FCS40 Series

AC-DC Power Supplies



40 Watts

- 40 W Convection Rating
- 2" by 3" Footprint
- Low 1.04" Profile
- High Efficiency
- Medical, ITE and Household Appliance Approvals
- Class I & Class II Installations
- High Power Density
- Less than 0.3 W No Load Input Power
- 3 Year Warranty





The FCS40 series is designed to minimize the no load power consumption and maximize efficiency to facilitate equipment design to meet the latest environmental legislation. Approved for medical and ITE applications in either Class I or Class II installations, this range of single output AC-DC power supplies are packaged in a low profile 1.04" height with a foot print of just 2" by 3". The FCS40 provides up to 40W convection-cooled over the full 90-264 VAC input range, and operates down to 80 VAC with minimal

vimensions:

FCS40:

2.00 x 3.00 x 1.04" (50.8 x 76.2 x 26.4 mm)

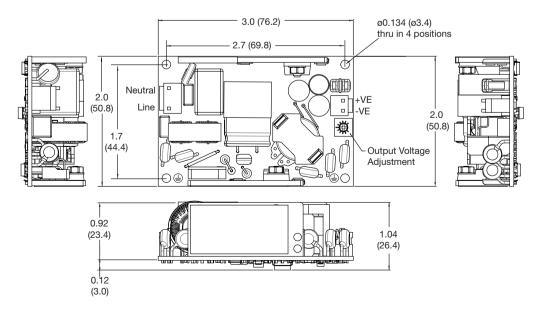
de-rating. The power supply features two AC line fuses and low leakage currents required by medical applications. The low profile, low noise and safety approvals covering ITE and medical standards allows the versatile FCS40 series to be used in a wide range of applications.

Models & Ratings

Output Power	Output Voltage	Output Current	Efficiency ⁽¹⁾	Model Number
40 W	12.0 V	3.34 A	82%	FCS40US12
40 W	15.0 V	2.67 A	85%	FCS40US15
40 W	18.0 V	2.23 A	85%	FCS40US18
40 W	24.0 V	1.67 A	85%	FCS40US24
40 W	36.0 V	1.11 A	84%	FCS40US36
40 W	48.0 V	0.83 A	86%	FCS40US48

Notes

Mechanical Details



CN1 - Input Connector					
Pin 1 Line					
Pin 2	Not Fitted				
Pin 3	Neutral				

Mates with JST housing VHR-3N and JST Series SVH-21T-P1.1 crimp terminals

CN2 - Output Connector				
Pin 1	+Vout			
Pin 2	-Vout			

Mates with JST housing VHR-2N and JST Series SVH-21T-P1.1 crimp terminals

Notes

- 1. All dimensions shown in inches (mm). Tolerance: ±0.02 (0.5)
- 2. Weight: 0.19 lbs (86 g) approx.

Mounting hole marked with (must be connected to safety earth for class I applications

^{1.} Typical efficiency measured at full load and 230 VAC input.

FCS40 Series





Summary

Characteristic		Minimum	Typical	Maximum	Units	Notes & Conditions
Input Range		80	115/230	264	VAC	Derate output from 100% at 90 VAC to 90% at 85 VAC and 80% at 80 VAC
No Load Input Power				0.3	W	
Efficiency			86		%	230 VAC (see models and ratings table)
Operating Temperature)	-25		+70	°C	See derating curve (fig.1)
	ITE	IEC60950-1, IEC	C62368-1, EN623	68-1, cUL62368-1		
Safety Approvals	Medical	IEC60601-1 Ed 3.1 Including Risk Management, ANSI/AAMI ES60601-1 & CSA C22.2 No.6061-1:08, EN60601-1				1-1 & CSA C22.2 No.6061-1:08, EN60601-1
	Household	IEC60335-1				

Input

<u> </u>					
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	80	115/230	264	VAC	Derate output from 100% at 90 VAC to 90% at 85 VAC and 80% at 80 VAC
Input Frequency	47	50/60	63	Hz	Agency approval, 47-63 Hz
Power Factor					EN61000-3-2 class A
Input Current - Full Load		0.8/0.4		Α	115/230 VAC
Inrush Current			60	Α	264 VAC cold start, 25 °C
Earth Leakage Current			270	μΑ	264 VAC/60 Hz
No load Input Power			0.3	W	
Input Protection	T3.15 A/250 A,	250 V Internal fus	e fitted in line and	neutral.	

