TAD125 Series

FiDUS
power in motion...

125 Watts

- Peak power up to 150W for 10 seconds
- Open frame, U channel, covered and DIN rail options
- Latest industrial safety approval IEC/EN 62368-1
- -40 to 85°C Operation
- Voltage adjust –20% to +10%
- Class I and II
- 3 Year warranty

The TAD125 series of compact open frame AC-DC PSUs provide 100W natural convection, 125W with 400LFM continuous power and a peak load of up to 150W for 10 seconds from a 3" x 2" package. The range is approved for use in Industrial and IT applications with IEC/EN/UL 62368-1 and is available in 12-48V units. The units are fully featured with voltage adjust and overload, over voltage and short circuit protection. They are available in four mechanical variants; open frame, U channel, covered and DIN rail. All units come with a Fidus 3 year warranty.

Dimensions:
Open frame 3.04 x 2.01 x 1.16" (77.2 x 51.1 x 29.5mm)
U channel 3.60 x 2.44 x 1.54" (91.4 x 62.0 x 39.2mm)
Covered 3.6 x 2.44 x 1.54" (91.4 x 62 x 39.2mm)

Models & Ratings

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Model Number (1)	Output Voltage	Output Current		Peak Power(2)		Efficiency	Capacitive Load
		Nominal	400LFM	Vin<130VAC	Vin>130VAC		
TAD125US12B	12V	8.34A	10.42A	140W	150W	91%	8700uF
TAD125US15B	15V	6.67A	8.34A	140W	150W	92%	5600uF
TAD125US18B	18V	5.56A	6.95A	140W	150W	92%	3900uF
TAD125US24B	24V	4.17A	5.21A	140W	150W	92%	2200uF
TAD125US28B	28V	3.58A	4.47A	140W	150W	92%	1600uF
TAD125US36B	36V	2.78A	3.48A	140W	150W	91%	1000uF
TAD125US48B	48V	2.09A	2.61A	140W	150W	91%	550uF

Notes

1. For class I version change remove **B** above. For Molex or screw terminal input and output terminals add **M** or **T** respectively to part number after –. For example TAD125US05-**M** for class I Molex input & output terminals. For U channel, enclosed or DIN rail variants, change the **A** above for **U**, **E** or **D** respectively. For OVC III or conformal coating add **C** and **R** respectively to the end of the part number
2. If peak profile loading is used, average power draw must be below 55% of nominal of 400LFM. Peak load can not be longer than 10 sec (duty of 20%)

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	85		264	VAC	120-370V DC
Operating temperature	-40		85	°C	See de-rating curves
Efficiency	91		92	%	See models and ratings table above
Dimensions	Open frame 3.04 x 2.01 x 1.16" (77.2 x 51.1 x 29.5mm) U channel 3.60 x 2.44 x 1.54" (91.4 x 62.0 x 39.2mm) Covered 3.6 x 2.44 x 1.54" (91.4 x 62 x 39.2mm)				
EMC	EN 55032 Level B conducted and level A radiated. EN61000-3 and EN61000-4, harmonics, flicker, Surge, EFT, ESD, conducted and radiated.				
Safety	IEC/EN/UL 62368-1				

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Input

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input voltage	85		264	VAC	See de-rating curve
DC Input voltage	120		370	VDC	
Input frequency	47		63	Hz	
Power factor					EN61000-3-2 class A and D compliant
Input current	0.7		1.8	A	0.4A at 240VAC, 0.8A at 100VAC
Inrush current			100	A	
Leakage current			300	uA	At 264VAC. BF rated
Start up time			1000	mS	
Rise time		20		mS	
No load input power		0.3		W	230VAC

Output

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	12		48	VDC	See Model & Ratings table
Set point accuracy			±1	%	Full load 230VAC
Line regulation			±0.2	%	Low line to high line at full load
Load regulation			±0.5		0-100% load
			±0.4	%	10% -90% load
Voltage adjust	-20		+10	%	
Minimum load	0			%	
Noise and ripple	140		150	mVp-p	12-15V respectively. 20MHz BW 10uF/25V X7R MLCC
	160	180	190		24V, 28V and 36V respectively. 20MHz BW 10uF/50V X7R MLCC
			340		48V. 20MHz BW 0.1uF/100V X7R MLCC
Transient response			3	%	Recovery within 1% within 600 µs for 50-75% step at 2.5A/us
Hold up time	18			mS	At full load and 115VAC
Overload protection	120		160		Trip & restart. Automatic recovery
Overvoltage protection	115		135		Latch off. AC reset required,
Short circuit protection					Automatic recovery

