

30 Watts

- Compact size 30W in 1.36 x 3.07 x 0.9"
- 30/45W Convection/Peak (20ms)
- Medical IEC 60601-1 safety approval (BF rated)
- -10 to +70°C Operation
- EN55011 Level B conducted & radiated
- 3 Year warranty



The CAP30 series of open frame AC/DC power supplies are designed for medical body floating applied part applications. The range gives 30W of power when convection cooled with a peak power of 45W for 20ms. The units have a wide temperature range, are available with 5 to 48VDC outputs and come with a FIDUS 3 year warranty.

Dimensions:

1.36 x 3.07 x 0.9" (34.54mm x 78mm x 22.86mm)

Models & Ratings

INSTALLATION ADVICE PG4

Model Number	Output Power	Output voltage	Output Current	
			Convection	Peak ⁽¹⁾
CAP3005	20W	5V	4A	9A
CAP3009	27W	9V	3A	3A
CAP3012	30W	12V	2.5A	3.33A
CAP3015	30W	15V	2A	2.66A
CAP3018	30W	18V	1.66A	2.22A
CAP3024	30W	24V	1.25A	1.66A
CAP3036	30W	36V	0.83A	1.11A
CAP3048	30W	48V	0.63A	0.83A

Notes

1. 20ms Peak load

3. At 100% load

4. Loom kit available, see 'Installation Advice' page 4

Key specifications

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
AC Input range	85		264	VAC	Derate linearly from 100% power at 90VAC to 85% at 85VAC
Operating temperature	-10		70	°C	Derate linearly from 100% power at 50°C to 50% power at 70°C.
Efficiency			89	%	
Dimensions	1.36 x 3.07 x 0.9" (34.54mm x 78mm x 22.86mm)				
EMC	EN55011 Level B conducted and radiated. EN61000-3 and EN61000-4, harmonics, flicker, surge, EFT, ESD, conducted and radiated, EN60601-1-2 4th edition.				
Safety	IEC/EN/ANSI/AAMI/CSA60601-1 3.1 edition.				

Input

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Input voltage	85		264	VAC	No derating
Input frequency	47		63	Hz	
Power factor					EN61000-3-2 class A compliant
Input current	0.5		1	A	0.5A @230VAC, 1A @100VAC
Inrush current		<40		A	At 240VAC cold start at 25°C
Earth leakage current					Class II construction

Output

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	5		48	VDC	See Model & Ratings table pg1
Total regulation			±3	%	Including setpoint, load and line regulation
Minimum load	0			%	
Ripple & Noise			1%	pk-pk	20MHz bandwidth limited, 1X probe with 0.47uF parallel capacitor
Hold up time	12			ms	115VAC 60Hz full load
Overload / Short circuit protection	120		160	% rated current	Trip & restart. Automatic recovery
Overvoltage protection			130	% rated voltage	Latching, requires AC reset.
Over temperature protection					Latching, requires AC reset.

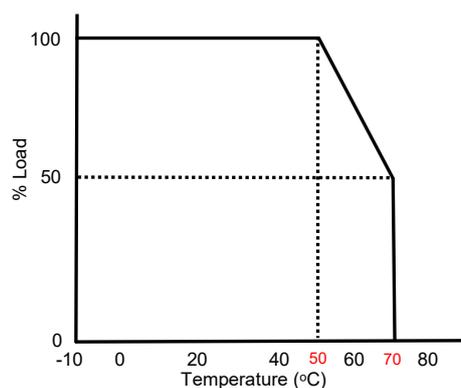
General

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency			89	%	See models & Ratings table
Isolation: Input to Output	4000			VAC	
Input to Ground	1500			VAC	
Output to Ground	1500			VAC	
Power density			8	W/ln ³	
MTBF	500			kHrs	MIL HDBK 217F 25°C ambient
Weight		70		g	
No load power			0.15	W	

Environmental

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-40		70	°C	Derate linearly from 100% power at 50°C to 50% power at 70°C.
Storage temperature	-40		80	°C	
Cooling					Convection cooled
Temperature coefficient			0.05	%/°C	
Humidity	5		95	%RH	Non-condensing. Same for storage conditions
Operating altitude			5000	M	
Shock (non operation)		50		g	11ms, 3 shocks for each direction
Vibration (operation)		2		Grms	5-500Hz, 15 Mins x y z

