

TPF150 Series

150 Watts

- 100W Convection / 150W Fan cooled
- 2 x 4" Open frame footprint
- U-Channel version (-U)
- Universal AC input 90-264VAC
- EN55022 Level B conducted & radiated
- 0 to +70°C Operation
- 3 Year warranty



The TPF150 series of AC-DC power supplies provides 150W of power (100W convection cooled) in an industry standard 2" x 4" package. The range is available in 2 formats; in open frame or within a U-channel for chassis mounting (-U option). Outputs from between 12 to 48V are available and every unit comes with a FIDUS 3 year warranty.

Dimensions:

Open Frame: 4 x 2 x 1.14" (101.6 x 50.8 x 29mm)
U-Channel: 4.12 x 2.25 x 1.38" (104.6 x 57 x 35mm)

Models & Ratings

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Model Number	Output Power ⁽²⁾	Output voltage	Output Current		Efficiency ⁽³⁾
			Convection	Forced Air ⁽²⁾	
TPF15012	150W	12V	8.33A	12.5A	91%
TPF15015	150W	15V	6.66A	15A	92%
TPF15019	150W	19V	5.26A	7.89A	91.5%
TPF15024	150W	24V	4.15A	6.25A	92.5%
TPF15028	150W	28V	3.57A	5.35A	92.5%
TPF15048	150W	48V	2.07A	3.12A	93.5%
TPF15012-U ⁽¹⁾	150W	12V	8.33A	12.5A	91%
TPF15015-U ⁽¹⁾	150W	15V	6.66A	15A	92%
TPF15019-U ⁽¹⁾	150W	19V	5.26A	7.89A	91.5%
TPF15024-U ⁽¹⁾	150W	24V	4.15A	6.25A	92.5%
TPF15028-U ⁽¹⁾	150W	28V	3.57A	5.35A	92.5%
TPF15048-U ⁽¹⁾	150W	48V	2.07A	3.12A	93.5%

Notes

1. Suffix '-U' added for U-Channel version
2. Requires 12 CFM

3. Efficiency at 100% load, 230VAC input.
4. Loom kits available, see 'Installation Advice' pg 5

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	90		264	VAC	No derating
Operating temperature	100W convection cooling, 0 to +60°C			°C	Derate linearly 2.5% per °C from 41 to 60°C
	150W forced air cooling, 0 to +70°C				Derate linearly 2.5% per °C from 51 to 70°C
Efficiency	>87% at average load, 115/230VAC				
Dimensions	Open Frame: 4 x 2 x 1.14" (101.6 x 50.8 x 29mm) U-Channel: 4.12 x 2.25 x 1.38" (104.6 x 57 x 35mm)				
EMC	EN55022 Level B conducted and radiated. EN61000-3 and EN61000-4, harmonics, flicker, Surge, EFT, ESD, conducted and radiated				
Safety	IEC60950-1, EN60950-1, UL60950-1, CSA-C22.2 No.950-1, CE, IEC62368-1, EN62368-1, UL62368-1				

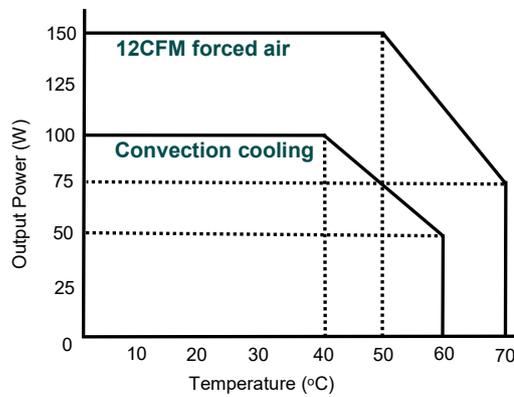
Input					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Input voltage	90		264	VAC	No derating
Input frequency	47		63	Hz	
Power factor	>0.9 at 115/230VAC at full load				EN61000-3-2 class A compliant
Input current (rms)			2.5	A	At 115VAC
			1.25		At 230VAC max
Inrush current			<45	A	115VAC cold start at 25°C
			<90		230VAC cold start at 25°C
No load input power			0.5	W	

Output					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	12		48	VDC	See Model & Ratings table
Set point accuracy			±3	%	12 to 24V outputs
			±2		28 and 48V outputs
Line regulation			±1	%	
Load regulation			±3	%	
Minimum load	0			%	
Transient response			10	%	Max deviation (20ms for 10%-100% load change)
Ripple & Noise	12 and 15V output 150mV. 19V output 190mV. 24V output 240mV. 28 and 48V output 300mV.			mV(Vp-p)	All models measured with 0.1uF ceramic and 10uF electrolytic capacitor. 20 MHz bandwidth.
Hold up time		>10		ms	At full load, 115VAC
Overload protection	105		160	%	
Short circuit protection					Trip and restart. Automatic recovery
Overvoltage protection	105		150	%	Vnom DC. Automatic recovery

General					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	>87% at average load, 115/230VAC				
Isolation: Input to Output	4000			VAC	
Input to Ground	1500			VAC	
Output to Ground	1500			VAC	
Switching frequency	70		75	KHz	
Power density			16.4	W/In ³	Open Frame type
			11.7		U-Channel type
MTBF		>100		KHrs	As per MIL-HDBK-217F, 25°C GB
Weight		206		g	Open Frame type
		275			U-Channel type