EMC: Emissions

	Standard	Test level	Criteria	Notes & Conditions
Conducted	EN55032	B		
Radiated	EN55032	A		
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	3	A	±6kV contact, ±8kV air
Radiated	EN61000-4-3	4	A	20V/m
EFT	EN61000-4-4	3	A	±2KV
Surges	EN61000-4-5	Installation Class 2	A	±1KV line—neutral, L/N to PE ±2KV
Conducted	EN61000-4-6	3	A	20Vrms
PFMF	EN61000-4-8	3	A	10A/rm
Dips and interruptions	EN61000-4-11			

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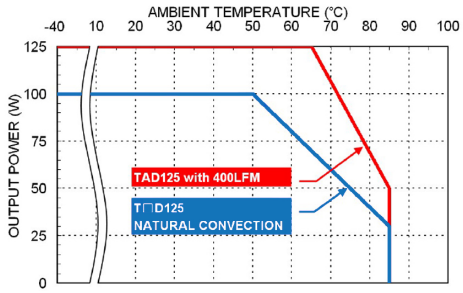
General

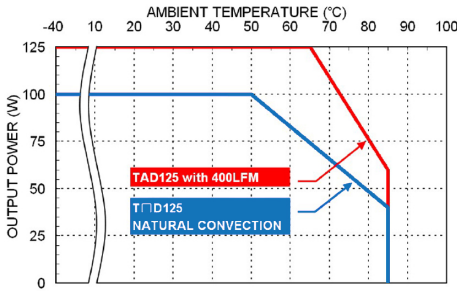
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	91		92	%	See models & Ratings table
Isolation: Input to Output	4000			VAC	Input to functional ground 2500VAC
Isolation resistance	1000			MΩ	500VDC
Power density			17.66	W/In^3	
Switching frequency (full load)	60		120	KHz	5V 60KHz 7.5V 80KHz 9V 70KHz Others 120KHz
MTBF		790		Khrs	MIL-HDBK-217F 25°C
Weight	156		232	g	TAD 156g , TUD 194g, TED 210g & TDD 232g

Environmental

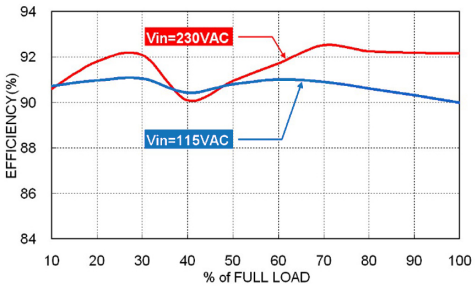
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-40		85	°C	See derating curves
Storage temperature	-40		85	°C	
Temperature coefficient			±0.02	%/°C	
Humidity	5		95	%RH	Non-condensing
Operating altitude			5000	M	
Vibration					IEC60068-2-6
Shock					IEC60068-2-27



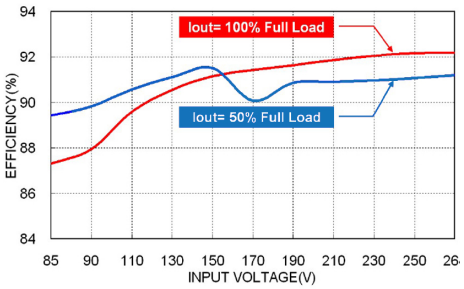
Derating Curve vs. Ambient Temperature
Vin=115VAC



Derating Curve vs. Ambient Temperature
Vin=230VAC



T□D125US24B Efficiency vs. Output Load



T□D125US24B Efficiency vs. Input Voltage

Safety Approvals

	Safety standard	Notes & Conditions
UL	UL 62368-1	UL: E193009
CB	IEC 62368-1	
TUV	EN 62368-1	
CE		2014/35/EU Low voltage directive
Equipment protection class		Class I or II

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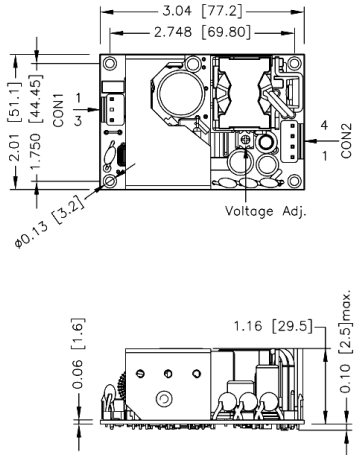
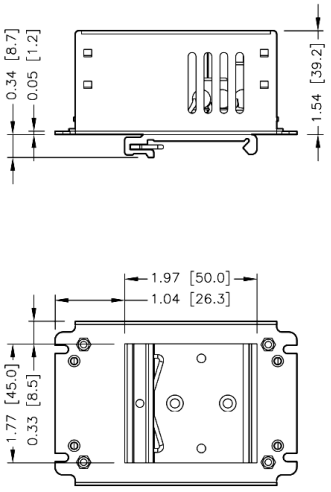
Mechanical Details