Derating curve



EMC: Emissions

	Standard	Test level	Criteria	Notes & Conditions
Conducted	EN55011	B		
Radiated	EN55011	B		
Harmonic current	EN61000-3-2	Class D		
Voltage flicker	EN61000-3-3			

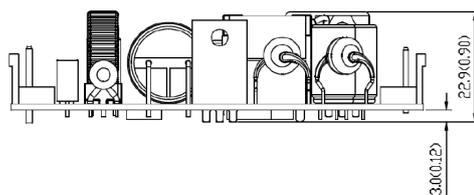
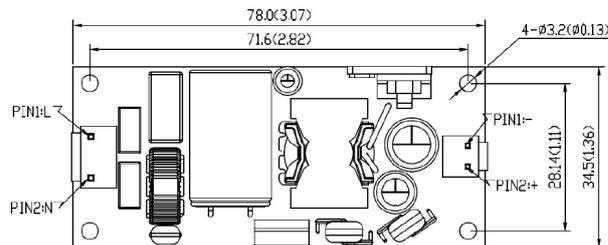
EMC: Immunity

	Standard	Test level	Criteria	Notes & Conditions
ESD	EN61000-4-2	4	A	±8kV contact, ±15kV air
Radiated	EN61000-4-3	3	A	10V/m
EFT	EN61000-4-4	3	A	2kV
Surges	EN61000-4-5	Installation Class 3	A	2kV L/N to GND, 1kV L to N
Conducted	EN61000-4-6	3	A	3V/6V 1kHz 80% AM 150kHz-80MHz
PFMF	EN61000-4-8		A	30A/m
Dips and interruptions	EN61000-4-11	30% 10ms, 60% 100ms 100% 500ms Criteria A,B,B		
	EN60601-1-2	100% 10ms, 30% 500ms, 100% 20ms, 100% 5000ms Criteria A,B,B, B		

Safety Approvals

	Safety standard	Notes & Conditions
UL	ES 60601-1	
CB	IEC 60601-1	
CE	EN 60601-1	2011/65/EU RoHS Directive, MDD 93/92/EEC
Means of patient protection	Input to Output: 2 x MOPP Input to Ground: 1 x MOPP Output to Ground: 1 x MOPP	BF rated
Equipment protection class		Class II

Mechanical Details



Dimensions in mm(inch)
Tolerances:
x.x = ±0.5 (x.xx = ± 0.02)

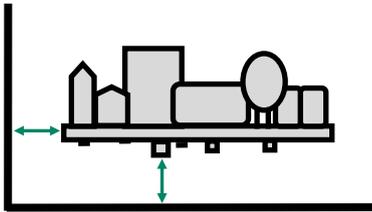
Notes

1. AC input header: JST B2P3-VH mating part no: JST VHR-3N

2. DC output header: JST B2P-VH mating part no: JST VHR-2N

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.

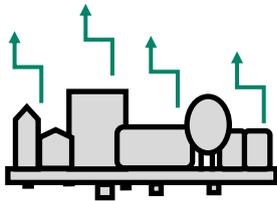
For **Class I** installations there should be 3-4mm between any part of the PSU and any earthed metal part of the enclosure. 3mm is acceptable for IT applications, 4mm required for medical applications. In Class I installations the PSU earth point must be connected to system safety ground.

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

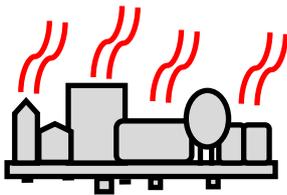


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that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

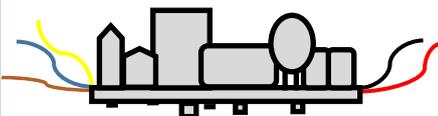


Thermal management is an important consideration when thinking about equipment service life. Electrolytic capacitors within the PSU wear with time and are typically the first end-of-life failure. Keeping the operation temperature of key components within the PSU, such as the electrolytic capacitors, 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 B2P3-VH	JST VHR-3N
Output	JST B2P-VH	JST VHR-2N
Loom Kit	CAP30 LK	