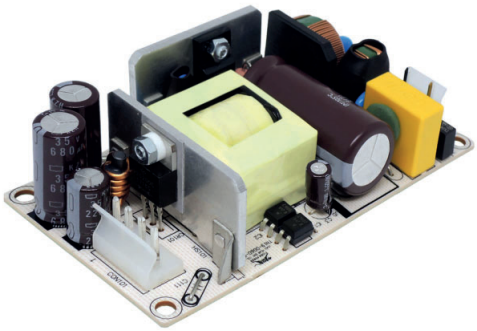
TN19-0060 SERIES



AC-DC

60W

DIMENSIONS:

OPEN FRAME:
2 x 4 x 1.06"
(50.8 x 101.6 x 27mm)

EN55032 LEVEL B

UP TO 87% EFFICIENT

IEC/UL/EN 62368-1

HIGH QUALITY CAPACITORS

NO-LOAD <0.15W

THREE YEAR WARRANTY

Part numbers

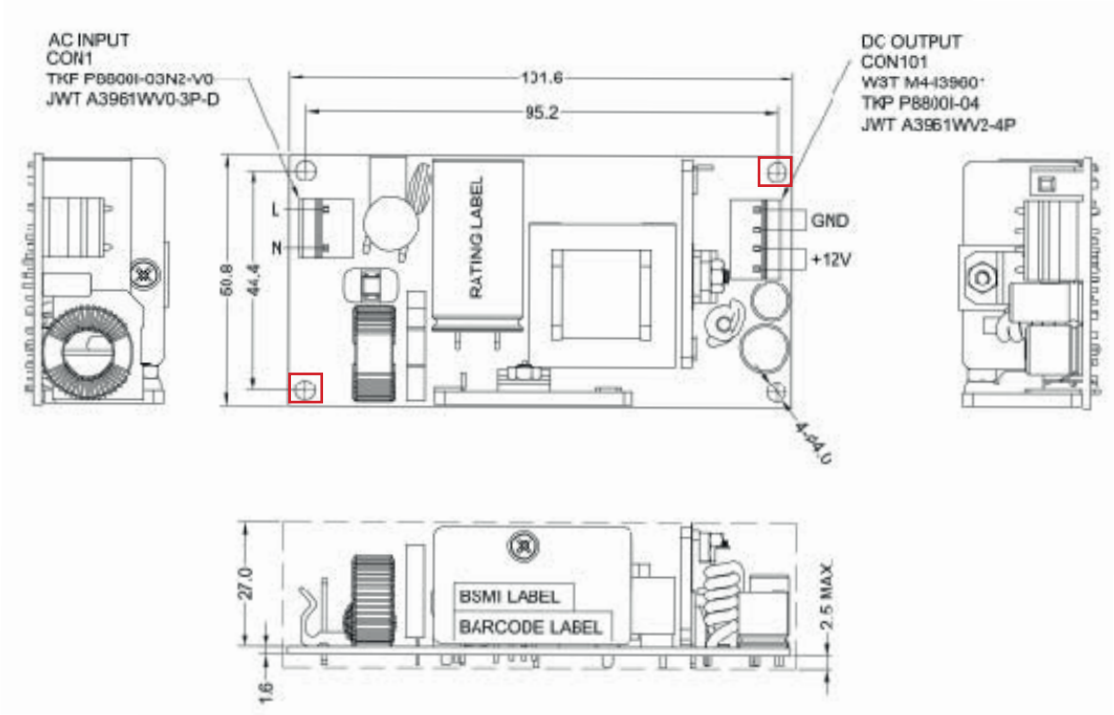
TN19	-	0060	12
Series		Power (W)	Output voltage
			12 = 12VDC 24 = 24VDC 48 = 48VDC

Key specifications

Input range	Safety certification	Efficiency	Environmental performance
90-264VAC	UL/IEC/EN 62368-1	<87%	Operational: -20 to 70°C

TN19-0060 SERIES

Mechanical



Connector	Compatible with
INPUT CON1	Molex 09503031
OUTPUT CON101	Molex 09503041

Notes
1. All dimensions shown in mm 2. Allow 10mm clearance from open frame unit 3. General tolerance ±1mm 4. Galvanically connect marked corners for optimised EMC performance

Weight	125g

Models & Ratings

Model Number	Output Power	Output Voltage	Output Current	Efficiency(1)
TN19-0060-12	60W	12V	5.0A	87%
TN19-0060-24	60W	24V	2.5A	87%
TN19-0060-48	60W	48V	1.25A	87%