Environmental					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	100W convection cooling, 0 to +60°C			°C	Derate linearly 2.5% per °C from 41 to 60°C
	150W forced air cooling, 0 to +70°C				Derate linearly 2.5% per °C from 51 to 70°C
Storage temperature	-10		85	°C	
Cooling	100W convection / 150W fan cooled				
Temperature coefficient			±1	%/°C	
Humidity	5		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		Also, Class D compliant
Voltage flicker	EN61000-3-3			

EMC: Immunity

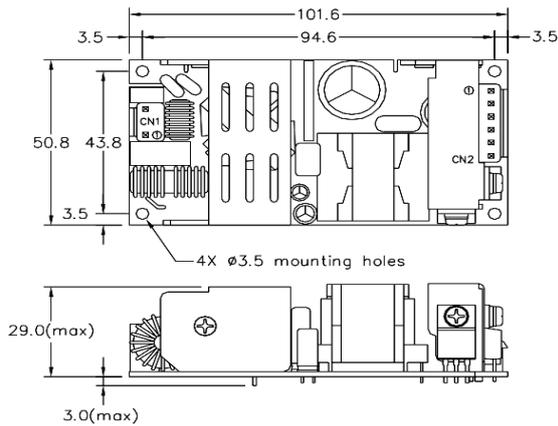
	Standard	Test level	Criteria	Notes & Conditions
ESD	EN61000-4-2	2	A	
Radiated	EN61000-4-3	3V/m	A	
EFT	EN61000-4-4	2	A	
Surges	EN61000-4-5	Installation Class 3	A	
Conducted	EN61000-4-6	3Vrms	A	
Magnetic Fields	EN61000-4-8	1A/m	A	Tested at 50Hz

Safety Approvals

	Safety standard	Notes & Conditions
UL	UL60950-1, CSA-C22.2 No.950-1, UL62368-1	
CB	IEC60950-1 2nd Edition, IEC62368-1	
TUV	EN60950-1 2nd Edition, EN62368-1	
CE		2015/863/EU RoHS Directive and 2014/35/EU Low voltage directive
Equipment protection class		Class I

Mechanical Details

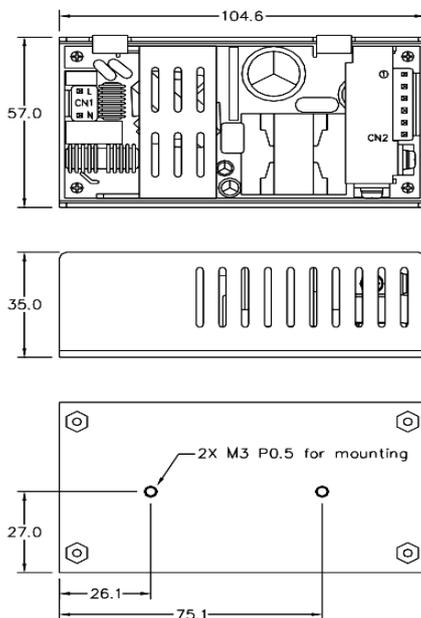
Open Frame



CN1: Input Connector

Pin	Function
1	AC Neutral
2	AC Line

U-Channel (-U)



CN2: Output Connector

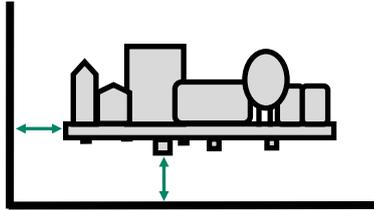
Pin	Function
1	GND
2	GND
3	GND
4	+Vo
5	+Vo
6	+Vo

Notes

- All dimensions shown in millimetres (mm)
- CN1: AC Input connector header: JST B3P-VH-B mating part: JST VHR-3N
- CN2: DC Output header: JST B6P-VH-B mating part: JST VHR-6N

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.

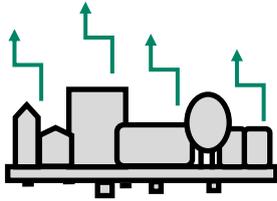
For **Class I** installations there should be 3-4mm between any part of the PSU and any earthed metal part of the enclosure. 3mm is acceptable for IT applications, 4mm required for medical applications. In Class I installations the PSU earth point must be connected to system safety ground.

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

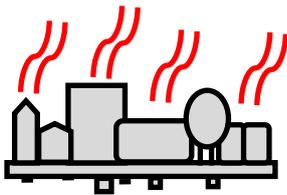


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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

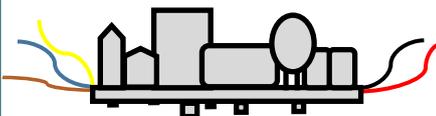


Thermal management is an important consideration when thinking about equipment service life. Electrolytic capacitors within the PSU wear with time and are typically the first end-of-life failure. Keeping the operation temperature of key components within the PSU, such as the electrolytic capacitors, 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	JST B3P-VH-B	JST VHR-3N
Output	JST B6P-VH-B	JST VHR-6N
Loom Kit	TPF150 LK	