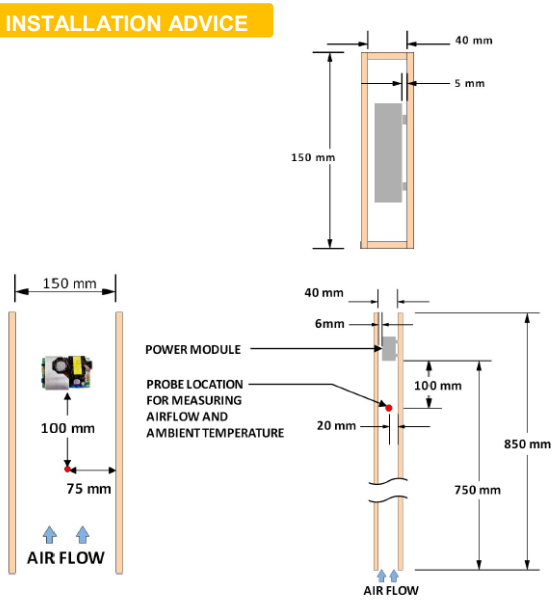
TAD OPEN FRAME



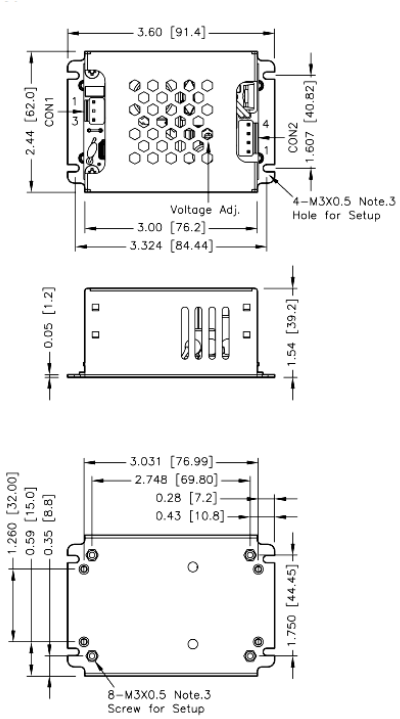
TDD DNI RAIL



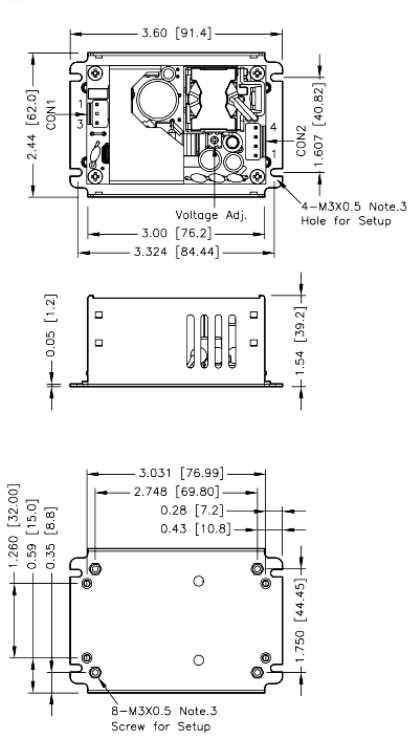
INSTALLATION ADVICE



TED ENCLOSED



TUD U CHANNEL



Pin Connections Input (CON1)[1]	
Pin	**Function**
1	Line
3	Neutral

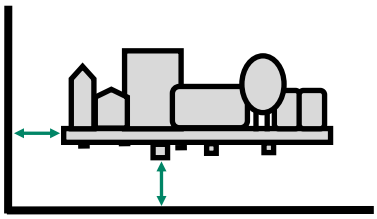
Pin Connections Output (CON2)[2]	
Pin	**Function**
1	-Vout
2	-Vout
3	+Vout
4	+Vout

Notes

1. Mates with JST VHR-3N, Molex version mates with 09-50-8031, screw terminal accepts 26-16AWG
2. Mates with JST VHR 4N, Molex version mated with 09-50-8041, screw terminal accepts 26-16AWG
3. Any mounting hole can be used for PE connection
4. All dimensions in inch [mm]
5. Tolerance: 2DP ±0.02" [1DP ±0.5mm], 3DP ±0.01 [2DP ±0.25mm], Pin dimension ±0.004[0.1]

Installation Advice

Safety

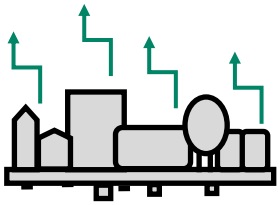


On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

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

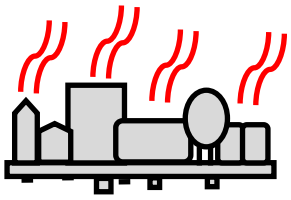


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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