Output - Main Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	12		48	VDC	See Models and Ratings table
Initial Set Accuracy			±1	%	50% load, 115/230 VAC
Output Voltage Adjustment	±10			%	
Minimum Load	0			Α	No minimum load required
Start Up Delay		1	2	s	
Output Rise Time			50	ms	
Hold Up Time	8.3/20			ms	Min at full load 115/230 VAC
Line Regulation			±0.5	%	90-264 VAC
Load Regulation			1	%	0-100% load.
Transient Response			4	%	Recovery within 1% in less than 500 µs for a 50-75% and 75-50% load step
Over/Undershoot			5	%	Full load
Ripple & Noise			1	% pk-pk	20 MHz bandwidth
Overvoltage Protection	115		140	%Vnom	Continuous trip and restart (hiccup)
Overload Protection	110		180	% I nom	
Short Circuit Protection					Continuous trip and restart (hiccup)
Temperature Coefficient			0.05	%/°C	



General

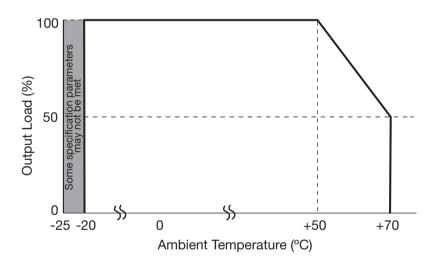
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		84		%	115/230 VAC, 100% load
Isolation: Input to Output	4000			VAC	2 MOPP
Input to Ground	1500			VAC	1 MOPP
Output to Ground	500			VAC	1 MOPP at output voltage
Power Density			6.4	W/in³	
Mean Time Between Failure	500			kHrs	MIL-HDBK-217F, Notice 2 +25 °C GB
Weight		0.19 (86.0)		lb(g)	

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Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions		
Operating Temperature	-25		+70	°C	See derating curve, fig.1		
Storage Temperature	-40		+85	°C			
Humidity	5		95	%RH	Non-condensing		
Operating Altitude		5000/4000 m ITE/Medical					
Shock	±3 x 30g shocks in each plane, total 18 shocks. 30g = 11ms (+/- 0.5msecs), half sine. Conforms to EN60068-2-27						
Vibration	Single axis 10-50	0 Hz at 2g sweep	and endurance at resonance	e in all 3 planes.	Conforms to EN60068-2-6		

Temperature Derating Curve

Figure 1



Notes -

FCS40US12 ripple and noise is <1.5% from -25 °C to 0 °C reducing to <1% after 1 minute warm up.

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011/32	Class B	See note 1.
Radiated	EN55011/32	Class A	Class B with Wurth Electronics 742 700 91 with 4 turns on AC Input. See note 1.
Harmonic Current	EN61000-3-2	Class A	
Voltage Functions	EN61000-3-3		

Notes

1. For class I applications, ensure the two mounting holes marked with 🖨 are connected together and to safety earth to meet conducted and radiated emissions.



