TAD180 Series

FiDUS
power in motion...

180 Watts

- Highest power density 3 x 2”
- 150W Convection / 180W Fan cooled / 220W peak for 5 sec
- Latest Industrial safety approval IEC/EN 62368-1
- OVCIII, DC input, Class I and II versions
- 8% Voltage adjust
- EN55032 Level B conducted & A radiated

The TAD180 series of chassis mount AC-DC PSUs provide 150W convection, 180W fan cooled with a peak load of 220W from a market leading 3” x 2” package. The range is approved for use in industrial and IT applications, available in 12-53V output models. The units are available in many variants; over-voltage III (for direct installation to consumer unit), 120-370 VDC input, Class I & II, enclosed or DIN rail. They are fully featured with 8% voltage output adjust and a full suite of protections

Dimensions:
Open: 3 x 2 x 1.24” (76.2 x 50.8 x 31.6mm)
DC: 3.1 x 2 x 1.24” (78.7 x 50.8 x 31.6mm)
Covered: 3.6 x 2.44 x 1.75” (91.4 x 62 x 44.5mm)
DIN: 3.6 x 2.44 x 2.09” (91.4 x 62 x 53.2mm)

Models & Ratings

INSTALLATION ADVICE PG 8

Model Number (1)	Output Power 10CFM	Output voltage	Output Current			Ripple & Noise(3)	Efficiency	Capacitive load
			Convection	10 CFM fan	5 sec Peak(2)			
TAD180US12A-M	180W	12V	12.5A	15A	18.33A	120mVp-p	92%	10000uF
TAD180US15A-M	180W	15V	10A	12A	14.66A	120mVp-p	92%	6800uF
TAD180US18A-M	180W	18V	8.34A	10A	12.22A	120mVp-p	92%	4700uF
TAD180US24A-M	180W	24V	6.25A	7.5A	9.16A	120mVp-p	94%	2700uF
TAD180US28A-M	180W	28V	5.36A	6.43A	7.85A	120mVp-p	93%	1800uF
TAD180US36A-M	180W	36V	4.17A	5A	6.11A	120mVp-p	93%	1200uF
TAD180US48A-M	180W	48V	3.13A	3.75A	4.58A	250mVp-p	93%	680uF
TAD180US53A-M	180W	53V	2.83A	3.4A	4.15A	250mVp-p	93%	560uF

Notes

1. For class II product change A above for B. For example TAD180US12B-M. For enclosed or DIN rail type add E1 or D1 and for OVC III or DC input add C or G to the end respectively
2. Peak max duration is 5sec, 20% duty with average below 55%
3. Noise is measured with 20MHZ bandwidth and for 12&15V units a 1uF/25V MLCC cap, 24-36V units a 1uF/50V MLCC cap and for 48-53V units 0.1uF/100V MLCC cap.
4. All specifications are at full load 230VAC 25°C unless otherwise stated.

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	85		264	VAC	See page 3 for derating curve. 120-370V DC version
Operating temperature	-40		85	°C	See page 3 for derating curve
Efficiency	92		94	%	See models and ratings table above
Dimensions	Open: 3 x 2 x 1.24” (76.2 x 50.8 x 31.6mm), DC: 3.1 x 2 x 1.24” (78.7 x 50.8 x 31.6mm), Covered: 3.6 x 2.44 x 1.75” (91.4 x 62 x 44.5mm), DIN: 3.6 x 2.44 x 2.09” (91.4 x 62 x 53.2mm)				
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				

Input

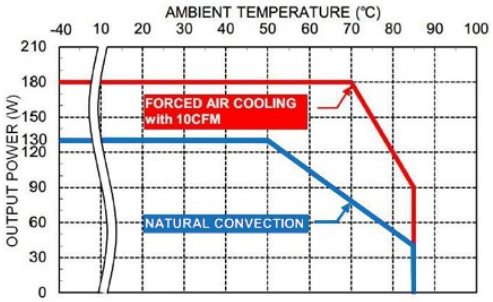
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input voltage	85		264	VAC	
DC Input voltage	120		370	VDC	Order DC version
Input frequency	47		63	Hz	
Power factor	0.95				EN61000-3-2 class A and D compliant
Input current			1.5/3	A	1.5A at 240VAC, 3A at 100VAC
Inrush current			100	A	230VAC cold start at 25°C
Leakage current			300	uA	At 264VAC.
Start up time			1.5	S	
Rise time		15		mS	
No load input power		0.15		W	230VAC Open and enclosed (without fan) 12V units

