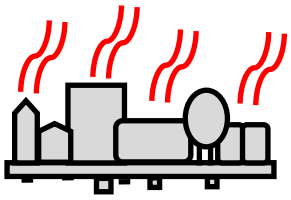


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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

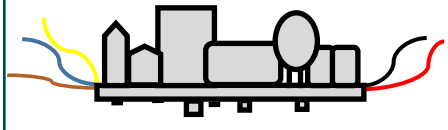
Thermal



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	B3P-VH	VHR3N
Output	M3 screw terminal	N/A
Loom Kit	SUF350 LK	