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Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Medical Device EMC	IEC60601-1-2	Ed.4.0 : 2014	as below	
Low Voltage PSU EMC	EN61204-3	High severity level	as below	
ESD	EN61000-4-2	±8kV contact, ±15kV air	А	
Radiated	EN61000-4-3	3	Α	
EFT	EN61000-4-4	3	Α	
Surge	EN61000-4-5	Installation class 3	Α	
Conducted	EN61000-4-6	3	Α	
Magnetic Fields	EN61000-4-8	4	Α	
		Dip 100% (0 VAC), 8.4 ms	Α	25% derating
		Dip 100% (0 VAC), 16.7 ms	В	
	EN61000-4-11 (100 VAC)	Dip 60% (40 VAC), 200 ms	В	
	LING 1000-4-11 (100 VAC)	Dip 30% (70 VAC), 500 ms	В	
		Dip 20% (80 VAC), 5000 ms	В	
		Int 100% (0 VAC), 5000 ms	В	
		Dip 100% (0 VAC), 8.4 ms	Α	
		Dip 100% (0 VAC), 16.7 ms	В	
	EN61000-4-11 (115 VAC)	Dip 60% (40 VAC), 200 ms	В	
	EN01000-4-11 (113 VAC)	Dip 30% (70 VAC), 500 ms	В	
		Dip 20% (80 VAC), 5000 ms	В	
		Int 100% (0 VAC), 5000 ms	В	
		Dip 100% (0 VAC), 10 ms	Α	
Dips and Interruptions		Dip 100% (0 VAC), 20 ms	В	
Dips and interruptions	EN61000-4-11 (240 VAC)	Dip 60% (96 VAC), 200 ms	В	
	EN61000-4-11 (240 VAC)	Dip 30% (168 VAC), 500 ms	В	
		Dip 20% (192 VAC), 5000 ms	В	
		Int 100% (0 VAC), 5000 ms	В	
		Dip 100% (0 VAC), 10 ms	Α	20% derating
		Dip 100% (0 VAC), 20 ms	Α	50% derating
	EN60601-1-2 (100 VAC)	Dip 60% (40 VAC), 100 ms	Α	75% derating
		Dip 30% (70 VAC), 500 ms	Α	
		Int 100% (0 VAC), 5000 ms	В	
		Dip 100% (0 VAC), 10 ms	Α	
		Dip 100% (0 VAC), 20 ms	Α	
	EN60601-1-2 (240 VAC)	Dip 60% (96 VAC), 100 ms	Α	
		Dip 30% (168 VAC), 500 ms	Α	
		Int 100% (0 VAC), 5000 ms	В	

Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
CB Report	IEC60950-1:2005, IEC62368-1:2014	Information Technology
UL	cUL62368-1	Information Technology
TUV	EN62368-1	Information Technology
CE	LVD	

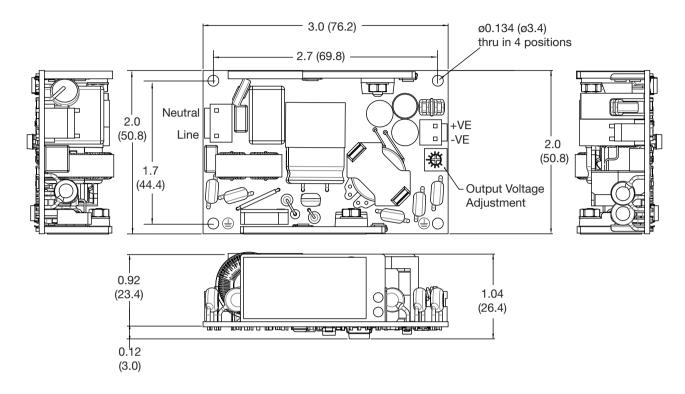
Safety Agency	Safety Standard	Notes & Conditions
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UL	ANSI/AAMI ES60601-1: & CSA C22.2 No.6061-1:08	Medical
CE	EN60601-1	Medical

Safe	ety Agency	Safety Standard	Notes & Conditions
CB F	Report	IEC60335-1	Household

Isolation	Safety Standard	Notes & Conditions
Primary to Secondary	2 x MOPP (Means of Patient Protection)	
Primary to Earth	1 x MOPP (Means of Patient Protection)	IEC60601-1 Ed 3.1
Secondary to Earth	1 x MOPP (Means of Patient Protection at output voltage)	



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