Output

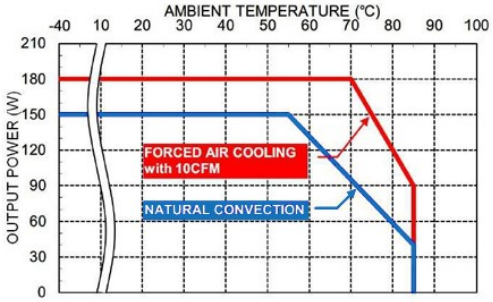
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	12		53	VDC	See Model & Ratings table
Set point accuracy			±1	%	
Line regulation			±0.2	%	
Load regulation			±0.4	%	10% to 90% load change
Voltage adjust			±8	%	
Minimum load	0			%	
Transient response			3	%	Recovery within 1% within 600 µs for 100-75% step at 2.5A/us
Hold up time		14		mS	At full load and 115VAC
Overload protection		150			Trip & restart. Automatic recovery
Overvoltage protection	115		135		Latch off. AC reset required,
Short circuit protection					Automatic recovery, for high current latch off
Over temperature protection		125		°C	Automatic recovery

Environmental

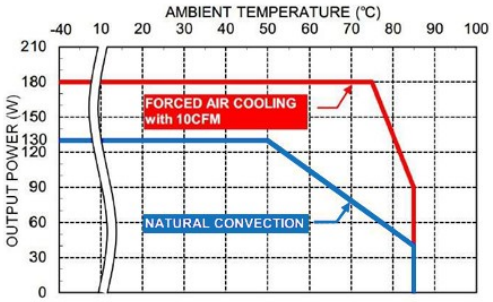
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-40		85	°C	See derating curve page 3
Storage temperature	-40		85	°C	
Cooling					Fan cooled (requires 10CFM),or convection cooled
Temperature coefficient			±0.02	%/°C	
Humidity	5		95	%RH	Non-condensing
Operating altitude			5000	M	
Thermal Shock					MIL-STD-810F
Vibration					IEC60068-2-6
Shock					IEC60068-2-27



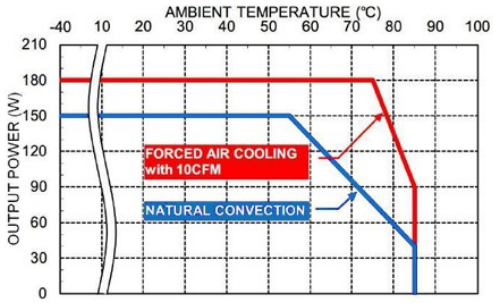
Derating Curve vs. Ambient Temperature
Vin=115VAC Open type



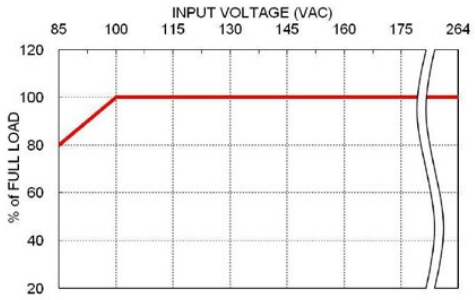
Derating Curve vs. Ambient Temperature
Vin=230VAC Open type



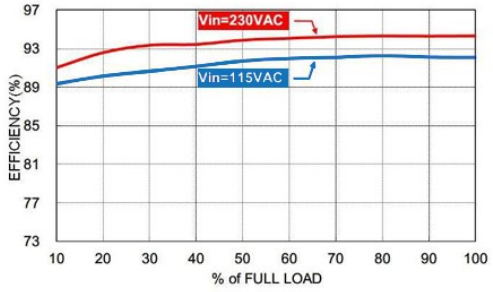
Derating Curve vs. Ambient Temperature
Vin=115VAC Enclosed type / Din rail type



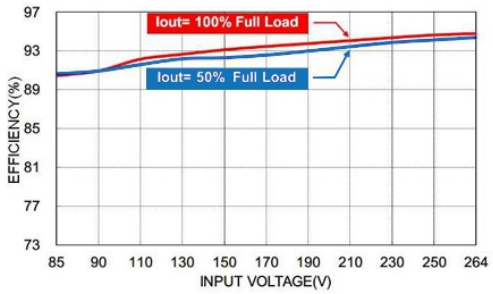
Derating Curve vs. Ambient Temperature
Vin=230VAC Enclosed type / Din rail type