1. Maximum efficiency at full load 230VAC

Input

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Input voltage	90		264	VAC	See page 5 for derating curve
Input frequency	47		63	Hz	
No load input power			0.15	W	
Input current (rms)			1.4	A	100VAC
Inrush current		30/60		A	115/230VAC cold start at 25°C

Output

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Output voltage	12		48	VDC	See Models & Ratings table
Line regulation		±1		%	Rated load
Load regulation		±5		%	0-100% load
Minimum load	0			%	
Ripple & noise			1	%	All models measured with 0.1uF ceramic and 47uF low ESR electrolytic capacitor. 20 MHz bandwidth. At rated line and full load.
Hold up time	16			ms	115VAC 60Hz

Protections

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Overload		12V model - 10 24V model - 5 48V model - 3		A	Trip and restart. Automatic recovery
Short circuit					Trip and restart. Automatic recovery <3sec
Overvoltage		12V model - 16 24V model - 32 48V model - 58		VDC	Max figures. Latch off reset

Safety

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Safety standards		IEC/UL/EN62368-1			
Isolation: Input to output	3000			VAC	
Isolation: Input to ground	1500			VAC	
Insulation resistance			50	MΩ	at 500VDC

EMC: Immunity

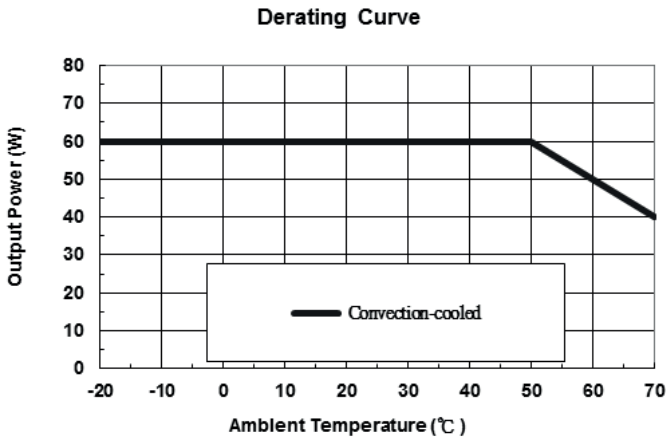
	Standard	Test level	Criteria	Notes/Conditions
ESD	EN61000-4-2	4	A	±8kV contact, ±15kV air.
Radiated	EN61000-4-3	2	A	3V/m 80MHz-500MHz sine wave 80% AM 1kHz
EFT	EN61000-4-4	2	A	±1kV
Surges	EN61000-4-5	Installation class 4	A	±2kV Live-Neutral, ±4kV Live/Neutral—Earth
Conducted	EN61000-4-6	2	A	3Vrms
PFMF	EN61000-4-8	1	A	1A/m
Voltage dips & interruptions	EN61000-4-11	2	A,A,B	>95% 0.5 cyc, 30% 25 cyc, >95% 250 cyc@230VAC

EMC: Emissions

	Standard	Test level	Criteria	Notes/Conditions
Conducted	EN55032	B		CISPR 32
Radiated	EN55032	B		
Harmonic current	EN61000-3-2	Class A		
Voltage flicker	EN61000-3-3			

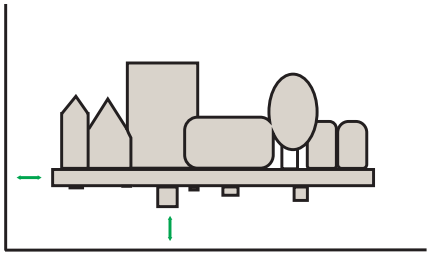
Environmental

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Operating temperature	-20		70	°C	See derating curve
Storage temperature	-40		85	°C	
Cooling					Free air
Operating Altitude			5000	m	
Humidity	0		90	% RH	Non condensing. Storage 0-95%
MTBF	1			MHrs	Telcordia SR-332 issue 2 @25 °C



Installation Advice

Safety

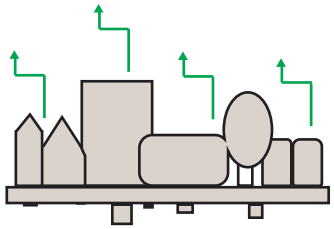


On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

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

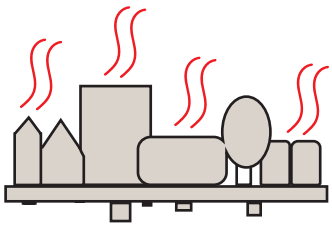


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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

16th January 2025