Derating Curve vs. Input Voltage
TAD180



Efficiency vs. Output Load
TAD180US24 with Forced air cooling



Efficiency vs. Input Voltage
TAD180US24 with Forced air cooling

General

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	92		94	%	See models & Ratings table
Isolation: Input to Output	3000			VAC	
Input to Ground	2000			VAC	
Isolation resistance	100			MΩ	At 500VDC
Power density			24.19	W/In^3	
Switching frequency		170		KHz	Full load 230VAC
MTBF		1145		Khrs	MIL-HDBK-217F 25°C
Weight	192	218	240	g	162g open frame, 218g enclosed, 240g DIN

EMC: Emissions

	Standard	Test level	Criteria	Notes & Conditions
Conducted	EN55011/32	B		
Radiated	EN55011/32	A		
Harmonic current	EN61000-3-2	Class A		Also meets Class D requirements.
Voltage flicker	EN61000-3-3			

EMC: Immunity

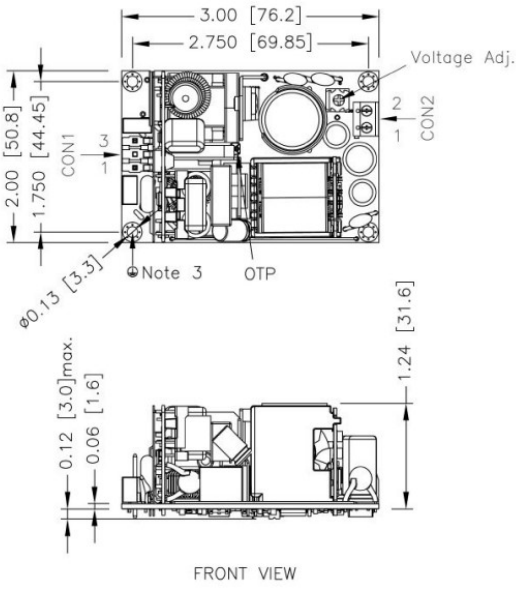
	Standard	Test level	Criteria	Notes & Conditions
ESD	EN61000-4-2	4	A	±8kV contact, ±15kV air
Radiated	EN61000-4-3	3	A	20V/m
EFT	EN61000-4-4	3	A	±2KV
Surges	EN61000-4-5	Installation Class 3	A	±2KV line—neutral, ±1KV line/neutral—earth
Conducted	EN61000-4-6	3	A	20Vrms
PFMF	EN61000-4-8	3	A	30A/rm
Dips and interruptions	EN61000-4-11			Compliant

Safety Approvals

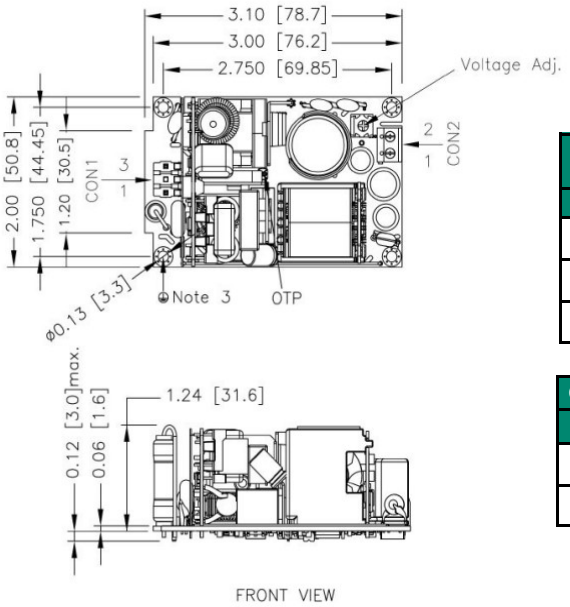
	Safety standard	Notes & Conditions
UL	UL 62368-1	E193009
CB	IEC 62368-1	
TUV	EN 62368-1	
CE		2014/35/EU Low voltage directive
Equipment protection class		Class I or II (specify when ordering, see models

Mechanical Details

Open Frame



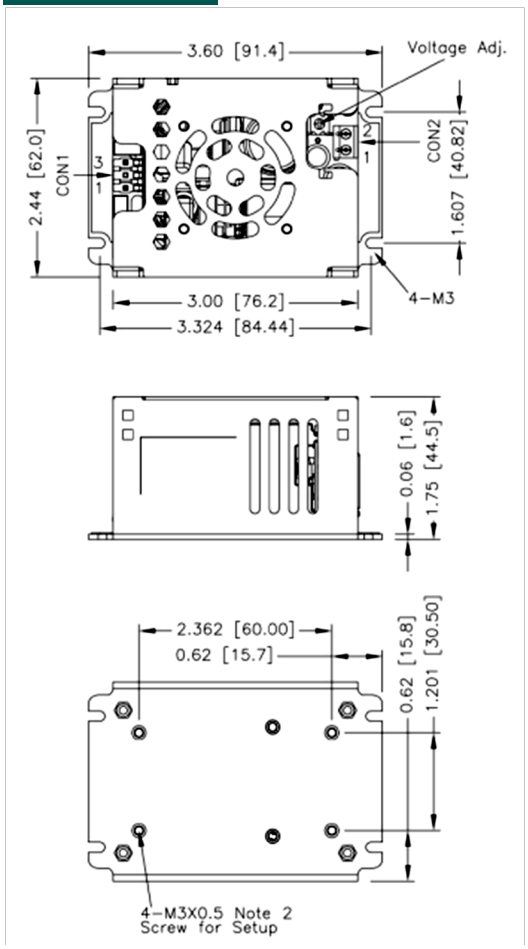
DC



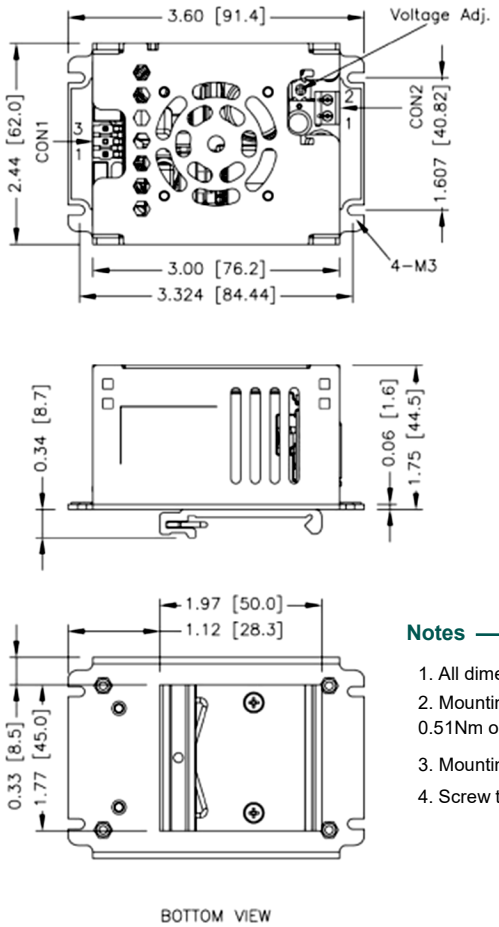
Pin Connections—Input (CON)[4]	
Pin	Function
1	Neutral (-DC)
2	N/C
3	Line (+DC)

CON2: Pin Connections[6]	
Pin	Function
1	+Vout
2	-Vout

Enclosed



DIN

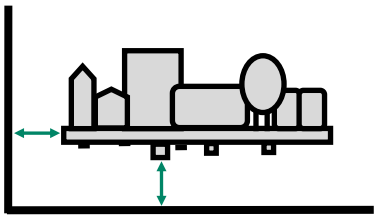


Notes

1. All dimensions in inches [mm]
2. Mounting screws not to exceed 5.2Kgf-cm / 0.51Nm on framed units
3. Mounting hole used for PE connection
4. Screw terminal torque 2.5kgf.cm / 0.25Nm

Installation Advice

Safety

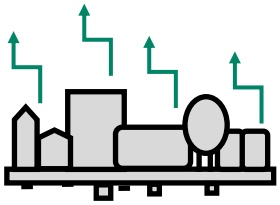


On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

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

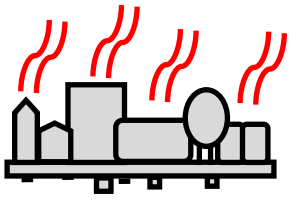


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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